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Fragmentation or Cooperation in Global Resource Governance?

A Comparative Analysis of the
Raw Materials Strategies of the G20

A collaboration between the Stiftung Wissenschaft und Politik (SWP) and the Federal Institute for Geosciences and Natural Resources (BGR)

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Preface

At the beginning of the twenty-first century dynamic emerging economies such as Brazil, China, and India have joined the major industrial nations of North America, Europe, and Japan as the principal consumers of mineral raw materials – and their pre-eminent producers. As well as bringing together the world's most populous, economically powerful states and biggest trading nations, the Group of 20 unites the most important producers and consumers of mineral raw materials.

The uneven distribution of mineral deposits across the earth's surface created by geological processes raises central geopolitical questions, particularly concerning raw material access and their trading conditions. Extraction and processing of raw materials, as well as the ensuing production of manufactured goods, take place within a global division of labour and are generally distributed throughout different world regions.

Many governments of industrial nations that are dependent on imports (of metal raw materials) have responded to fluctuations in demand and price by implementing national raw materials strategies, while even major mineral raw material producing countries are seen to be coordinating their political strategies internally and externally. Countries that both produce and consume large amounts of mineral raw materials face particular challenges in formulating a coherent raw materials policy. The G20 countries are marked by very different mineral economy and industrial development starting conditions. This is reflected in the ways the subject of raw materials is perceived and which raw materials policies are implemented. They operate in between unilateral initiatives and international cooperation.

The present study is based on the following questions:

- Which interests and objectives do the G20 countries pursue with their strategies for raw materials?
- Which tools are available for the G20 countries to implement their strategies?
- Are there any opportunities for a more coordinated international raw materials policy?

International raw materials policy is a cross-cutting issue that combines central global challenges with regard to economic policy, trade, environmental protection, and development. Because of its economic policy coordinating function, the forum of the G20 offers an opportunity to deal with global questions relating to raw material production, consumption, and trade. It is in that context that the G20 was chosen as the object of study.

The present study was conducted on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) in a collaborative project involving the German Federal Institute for Geosciences and Natural Resources (BGR) and the German Institute for International and Security Affairs (SWP). The study was initiated by the Sector Project Policy Advice Mineral and Energy Resources that is advising the BMZ on issues relating to development cooperation policies in the raw materials sector.

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Fragmentation or Cooperation in Global Resource Governance? A Comparative Analysis of the Raw Materials Strategies of the G20

Developments on the markets for metals and minerals pose major challenges to companies and governments alike. Prices have risen sharply since the turn of the millennium – a trend that was interrupted only temporarily during the financial and economic crisis of 2008/2009. Strong economic growth in China and many other emerging economies, technological developments, and the growing world population were particularly responsible for the price surge. But raw materials markets are not simply characterized by high or rising prices. For some minerals, prices have fluctuated considerably. Moreover, the price mechanism often fails to function to full satisfaction. Raw materials markets are generally prone to the "pork cycle." The basic problems are production lag and rigid expectations. When prices are high, new mining investments are made. But their effects are delayed due to the long lead times involved in developing new mining and production facilities. When production finally does kick in, the market becomes saturated, prices decline again, and so does investment. As a result, production capacities will again be too low to meet the next surge in demand. In general, mining companies expand their production capacity only slowly because of high capital requirements, long start-up times, sometimes opaque market structures, distorted expectations, and at times contradictory signals from governments. Furthermore, many minerals and metals are characterized by a high concentration of production in terms of geography and businesses. Finally, prices are not only determined by the real economy, but – at least in the short term – also by financial markets. Raw materials have become attractive objects of speculation.

These challenges cannot be solved by one nation acting alone. Policy measures that at first sight may seem rational on the national level, can, in the worst case, lead to collectively adverse outcomes on the global level. But multilateral governance approaches for metals and minerals markets are practically nonexistent. Differences in interests, objectives, and instruments of choice between the major producer and consumer countries have, so far, obstructed effec-

tive international raw materials governance. Nevertheless, attempts to improve the governance of global minerals and metals markets should be intensified.

- *G20 as an agenda-setter*: While the G20 is not the proper forum for raw materials governance due to its lack of institutional capacity, it could serve well as an agenda-setter. The G20 Working Group on Energy and Raw Materials could be tasked with analyzing and discussing production, consumption, trade, and investment trends in the mineral markets. The Working Group could also initiate a first exchange concerning the interests, objectives, and policies of the G20 countries in the area of minerals and metals and develop recommendations for institutional reforms in global mineral governance.
- *International metals and minerals forum:* It would be desirable to establish an international platform where producer and consumer countries could meet regularly to exchange views and develop joint solutions to market challenges. The current lack of a critical mass of support in the G20 for founding such a platform should not prevent the German government from promoting this idea. In the long run such an initiative could develop into an international institution like the International Energy Forum (IEF) or the recently founded International Renewable Energy Agency (IRENA).
- *Data transparency:* An international data initiative to improve transparency on market actors, reserves, traded volumes, and prices of minerals and metals would be desirable. The Joint Organizations Data Initiative (JODI) of the IEF, which makes a significant contribution to transparency on the oil markets and is expanding into the gas markets, could serve as a model. Without doubt, collecting data on minerals and metals is a much more complex business, as there are significant differences in production, demand, consumption, and trade patterns between them. This problem could be overcome by more strongly pooling the resources of major raw materials companies and specialist national institutions (such as the geological surveys). The international study groups on lead and zinc, copper, and nickel, which are headquartered in Lisbon, could supply a basis for intensifying collaboration between companies and geological surveys.
- *Transparency of financial flows and due diligence in supply chains of mineral resources:* National, legal requirements (such as sections 1502 and 1504 of the U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act) and voluntary international transparency and certification initiatives (such as the Extractive Industries Transparency Initiative, EITI, or the OECD's Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas) are important instruments for countering the illegal trade in so-called conflict minerals, corruption, and poor governance. At the same time, implementing the numerous certification schemes and reporting obligations requires considerable financial and personnel resources. It would therefore be desirable to more closely harmonize these different initiatives.
- *Strengthening international trade rules on export restrictions:* Export restrictions are increasingly becoming a problem in international trade. Although export restrictions can be a useful instrument to secure developing countries a share of the resource rent, they often result in a misallocation of resources. WTO rules do not yet adequately curb export restrictions. While strengthening the rules would be desirable, it is rather unlikely to occur, given the opposition of most emerging economies and developing countries. The OECD inventory on export barriers is at least a first step in the right direction to raise awareness.

Aside from these multilateral approaches, bilateral and plurilateral cooperation should be strengthened, possibly also in regional contexts such the EU, MERCOSUR, and ASEAN.

- *Research and development:* Given that many countries face the same challenges, joining forces could reduce costs and increase effectiveness. Research and development is one potential area of cooperation. For example, the trilateral cooperation between the EU, the United States, and Japan on developing substitutes, recycling, and raw material and product efficiency could be strengthened. It would also be conceivable to involve other countries such as South Korea, which takes a strong interest in ensuring a secure supply for its industries and has accordingly been intensifying its recycling efforts for several years.
- *Development cooperation:* The raw materials sector is an important component of development cooperation for many OECD countries. It is thus all the more important that initiatives to support capacity development or deal with regulatory issues are closely coordinated among donor countries represented in the OECD's Development Assistance Committee. One way to integrate the large emerging

economies more strongly into these efforts would be triangular cooperation projects. For instance, Germany and Brazil could pool mining sector capacity-building efforts in a third country. Bilateral dialogs such as the Africa dialogue with China should also be intensified.

- *Coordination of stockpiling programs:* Maintaining national mineral and metal contingency reserves, in particular for critical materials, is a strategy pursued especially by East Asian countries, but is not recommendable. To avoid further tightening the markets, stockpiling efforts should at least be coordinated internationally, for example along the lines of energy cooperation within the IEA.

Hanns Günther Hilpert
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Introduction: Global Raw Materials Markets – National Raw Materials Policies

Hanns Günther Hilpert and Stormy-Annika Mildner

Trends on the Raw Materials Markets and Policy Responses

Since the turn of the millennium, increasing and sometimes volatile prices in combination with temporary supply shortages have moved minerals and metals high up the agendas of policymakers around the world. Numerous documents published by governments across the world document the urgency of the issue – the raw materials strategy of the German Federal Government being just one of them.

One reason why the state is currently experiencing a renaissance in the raw materials sector lies in the surge in demand, which came as a surprise to many market participants.[1] While there is no reason to fear exhaustion of minerals and metals from a geological perspective, prices cannot be expected to return to the comparatively low levels of the 1980s and 1990s – even if a cyclical downturn is quite conceivable. Driven by growing demand from China and other emerging economies, the former buyers' market has turned into a veritable sellers' market. Changing industrial demand structures, strong geographical and business concentration of supply, political interventions in the markets (such as export controls), and ecologically, politically, and socially driven conflicts in many poorer producing countries have further increased prices. Moreover, raw materials have become an attractive object of financial speculation. Due to the exhaustion of certain traditional mining sites, high development costs for new projects, long phase-in times, and high investment risks, global supply has not been able to adapt quickly to rising demand and prices. As a consequence, the most recent boom (2003 to early 2012) proved to be the longest since 1945 (see Figure 1, p. 12).

Prices fell temporarily in the course of the financial and economic crisis of 2008/2009, only to rebound shortly thereafter. For example, the price of a tonne of copper, which had been around US$1,683 in January 2003, leapt to US$9,554 in January 2011.[2] The price of a tonne of iron ore rose from US$12.68 to US$187.18 during the same period.[3] Prices fell between late 2011/early 2012 and mid-2012 due to depressed economic prospects in Europe and China. Since mid-2012, however, prices of important industrial minerals have risen again. Most analysts expect prices to remain at a generally high level in the medium term – providing the euro crisis is resolved and stronger growth returns to emerging economies.

Although the raw materials sector has always been one in which states and state-owned enterprises operate, state interventions have increased in number and intensity since the mid-2000s. The laissez-faire attitude towards international raw materials markets is increasingly on the retreat.

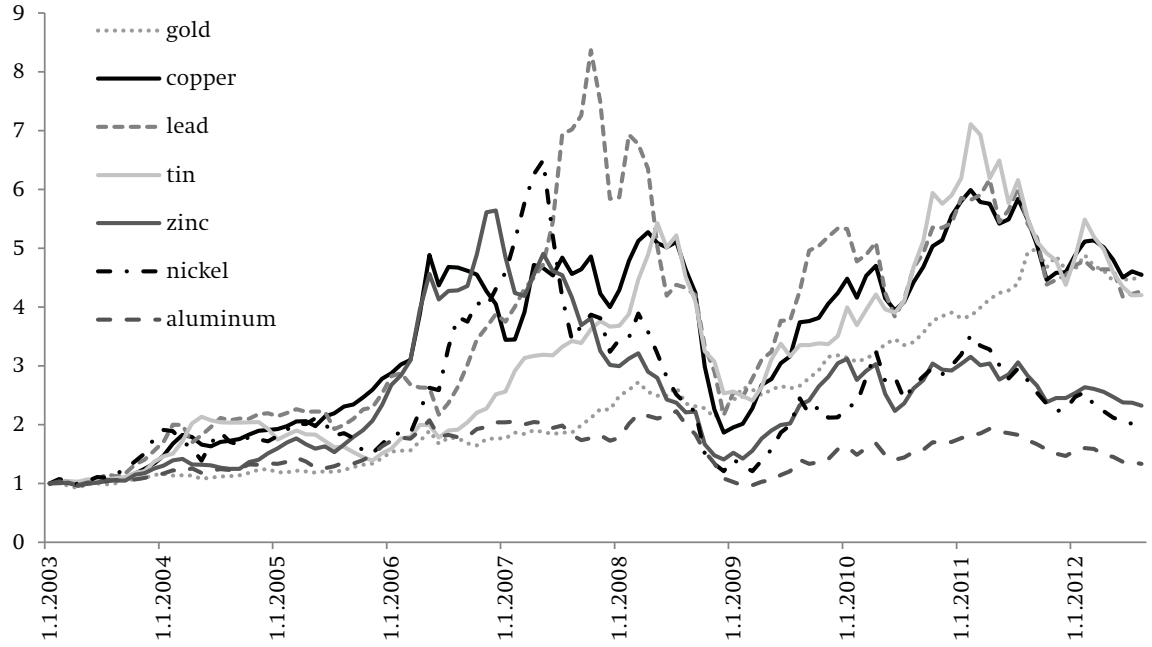
The strategic objectives and instruments of national raw materials policies vary according to the domestic raw materials base, domestic demand, and dependence on international markets. Accordingly, the interests of consumer and producer countries contrast sharply. Import-dependent countries are interested primarily in a secure supply of minerals and metals at affordable prices, and employ a wide range of measures to secure this. Some governments seek to arrange exclusive supply contracts or support national enterprises in bidding for contracts overseas. Others rely on strategic stockpiling to become less vulnerable in case of supply disruptions, or seek to diversify supply sources by concluding resource partnerships and supporting producer countries through investment in training, infrastructure, and industrial processing.

1 For a more extensive discussion, see Hanns Günther Hilpert, Gitta Lauster, Stormy-Annika Mildner, and Florian Wassenberg, "Wettlauf um Metalle: Eisenerz und Seltene Erden," in *Konfliktrisiko Rohstoffe? Herausforderungen und Chancen im Umgang mit knappen Ressourcen*, SWP-Studie 5/2011, ed. Stormy-Annika Mildner, pp. 131–70 (Berlin: Stiftung Wissenschaft und Politik, February 2011); Hanns Günther Hilpert, Gitta Lauster, Stormy-Annika Mildner, and Florian Wassenberg, "Metals: The Case of Rare Earths," in *Resource Scarcity – A Global Security Threat?* SWP Research Paper 2/2011, ed. Stormy-Annika Mildner, Solveig Richter, and Gitta Lauster, pp. 25–27 (Berlin: Stiftung Wissenschaft und Politik, March 2011).

2 BGR Database 2012.

3 IMF, *Primary Commodity Prices*, http://www.imf.org/external/np/res/commod/index.asp (accessed August 21, 2012).

Figure 1
Price indices of selected metals, in U.S. dollars at current market prices, January 2003 to August 2012 (Index: 2003 = 1)



Source: BGR Database 2012.

Others still work to develop substitutes, efficiency, and recycling.

The interests of resource-rich countries are more diverse, and resource strategies and measures differ widely. Some countries seek to increase the contribution of the raw materials sector to economic growth and development. Some are interested in maximizing exports while others are more concerned with securing supplies for domestic manufacturing. And some governments use raw materials to achieve broader foreign policy goals. Governments employ very different instruments to pursue these various interests. Some impose taxes on mineral and metal exports (such as export tariffs), sometimes even limiting exports using quotas.[4] Others subsidize imports or impose resource taxes, while yet others enact national minimum ownership quotas for mining companies or support the global market activities of domestic mining companies. In some cases, raw materials policies follow internal political and foreign policy objectives rather than economic rationale. Resource nationalism usually results in discrimination against all or some foreign consumers (or countries), and in its strongest form can lead to nationalization of the resource sector.

The government activities in consumer countries present a typical case of the competition paradox.[5] At first sight, a state can improve its supply security by imposing export restrictions, subsidizing imports, and establishing raw materials stockpiles or supporting domestic companies investing in mining abroad. However, this strategy promises success only as long as other states are not employing the same measures (or at least not to the same degree). In the worst case, a prisoners' dilemma emerges, where rational political decisions on the national level lead to collectively adverse results on the global level.[6] Unintended consequences would include raw materials becoming

4 WTO, *WTO Document WT/TPR/OV/14*, November 2011.

5 Wolfgang Stützel and Rolf-Dieter Grass, *Volkswirtschaftslehre* (Munich: Vahlen, 1983), pp. 152–59.

6 Robert Axelrod, *Die Evolution der Kooperation* (Munich: Oldenbourg, 2000).

even scarcer on international markets, fueling price surges and price volatility and intensifying conflicts.

The adverse effects in this case would not be restricted to consumer countries. Although producer countries would benefit from higher prices and improved terms of trade, they would also be exposed to greater risks. If high resource rents coincided with poor governance and weak institutions, corruption, rent-seeking, and mismanagement, intra-state conflicts could soon follow. Additionally, rising exchange rates due to growing demand can become a hindrance to export-oriented manufacturing industries (the "Dutch disease"). Finally, environmental and resource protection as well as social aspects are often neglected as a consequence and states do not invest sufficiently in infrastructure, education, and health in order to create a solid basis for sustainable economic growth. An abundance of raw materials can then quickly turn from an engine for economic and social development into a curse.

The Need for Global Governance

"Global governance" of raw materials can counter the risk of a prisoners' dilemma, keep rivalry for minerals and metals at bay, and strengthen the markets' allocation mechanisms. Functioning international raw material markets require a solid framework, with a reliable legal system, secure transport routes, efficient market platforms (raw materials exchanges), and reliable information (for example, from geological surveys). Governments also play a decisive role. For example, trade and competition policy can counteract market failures. Government action is also indispensable when it comes to promoting an environmentally friendly and economically sustainable raw materials economy, developing a recycling economy, preventing cartels and market disruptions, and curbing local and international potential for conflict. While existing (inter)national raw materials governance may have been adequate during the twentieth century, in times of often falling prices, it is unable to tackle the new market and competition conditions of the twenty-first century.

Within the UN system, independent study groups have been established for four metals: the International Lead and Zinc Study Group (ILZSG), the International Copper Study Group (ICSG), and the International Nickel Study Group (INSG). These are open to countries with significant involvement in production, consumption, or international trade, usually industrial and emerging economies, as well as a few resource-rich developing countries. The ICSG has twenty-four members, including Australia, China, the European Union, and the United States. The INSG has fifteen, including Brazil, Australia, Japan, and Russia (but not the United States or China). The ILZSG has thirty members, including China and the United States. The objective of these study groups is to create market transparency by providing data on production, consumption, trade, and prices, and national policy approaches such as environmental legislation. But these initiatives do not go far enough. Concentrating on a certain raw material makes sense, but the remit of the study groups is generally too narrow.[7]

The Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development (IGF) is a forum for dialog and consultation to enhance the mining sector's contribution to sustainable development. The IGF is a voluntary coalition of governments founded after the World Summit on Sustainable Development (WSSD) in 2005. It is the only intergovernmental forum that permits mining ministries from all over the world to exchange views on the challenges facing mining and its potential contribution to sustainable development, regardless of whether the country possesses raw materials of global significance. The IGF also actively promotes its topics within the global development and sustainability agenda. Its Mining Policy Framework lays out comprehensive recommendations on best practice and policy in the minerals sector.[8] More than half of its forty-three members are African countries. Others include significant resource-producing developing and emerging economies in Asia (Kazakhstan, Mongolia), Oceania, Latin America (Brazil, Mexico), and the Caribbean, as well as Australia, Canada, and Russia. But important actors such as China, Japan, and the United States are not members, and from the European Union only the United Kingdom and Romania have joined.

The International Resource Panel (IRP) of the United Nations Environment Program (UNEP) is a first step

7 International Lead and Zinc Study Group, http://www.ilzsg.org/static/home.aspx; International Copper Study Group, http://www.icsg.org; International Nickel Study Group, http://www.insg.org (accessed October 11, 2012).
8 Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development, *Mining and Sustainable Development. Managing One to Advance the Other*, 2010, http://www.globaldialogue.info/Mining%20Policy%20Framework%20final.pdf (accessed October 10, 2012).

toward a comprehensive approach to global management of natural resources. Its task is to disseminate scientific information on the sustainable use of natural resources and provide information on environmentally compatible economic growth. Metals recycling is one important topic. As the IRP's task is not to develop binding standards, its efficacy remains limited.

WTO rules place limits on quantitative export restrictions. Quantitative restrictions in the form of quotas or bans are forbidden. But exceptions leave considerable leeway: export quotas are allowed in the case of internal supply crises, if they serve the protection of depletable natural resources, the environment, human health and animal protection, or national security. Unlike import tariffs, export tariffs are allowed. They have not been reduced systematically in the past, nor are they bound at the WTO. The latter means that countries may raise existing export tariffs without violating WTO rules. Only a few countries have so far agreed to abolish export tariffs in WTO accession agreements. China is one of them.

The G20 has recognized the importance of improving raw materials governance and has started addressing the issue, although the focus to date has been on energy and agricultural markets rather than minerals and metals. Transparency and price volatility occupied an important place on the G20 agenda during the French presidency in 2011. The 2011 Summit Declaration emphasized that "appropriately regulated and transparent agricultural financial markets are a key for well-functioning physical markets and risk management," and committed to "mitigate[ing] the adverse effects of excessive price volatility for the most vulnerable through the development of appropriate risk-management instruments."[9] Energy resources also featured prominently in the final declaration. With regard to international raw materials markets, the G20 called for "enhanced market transparency [...] and [...] appropriate regulation and supervision." With respect to derivatives markets, "[m]arket regulators and authorities should be granted effective intervention powers to address disorderly markets and prevent market abuses."[10] Under a Japanese chair, the G20 Study Group on Commodities analyzed the drivers of price volatility, also consulting many other international institutions, and published its report in November 2011.[11]

During its G20 presidency in 2012, Mexico again placed food security and price volatility on the agenda, but the euro crisis crowded out many other topics and hardly any progress was achieved on raw materials. In the end, the summit merely confirmed that food security was "one of the most important challenges that the world faces today" and, against the background of a growing world population, called for an increase in sustainable agriculture and an intensification of efforts to increase market transparency (for example through the Platform for Agricultural Risk Management, the GEO Global Agriculture Monitoring, and the Agricultural Market Information System).[12] The 2012 Summit also emphasized the importance of transparency on energy markets, where price volatility can contribute significantly to economic instability, and stressed the positive impact of the Joint Organizations Data Initiative (JODI).[13] Minerals and metals were not mentioned specifically in the final declaration. The G20 Study Group on Commodities merged with the Study Group on Energy to become the Energy and Commodity Markets Working Group. A subgroup on raw materials (primarily agricultural and energy resources) headed by the United Kingdom and Brazil built on the 2011 results and addressed in particular the macroeconomic consequences of price volatility on economic growth, inflation, terms of trade, and state budgets.[14]

The G8 has already moved one step further than the G20, to address at least one aspect of the raw materials economy: the so-called resource curse (which is not exclusive to developing countries). In their Summit declaration of 2009, the G8 countries stressed the significance of the raw materials industry for the development and stability in many countries and the

9 *G20 Cannes Summit Final Declaration*, sections 40–51, from G20 Information Center, University of Toronto, http://www.g20.utoronto.ca/2011/2011-cannes-declaration-111104-en.html (accessed February 25, 2013).

10 Ibid., section 32.

11 G20 Study Group on Commodities, *Report of the G20 Study Group on Commodities*, http://www.cmegroup.com/education/files/G20Nakaso-November202011.pdf (accessed October 10, 2012).

12 *G20 Leaders' Declaration*, June 18–19, 2012, from G20 Information Center, University of Toronto, http://www.g20.utoronto.ca/summits/2012loscabos.html (accessed July 25, 2012).

13 Ibid.

14 Energy and Commodity Markets Working Group, *G20 Commodity Markets Subgroup Summary Report on the Impacts of Excessive Commodity Price Volatility on Growth* (n.p., June 2012), http://www.g20.org/images/stories/canalfinan/deliverables/energy_markets/Policy_Report_to_Mitigate_Commodity_Price_Volatility.pdf (accessed October 10, 2012).

necessity to introduce transparency and certification initiatives to increase government revenues and limit the corruption, conflict, and violence that can be fueled by revenues from natural resources.[15] At the Deauville summit in May 2011, they agreed to promote transparency by supporting EITI and committed "to setting in place transparency laws and regulations or to promoting voluntary standards that require or encourage oil, gas, and mining companies to disclose the payments they make to governments." The aim is to promote economic growth and development in resource-rich developing countries through greater transparency and good governance.[16]

Barriers to Cooperation

Although countries have become more aware that the challenges on the raw materials markets cannot be solved single-handedly, discussions in both the G8 and the G20 demonstrate how controversial the issue is. Some G20 states believe that the problems lie mainly in speculation and raw material cartels, whereas others blame government intervention in markets. The problem perceptions of the G20 members diverge widely, as do their concerns and interests. In light of rising prices and growing scarcities, strongly import-dependent industrial countries like France, Germany, Italy, and Japan, are concerned primarily with security of supply and industrial competitiveness. China, despite its large domestic mining sector, fears supply shortages threatening its own development and industrialization. Producer countries, such as Australia, Brazil, Canada, Russia, and South Africa welcome the rising prices and see them as a chance for prosperity and development.

Cooperation among the G20 is further impeded by differing ideas about regulation and by the diversity of mining traditions. Whereas governments and industries in Anglo-Saxon countries place more trust in the allocative function of free markets, their counterparts in continental Europe and East Asia fear a depletion of mineral reserves, mismanagement of markets and disruptions in supply chains. There is generally disagreement about the role of the state in the market and about what instruments should be used to tackle problems associated with the raw materials sector. The *German Government's Raw Materials Strategy*, for example, states that companies themselves are responsible for safeguarding their supplies. Accordingly, the German government should merely create the right conditions and intervene only where markets fail to function correctly. National stockpiling or a state company for exploration and mining are rejected as options. In other countries, the government plays a much more proactive role. In Japan and South Korea, companies are supported by state-owned raw material enterprises: JOGMEC (Japan Oil, Gas and Metals National Corp.) and KORES (Korea Resources Corp.). These are responsible for maintaining national stocks of oil, gas, and strategic metals, and also invest actively in mining and processing abroad. China goes even further, specifically supporting its domestic manufacturing sector by regulating raw materials markets, for example in the area of rare earth elements.

Major differences also exist with respect to the use of foreign (economic) policy instruments. Whereas the European Union, Japan, Mexico, and the United States regard export restrictions such as Chinese tariffs and quotas on minerals and metals as competition-distorting, China and other emerging economies cite national sovereignty and the need to protect, among others, resources, the environment, human health, and animal welfare. The G20 members also disagree on the objectives and the adequate instruments of development policy. Germany, for example, ties technical and financial aid to clear conditions of good governance, at least most of the time, in order to achieve better raw materials governance in partner countries. China, by contrast, forgoes such conditions.

The lines of conflict follow similar patterns when it comes to transparency in revenue streams and due diligence in supply chains. With the U.S. *Dodd-Frank Act* (2010) and the *EU Transparency Directive* (2011), the United States and European Union took the lead – and met fierce opposition from other G20 countries such as China and Russia.

Differences between G20 states concerning interests, ideas about regulation, objectives, and instruments interfere with effective international raw materials governance. The necessary preconditions for overcoming these barriers are improving transparency on strategies and policies pursued by the G20 members and strengthening communication between them

15 G8, *"Responsible Leadership for a Sustainable Future": G8 Declaration* (n.p., 2009), http://www.g8italia2009.it/static/G8_Allegato/G8_Declaration_08_07_09_final,0.pdf.
16 *G8 Declaration: Renewed Commitment for Freedom and Democracy*, Deauville, 2011, from G8 Information Center, University of Toronto, http://www.g8.utoronto.ca/summit/2011deauville/2011-declaration-en.html (accessed May 2, 2012).

on raw materials. Only if governments and national institutions dealing with raw materials communicate with each other, and mutual trust is built, there will be a realistic chance for global raw materials governance that can effectively tackle the problems on the markets. Even then, this will likely be a long-term project.

Presently, knowledge about the policies of the G20 states on minerals and metals is inadequate. That is the starting point of this report, which sets out to explore the opportunities and challenges of intensifying international cooperation by systematically examining the raw materials situations, strategies, and instruments of the G20 countries.

The next chapter explains the focus on G20 countries and identifies commonalities and differences within their raw material economies and policies. The individual country profiles that follow first give an overview of minerals in the national economy before analyzing a country's raw materials strategies and policies. All the G20 members are covered: Argentina, Australia, Brazil, Canada, China, the European Union, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom, and the United States.

Country Selection and Results

Hanns Günther Hilpert and Stormy-Annika Mildner

Country Selection

The G20 countries were selected on the basis of the following considerations: First of all, the G20 members are of exceptional international importance. With 87 percent of global GDP (2011), 80 percent of global trade (2010), and 65 percent of world population (2011), they represent not only the world's most significant economies (see Annex 6, p. 188) but include the global political heavyweights that can crucially influence international and regional policy-making.[1] Secondly, the G20 states make up a critical proportion of international raw materials markets. This applies to production of mineral resources (see Figure 1, p. 18) as well as consumption (see Figure 2, p. 18) and world trade (see Annex 12, pp. 200ff.). According to the German Federal Institute for Geosciences and Natural Resources (Bundesanstalt für Geowissenschaften und Rohstoffe, BGR), the G20 were responsible for 72 percent of global mining production and 84 percent of global consumption of refined minerals in 2010.[2]

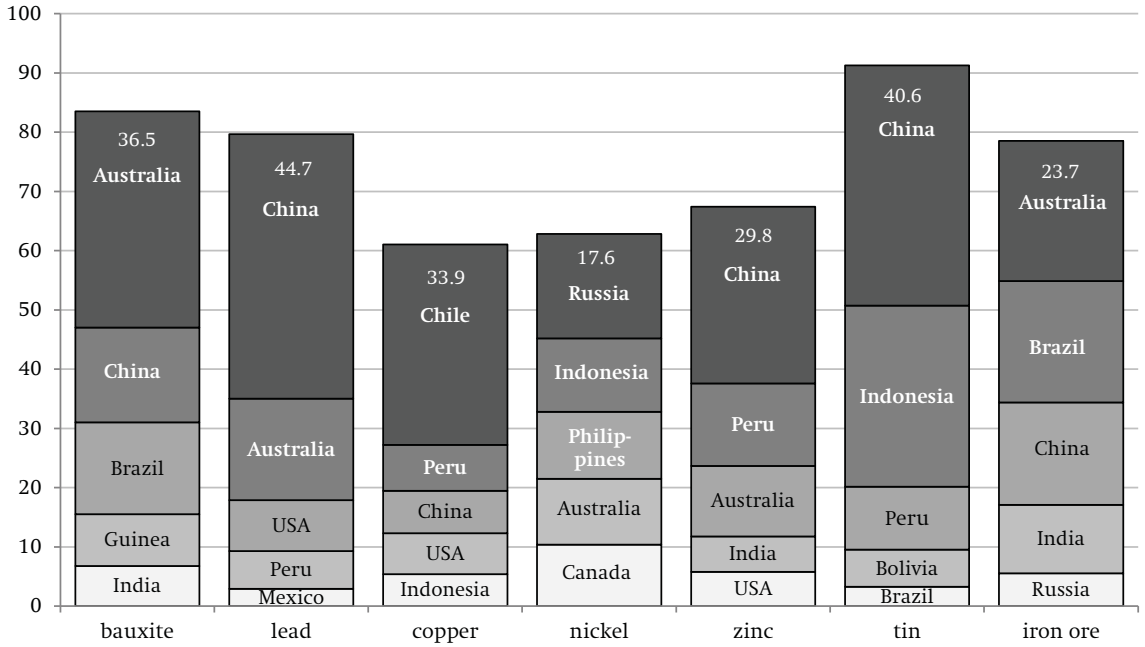
China has come to assume an especially prominent position. In the past decade, it has turned from an exporting nation with relatively small demand for raw materials into the world's largest consumer of aluminum (39.8 percent of global consumption in 2010), copper (38.4 percent), lead (44.0 percent), nickel (39.3 percent), tin (41.0 percent), steel (44.9 percent), and zinc (42.5 percent).[3] This development can be attributed to the country's ongoing industrialization, which is accompanied by a raw-material-intensive infrastructure boom. Other G20 countries with a particularly high share of global raw materials consumption are the United States, Japan, Germany, South Korea, and India. With respect to production, China's position is a little less dominant than its position in global consumption. The largest producers of mineral and metals among the G20, aside from China, are Australia, Brazil, and Canada.[4]

The list of globally active companies in this field is also dominated by the G20 (see table 1, p. 19). Only nine of the hundred largest mining companies (by market value) are not headquartered in a G20 member state. Among the twenty largest, the Swiss Glencore and Xstrata are the only two not from a G20 state. The international mining sector is characterized by a high degree of concentration. The market values of the three largest mining companies – BHP Billiton (Australia/United Kingdom), Vale (Brazil), and Rio Tinto (Australia/United Kingdom) – represent one quarter of the global mining industry.[5]

Moreover, almost two-thirds of global spending on exploration for nonferrous and precious metals in 2010 occurred in just eight countries: Canada (19 percent), Australia (12 percent), United States (8 percent), Mexico (6 percent), China (4 percent), Russia (4 percent), and Brazil and Argentina (3 percent each).[6] Canada and Australia exhibit the highest density of junior mining companies, whose unconventional approaches are crucial for initial exploration activities. The bulk of global raw materials trading takes place on commodity futures exchanges at Anglo-Saxon (London, New York, Toronto, Melbourne) and Chinese (Shanghai, Dalian, Zhengzhou) stock exchanges, or over the counter.

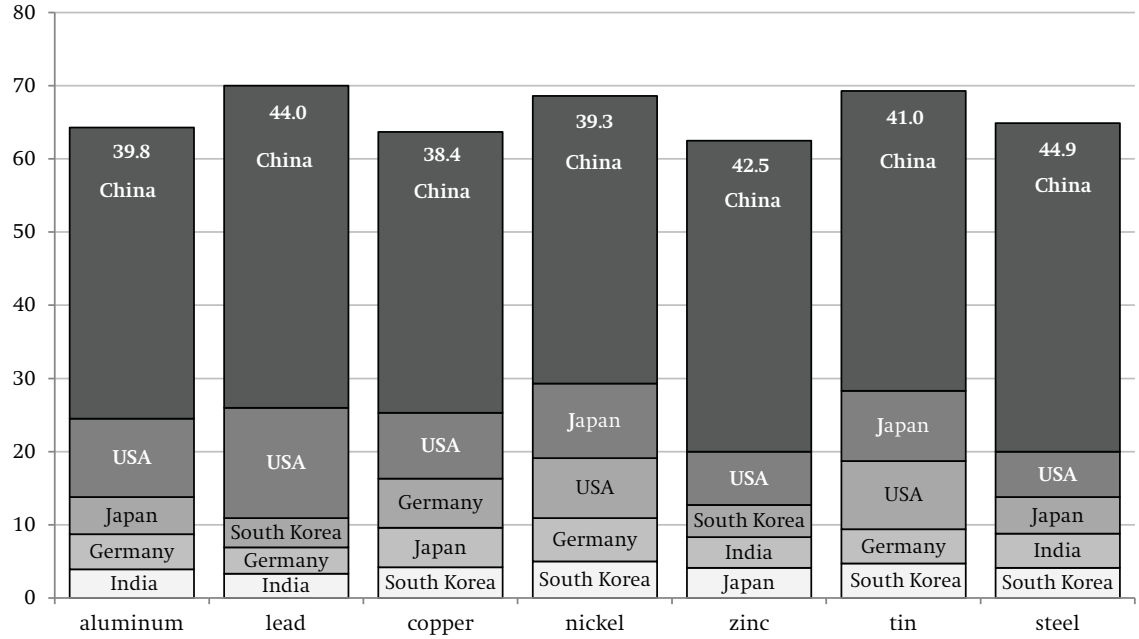
1 G20, *Statistics*, http://www.g20.org/index.php/en/numeralia (accessed June 5, 2012).
2 Manfred Dalheimer, *Entwicklungsfaktor Rohstoff*, workshop "Ziele und Instrumente der deutschen Rohstoffpolitik: Die Versorgung der deutschen Wirtschaft mit Roh- und Werkstoffen für Hochtechnologie – Präzisierung und Weiterentwicklung der deutschen Rohstoffstrategie," Büro für Technik-Abschätzung beim Deutschen Bundestag und Fraunhofer-Institut für System- und Innovationsforschung ISI (Berlin, 2011).
3 BGR and DERA, *Deutschland – Rohstoffsituation 2010*, DERA Rohstoffinformationen (Hannover, December 2011), pp. 116ff., http://www.bgr.bund.de/DE/Gemeinsames/Produkte/Downloads/DERA_Rohstoffinformationen/rohstoffinformationen-07.pdf?__blob=publicationFile&v=7 (accessed October 15, 2012).
4 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013); UNCTAD, *Iron Ore Statistics* (Geneva, November 2011).
5 Barry Sergeant, *Top 100 Mining Companies: What a Difference a Year Makes*, January 2010, http://www.mineweb.com/mineweb/view/mineweb/en/page67?oid=95737&sn=Detail (accessed October 15, 2012).
6 See BGR database 2012.

Figure 1
Production of selected metals in 2010: Shares of top five producer countries (%)



Source: All data (except iron ore) from Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013); UNCTAD, *Iron Ore Statistics*, Geneva, November 2011.

Figure 2
Consumption of selected metals in 2010: Shares of top five consumer countries (%)



Source: BGR and DERA, *Deutschland – Rohstoffsituation 2010*, DERA Rohstoffinformationen (Hannover, December 2011), pp. 116ff.

Table 1
G20 shares of the 100 largest mining companies

	Global top-100 mining companies
G20 total	94
China	22
Canada	16
South Africa	10
United States	10
India	8
United Kingdom	7
Australia	6
Russia	6
Other G20	9
Other	12
Thereof: Purely Non-G20	9
Thereof: Companies with partial G20 ownership	3

Companies may be counted twice where they are based in more than one country.
Source: Barry Sergeant, *Top 100 Mining Companies: What a Difference a Year Makes*, January 2010, http://www.mineweb.com/mineweb/view/mineweb/en/page67?oid=95737&sn=Detail (accessed March 5, 2013).

In light of these numbers, it is hardly surprising that the G20 countries also occupy a dominant position with regard to business mergers. Buyers from Australia (22 percent), the United States (17 percent), Canada (14 percent), China (11 percent), and Russia (5 percent) accounted for the lion's share of mergers in the mining sector worldwide (measured in terms of value) in 2011. The picture looks similar on the sellers' side, where projects located in just three countries made up more than 51 percent of mergers in 2011: Canada (25 percent), the United States (15 percent), and Australia (11 percent). China accounted for 6 percent of projects and Russia for 3 percent.[7]

With the world's largest consumer and producer countries among its members, the G20 offers a promising forum to set an agenda that could eventually improve international raw materials governance. However, the G20 nations do not only differ in their interests, they also exhibit significant differences in economic strength, political influence, stage of development, and position on the raw materials markets.

Minerals in the National Economies of the G20 Countries

The objectives countries pursue through their resource policies depend on many factors, including their natural endowments with minerals and metals and the structure of their economies. Each of the following country profiles therefore starts by taking a closer look at national resource production and consumption. In this regard, it should be mentioned that the appraisal was not always easy to prepare, given the inadequacies of country and resource data. National production and consumption figures and data on international trade and investment flows are not only of very mixed quality but often also incomplete or contradictory. And the resource situation of a country is only a temporary snap-shot: innovations, changes in demand, price changes, or the discovery of new reserves can change the picture quickly.

The following results can be derived from the country studies (see also Annexes 7, 8, 9, 10, 11, 12, pp. 192ff.).[8]
While China, Australia, Brazil, and India are the world's largest producers of raw materials, China is also characterized by very strong and growing domestic demand (in bulk metals, it accounts for over 40 percent of world consumption), which cannot be met solely by domestic production. Thus China is heavily dependent on imports. This also holds true, although to a much lesser degree, for India, which is among the country group with medium to high domestic consumption. Both Australia and Brazil are export-oriented. In the case of Australia, the manufacturing sector remains weak, therefore domestic demand and consumption is comparatively low.

The European Union, the United States, Russia, Canada, South Africa, Germany, and Mexico belong to the G20 countries with a moderate to strongly developed raw materials production. Due to their high levels of consumption, the European Union and the United States are nonetheless dependent on imports, as is Germany. Russia, Canada, and South Africa are

7 See PwC, *On the Road Again? Global Mining 2011 Deals Review & 2012 Outlook*, March 2012, http://www.pwc.se/sv_SE/se/metal-mining/assets/global-mining-2011-deals-review-and-2012-outlook.pdf (accessed October 15, 2012).

8 The countries were categorized according to the production volume (Annex 8, pp. 194f.); categorizing them according to production value would have resulted in a slightly different ranking (Annex 10, p. 198).

significantly more export-oriented. Mexico has relatively low domestic consumption and low exports.

The G20 members characterized by comparatively low raw materials production are Turkey, Italy, France, the United Kingdom, Saudi Arabia, Japan, Argentina, South Korea, and Indonesia. Japan, Italy, and South Korea are also countries with a moderate level of national consumption. Thus, to meet domestic demand they depend on imports. France and Turkey fare similarly, although they are characterized by lower consumption rates. In Argentina, the United Kingdom, Indonesia, and Saudi Arabia domestic demand is even lower.

The Raw Materials Policies of the G20 Countries

Which resource policies countries pursue is not only determined by their resource endowment, production, consumption, and industrial structure, however. How the problems are debated internally, which actors are involved, and which risks and prospects are perceived play an equally important role.

The following results can be derived from the country studies (see Annexes 4–5, pp. 172ff.).

Institutional Setting

In all the G20 countries, commodity policy falls under the portfolio of one or more ministries or central authorities, with great variance in staffing, financial resources, and concentration of authority. In Argentina, Australia, Brazil, France, Germany, India, Indonesia, Italy, Japan, Mexico, South Africa, South Korea, Turkey, the United Kingdom, and to a lesser degree also the United States, one ministry takes the leading role on raw materials policy. In China, Canada, the European Union, Russia, and Saudi Arabia, raw materials policy is spread across several institutions in a more or less coordinated fashion.

While in the centralized states of Brazil, France, Japan, Mexico, Saudi Arabia, South Africa, South Korea, and Turkey, the central government and its institutions are primarily responsible for setting rules and regulations and supervising the mining and processing sector, powers (of regulation, supervision, environmental and labor protection, licensing, taxation, and royalties) are shared more evenly between the federal and state level in all other G20 members. States, provinces, and regions in Argentina, Australia, Canada, China, the European Union, Germany, Italy, and the United States possess legislative powers of their own for the mining sector.

The raw material economies of China, India, Russia, and Saudi Arabia are characterized by a dominance of state-owned or state-controlled enterprises. In most other G20 members, the companies active in mining and processing of minerals and metals are mostly private. Nonetheless, government-owned mining companies can also be found in Brazil, France (AREVA), Indonesia (PT Aneka Tambang), Mexico, and Turkey (EtiMGIM). The state-owned JOGMEC and KORES are key business stakeholders in the extractive industries of Japan and South Korea respectively, as well as instruments of state raw materials policy.

Civil society groups with more or less political influence are found particularly in Europe (Germany, France, United Kingdom, European Union) and the United States. In many of the major producing countries, trade unions (in Australia, Canada, South Africa) or local communities (Argentina, Australia, Brazil, Canada, China, India, Indonesia, and Mexico) demand greater participation in decision-making processes of national mining policy.

Explicit Strategic Documents

Australia, Italy, Mexico, Saudi Arabia, and Turkey have no official policy documents identifying general objectives and strategies for the mining sector, while the European Union, France, Germany, Japan, South Korea, and the United Kingdom have published comprehensive strategies. Although the Chinese government has also laid down an explicit strategy, the policy paper is outdated and limited in its application. Partial strategies emanating from individual ministries or covering only parts of the mining sector can be found in Argentina, Brazil, India, Indonesia, and the United States. The topics covered by such strategies include: securing supply for domestic industries (and in some cases also for the agricultural sector), domestic production, creating added value through processing, access to raw materials abroad, environmental, social, and development concerns, participation by local communities, and in some cases recycling, substitution, and resource efficiency (see Annex 4, pp. 172ff.).

Identifying Critical Raw Materials

Many resource-poor and import-dependent countries have compiled lists of critical raw materials, as have some resource-rich countries. The selection criteria for criticality vary widely. Brazil, the European Union, France, Germany, Japan, South Korea, the United Kingdom, and the United States determine criticality according to domestic demand (by industry and in some cases agriculture) and vulnerability to disruption of supply. China implicitly selects critical materials within the framework of its national stockpiling. In general, however, producing countries are less interested in supply security. They view resources as lucrative export commodities and a source of foreign exchange, and define criticality accordingly. In this context, Brazil and China, and to a limited degree Russia have identified certain critical minerals and metals. For Canada, the criticality of a mineral lies not so much in its scarcity as in its socio-economic importance for Canadian regions.

Promoting Domestic Production of Raw Materials (Including Domestic Processing and Value Added)

In virtually all G20 countries, government institutions and/or private-sector actors are engaged in exploration activities. Given their promising resource endowments, Argentina, Australia, Canada, China, Indonesia, Mexico, South Africa, and the United States plan to expand domestic production of minerals and metals. France, Germany, Japan, South Korea, the United Kingdom, and the United States are also engaged in marine mineral exploration and the technological development of deep-sea mining.

While Argentina, Australia, Canada, Mexico, and South Africa have been actively promoting foreign direct investment for quite some time, Russia is now planning to cautiously open the sector to foreign investors while India aims at making the sector more investment-friendly in general.

Australia and Indonesia have lost some of their appeal: Australia by imposing a mining tax of 30 percent on corporate profits from iron ore and coal, Indonesia by tightening export restrictions on minerals and metals. In the United States, legislative efforts are under way to expedite the complex and lengthy licensing process.

Brazil, China, India, Indonesia, and Saudi Arabia actively encourage domestic processing of locally extracted raw materials. China and Indonesia have created regional development plans based on domestic resource endowments. China in particular uses its wealth of raw materials to advance national development and industrialization through a variety of assistance activities. Russia and South Africa are planning to increase domestic value added by expanding domestic processing.

National Stockpiling

China, Japan, Russia, South Korea, and the United States store critical raw materials. In Japan, the private sector is required by law to hold reserves. China, Japan, and South Korea stockpile to protect the domestic economy against sudden supply disruptions or unexpected price hikes, while the United States is motivated solely by national defense considerations. While China and Japan do not reveal which minerals and metals are held in reserve, South Korean and U.S. reserves are quite transparent. France, Germany, and the European Union have discussed the option of stockpiling, but so far rejected it for both practical reasons and fundamental considerations, fearing that it would rather fuel than resolve market distortions.

Recycling

Several countries are expanding their recycling industries to open up new sources of raw materials supply. China, France, Germany, Japan, South Korea, the United Kingdom, and the United States have established legal frameworks for their recycling industries. In the European Union, Germany, Japan, South Korea, the United Kingdom, and the United States, the search for new recycling technologies is backed by publicly funded research programs. In Russia, the recycling of mining spoil is under discussion.

Promoting Innovation (Substitutes and Resource Efficiency)

Argentina, Australia, Canada, India, Indonesia, Italy, Mexico, Russia, Saudi Arabia, South Africa, and Turkey place no strong focus on promoting innovation in the resources sector. The other G-20 countries conduct research and development with different priorities, different degrees of intensity, and different govern-

ment incentives and support. Research programs in the European Union, Germany, the United Kingdom, and the United States place strong emphasis on resource efficiency and recycling. Japan is particularly engaged in long-term research programs seeking substitutes for rare earth elements and other rare metals.

Protecting the Environment and Workers

All G20 countries have labor protection and environmental laws for the mining sector, but there are wide differences in their reach and implementation. Unsurprisingly, enforcement is much more difficult in developing countries and emerging economies. Informal artisanal and small-scale mining, often with inhumane working conditions and environmental degradation, is particularly prevalent in Brazil, China, India, and Indonesia. Australia, Canada, the European Union, France, Germany, Japan, South Korea, the United Kingdom, and the United States have committed themselves politically, in some cases even legally, to encourage or compel their industries to comply with labor and environmental standards in their mining activities abroad.

Investing in Foreign Raw Materials Sectors

While several G20 governments support domestic companies involved in foreign direct investment in mining, very different instruments are used, and the intensity of the measures varies greatly depending on the country and investment project. China, France, India, Japan, and South Korea all have state-owned or quasi-governmental raw materials companies that explore for natural resources abroad. The governments of China, Japan, and South Korea sometimes provide the necessary mining infrastructure (transport, energy, local health care, training of skilled workers). Export credit agencies in China, France, Germany, Italy, Japan, South Korea, and the United Kingdom offer advantageous financing and guarantees for investments abroad.

Australia, Canada, China, the European Union, France, Germany, India, Italy, Japan, and South Korea pursue various forms of raw materials diplomacy to assist their companies. Some conclude bilateral trade agreements featuring strict rules on export barriers, while others establish resource partnerships with resource-rich countries.

Export Restrictions

Argentina, China, Indonesia, and Russia impose export tariffs and/or quotas to restrict raw material exports. China in particular makes use of a wide range of measures, restricting exports or increasing their price through export tariffs, export quotas, mandatory export licenses, compulsory minimum prices, and the suspension of value-added tax refunds. Indonesia is prohibiting the export of numerous unprocessed minerals and metals from 2014 onwards. Occasional export restrictions are imposed by India (export tariff on iron ore) and South Africa (export license obligation). These countries justify export restrictions in terms of resource protection, environmental protection, promoting domestic added value, or simply the need for government revenues. The European Union (also as the representative of France, Germany, Italy, and the United Kingdom), Japan, Mexico, Turkey, and the United States, try to curtail the use of export restrictions through bilateral and multilateral trade policy measures.

Development Policy

The OECD member states among the G20 are increasingly directing their development policy toward the raw materials sector, as is China and – to an as yet very limited extent – India. Donor countries aim at 1) developing the mining sector in the partner country; and 2) promoting sustainable development. They do so by providing financial and technical assistance and, in some cases, by incentivizing foreign direct investment by their own mining and refining companies. The objective of sustainability is strongest in the development policies of the European G20 countries (Germany, France, United Kingdom), and the United States. Australia's and Canada's development cooperation in the raw materials sector goes hand in hand with the exploration and production activities of their national mining industries in Africa, Latin America, and the Asia-Pacific region.

The three East Asian countries – China, Japan, and South Korea – rely most strongly on the combination of export promotion, direct investment, and development cooperation, in particular when it comes to developing physical infrastructure. The leading objective in this case is to initiate market-based development processes in the partner country.

Global Governance

Most G20 countries are members of at least one international governance institution active in the mining sector. So far, however, none of them has explicitly argued in favor of stronger institutionalization, consolidation, or strengthening of these institutions, let alone the establishment of a new multilateral organization. Emerging economies and developing countries are particularly critical of such ambitions, which they interpret as an attempt by industrialized countries to curtail the economic and social development of the Global South. Canada and Australia, as major producers, see no need for a new governance structure as they believe the markets function adequately. It is unlikely that the G20 will take up the issue under the Russian presidency (2013), given Russia's preference for export restrictions. Whether Australia, which takes over the G20 presidency in 2014, will place the topic on the agenda remains to be seen, as it prefers the G20 to focus on macroeconomic issues. But the biggest opponent of discussing the issue within the G20 is China.

Transparency Initiatives

The United States has assumed the role of a global pioneer in creating binding transparency obligations for revenue flows in the raw materials sector and due diligence in supply chains of so-called conflict minerals. Within the European Union, the Council and the European Parliament are currently negotiating such reporting obligations. One of the strongest advocates is France, whereas Germany and the United Kingdom are critical. Since the U.S. Securities and Exchange Commission published its guidelines for reporting payments in the raw materials sector, the topic has been gathering momentum in other countries, such as Canada. Whether other G20 countries will join this trend remains questionable. Australia has not signaled any such intention, nor are emerging economies and developing countries likely to join soon. EITI has somewhat better chances of success. The G20 and the G8 have repeatedly supported it in their summit declarations, and Australia, Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States are stakeholders, Indonesia is a candidate. The United Kingdom has placed the EITI high the agenda of its G8 presidency in 2013, proposing all G8 members to join the initiative as full members.[9]

But the most significant mining countries remain rather cautious, limiting the scope of the development.

9 The EITI differentiates between compliance countries, candidate countries, and stakeholders (countries civil society, and companies). To become a candidate country certain requirements have to be met; to earn the status of compliance country, a validation process has to be completed.

Argentina

Claudia Zilla

Argentina has always regarded itself primarily as an agricultural country without any pronounced mining tradition. Indeed, mining companies long ignored the mineral deposits of the Argentine cordilleras, which have yet to be properly explored. The development of Argentine deposits only became attractive for foreign direct investment (FDI) in the context of growing demand for raw materials during the last two decades. Moreover, legislative reforms of the 1990s laid the foundation for today's mining market and ownership structure and attracted foreign capital.

Minerals in the National Economy

While Argentina belongs to the G20 members with small shares of world raw materials production and consumption, its potential is largely unknown but expected to be significant. The area where reserves are suspected covers 75,000 square kilometers, of which only 25 percent have been explored. Metal ores are concentrated in three areas of the Andes, the northwest, Cuyo, and Patagonia, while production of nonmetallic minerals predominates in the northeast and center.[1] Rising production is observed in particular with respect to copper, gold (as a by-product of copper production), lithium, and borax.[2] In 2009, Argentina was the world's second-largest producer of borax and the fourth-largest producer of strontium (from celestine).[3] In 2010, it was the world's third-largest producer of lithium.[4] Argentina (Puno region), Chile (Atacama Desert), and Bolivia (Uyuni) form the "Lithium Triangle" that, according to official sources, holds 90 percent of known global lithium reserves. Argentina alone holds 22 percent of global reserves,[5] and in 2009 was the region's second-largest producer after Chile, accounting for 11 percent of world production (2,220 tonnes). A single company, Minera del Altiplano, accounts for the entire lithium production.[6] The process used here is particularly economical (vaporization of brine) and of great relevance for the automobile industry, motivating car manufacturers and suppliers to acquire shares in mining companies.[7]

In terms of value, gold mining is most important for Argentina, followed by copper and silver. Argentina was the world's fourteenth-largest producer of gold in 2010, with a share of 2 percent (roughly 58 tonnes),[8] and tenth-largest silver producer, with a share of 3 percent (around 694 tonnes).[9] Copper is comparatively insignificant with a global share of 1 percent.

The mining sector has grown modestly since the mid-1990s. It is estimated to contribute 3.4 percent of

1 Instituto para el Desarrollo Social Argentino (IDESA), *La minería y su aporte al desarrollo económico nacional* (Buenos Aires, December 2011), p. 20, http://www.idesa.org/sites/default/files/Publicaciones/Informe_Mineria_COMPLETO_30082011_PE-2.pdf (accessed October 15, 2012); based on Susan Wacaster, "Argentina [Advance Release]," in USGS, *2009 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, February 2011), http://minerals.usgs.gov/minerals/pubs/country/2009/myb3-2009-ar.pdf (accessed October 15, 2012).

2 Jürgen Vasters, Peter Buchholz, Dieter Huy, Martin Schmitz, Simone Röhling, and Sven Altfelder, *Rohstoffwirtschaftliche Bewertung der Länder Afrikas, Asiens, der Gemeinschaft Unabhängiger Staaten (GUS) mit Georgien und Südamerikas im Hinblick auf die Bedeutung für Deutschland* (Hannover: Bundesanstalt für Geowissenschaften und Rohstoffe, Deutsche Rohstoffagentur, September 2010), http://www.bgr.bund.de/DE/Themen/Min_rohstoffe/Downloads/laenderbewertung.pdf?__blob=publicationFile&v=3 (accessed November 19, 2012).

3 Wacaster, "Argentina [Advance Release]" (see note 1), p. 2.1.

4 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

5 Minsterio de Planificación Federal, Inversión Pública y Servicios, *El gobierno nacional y su política minera*, July 4, 2011, http://www.minplan.gob.ar/notas/1423-el-gobierno-nacional-y-su-poltica-minera (accessed August 26, 2012). While other sources mention smaller shares, they all agree on the great strategic significance of the "Lithium Triangle."

6 While sources such as IDESA (2011, see note 1) and Engineering and Mining Journal (E&MJ), ed., *Argentina Mining*, October 2010, p. 68, http://www.gbreports.com/admin/reports/EMJ-Argentina2010.pdf (accessed October 10, 2012) estimate the lithium reserves in the tri-state area to make up at least 80 percent of total global reserves, the German-Argentine Chamber of Commerce records only 58 percent.

7 For example, Toyota owns 25 percent of Sales Jujuy.

8 BMWFJ, *World Mining Data 2012* (see note 4).

9 Ibid.

Argentine GDP (2009, goods and services),[10] and 3.1 percent of exports. As an enclave sector detached from the domestic value chain but closely linked to global markets, mining was almost completely unaffected by Argentina's economic crisis of 2001/02.[11] The raw materials sector grew increasingly dynamically in 2003–2010, fueled by major FDI inflows from twenty different countries. By 2010, the Ministry of Federal Planning, Public Investments, and Services (Ministerio de Planificación Federal, Inversiones Públicas y Servicios) had registered 570 mining projects (exploration and production).[12] The magnitude of exploration activity suggests further expansion of this economic sector.

In 2010, gold, copper, and aluminum were Argentina's fifth-largest export category, after oil seeds and oleaginous fruits, vehicles, petrochemicals, and grain.[13] Aluminum, which is produced domestically from imported bauxite is the second most important export in this sector after gold.[14] The value of mining exports increased by 753 percent between 1993 and 2009,[15] and because it creates a trade surplus the mining sector represents an important source of foreign exchange. However, most mining products are exported unprocessed, leaving domestic manufacturing dependent on imports of processed and finished products. As rising world market prices stoked the global mining boom, numerous international corporations expanded their activities into Argentina, with Canadian, Australian, and American firms leading the way. Of more than 1,100 registered mining companies only 145 were actually active in 2010.[16] Of registered companies, 82 percent are currently being established or conducting exploratory projects. Only 14 percent of the companies are already operating. The remaining 4 percent are companies indicating an interest in exploration. Large-scale (metal) mining projects dominate ("mega mining"), largely as open-cast operations.

The Raw Materials Policy

Institutional Setting

The constitutional reform of 1994 gave the national state and the provinces ownership of Argentina's subsurface mineral resources.[17] As a federal country, almost all Argentina's non-maritime territory is divided into provinces, and provincial governments are almost entirely in charge of issuing exploration and mining licenses.

The mining sector is not very well positioned institutionally. A second-tier department, namely a secretariat (Secretaría de Minería) within the Ministry of Federal Planning, Public Investments, and Services, is responsible for mining matters at the federal level.[18] The Mining Secretariat consists of two directorates, the National Directorate of Mining (Dirección Nacional de Minería) and the Directorate of Strategic Regional Planning (Dirección Nacional de Planificación Estratégica Regional). The Geological and Mining Survey (Servicio Geológico Minero Argentino, SEGEMAR) as a technical/scientific agency is also part of the Mining Secretariat.[19] Two parliamentary committees deal with mining matters: the Chamber of Representatives Committee on Mining and the Senate Committee

10 Wacaster, "Argentina [Advance Release]" (see note 1), p. 2.1; Vasters et al., *Rohstoffwirtschaftliche Bewertung* (see note 2), p. 37.

11 Gaspar Tolón Estarelles, *Situación actual de la minería en la Argentina* (Buenos Aires: Friedrich Ebert Stiftung [FES] Argentina/Asociación de economía para el desarrollo de la argentina [AEDA], 2011), http://library.fes.de/pdf-files/bueros/argentinien/08611.pdf (accessed October 4, 2012).

12 Data for 2003–2010 from Minsterio de Planificación Federal, Inversión Pública y Servicios, *El gobierno nacional* (see note 5).

13 IDESA, *La minería y su aporte al desarrollo económico nacional* (see note 1), pp. 59f.

14 Deutsch-Argentinische Industrie- und Handelskammer (AHK), *Bergbau in Argentinien* (Buenos Aires, 2011), http://www.ahkbrasil.com/pdf_public/CE_fm_Fact%20Sheet%20Bergbau_20110902.pdf (accessed October 4, 2012).

15 IDESA, *La minería y su aporte al desarrollo económico nacional* (see note 1), p. 22.

16 Ibid., p. 91.

17 Constitución Nacional, 1994, art. 124: "Corresponde a las provincias el dominio originario de los recursos naturales existentes en su territorio." Previously, due to ambiguities in the old constitution, some mineral resources had been national property, others provincial property.

18 The federal Division for the Environment and Sustainable Development also has the status of a secretariat, However, it is assigned to the presidential office (Secretaría de Ambiente y Desarrollo Sustentable, under Jefatura de Gabinete de Ministros).

19 Servicio Geológico Minero Argentino, http://www.segemar.gov.ar (accessed August 27, 2012). The Mining Secretariat is also responsible for a coal company in the province of Santa Cruz, the Yacimientos Carboníferos Rio Turbio (YCRT). This successor to Yacimientos Carboníferos Fiscales (YCF; privatized in 1994) was taken under federal administration in 2010.

on Mining, Energy, and Fuels.[20] Agencies responsible for regulating mineral resources in the fifteen provinces are represented in the Federal Mining Council (Consejo Federal de Minería, COFEMIN), which advises the secretariat for mining on sectoral policy.[21]

Private sector interests are organized in various associations, such as the Argentine Mining Chamber (Cámara de Empresarios Mineros, CAM) and the Group of Exploring Mining Companies of Argentina (Grupo de Empresas Mineras Exploradoras de la República Argentina, GEMERA). These prefer direct communication with the federal and provincial executive branch, which is usually more open to their concerns than Congress. The Argentine Union of Mineworkers (Asociación Obrera Minera Argentina, AOMA) represents workers in the sector.[22]

In terms of key actors and institutions, the political context is as follows: The governments of Cristina Fernández de Kirchner (2007–2011 and 2011–2015) have promoted the mining sector (through weak and thus investment-friendly national regulation) with the support of many provincial leaders who are politically close to the federal government. The Supreme Court of Argentina is considered "green," giving ecological concerns better chances of success in court (for an example see "Evaluation and Outlook", pp. 28f.).

Concepts and Strategies

Four national laws are relevant for the mining sector: the *Mining Code (Código de Minería)*,[23] the *Mining Investment Law* (*Ley de Inversiones Mineras No. 24.196*, 1993), the *General Law on the Environment* (*Ley General del Ambiente No. 25.675*, 2003), and the *Glacier Protection Law* (*Ley de Presupuestos Mínimos para la Preservación de los Glaciares y del Ambiente Periglacial No. 26.639*, 2010).

The first (and thus far only) *National Mining Plan* was passed in 2004 during the presidency of Néstor Kirchner. More declarative than strategically detailed, it puts forward the objectives of giving mining policy a longer-term national status, establishing a stable environment to promote investment, developing a national production model, and advancing regional integration, international cooperation, and public transparency.[24] The plan does not list strategic or critical minerals.[25]

The regulatory framework for mining dates back to the neoliberal 1990s, and is therefore aligned with the strongly market-led "Washington Consensus."[26] The objective at the time was to create legal security and fiscal and trade incentives to attract FDI and to promote exports. Although Cristina Fernández de Kirchner has taken interventionist measures in many sectors, she is regarded as supportive of the mining industry, which has so far been spared from stronger regulation.

The state (generally at province level) issues exploration and production licenses, whose recipients are entitled to treat their mines as private property. Mining licenses are granted on a first come, first served basis, where the person who discovers a deposit is given permission to mine. The concessions are exclusive and indefinite, and can be sold by contract. They are granted free of charge, with a regular fee *(canon)* and minimum investment within a certain timeframe required to keep the concession.[27]

20 Honorable Cámara de Diputados, *Comisión de Minería*, http://www.hcdn.gov.ar/comisiones/permanentes/cmineria/index.html (accessed August 17, 2012); Senado de la Nación Argentina, *Comisión de Minería, Energía y Combustibles*, http://www.senado.gov.ar/web/comisiones/cominfogral.php?nro_comision=65 (accessed 17.8.2012).

21 See also Instituto Correntino del Agua y del Ambiente (ICAA), http://www.icaa.gov.ar/?p=514 (accessed August 27, 2012).

22 Asociación Obrera Minera Argentina (AOMA), http://www.aomaosam.org.ar (accessed August 27, 2012).

23 The Mining Code was passed by the National Congress on November 25, 1886, and has been amended several times. The last significant changes were made in 1995: Actualización Minera (Ley No. 24.498) and Protección Ambiental (Ley 24.585). The Constitution stipulates a single Mining Code providing the framework for the entire country. The provinces are responsible for regulation. Secretaría de Minería de la Nación, *Código de Minería – Legislación Minera y Tributaria*, http://www.mineria.gov.ar/codigominero.htm (accessed August 13, 2012).

24 Minsterio de Planificación Federal, Inversión Pública y Servicios, *El gobierno nacional* (see note 5).

25 Only uranium is defined as a strategic material on grounds of security and is subject to a number of special rules.

26 One objective of the "Washington Consensus" was the disposal (sale, privatization, etc.) of national property (including non-renewable natural resources) as a strategy to improve public finances.

27 According to Law No. 24.224 on "Reordenamiento minero," there are three levels of fee according to the type of mining: 80, 800, and 40 Argentine pesos per year. Discoverers of deposits are exempt for three years. The area assigned for exploration purposes may not exceed 10,000 hectares and one person may not own more than twenty concessions (200,000 hectares) in any one province. There is a one-off fee of 400 Argentine pesos per 500 hectares; Secretaría de Minería de la Nación, *Código de Minería* (see note 23).

The provinces also set and collect royalties *(regalías)*, with the Mining Investment Law defining a ceiling of 3 percent of value "at the pit head" *(boca de mina)*. Mining investments are not subject to any special conditions or authorization requirements. Before exploration or production starts, an environmental impact assessment ("Informe de Impacto Ambiental") must be submitted to the respective provincial authority, which rules on environmental compatibility ("Declaración de Impacto Ambiental"). The environmental impact assessment must be renewed every two years. The *General Law on the Environment* sets minimum national standards for environmental protection, but the provinces may implement their own more restrictive rules ranging from banning surface mining or the use of cyanide to the complete prohibition of all mining activities. The provinces are also responsible for establishing agencies to implement and monitor mining legislation and for fiscal and environmental matters concerning mining.

Policy Measures and Instruments

National Level

The Argentine mining sector is privately owned and dominated by international companies. The government is not authorized to conduct production activities itself, so mining must operate through concessions. Domestic and foreign investments must be treated equally. Foreign investors (natural persons and corporate entities) are allowed to transfer their net profits abroad without restrictions. Except for nuclear materials, all minerals may be traded freely at home and abroad. The mining sector enjoys numerous fiscal benefits, for instance applying to the import of machines and machine parts. Moreover, a stable tax burden is guaranteed for a thirty-year period, and the value added tax regime (*Régimen de Financiamiento y Devolución del IVA, Ley No. 24.402*, 1994) favors purchases of capital goods for mining.

Several national initiatives in 2012 sought to harmonize provincial mining policies by involving the federal government, in particular dealing with increasing protests against mining and granting the provincial governments greater economic participation in mining activities. In the context of increasing resistance to mining projects in different regions, ten governors of mining provinces founded the Federal Organization of Mining States (Organización Federal de Estados Mineros, OFEMI) in February 2012. A month later they signed the *Federal Agreement on Mining Development (Acuerdo Federal para el Desarrollo Minero)*, demanding, in accordance with the position of the federal government, the creation of state-owned provincial enterprises (that engage in exploration and production and share in the respective profits) and the institution of local infrastructure funds.[28]

International Level

International coordination in the mining sector is weak. Existing institutions possess few governance functions and are more discussion forums than convergence mechanisms. Argentina is one of the seventeen members of the Latin American Mining Organization (Organismo Latinoamericano de Minería, OLAMI), founded in 1984.[29] The OLAMI secretariat is headquartered in the province of Buenos Aires,[30] with sectoral actors (labor unions, companies, government agencies, universities, etc.) represented in its national coordination units. Within the Southern Common Market (Mercado Común del Sur, MERCOSUR), the Mining and Geology Working Subgroup (Subgrupo de Trabajo No. 15) of the Mercosur Council (Consejo Mercado Común) deals with raw materials production.

Argentina and Chile jointly run the world's first cross-border mining scheme, launched with two specific projects in the Andean border region (Argentine province San Juan and Chilean Atacama region). The production of copper and molybdenum in El Pachón and gold and silver in Pascua-Lama led the two governments in 1997 and 1999 to sign a treaty on mining integration and complementation, which entered into force in 2000.[31] International initiatives

28 The document was signed by the governors of the provinces Jujuy, Salta, La Rioja, San Juan, Mendoza, Neuquén, Rio Negro, Chubut, Santa Cruz, and Catamarca.

29 The member states of OLAMI are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Paraguay, Peru, Uruguay, and Venezuela.

30 OLAMI, http://www.olami.org.ar (accessed August 17, 2012).

31 The "Tratado de integración y complemantación minera entre Argentina y Chile" relaxed a number of regulations. It ensures free movement of persons and goods between Argentina and Chile, exempting them from customs laws, but both countries may continue to apply their own environmental, labor, health, and other legislation. Workers only pay taxes in the country in which they are employed. Investors may use all available natural resources (such as water) needed to conduct mining activities. A binational administrative disputes committee was established. Estarelles, *Situación actual de la minería en la Argentina* (see note 11), pp. 13f.

such as the Extractive Industries Transparency Initiative (EITI) are largely ignored in Argentina.[32] The Kirchner government is skeptical of such "regimes from the North," and participation in EITI is often rejected on the grounds that the country has nothing to hide. Argentine subsidiaries of international corporations (such as Xstrata Pachon S.A. and supplier Eco Minera S.A.) participate in the Global Compact, as does the San Juan province chamber of mining (Cámara Minera de San Juan). The Argentine Chamber of Mining Companies (CAEN) is a member of the International Council on Mining and Metals (ICMM) and Argentina is also a member of the Common Fund for Commodities (CFC) and the Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development.

Evaluation and Outlook

Argentina is a relatively recent mining country and has to date explored only a fraction of its potential. In the new millennium the mining sector has seen extremely dynamic developments, with exponential growth in the number of exploration projects indicating further expansion to come. While the federal government and many provincial governments strongly promote mining and increasingly seek to acquire a share of the returns, organized civil society groups and parts of the population in mining regions express strong reservations over social and environmental issues. Several anti-mining mobilizations have been successful. The mining debate in Argentina is still at a nascent stage, with four key aspects dominating the discussion.

First, in the context of a strongly ideology-driven discussion, there is a lack of technical institutions with the necessary capacity, competence, and legitimacy to conduct independent, reliable evaluations on behalf of various actors and parties. The relevant departments and agencies are regarded as poorly equipped and biased (pro-mining), and therefore the public does not see them as reliable sources of information, responsible regulators, or neutral mediators. Existing legislation limits the regulatory role of government.[33] For example, companies may hire any consultancy they wish (without any registration procedure) to conduct the environmental impact assessment. The assessment is then evaluated by a provincial body (usually as a desk review) following bureaucratic and political rather than scientific principles. Environment departments have virtually no influence on mining policy, and ecological factors are therefore mostly neglected.

The second key aspect is environmental protection. Most Argentine mines are in the Andes, the source of numerous rivers that represent an important water supply for the population and for several branches of agriculture.[34] The case of glacier protection is paradigmatic for the ecological dimension of the mining debate. The law regulating mining activities in glacial and periglacial zones was finally passed in 2008 in a second, revised version *(Ley 26.639)*, two years after President Cristina Fernández de Kirchner vetoed the first *(Decree 1837/08)* as too restrictive for the mining industry. In a case brought by Canadian mining company Barrik Gold (with support from employers' associations and trade unions) in the mining province San Juan, a federal judge struck down key provisions on the basis that the law was insufficiently precise and created legal uncertainty that violated the company's rights.[35] However, in July 2012 the Supreme Court revoked the injunction, declared the *Law for the Preservation of the Glaciers* valid in its entirety, and demanded a glacier inventory as the basis for its implementation. In 2003 a mobilization against the expansion of a surface gold and silver mine owned by Meridian Gold (Canada) in Esquel (Chubut province) led to a referendum that stopped the mining activities. And in Andalagá (Catamarca province) groups campaigned against the Agua Rica project (gold, copper, and molybdenum production) of BHP Minerals (Australia).[36]

Thirdly, the debate is loaded with issues of extractivism and enclave economies. In Argentina, production of raw materials (especially metals) by inter-

32 In Latin America, Peru is a member of EITI and Guatemala a candidate. Extractive Industries Transparency Initiative (EITI), http://eiti.org/countries (accessed August 25, 2012).

33 For example, Ley No. 24.585 (1995) amending the Mining Code, http://www1.hcdn.gov.ar/dependencias/cmineria/ley_24_585.htm (accessed August 26, 2012).

34 IDESA, *La minería y su aporte al desarrollo económico nacional* (see note 1), pp. 92f.

35 Adrian Ventura, "La Corte respaldó la plena vigencia de la ley de glaciares," *La Nación*, July 4, 2012, http://www.lanacion.com.ar/1487532-la-corte-respaldo-la-plena-vigencia-de-la-ley-de-glaciares (accessed August 27, 2012).

36 IDESA, *La minería y su aporte al desarrollo económico nacional* (see note 1), pp. 113f.

national mining companies is mainly for export, whereas most of the minerals needed on the domestic market must be reimported after processing abroad. In this situation of "threefold external dependence" (on foreign capital, raw material exports, and processed mineral imports), the arguments of extractivism[37] and enclave economies[38] have been at the forefront of criticism of mining in Argentina.[39]

The fourth point concerns local development, where it is widely observed that those local communities that are worst affected by the environmental damage of mining also profit least in economic terms. Of all taxes and duties paid by export-oriented mining companies, the federal government collects around 90 percent, with the provinces – which own the resources – receiving less than 10 percent. The share received by the departments (the tier below the province), where mining projects are located is often less than 3 percent.[40] Argentina lacks significant positive experience in the establishment of trust funds, revenue sharing, participatory development plans, and other mechanisms for the redistribution of resource rents. It is questionable whether recent initiatives by the federal and provincial governments to create state-owned enterprises that participate in the production process and receive a share of profits will transfer the benefits of the resource rents to the citizens of mining regions.

Generally, national and mining-region governments rely one-sidedly on promoting FDI in the mining sector, and more recently also on receiving a larger share of the mining rent.

The possibilities for citizens to obtain information or participate in mining issues are generally extremely weak, with mistrust and confrontation dominating the process. The potential for conflict is growing because legal, political, and social aspects are disregarded, civil society actors are not duly involved, and institutional measures that could balance interests and settle disputes are not implemented. This situation is thus the opposite of the stable environment and legal certainty that the federal government and many provincial governments want to offer foreign investors.

37 Extractivism is a development strategy that aims at maximum exploitation of raw materials (and agricultural land), to export resources with little or no processing in order to secure foreign currency.

38 Enclave economies are based on the transfer of resources to extraterritorial actors without the establishment of significant endogenous production. Classifying the mining sector as an enclave economy refers to a situation where sectoral production logic becomes detached from the local production cycle.

39 For a fundamental critique, see Maristella Svampa and Mariana Antonelli, eds., *Minería transnacional, narrativas del desarrollo y resistencias sociales* (Buenos Aires, 2009).

40 While estimates of the actual distribution of mining revenues vary, all agree on the basic weighting (central state → provinces → departments). Daniel Gonzalo Jerez and Hugo Nielson, *Análisis de la situación actual y aspectos a considerer en la discusión de las cuestiones tributarias de la minería en la Argentina*, May 2012, http://www.olami.org.ar/archivos/publicaciones/CUESTIONES%20TRIBUTARIAS%20DE%20LA%20MINER%C3%8DA%20EN%20ARGENTINA.pdf (accessed August 20, 2012); "Reclaman una mejor distribución delos impuestos a la minería," *El Inversor Energético & Minero*, December 28, 2010, http://www.petrolnews.net/noticia.php?ID=eeca5851e81602e97440f7d30a3548a7&r=15013 (accessed August 20, 2012).

Australia

Gitta Lauster

Australia is very well-endowed with a wide range of raw materials and has benefited greatly from the sharp rise in resource prices. Its economy has recorded constant growth rates for more than twenty years. With a relatively small domestic manufacturing sector and extensive resource production, Australia produces resources primarily for export, especially to Asian countries, with processing largely done abroad. The Australian government is therefore seeking to support domestic resource processing in order to increase national added value and reduce vulnerability to world market developments. It has no formalized and comprehensive resource strategy, but has committed itself to developing measures to diminish the risk of "resource curse" in an imbalanced economy.

Minerals in the National Economy

Australia stands out globally as the second-largest mining nation and one of the most important raw materials exporters. Always having been a major exporter, the country's significance for international markets has grown still further in the twenty-first century. Currently, Australia is experiencing its biggest mining boom in over 150 years.[1]

Australia possesses extensive and profitable mineral and metal resources, which make up an important share of its exports. According to Geoscience Australia (whose data is also used by the USGS), Australia has very significant amounts of rutile (49.0 percent of known global reserves), zirconium (44.1 percent), tantalum (43.8 percent), lead (39.4 percent), nickel (27.4 percent), zinc (25.1 percent), industrial diamonds (23.5 percent), bauxite (21.4 percent), iron ore (18.1 percent), cobalt (16.4 percent), and gold (16.2 percent).[2] With 16.4 percent of global production of non-energy raw materials (by weight), Australia numbers among the main G20 producers of minerals and metals. It is one of the leading producers and exporters of iron and ferro-alloy metals, most non-ferrous metals, and precious metals as well as many industrial minerals. Beside their quantity, the quality of Australian resources must be noted. For instance, Australian iron ore has a particularly high iron content (more than 60 percent), comparable to ores from Brazil, South Africa, and India.[3] Australia is also the leading producer of bauxite (36.5 percent of global production), titanium (20.8 percent), and zirconium (47.8 percent), and ranks second in production of lead (17.1 percent), iron ore (21.4 percent), gold (10.2 percent), lithium (22.0 percent), and manganese (18.7 percent).[4] While the Australian recycling industry is mostly directed towards waste management, industrial recycling of metals and minerals takes place in various states and territories.[5]

Strong global demand for raw materials has stimulated exploration and led to the discovery of significant reserves of iron ore, cobalt, gold, copper, nickel, and rare earth elements.[6] Besides increased production of the important high-grade iron ore, extraction of rare earth elements may bring economic gains. Lynas has discovered the world's second-largest deposit of rare earth elements at Mount Weld (the largest deposit is in Chinese Inner Mongolia). A concentration plant has already begun operations at Mount Weld,

1 Robert G. Gregory, *Then and Now: Reflections on Two Australian Mining Booms*, IZA Discussion Paper 5969, September 2011, http://ftp.iza.org/dp5969.pdf (accessed October 10, 2012).
2 Geoscience Australia, *Australia's Identified Mineral Resources 2011*, April 3, 2012, p. 6, https://www.ga.gov.au/image_cache/GA20563.pdf (accessed April 29, 2012).
3 Richard O'Brien, *Australia's Iron Ore Product Quality*, Geoscience Australia, 2009, http://www.australianminesatlas.gov.au/mapping/files/australianironorequality.pdf (accessed September 7, 2012).
4 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).
5 Planet Ark, "History of Australian Recycling," http://recyclingweek.planetark.org/recycling-info/history.cfm (accessed September 25, 2012).
6 Australian Government, Bureau of Resources and Energy Economics, *Mining Industry: Major Projects*, April 2012, p. 1, http://bree.gov.au/documents/publications/resources/Mining-Industry-Major-Projects.pdf (accessed May 27, 2012); Minerals Council of Australia, *Quarterly Economic Brief*, autumn 2012, p. 5, http://www.minerals.org.au/file_upload/files/publications/MCA_Quarterly_Economic_Brief_Autumn_2012.pdf (accessed October 10, 2012).

and Lynas planned to locate processing in Malaysia.[7] While massive opposition by environmental activists and local communities repeatedly postponed the opening of the Malaysian plant,[8] Lynas obtained a temporary two-year license in September 2012,[9] and the local court rejected all further objections in November 2012.[10]

With a strong extractive sector, Australia can generally satisfy its domestic industrial demand and export up to 95 percent of its mining products. Processing mainly takes place abroad, with only about 30 percent of Australian-produced energy and metals consumed at home.[11] Mineral exports contributed 8.8 percent of Australia's GDP in 2010,[12] representing 60 percent of all exports of goods and services in 2010/2011, with a rising trend.[13] The largest share of exports goes to Asian markets: 30 percent to China, 25 percent to Japan, and about 10 percent to South Korea.[14]

Australian mining companies are all private-sector. Alongside mining giants like the British-Australian BHP Billiton and Rio Tinto, these are often subsidiaries of European or North American firms, like Swiss-based Xstrata's Xstrata Nickel Australia Pty Ltd. Joint ventures are common, for instance the aluminum smelter run by Australia's Bauxite Resources Ltd. and the Chinese Yankuang Group Corp.[15] Many smaller mining companies are also headquartered in Australia, which is very popular among foreign investors. This applies in particular to Western Australia, home to some 45 percent of Australian production,[16] which is reputed to have a very attractive investment environment and ranks twelfth (out of 93 countries and regions) in the Fraser Institute's Policy Potential Index.[17]

The Raw Materials Policy

Institutional Setting

Australia's mineral rights are owned by the Crown but administered by the six states (New South Wales, Queensland, South Australia, Tasmania, Victoria, and Western Australia) and two territories (Northern Territory und Australian Capital Territory).[18] The federal state may intervene in cases of "national interest," but may not discriminate against any state or territory.[19]

Nationally, the Department of Resources, Energy and Tourism (RET) is largely responsible for resource policy. In July 2011, the Bureau of Resources and Energy Economics (BREE) was created within the RET to conduct independent research and policy advice.[20] The Department of Foreign Affairs and Trade (DFAT) is responsible for international cooperation, including summit forums like the G20. The Council of Australian Governments (COAG) is another important actor in the raw materials sector, coordinating political reforms that involve national interests. Its member-

7 Lynas Corporation Ltd., *Concentration Plant*, http://www.lynascorp.com/page.asp?category_id=2&page_id=40 (accessed April 29, 2012); "Australien könnte Markt für Seltene Erden beleben," *GTAI*, November 18, 2011, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=320800.html (accessed April 29, 2012).
8 Graeme Irvine, "Lynas on Hold for a Week," *Pro Edge Wire*, September 25, 2012, http://proedgewire.com/rare-earth-intel/lynas-on-hold-for-a-week/ (accessed September 26, 2012).
9 Petaling Jaya, "Lynas Gets Temporaty Operating Licence," *The Star*, September 5, 2012, http://thestar.com.my/news/story.asp?file=/2012/9/5/nation/20120905162349&sec=nation (accessed November 7, 2012).
10 Esther Tanquintic-Misa, "Lynas Prevails: Malaysia Kuantan Court Junks Legal Action for 2nd Time," *Commodities and Futures*, November 15, 2012, http://au.ibtimes.com/articles/405124/20121115/malaysia-australia-lynas-rare-earths-court.htm#.UKts3tcvPDa (accessed November 20, 2012).
11 For minerals alone, the figure is even smaller; Michael Sauermost, "Rohstoffe bleiben Australiens 'Lebensversicherung,'" *GTAI*, April 13, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=556182.html (accessed October 10, 2012).
12 Pui-Kwan Tse, "Australia [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, December 2011), p. 3.1, http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-as.pdf (accessed April 22, 2012).
13 Minerals Council of Australia, *Quarterly Economic Brief* (see note 6), p. 1.
14 Sauermost, "Rohstoffe bleiben Australiens 'Lebensversicherung'" (see note 11).
15 Tse, "Australia [Advance Release]" (see note 12), p. 3.3.
16 Michael Sauermost, "Bergbausektor bleibt Australiens Wachstumsmotor," *GTAI*, April 21, 2011, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=79160.html (accessed May 27, 2012).
17 Fred McMahon and Miguel Cervantes, *Survey of Mining Companies 2011/2012*, Fraser Institute, February 2012, p. 11, http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/mining-survey-2011-2012.pdf (accessed May 26, 2012).
18 At some points "states" is used to refer to both states and territories.
19 Tse, "Australia [Advance Release]" (see note 12), p. 3.2.
20 Bureau of Resources and Energy Economics (BREE), "About," http://www.bree.gov.au/about/about.html (accessed September 7, 2012).

ship consists of the Prime Minister, the leaders of the states and territories, and the president of the Australian Local Government Association (ALGA).[21] The Australian trade commission, Austrade, supports the international activities of Australian companies and works to attract foreign direct investment and promote international educational exchanges.[22] The Australian Agency for International Development (AusAID) is responsible for international cooperation and is known for its *Mining for Development* program that seeks to develop mining industries in developing countries.[23]

The geological survey, Geoscience Australia, is run by RET and responsible for resource exploration and providing research and data for businesses. Geoscience Australia provides information regardless of the nationality of the corporation seeking advice.[24] Scientific advice for Australian firms, communities, and state and federal governments is also supplied by the Commonwealth Scientific and Industrial Research Organisation.[25] Regional employers' associations like the Chamber of Minerals and Energy of Western Australia also provide Australian politicians and businesses with helpful information.[26]

Australia has a powerful mining lobby operating at the local and national level. It is exceptionally well-funded, including as it does several mining giants and individual mining magnates that are all strongly committed to the industry's interests.[27] The Minerals Council of Australia, for instance, was reported to have played an important role in the failure of the national government's first attempt to implement a new resource tax, the Resource Super Profits Tax (RSPT). The Council was the initiator of a massive media campaign in 2010.[28]

Concepts and Strategies

Australian raw materials policy has been strongly determined by the country's long history as a net exporter, and is thus slanted towards distinctly different goals than those of resource-dependent countries with strong industrial sectors. Although there is no single comprehensive document identifying critical materials or providing a long-term strategy, various documents and studies, including COAG papers,[29] provide sectoral recommendations, for instance on the rights of the central state vis-à-vis the states and territories. However, these are less comprehensive than the strategic documents and criticality analyses prepared in the United States, the European Union, and Germany.[30] The relevant ministries regard the national resource strategy as including measures to attract investment in competition with other regions, supplying the necessary skilled labor, maintaining productivity, and ensuring the continuing profitability of exports. The central state will only intervene in the markets if the national interest is endangered. This was the case, for instance, when the state-owned China Non-Ferrous Metal Mining (Group) Co. sought to purchase a controlling 51.6 percent share in Lynas Corp., which was opposed by the Australian Foreign Investment Review Board (FIRB).[31]

The national government also intervenes to avoid production bottlenecks and maintain efficiency in the

21 Council of Australian Governments (COAG), "About COAG," http://www.coag.gov.au/about_coag (accessed September 25, 2012).
22 Austrade, "About Us," http://www.austrade.gov.au/About-Austrade/default.aspx (accessed September 25, 2012).
23 AusAID, "Mine Action," http://www.ausaid.gov.au/aidissues/mineaction/Pages/home.aspx (accessed September 25, 2012).
24 Interview at Geoscience Australia, July 2012.
25 Commonwealth Scientific and Industrial Research Organization, http://www.csiro.au/ (accessed September 28, 2012).
26 Chamber of Minerals and Energy of Western Australia, http://www.cmewa.com/ (accessed September 28, 2012).
27 Perry Williams and Jonathan Barrett, "You Know I'm Right: Rinehart," *Financial Review*, September 4, 2012, http://afr.com/p/business/resources/fighting_taxes_isn_self_interest_wNnln6DXf8AtaYGEAEIWJN (accessed September 7, 2012); Forbes, "Georgina Rinehart," March 2012, http://www.forbes.com/profile/georgina-rinehart/ (accessed September 7, 2012).
28 Ben Hills, "Captain Hooke," *Sydney Morning Herald*, June 30, 2012, http://newsstore.fairfax.com.au/apps/viewDocument.ac;jsessionid=67C018BF8022E8A97F96BFCECB86BB71?page=1&sy=afr&kw=director&pb=none&dt=selectRange&dr=1month&so=relevance&sf=text&sf=headline&rc=150&rm=200&sp=nrm&clsPage=1&docID=SMH12063040IC760IBR2 (accessed September 7, 2012); ABC Local, "Mitch Hooke, CEO of the Minerals Council of Australia," March 2, 2012, http://www.abc.net.au/sundayprofile/stories/3444466.htm (accessed September 7, 2012).
29 Interviews with representatives of RET, July 2012.
30 "Australia Lacks Resources Strategy, Liveris," *Neoskosmos.com*, May 11, 2011, http://neoskosmos.com/news/en/australia-lacks-resources-strategy-liveris (accessed August 26, 2012).
31 Rebecca Keenan, "Australia Blocked Rare Earth Deal on Supply Concerns," *Bloomberg*, February 15, 2011, http://www.bloomberg.com/news/2011-02-14/australia-blocked-china-rare-earth-takeover-on-concern-of-threat-to-supply.html (accessed September 7, 2012).

extractive sector, and has in the past undertaken great efforts, for instance to expand port capacity in New South Wales, Queensland, and Western Australia.[32] Since about 8 percent of the workforce is employed in the broader resources sector (including oil and gas), this also benefits employment.[33] However, the numbers employed in the mining business itself are considerably smaller, accentuating the problem of economic imbalances. Large amounts of capital and labor are required to build a new mine, but only a small workforce is eventually needed to operate most mines. A sectoral lack of skilled labor is another challenge. Critics of Australia's raw materials policy fear that the country may be moving toward deindustrialization or suffering the "Dutch disease" (although the latter's applicability to Australia is disputed).[34] Australia is often discussed as a "two-speed" or "patchwork" economy, where mining grows faster than other sectors.[35] While the mining sector is forecast to grow at an annual rate of 9 percent over the next few years, other sectors are only expected to register 2 percent growth.[36] No solution is in sight to the effect of high wages and the steeply rising Australian dollar on the productivity of manufacturing and tourism.

Measures and Instruments

Legislation

Section 91 of the Australian Constitution allows the states and territories to collect royalties for the extraction and purchase of natural resources and use them for the benefit of their citizens.[37] Mining legislation is quite similar across the states and territories.[38]

Western Australia, the state with the largest mining industry, regulates the purchase of land use licenses: the *1978 Mining Act* for exploration and mining licenses; the *1986 Environment Protection Act* for extraction; and the *1997 Land Administration Act* for ownership and management of state-owned land. The *Native Title Act* regulates the purchase of land rights from traditional Aborigine groups. Any company that wishes to acquire an exploration license has to complete a multi-stage application process that includes the obligation to inform the relevant agencies, ministries, affected landowners, and communities, and complete environmental assessments. Extraction licenses are issued out on a first come, first served basis, with holders of exploration licenses given preference. The application process includes a definition of the area involved, an application for the use of the land and the payment of royalties as well as the obligation to inform landowners and the community as well as the public.[39] The process applies equally to Australian and foreign firms; the latter are under no obligation to involve Australian firms. In the case of "substantial" projects, however, investments must be approved by the government.[40]

The political framework for foreign direct investment is provided by the *1975 Foreign Acquisitions and Takeovers Act* (FATA) and the *1989 Foreign Acquisitions and Takeovers Regulations* (FATR). The latter set thresholds below which the FATA does not apply, with special arrangements for investments from the United States.[41] These two laws give the Treasurer thirty days (extendable to ninety) to scrutinize FDI proposals, decide whether they conflict with national interest, and approve or reject them.[42] In making these decisions, the Treasurer is advised by the four-member Foreign Investment Review Board (FIRB).[43] The government seeks industrial and sectoral balance and diversity, examines the impact of FDI on competition, and works to avoid monopolies. The FIRB always reviews

32 Interviews with representatives of RET, July 2012.
33 Minerals Council of Australia, *Quarterly Economic Brief*, autumn 2012, p. 6.
34 Interviews with representatives of the Treasury, July 2012.
35 Gary Banks, *Australia's Mining Boom: What's the Problem?* Address to the Melbourne Institute and the Australian Economic and Social Outlook Conference, June 30, 2011, p. 2, http://www.pc.gov.au/__data/assets/pdf_file/0018/110592/mining-boom-what-problem.pdf (accessed October 10, 2012).
36 Neil Hume, "Two-Speed Australian Economy Creates Unease," *Financial Times*, May 15, 2012, http://www.ft.com/cms/s/0/8dd3c344-9d7a-11e1-9327-00144feabdc0.html#axzz27s8aPxkb (accessed September 28, 2012).
37 Parliament of Australia, *Commonwealth of Australia Constitution Act*, section 91, http://www.aph.gov.au/About_Parliament/Senate/Powers_practice_n_procedures/Constitution/chapter4 (accessed August 28, 2012).
38 Invest Australia et al., *Mineral and Petroleum Exploration and Development in Australia*: *A Guide for Investors* (Canberra, 2005), chapter 9, http://www.ret.gov.au/resources/Documents/Minerals%20and%20Petroleum%20Exploration/Guide_for_%20Investors_9OnshoreLegislation.pdf (accessed September 7, 2012).
39 Ibid.
40 Ibid.
41 Australian Government, The Treasury, *Australia's Foreign Investment Policy*, September 2009.
42 Austrade, *Regulation of Foreign Investment in Australia*, March 2011.
43 Foreign Investment Review Board, *Who Are We?* http://www.firb.gov.au/content/who.asp?NavID=48 (accessed September 7, 2012).

investments by state-owned foreign entities, no matter what size the project is.[44] This is often the case with Chinese initiatives, which are often backed by the state or state-owned enterprises. The Australian Competition and Consumer Commission (ACCC) also reviews the impact of proposals on competition, and the government examines the effect of foreign investments on Australian taxation and the environment.[45]

Aboriginal Rights

The land rights of the Aboriginal population in traditional areas are protected at the state and territory level, with the national government wielding powers of last resort under the *1984 Aboriginal and Torres Strait Islander Heritage Protection Act*. Mining firms pay royalties to traditional landowners under the *1993 Native Titles Act*, with the National Native Title Tribunal (established under the same act) intervening to help settle conflicts.[46] Recently discussion has arisen over the lack of Aboriginal participation in the windfall profits from the current mining boom.[47]

Taxation of the Mining Sector

Royalties for mineral extraction are defined and collected by the state and territory governments.[48] Royalties for resources in Australian territorial waters are shared by national government and the respective state.[49]

Taxes on resource production have always been relatively low in Australia and have not risen significantly during the mining boom. Stronger taxation of the mining sector would allow the whole population of Australia to benefit more strongly from their natural resources, and not only the mining companies. To what extent the population actually benefited would of course depend on the actual use of the taxes and fees collected. In 2007, the Australian Bureau of Agricultural and Resource Economics recommended taxing mining profits,[50] and in May 2010 then Labour Prime Minister Kevin Rudd attempted to implement the advice by introducing a 40 percent profit tax (Resource Super Profits Tax, RSPT). His failure, especially in the face of massive opposition by the powerful mining lobby, was one factor that led to his replacement as prime minister by his colleague and deputy Julia Gillard in June 2010. After the August 2010 elections, Gillard's new government again proposed a mining tax with the same goal: profit-based taxation in addition to the existing fees and royalties. Taxation of profits can be more efficient than raising fees, as the latter can discourage investment. In boom times, profits and thus taxes are higher; in recession both decrease. On the other hand, price cycles make it hard for the government to plan tax revenues. The new Mineral Resources Rent Tax (MRRT) that Gillard introduced in July 2012 imposes a 30 percent tax on profits, but for iron ore and coal only.[51] Miners with annual profits less than $AUS50 million are exempt,[52] and royalties and fees can be deducted.[53] The industry accepted the new MRRT, as its provisions are a good deal less strict than those initially proposed.[54] But the question of the powers of central and state governments in the legislation is disputed and the Australian Fortescue Metals Group is planning to challenge it before the High Court. Three months after the new tax came into force, it is not even certain whether and to what extent the government will be collecting it at all. Mining giants BHP Billiton, Rio Tinto, and Xstrata are all currently exempt, and the strength of the Australian Dollar, falling commodity prices, and shrinking mining profits mean that the government's revenues

44 Austrade, *Regulation of Foreign Investment in Australia* (see note 42).
45 Australian Government, The Treasurer, *Australia's Foreign Investment Policy*, January 2012, http://www.firb.gov.au/content/_downloads/AFIP_Aug2012.pdf (accessed September 25, 2012).
46 Sandy Wood, *Aboriginal Land Rights in Australia*, http://www.wcl.american.edu/hrbrief/v6i3/aboriginal.htm (accessed September 28, 2012).
47 Norimitsu Onishi, "Rich in Land, Aborigines Split on How to Use It," *New York Times*, February 12, 2011, http://www. nytimes.com/2011/02/13/world/asia/13australia.html?pagewanted=all&_r=0 (accessed September 28, 2012).
48 Pietro Guj, *Mineral Royalties and Other Mining Specific Taxes*, 2012, http://im4dc.org/wp-content/uploads/2012/01/UWA_1698_Paper-01_-Mineral-royalties-other-mining-specific-taxes1.pdf (accessed August 28, 2012).
49 RET, *Resources Taxation*, http://www.ret.gov.au/resources/enhancing/taxation/pages/resourcestaxation.aspx (accessed September 28, 2012).
50 OECD, *Economic Survey Australia 2008*, p. 39.
51 "Bergbaukonzerne spüren die Abkühlung in China," *Frankfurter Allgemeine Zeitung*, March 21, 2012, p. 17.
52 Blake Dawson, *Mining in Australia: An Introduction for Investors*, 2011 ed., http://www.ashurst.com/doc.aspx?id_Resource=6121 (accessed October 10, 2012).
53 "MRRT Not That Complex: Henry," *Sydney Morning Herald*, November 22, 2010, http://news.smh.com.au/breaking-news-national/mrrt-not-that-complexhenry-20101122-183eb.html (accessed August 5, 2012).
54 Interviews with representatives of the Minerals Council of Australia, July 2012.

will be much less than originally expected.[55] And as a profit-based tax, revenues will always vary.[56]

While the government and the mining industry expected the resource boom to continue, a note of caution has become apparent.[57] Wages rose strongly during the boom and represent a challenge to companies in less profitable times, as do rising energy and transport costs in combination with the strength of the Australian dollar.[58] Furthermore, the Mineral Resources Rent Tax and new legislation on CO_2 emissions leave some companies fearing that their profits will decline further. This situation is further aggravated by currently falling Chinese demand for many materials such as iron ore, where prices fell dramatically in the third quarter of 2012 (in August and September 2012 the price of iron ore fell as low as US$90/tonne, from US$150/tonne only a few months earlier in April).[59]

Resource Wealth Fund

Proceeds from the new MRRT were initially intended to support Australian companies, especially smaller businesses, but are now instead to be diverted to the pensions system.[60] The idea of channeling revenues into a sovereign wealth fund, as practiced by other resource-rich countries, has been discussed repeatedly (again in spring 2012 because of the high exchange rate) but rejected.[61] The Australian government thus has no fund like Norway's to compensate for future periods of lower prices. However, this model is currently being addressed at the state level, with Western Australia planning to create a wealth fund with revenues from its large mining sector.[62]

International Trade

Australia is an open and transparent market economy and rigorously follows free-market principles. It ranks third in the 2012 Index of Economic Freedom, after only Hong Kong and Singapore.[63] In recent decades, Australia has lowered trade barriers and reduced tariffs. The highest tariffs have historically been in the textile, clothing, and the car industries;[64] these too were substantially reduced in 2010.[65] In the raw materials sector, the government tries to support the domestic sector through tax breaks, for instance on fuel.[66] While the government currently supports aluminum smelting through energy subsidies,[67] some smelters have had to close due to strong competition, especially from China, and the future of others is un-

55 Andrew Bolt, "Government's Mining Tax Fails to Raise a Cent; Budget Smashed," *Herald Sun*, October 25, 2012, http://blogs.news.com.au/heraldsun/andrewbolt/index.php/heraldsun/comments/governments_mining_tax_fails_to_raise_a_cent_budget_smashed/ (accessed November 20, 2012).
56 Vicky Validakis, "Mining Tax Massive Fail," *Australian Mining*, October 25, 2012, http://www.miningaustralia.com.au/news/mining-tax-massive-fail (accessed November 20, 2012).
57 Christoph Hein, "Die großen Rohstoffkonzerne rudern zurück," *Frankfurter Allgemeine Zeitung*, May 21, 2012, p. 12.
58 Werner Kemper, "Mehrere australische Bergbauprojekte auf unbestimmt verschoben," *GTAI*, August 28, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=633924.html (accessed October 10, 2012); "New Crest Chef: Australischer Dollar wird uns killen," *Wirtschaftsfacts.de*, March 28, 2012, http://www.wirtschaftsfacts.de/2012/03/new-crest-chef-australischer-dollar-wird-uns-killen/ (accessed October 10, 2012).
59 Yoreeh Koh, "Iron Ore Volatility to Remain, Says Rio Boss Albanese," *Couriermail*, November 20, 2012, http://www.couriermail.com.au/news/iron-ore-volatility-to-remain-says-rio-boss-albanese/story-e6freon6-1226520552538 (accessed November 21, 2012).
60 David Dittman, "Australia's Mineral Resource Rent Tax: It's the Investment, Stupid," *InvestingDaily*, November 8, 2012, http://www.investingdaily.com/14327/australias-mineral-resource-rent-tax-its-the-investment-stupid (accessed November 20, 2012).
61 Interviews with representatives of the relevant ministries, July 2012; see also Phil Garton and David Gruen, *The Role of Sovereign Wealth Funds in Managing Resource Booms: A Comparison of Australia and Norway*, February 23, 2012, http://www.treasury.gov.au/PublicationsAndMedia/Speeches/2012/The-role-of-sovereign-wealth-funds-in-managing-resource-booms (accessed September 25, 2012).
62 Enda Curran, "Western Australia Goes Sovereign," *Wall Street Journal*, May 17, 2012, http://blogs.wsj.com/dealjournalaustralia/2012/05/17/western-australia-goes-sovereign/ (accessed September 7, 2012).
63 Heritage Foundation, *2012 Index of Economic Freedom, Australia*, http://www.heritage.org/index/country/australia (accessed September 25, 2012).
64 Ministry of Foreign Affairs of Japan, *Australia-Japan Trade and Economic Framework (Joint Study)*, http://www.mofa.go.jp/region/asia-paci/australia/study0504/index.html (accessed September 25, 2012).
65 Australian Customs and Border Protection Service, *Australian Customs Notice No. 2009/49. Tariff, Duty Rate and Statistical Code Changes for 1 January 2010*, http://www.customs.gov.au/webdata/resources/files/ACN0949.pdf (accessed November 20, 2012).
66 Rebecca Lawson, "Miners Spared from Cuts to Diesel Fuel Rebate," *PerthNow*, May 8, 2012, http://www.perthnow.com.au/business/miners-spared-from-cuts-to-diesel-fuel-rebate/story-e6frg2r3-1226350382653 (accessed November 20, 2012).
67 Bernard Keane, "Aluminium Smelting: The Best Bang for Your Fossil-Fuel Subsidy Buck," *Crikey*, March 10, 2011, http://www.crikey.com.au/2011/03/10/aluminium-smelting-the-best-bang-for-your-fossil-fuel-subsidy-buck/ (accessed September 25, 2012).

certain.[68] High costs in Australia have moved BHP Billiton to start relocating some of its smelting operations (using Australian bauxite) to Africa (Mozal in Mozambique and Hillside and Bayside in South Africa).

In the WTO Australia supports reducing import tariffs and other trade barriers, including in the agricultural sector, with the intention of opening up markets for Australian agricultural and industrial products.[69] Australia has signed free trade agreements with ASEAN, New Zealand, Thailand, Singapore, the United States, and Chile; negotiations with Malaysia were concluded in May 2012, and the launch of the free trade agreement is planned for early 2013. Further agreements are currently in the pipeline, including with Australia's number one trading partner China, as well as India, Japan, and South Korea. Australia has always been an advocate of multilateralism and free and non-discriminatory trade.[70]

International Cooperation

Australia is a founding member of the resource study groups for lead and zinc, and for nickel, and joined the group for copper in 2011.[71] The RET holds regular bilateral minerals and energy cooperations meetings with China, India, Japan, South Korea, Taiwan, and the United States to exchange information on the minerals and energy sector and discuss new legislation, trade and investments, renewable energy, market trends, and technological innovations.[72] A memorandum of understanding on deeper energy and raw materials cooperation was signed with Germany in June 2011.[73] Australia closely follows other countries' raw materials strategies and discourses, for instance the sections in the *U.S. Dodd-Frank Act* on trade of so-called conflict minerals and revenue transparency and the EU's similar transparency directive.[74] Australia adheres closely to its open-market principles and further legislation is considered unnecessary as transparency is already obligatory in the Australian resource sector.[75] Legal developments in other countries are followed with particular regard to their impact on Australian trade and investment. Negotiation processes over FDI with the United States and the EU are criticized as often being too slow, compared to other investors, for instance those from Asian countries.[76]

Broadening the G20 agenda on raw materials is not a priority for Australia, which would prefer the G20 to remain focused on macroeconomic issues. The Australian G20 presidency in 2014 is thus unlikely to continue the trend set by the French presidency in 2011, when the agenda was extended towards resource trade.[77]

An EITI pilot was launched in July 2012. The Australian mining industry's compliance with EITI principles is monitored by the central government, states and territories, businesses and non-governmental organizations.[78] Australia also supports EITI financially.[79]

The Global Compact Network Australia was initiated in May 2009 and is to be formalized and developed through working groups, conferences, and logical frameworks.[80]

68 Sid Maher and Joe Kelly, "Threat to Smelters Sparks Power Alarm," *The Australian*, May 25, 2012, http://www.theaustralian.com.au/national-affairs/climate/threat-to-smelters-sparks-power-alarm/story-e6frg6xf-1226366237935 (accessed September 25, 2012).
69 DFAT, *Trade at a Glance 2011*, http://www.dfat.gov.au/publications/trade/trade-at-a-glance-2011.html#sect19 (accessed September 25, 2012).
70 Australian Government, *Gillard Government Trade Policy Statement: Trading our Way to More Jobs and Prosperity*, April 2011, http://www.dfat.gov.au/publications/trade/trading-our-way-to-more-jobs-and-prosperity.html (accessed September 25, 2012).
71 RET, *International Metal Study Groups*, http://www.ret.gov.au/resources/mining/australian_mineral_commodities/study-group/Pages/international_metal_study_groups.aspx (accessed September 7, 2012).
72 RET, *Bilateral Minerals and Energy Cooperation*, http://www.ret.gov.au/resources/enhancing/bmec/Pages/default.aspx (accessed September 25, 2012).
73 *Gemeinsame deutsch-australische Erklärung zur Zusammenarbeit im Rohstoff- und Energiebereich*, Canberra, June 1, 2011, http://www.australien.diplo.de/contentblob/3459906/Daten/2117796/bilaterales_engagement.pdf (accessed November 20, 2012).
74 See also in this volume "European Union," pp. 59ff., and "United States of America," pp. 150ff.
75 Interview with a representative of AusAID, July 2012.
76 Interviews with representatives of the relevant ministries and associations, July 2012.
77 Interviews with representatives of the relevant ministries, July 2012.
78 Kevin Rudd, "Australia Encourages Transparency in Oil, Gas and Mining," press release, October 27, 2011, http://www.foreignminister.gov.au/releases/2011/kr_mr_111027.html (accessed September 20, 2012).
79 Australian Minister for Foreign Affairs, "Australia Helps Developing Countries Turn Mineral Resources into Wealth," media release, August 10, 2012, http://foreignminister.gov.au/releases/2012/bc_mr_120810a.html (accessed September 7, 2012).
80 UN Global Compact, *Local Network Report 2010 Australia*, http://www.unglobalcompact.org/docs/networks_around_

Development Cooperation

Australian mining companies are very active abroad, with about 40 percent of their exploration and mining projects located in Africa. Of these 650 African projects, 134 are in South Africa and 37 in Namibia. The main products are diamonds, iron ore, gold, coal, copper, platinum, and uranium. Australian investment in African exploration and mining projects reached $20 billion in the 2010/2011 fiscal year, with a rising trend. Supporting the activities of Australian firms abroad is an important aspect of Australian development cooperation.[81]

The *Mining for Development* program run by AusAID seeks to support the mining sector in developing countries by transferring knowledge, especially to Africa, Asia, and Pacific regions. In 2011, Australia supplied development cooperation to thirty-three African countries. In October 2011, Prime Minister Julia Gillard showed her appreciation for these efforts by announcing the establishment of an International Mining for Development Center to provide scientific advice and information.[82] It is one of six pillars of a new development initiative in the mining business, the others being support for NGOs, technical assistance, transparency, framework-building partnerships, and education partnerships.[83]

Evaluation and Outlook

There is no coherent and comprehensive Australian raw materials strategy. The measures in place today concern government support for maintaining productivity, for instance in the form of infrastructure improvements. Internationally, Australia opposes an interference in the markets and is unlikely to support any broadening of the agendas of forums like the G20. To date, the government has not managed to channel mining profits to the benefit of the population. The impact of the new mining tax is not yet clear.

Australia considers itself an open and transparent market economy, currently facing challenges brought about by the mining boom. The government must juggle the demands of foreign markets and investors, while pursuing economic diversification in order to reduce the risks posed by price fluctuations. Efforts by Australian firms to tackle these threats by signing long-term supply agreements will only provide temporary relief. Apart from falling demand, competition from other suppliers will also pose risks. This is especially true for materials that are not actually scarce, such as of iron ore. An end to the Chinese construction boom coinciding with competition from other iron ore suppliers will affect Australia dramatically. Australia will have to adapt to such changes quickly. The risks of current developments are summarized in a white paper on the "Asian Century" commissioned by the government in September 2011.[84] It identifies the challenges for Australia posed by the massive impact of Asia on its economy. Besides regional security and stronger political and cultural relations, the development of the Australian economy in the Asian region is emphasized, along with support for education, science, and innovation, taxation reforms, and macroeconomic and financial measures. According to the white paper, the creation of more added value in Australian manufacturing industry and services is decisive for the country's future.

To avoid Australia remaining merely a giant mining site for the world, Prime Minister Gillard appointed a Taskforce on Manufacturing.[85] Its report published in August 2012 includes more than forty recommendations for increasing added value in the Australian economy and reducing dependence on extractive industries. But it remains to be seen how successfully these recommendations will be put into practice and to what extent the government will manage to diversify the Australian economy.

world_doc/communication/network_reports/2010/AU_2010.pdf (accessed August 30, 2012).

81 Dieter Grau, "Australische Bergbauunternehmen expandieren in Südafrika," *GTAI*, September 14, 2011, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=210884.html (accessed May 27, 2012).

82 AusAID, *Mining for Development in Africa*, http://www.aapartnerships.org/downloads/Mining_for_Development_in_Africa_ENG.pdf (accessed September 7, 2012).

83 AusAID, *Australia's Mining for Development Initiative* (Canberra, October 2011), http://www.ausaid.gov.au/aidissues/Documents/mining-for-development.pdf (accessed September 7, 2012).

84 Australian Government, *Australia in the Asian Century White Paper* (Canberra, October 2012), http://asiancentury.dpmc.gov.au/white-paper (accessed November 20, 2012).

85 Australian Government, *Prime Minister's Taskforce on Manufacturing*, Canberra, http://www.innovation.gov.au/Industry/Manufacturing/Taskforce/Pages/default.aspx (accessed November 20, 2012).

Brazil

Claudia Zilla

For a long period of time, the production and processing of agricultural raw materials was central to Brazil's economy. Recently, the status of energy resources has been boosted by the discovery of oil reserves. Furthermore, the country has also always benefited from its major iron ore reserves. Mining has had a long tradition since the beginning of Portuguese colonization, with gold and gemstones in particular playing an important role in developing the country's more rural areas and contributing to the former colony's wealth. Today, Brazil is one of the world's largest mining producers,[1] with production and export volumes allowing it to consider itself a global player. The country attracts large amounts of foreign investment and hosts Vale as the world's largest mining company.

Minerals in the National Economy

Brazil is a major producer of minerals, with an expanding raw materials industry and a position as a significant global supplier. As the world's fifth-largest country by area, it has significant deposits of bauxite, copper, iron, niobium, nickel, gold, phosphate, and graphite.[2] Brazil produces seventy minerals, of which twenty-one are metals and forty-five industrial minerals.[3] It was the top producer of niobium in 2010,[4] and is among the leading producers of iron ore, bauxite, industrial minerals (asbestos and graphite), and gemstones. Moreover, Brazil exports nickel, magnesium, tin, vermiculite, chromium, and gold on a large scale. The country has gained a significant place in the global smelting business, especially for aluminum, but also nickel and its byproduct cobalt, copper, zinc, and tin.[5] Brazil can meet its own demand for limestone, industrial diamonds, titanium, copper, tungsten, and talc. Imports supplement domestic production of phosphate, diatomite, and zinc.

In 2008, mining accounted for 4.2 percent of GDP, of which 1.1 percent derived from production and 3.1 percent from processing.[6] Over the past decade, the mining sector has grown at an annual average rate of 10 percent. While metal ores for export grew by 6 percent, production of non-metal minerals destined for the domestic market grew by a more modest 3 percent due to its structural linkage to domestic industrial growth (2008: 3.2 percent). In 2009, the mining sector grew considerably more strongly than the Brazilian economy as a whole (3.1 percent vs. 0.6 percent),[7] reaching a record year-on-year high of 28 percent two years later, in 2011. Overall, the value of mining output increased by 550 percent, from US$7.7 billion to US$50 billion, between 2001 and 2011.[8]

Mining is important for Brazil's current account, accounting for about 12 percent of total exports (by value) in 2010.[9] Iron ore still tops the list (82 percent

1 Engineering and Mining Journal (E&MJ), *Brazil Mining*, January/February 2011, p. 51, http://www.gbreports.com/admin/reports/BrazilMining_2011.pdf (accessed October 10, 2012).
2 Minsterio de Minas e Energia (MME) and Secretaria de Geologia, Mineração e Transformação Mineral (SGM), eds., *Plano Nacional de Mineração 2030: Geologia, Mineração e Transformação Mineral* (Brasília, 2011), p. 24, http://www.mme.gov.br/mme/galerias/arquivos/noticias/2011/PNM_2030.pdf (accessed August 20, 2012).
3 E&MJ, *Brazil Mining* (see note 1), p. 51.
4 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).
5 Jürgen Vasters, Peter Buchholz, Dieter Huy, Martin Schmitz, Simone Röhling, and Sven Altfelder, *Rohstoffwirtschaftliche Bewertung der Länder Afrikas, Asiens, der Gemeinschaft Unabhängiger Staaten (GUS) mit Georgien und Südamerikas im Hinblick auf die Bedeutung für Deutschland* (Hannover: Bundesanstalt für Geowissenschaften und Rohstoffe, Deutsche Rohstoffagentur, September 2010), p. 33, http://www.bgr.bund.de/DE/Themen/Min_rohstoffe/Downloads/laenderbewertung.pdf?__blob=publicationFile&v=3 (accessed November 19, 2012).
6 MME and SGM, eds., *Plano Nacional de Mineração 2030* (see note 2), p. 9.
7 Ibid.
8 Instituto Brasileiro de Mineração (IBRAM), *Informações e análises de economía mineral brasileira*, 6th ed., 2011, http://www.ibram.org.br/sites/1300/1382/00001157.pdf (accessed November 16, 2012).
9 Vasters et al., *Rohstoffwirtschaftliche Bewertung* (see note 5), p. 33.

by value),[10] followed by niobium (4.7 percent), gold (4.6 percent), and copper (4.1 percent).[11] Potassium chloride (29 percent), which is needed for fertilizer production, and copper (12.3 percent) are the biggest imports.

The mining sector itself provided 165,000 jobs in 2011,[12] but every job in mineral production creates an additional thirteen in upstream and downstream sectors and supply industries (multiplier effect 1:13).[13] Thus altogether 2.1 million workers were employed by the minerals sector in 2011.[14] Many mining companies complain of a lack of skilled labor.[15]

The Brazilian mining sector is largely controlled by the private sector; there are only very few state-owned enterprises. In 2010, almost 8,000 companies were active in extraction.[16] While there are numerous smaller exploration, production, and service companies, the raw materials sector is dominated by just fifteen domestic and foreign firms.[17] Investment in the mining sector comes primarily from Canada (19 percent), Australia (12 percent) the United States (8 percent), Mexico (6 percent), Peru and Chile (5 percent each), Russia and China (4 percent each), and Argentina and Brazil (3 percent each).[18] Brazil ranks tenth in the world for private investment in mineral exploration (2009: US$321 million or 3 percent global share).[19]

Brazil's raw materials economy is internationalized. Vale is the world's biggest mining company in terms of production value, and second in market value.[20] It was founded by the Brazilian government in 1942 as Companhia Vale do Rio Doce, and privatized in 1997. Today, the Brazilian state retains a 5.6 percent stake.[21] Vale has become one of the leading international mining enterprises and operates in thirty-six countries, especially in extraction and processing of iron ore (where 80 percent of Brazilian production is in Vale's hands),[22] nickel, potash and phosphate, copper, bauxite, manganese, and coal. Among the fifty-two Brazilian companies with global reach, six operate in the raw materials sector: Gerdau, Grupo Camargo Corrêa, Grupo Votorantim, Magnesita, Tupy, and Vale. Comanhia Siderúrgica Nacional (CSN) and MMX Mineração are also growing dynamically.[23]

The Raw Materials Policy

Institutional Setting

While Brazil is a federal state, its minerals and energy resources are owned by the federal government (the union or "União"). The federal states are responsible for environmental regulation. Their environment agencies award environmental licenses, but are not responsible for projects that transcend state borders.[24] Minas Gerais, as its name suggests, is a historic mining state and maintains its relevance. The Amazon state Pará, where Vale operates the world's largest iron ore complex at Carajás, has been growing in significance.[25]

Numerous state and non-state actors and institutions participate in formulating and shaping raw materials policy. The Ministry of Mines and Energy (Ministério de Minas e Energia, MME) is responsible for the mining industry, with specific powers exercised by the Secretariat for Geology, Mining, and Mineral Transformation (Secretaria de Geologia, Mineração e Transformação Mineral, SGM)[26] and the National

10 IBRAM (ed.), *Informações e análises de economía mineral brasileira* (see note 8).
11 Data for 2010. Ibid.
12 Ibid.
13 Ibid.
14 Ibid.
15 MME and SGM, eds., *Plano Nacional de Mineração 2030* (see note 2), p. 66, referring to a study published in 2007 by the Confederacção Nacional de Indústria (CNI).
16 IBRAM, *Informações e análises de economía mineral brasileira* (see note 8).
17 E&MJ, *Brazil Mining* (see note 1), p. 52.
18 IBRAM, *Informações e análises de economía mineral brasileira* (see note 8).
19 IBRAM, *The Strength of Brazilian Mining* (Brasília, 2012), http://www.ibram.org.br/sites/1400/1457/00000294.pdf (accessed August 20, 2012), p. 11; based on 2009 data from the Metals Economic Group.
20 "Top 100 Mining Companies: What a Difference a Year Makes," *Mineweb*, January 12, 2010, http://www.mineweb.com/mineweb/view/mineweb/en/page67?oid=95737&sn=Detail (accessed June 7, 2012).
21 E&MJ, *Brazil Mining* (see note 1), p. 64.
22 Ibid., p. 52.
23 MME and SGM, eds., *Plano Nacional de Mineração 2030* (see note 2), p. 8.
24 On the Brazilian environmental licensing regime see MME, http://www.dnpm-pe.gov.br/Legisla/Guia/Guia_6.htm (accessed August 20, 2012).
25 The states most heavily involved in minerals production are: Gerais (48 percent), Pará (28 percent), Goiás (5 percent), São Paulo (4 percent), Bahia (2.7 percent), Mato Grosso do Sul (1.8 percent), Sergipe (1.7 percent). The other states together account for 8.8 percent. IBRAM, *Informações e análises de economía mineral brasileira* (see note 8).
26 MME and SGM, eds., *Plano Nacional de Mineracao 2030* (see note 2).

Department of Mining Production (Departamento Nacional de Produção Mineral, DNPM), founded in 1994 to support and monitor activities in the raw materials sector.[27] The Brazilian Geological Survey (Serviço Geológico do Brasil, CPRM) is a public-private enterprise founded in 1969 and answerable to the ministry.[28] Its remit is to organize and systematize Brazilian geological knowledge and develop the federal government's Brazilian Geological Program. The Center for Mining Technology (Centro de Tecnologia Mineral, CETEM), created in 1978, is answerable to the Ministry for Science, Technology and Innovation (Ministério da Ciência, Tecnologia e Inovação, MCTI). It focuses on research, technological development, and professional training for raw materials processing and supports companies in the mineral/metallurgical and raw materials/chemicals sectors.[29] CETEM is funded mainly by the federal government and is headquartered in Rio de Janeiro. In the House of Representatives, the Mining and Energy Committee (Commissão de Minas e Energia, CME) is responsible for mining.

The Brazilian Mining Institute (Instituto Brasileiro de Mineração, IBRAM)[30] is a private non-profit association representing the interests of mining companies and organizations. IBRAM provides sector-specific information and communication through a vast range of statistical, legal, and policy publications. The Agency for Technological Development of the Mining Industry (Agência para o Desenvolvimento Tecnológico da Indústria Mineral Brasileira, ADIMB),[31] established in 1996, promotes scientific and technical development in the mining industry and provides training for skilled workers in the fields of exploration and prospecting. Besides publications, workshops, and seminars, the agency also organizes expeditions. Today a private entity, ADIMB was originally set up by the science and mining ministries in 1993. ADIMB consists of four member institutions, MME, MCTI, IBRAM, and DNPM, as well as sixty-five associated businesses. Some mining companies are also active in research, development, and education. Vale, for instance, founded its own technology institute (Instituto Tecnologico Vale, ITV) in 2009 to develop new technologies for a sustainable mining industry.[32]

Concepts and Strategies

The Brazilian government sporadically publishes mining plans that take stock of the current situation and propose policies, thus serving the dual purpose of diagnosis and strategic conceptionalization.[33] MME published the most recent in 2011: the *National Mining Plan 2030* (*Plano Nacional de Mineração*, PNM).[34] Its five chapters address 1) the environment in which the mining sector operates, 2) challenges in geology, mining, and processing, 3) future scenarios, 4) forecasts for demand, investment, and human resources, and 5) strategic objectives and activities.

PNM 2030 identifies "strategic minerals" that are "essential" or "critical" in one or more of the following categories: 1) importance to key industries and strong import-dependency, 2) growing significance in the coming decade, and 3) competitive advantage of the Brazilian mining sector.[35] A mineral is thus considered "critical" if it is important to domestic key industries and must be imported to meet demand. Here, Brazil needs unrestricted market access and a diversified and competitive supply structure without cartels. One example of the first category would be minerals used in the production of the fertilizers required to ensure productivity in the agricultural sector. While the Brazilian government believes that the growing geopolitical importance of food security offers a chance to expand production and export of agricultural products and consolidate Brazil's global leadership in this sector, the country still imports most of its fertilizer minerals: 90 percent of domestically-consumed potassium, 70 percent its nitrogen

27 For a description of the activities of the Departamento Nacional de Produção Mineral (DNPM), see http://www.dnpm.gov.br/conteudo.asp?IDSecao=45&IDPagina=33 (accessed August 20, 2012).
28 CPRM stands for Companhia de Pesquisa de Recursos Mineirais, http://www.cprm.gov.br (accessed August 20, 2012).
29 Centro de Teconologia Mineral (CETEM), http://www.cetem.gov.br/conheca.php (accessed August 20, 2012).
30 IBRAM, http://www.ibram.org.br (accessed August 20, 2012).
31 Agência para o Desenvolvimento Tecnológico da Indústria Mineral Brasileira (ADIMB), http://www.adimb.com.br/site/ (accessed August 20, 2012).
32 Instituto Tecnológico Vale (ITV), http://www.vale.com/pt-br/sustentabilidade/instituto-tecnologico-vale/paginas/default.aspx (accessed August 20, 2012).
33 Cf. previous mining plans: I Plano Mestre Decenal para la Aviliação dos Recursos Minerais do Brasil (I PMD: 1965–1974), II Plano Decentral de Mineração (II PDM: 1981–1990), and Plano Plurianual para o Desenvolvimento do Sector Mineral (PPDSM: 1994).
34 MME and SGM, eds., *Plano Nacional de Mineração 2030* (see note 2).
35 Ibid., pp. 63ff.

fertilizer, and 50 percent of its phosphorus. Given that these imports were worth US$4 billion in 2008, this also has a negative effect on the trade balance.

Secondly, minerals are also classified as strategic if their relevance is definitely expected to grow in coming decades because of their use in high-technology products. This makes cobalt, lithium, rare earth minerals, and tantalum "resources of future importance" where the government seeks to promote exploration and production, as well as initiating public-private cooperation (especially in research, development, and innovation) to accelerate the development of value-added chains.[36]

The third category of strategic minerals are those where Brazil has a competitive advantage in production and export and whose export generates foreign exchange. Here, global demand and price trends play a crucial role. These strategic materials include iron ore (10 percent of all Brazilian exports) and niobium (where Brazil accounts for more than 90 percent of global reserves and production).

Chapter five of *PNM 2030* defines the strategic goals of mining policy until 2030. Its top priorities are: 1) effective public governance; 2) expanding geological knowledge; and 3) management of strategic minerals. These concern fundamental structures of mining policy and fall largely under the powers of the MME. A second set of goals addresses the prerequisites for full development of the mining sector: 1) production in protected areas ("áreas com restriçao"), such as Amazonia; 2) formalizing and strengthening micro- and small enterprises; 3) research, development, and innovation; 4) education and training; and 5) infrastructure and logistics. These measures require concerted cooperation by government, the private sector, and civil society. The third set of goals includes: 1) sustainability of production; 2) value added chains and competitiveness; and 3) promotion of sustainable development in mining regions.[37] Achieving this last set of goals will be contingent on the first two and requires cooperation between public, private, and civil society actors.

36 Brazil is well aware of the location of its deposits of rare earth minerals, and was a pioneer of their exploration and production until the 1950s. But the sector stagnated following the wave of nationalizations, and today Brazil lacks the necessary technological knowhow for profitable production.
37 MME and SGM, eds., *Plano Nacional de Mineração 2030* (see note 2), p. 122.

Policy Measures and Instruments

National Level

During the presidency of Luiz Inácio Lula da Silva (2003–2010), a range of government initiatives injected new impetus into the raw materials industry.[38] Under President Dilma Rousseff (2011–2014), who was herself previously Minister of Mining and Energy, reforms of the legislative framework are being discussed, to increase the government's participation in resource revenues.[39]

Current legislative proposals from Congress and the executive include a spectrum of measures designed to promote the mining industry and increase the state's control. They mention seven areas that require reform:

(1) Unlike other Latin American countries, the distribution of resource rents is not a source of great disagreement amongst Brazilian local authorities. Taxation of mining companies varies depending on where mining takes place and which minerals are extracted. Corporate income tax is between 10 and 15 percent,[40] while the licensing regime (the *Compensação Financeira pela Exploração de Recursos Minerais*, CFEM) stipulates a royalty of 3 percent on net sales, of which the local community receives 65 percent, the state government 23 percent, and the federal government 12 percent. As well as increasing license fees, the government plans to modify the redistribution principle. Other reforms concern the scope, duration, subject, and management of concessions: (2) the government intends to limit the size of plot covered by a concession; (3) to uphold their rights, concession holders will be required to make minimum investments; (4) in certain cases, the current procedure granting concessions without expiry dates on a first come, first served basis will be replaced by a tendering process with licenses limited to a maximum of five years; (5) extraction concessions will no longer be issued to natural persons for unlimited periods, but only to legal persons, with a limit of forty years, extendable by another forty years. (6) Mining in protected areas urgently requires stronger regulation in relation to environmental protection and indigenous rights. *Article 231* of the *Brazilian Constitution* recognizes the rights of indigenous peoples to the natural resources

38 For instance, mapping programs were revived.
39 On mining legislation see DNPM, http://www.dnpm.gov.br/conteudo.asp?IDSecao=67 (accessed August 20, 2012).
40 E&MJ, *Brazil Mining* (see note 1), p. 58.

in their territories (about 15 percent of the country) but does not generally prohibit extraction there. Instead, Congress permits or rejects mining projects after a hearing with the affected indigenous communities. Outstanding regulatory loopholes in this are expected to be closed soon. Finally, (7) the government hopes that creating a National Mining Agency (Agência Nacional de Mineração, ANM) answerable to the MME will give the sector fresh impetus. This agency would replace the DNPM and would be autonomous in its actions, budget, and management.

The government also wishes to increase value added in the mining sector by expanding pre-export processing. Central challenges facing the mining sector are inadequate infrastructure, energy costs, shortages of skilled labor, and problems accessing funding. In this context, the government is interested in technology transfer from abroad, but rejects raw material partnerships that would reduce Brazil to the role of supplier and prevent it from increasing added value at home. Instead, the government supports the creation of joint ventures with Brazilian participation.[41] Projects that transfer technology to Brazil, allow domestic processing, and ensure exports to the technology-supplying country are regarded as attractive. The government is specifically seeking to decrease Brazil's twin dependency in iron ore exports (iron as dominant export product, China as dominant purchaser): Diversifying mineral exports and markets is a trade priority.

As mentioned above, the agricultural sector is strongly dependent on imported phosphate and potash fertilizers. The government therefore seeks to support domestic phosphate and potash production and intends to establish a fertilizer industry to reduce import dependency. Even though some phosphate is produced in Brazil, the country still has to import large volumes to meet domestic demand. Brazil is the world's second-largest importer of potash.

Informal mining is another controversial issue. About half a million people are directly involved in what is variously referred to as artisanal mining ("minería artesanal"), small-scale mining, or illegal mining ("minería ilegal").[42] Informal extraction of gold (and gemstones and diamonds) leads to social, health, and environmental problems affecting the prospectors ("garimpeiros") and their communities (and often harming indigenous groups). In particular, mercury used in gold extraction pollutes rivers on which neighboring communities depend for their livelihoods. "Garimpeiros" often live in settlements with poor sanitary conditions. However, small-scale mining is an important source of income for people in rural areas. The government therefore works to contain these problems by promoting cooperatives ("Cooperativa de Mineraãço dos Garimpeiros").

International Level

The government's mining policy is strongly focused on the domestic level, with less attention paid to international coordination. In Latin America, regional institutions in this field serve objectives of communication and exchange of ideas rather than searching for joint solutions for policy issues. Brazil is one of seventeen members of the Latin American Mining Organization (Organismo Latinoamericano de Minería, OLAMI).[43] Established in 1984, OLAMI consists of national coordinating units composed of sectoral representatives (trade unions, businesses, state agencies, universities, etc.). Within the Southern Common Market (Mercado Común del Sur, MERCOSUR), the Mining and Geology Working Subgroup (Subgrupo de Trabajo No. 15) of the Mercosur Council (Consejo Mercado Común) deals with raw materials production.

Brazil is active in several international initiatives, but does not participate in the Extractive Industries Transparency Initiative (EITI). Brazil is a member of the Kimberley Process Certification Scheme (KPCS) and two international raw materials study groups (nickel and zinc).[44] The mining company Vale and the Mining Institute (IBRAM) are members of the International Council on Mining and Metals (ICMM). Brazil participates in the Common Fund for Commodities (CFC) and the Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development. In the EU-Brazil

41 "Alemães propõem parceria com o Brasil na área de matérias-primas," *Valor Económico*, March 7, 2012, http://www.inovasc.org.br/internacional/alemaes-propoem-parceria-com-o-brasil-na-area-de-materias-primas/ (accessed August 28, 2012).

42 The World Bank, Communities and Small Scale Mining (CASM), *ASM Profile of Brazil*, February 2009, https://www.artisanalmining.org/casm/map?CO=BR (accessed November 20, 2012).

43 Members: Argentina, Bolivia, Brazil, Chile, Columbia, Costa Rica, Cuba, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Paraguay, Peru, Uruguay, and Venezuela. OLAMI, http://www.olami.org.ar (accessed August 17, 2012).

44 Kimberley Process Certification Scheme (KPCS), *Brazil*, http://www.kimberleyprocess.com/web/kimberley-process/participant/brazil (accessed September 10, 2012).

Regulatory and Industrial Policy Dialogues initiated in 2009, a subgroup is working on "non-ferrous metals and minerals."[45]

Evaluation and Outlook

The importance of the mining and mineral processing sectors for the Brazilian economy has risen steadily over recent decades. For government and business alike, promoting the mining sector also includes expanding it geographically into so-called frontier areas. Amazonia is currently the limit of mining, but that could change. This region has hardly been explored but is likely to have significant mineral resources. At the same time, protecting Amazonia's biodiversity and indigenous peoples is of great ecological and social relevance. So these diverging goals constitute a potential source of conflict. Numerous non-governmental organizations have criticized rights violations in the context of mining. In light of these challenges, the government should focus less on the geographical expansion of mining than on enhancing efficiency in an environmentally, socially, and economically sustainable manner through technological development and infrastructure support. In both areas, investment rates in Brazil are far too low.[46] Two other factors may become obstacles to dynamic development in the sector. Firstly, the lengthy debate on reforming the legal framework (which has already been going on for two years) creates uncertainties. Secondly, environmental regulation is important in order to guarantee high ecological standards. In Brazil, it is often seen as a bureaucratic obstacle.

45 European Commission, Directorate General Enterprise and Industry, ed., *International Affairs EU-Brazil*, http://ec.europa.eu/enterprise/policies/international/cooperating-governments/brazil/index_en.htm (accessed August 20, 2012).
46 Unlike other OECD countries, in Brazil the government (and not the private sector) is responsible for investment in technology, development, and innovation.

Canada

Petra Dolata

Canada is one of the world's leading producers of raw materials, with rich and varied natural resources found across its territory. A large proportion of extracted resources are exported, mainly to the United States, and the Canadian mining sector attracts large flows of foreign direct investment.

Minerals in the National Economy

Mineral and metal resources and mines can be found in all of Canada's ten provinces and three territories. Geological formations like the Canadian Shield and the mountain ranges in the west hold particularly rich deposits. For 2009, Natural Resources Canada puts known reserves at 451,000 tonnes of lead, 918 tonnes of gold, 7.3 million tonnes of copper, 215,000 tonnes of molybdenum, 3.3 million tonnes of nickel, 6,245 tonnes of silver, and 4.3 million tonnes of zinc.[1] These reserves are not evenly distributed. Ontario and Quebec are the leading provinces for gold, the Northwest Territories head the list for diamonds. Uranium is exclusively mined in Saskatchewan, while iron ore is mainly extracted in Newfoundland and Quebec. Copper is mostly mined in Ontario and British Columbia, nickel in Newfoundland and Ontario (but also in Quebec and Manitoba), indium and molybdenum are mostly extracted in British Columbia, and lead in New Brunswick.

In 2011, non-energy raw materials worth CDN$43.3 billion were produced,[2] CDN$25.3 billion from metals and CDN$18 billion from non-metallic resources.[3] In 2010, the mining and refining sector accounted for 2.8 percent of GDP, with an upward trend.[4] The sector employs approximately 308,000 people, accounting for almost 2 percent of the country's workforce. In 2010, 968 production sites were in operation, 71 producing metals and 897 non-metals. While the biggest numbers of metal-producing mines are found in Quebec (22), followed by Ontario (18), and British Columbia (12), when it comes to added value in the mining industry, Ontario leads ahead of Saskatchewan, British Columbia, and Quebec.[5] The mining industry (excluding oil sands) paid around CDN$5.5 billion in taxes and royalties to Canadian provincial (which received 54.3 percent) and federal governments (45.7 percent) in 2010.[6] Canada is the world's leading producer of potash, which is found almost exclusively in Saskatchewan, the global number two for uranium, and ranks third for aluminum and titanium ores.[7] It is among the world's five largest producers of chrysotile (asbestos),[8] diamonds, graphite, cadmium, cobalt ores, molybdenum, nickel, platinum metals, sulfur, tellurium, and titanium.[9] Canada also has great potential

1 Natural Resources Canada (NRCan), *Canadian Reserves of Selected Major Metals*, 2011, http://www.nrcan.gc.ca/minerals-metals/publications-reports/3975#T1 (accessed September 15, 2012).

2 Average exchange rate of Canadian Dollars: 0.989 US$ for 2011, 1.030 US$ for 2010, 1.142 US$ for 2009. Bank of Canada, *Monthly and Annual Average Exchange Rates*, 2012, http://www.bankofcanada.ca/rates/exchange/exchange-rates-in-pdf/ (accessed September 15, 2012).

3 NRCan, *Canada's MineraGFl Production Reaches a Record $50 Billion*, March 2012, http://www.nrcan.gc.ca/minerals-metals/publications-reports/3575 (accessed September 15, 2012).

4 NRCan, *Capital Investment Rebounds in 2010 and Is Expected to Increase Further in 2011*, June 2011, http://www.nrcan.gc.ca/minerals-metals/publications-reports/3167 (accessed September 15, 2012).

5 Mining Association of Canada (MAC), *F&F 2011: Facts and Figures of the Canadian Mining Industry*, 2011, http://www.mining.ca/www/media_lib/MAC_Documents/F&F2011-English.pdf (accessed September 15, 2012), pp. 4, 10–11. For a more detailed discussion covering specific minerals and metals see Philip M. Mobbs, "Canada [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, November 2011), pp. 5.3–5.10, http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-ca.pdf (accessed September 15, 2012).

6 MAC, *F&F 2011* (see note 5), pp. 9, 20, 26.

7 Ibid., annex 4, pp. 102–103; Philip M. Mobbs, "Canada [Advance Release]" (see note 5), p. 5.1.

8 In September 2012 Canada declared it was ending asbestos mining; Stephen Chase and Les Perreaux, "Ottawa Does U-Turn on Asbestos Mining, *Globe and Mail*, September 14, 2012, http://www.theglobeandmail.com/news/politics/ottawa-does-u-turn-on-asbestos-mining/article4545704/ (accessed September 15, 2012).

9 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/Welt

when it comes to critical raw materials. Out of the fourteen identified by the EU, eight are found in Canada: antimony, fluorspar, germanium, graphite, niobium, rare earths, tantalum, and tungsten.[10] Significant reserves of various rare earths are also believed to lie in the ground in Canada.[11] According to Statistics Canada, the value of metal ore and non-metallic mineral exports was almost CDN$17.5 billion in 2011 and the value of metal and non-metallic mineral products was more than CDN$44 billion,[12] more than half of which is exported to the United States. The European Union and China are further export destinations. Important as Canada may be as an exporter, it also imports metals and ores worth almost CDN$40 billion. Its trade deficit of CDN$7.6 billion (2010) for iron and steel exposes a structural weakness: Canada is competitive in production and enrichment, but not so much in processing.[13]

After China, Canada is the country with the most mining companies among the global "top 100," and mining is one of the few sectors where Canadian firms invest on a large scale internationally. Over one thousand Canadian companies are active in over one hundred countries, and possess foreign mining stakes totaling about CDN$129 billion. Canada currently accounts for about 40 percent of global spending on exploration, about 60 percent of which stays in the western hemisphere, especially in Chile, Mexico, the United States, and Argentina. The seven largest mining companies possess half of all foreign assets.[14] In 2010, Canadian mining companies invested CDN$58 billion abroad, representing almost 10 percent of all Canadian foreign direct investment.

The Canadian resource sector is very attractive for foreign investors because of its rich deposits and safe investment environment. Five Canadian provinces and territories are among the top ten regions in the Fraser Institute's Policy Potential Index of the best places to mine: New Brunswick (1), Alberta (3), Québec (5), Saskatchewan (6), and Yukon (10).[15] In 2012, Canada was the number one address for international investment in the area of non-ferrous metals, and 18 percent of global spending on exploration went to Canada.[16]

Toronto is an international financial center for mining. About 1,500 mining companies are listed on the Toronto Stock Exchange, or about 58 percent of all the world's listed mining companies. They primarily trade diamonds, iron ore, gold, potash, copper, nickel, silver, and uranium. The ten largest companies listed all possess assets estimated to exceed CDN$10 billion. 36 percent of global mining assets and 83 percent of all private financial activities in the mining sector are traded here, half of which relate to activities in Canada. The TSX Venture Exchange in particular arranges private investment between CDN$1 and 5 million and is thus attractive for smaller companies.[17]

Resource Policy

Canadian resource policy is best understood by applying a multi-level system approach. The constitution assigns wide-ranging powers over natural resources to the provinces, which differ in their raw materials mix, with specific raw materials concentrated in specific regions. These constitutional and geological factors

BergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

10 Linda-Maree Klimesch and Aarti Mona Sörensen, *Möglichkeiten deutscher Unternehmen für ein Engagement im kanadischen Rohstoffsektor*, 2011, http://www.deutsche-rohstoffagetur.de/DERA/DE/Downloads/Laenderstudie_Kanada_Dez2011.pdf?__blob=publicationFile&v=7 (accessed October 9, 2012), 13. A collection of data can be found on page 14 and a qualitative analysis on pages 15 to 19.

11 Rainer Jaensch, "Goldgräberstimmung in Kanadas Bergbau," *GTAI*, March 31, 2011, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=79740.html (accessed October 9, 2012); MAC, *F&F 2011* (see note 5), p. 89; Canadian Chamber of Commerce, *Canada's Rare Earth Deposits Can Offer a Substantial Competitive Advantage*, April 2012, http://www.chamber.ca/images/uploads/Reports/2012/201204RareEarthElements.pdf (accessed September 15, 2012).

12 Statistics Canada, *Exports of Goods on a Balance-of-Payments Basis, by Product*, CANSIM, table 228-0043, 2012, http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/gblec04-eng.htm (accessed September 15, 2012).

13 MAC, *F&F 2011* (see note 5), pp. 82–83.

14 NRCan, *Canada's Mining Assets Abroad*, January 2012, http://www.nrcan.gc.ca/minerals-metals/publications-reports/4425 (accessed September 15, 2012); MAC, *F&F 2011* (see note 5), p. 82.

15 Fred McMahon and Miguel Cervantes, *Survey of Mining Companies 2011/2012*, February 2012, http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/mining-survey-2011-2012.pdf (accessed September 15, 2012).

16 Metals Economics Group, *World Exploration Trends 2012: A Special Report from Metals Economics Group for the PDAC International Convention*, http://www.metalseconomics.com/sites/default/files/uploads/PDFs/wet2012english.pdf (accessed September 15, 2012).

17 MAC, *F&F 2011* (see note 5), pp. 11, 13, 37–39.

make it difficult to establish a comprehensive federal resource policy. In addition, most producers in Canada are private-sector non-state actors, so production and industrial location are determined only by investment and infrastructure policy.

Institutional Setting

Resource policy is mostly in the hands of the provinces (and to some extent the territories). The constitution gives the provinces vast powers over resource exploration, development, and production, as well as the regulation of mining activities. The central government is responsible only for certain territories, offshore areas, and uranium. Apart from the Nunavut Territory, which was established in 1999, all provinces and territories have their own mining legislation and their own ministry. Since the early twentieth century, exploration and production rights have not been automatically transferred to investors, but remain with the provinces, which may grant leases to private individuals and companies. These register their claim to a piece of land and commit to explore for resources within a certain period. Today, about 90 percent of the land belongs to the state as "Crown Land." This means that it is relatively easy to stake a claim.[18] Nonetheless, only a small fraction of these claims ultimately lead to commercial production.

The national government, especially Natural Resources Canada, plays an important role in scientific research, research funding, and data collection and analysis. The Canada Centre for Mineral and Energy Technology (CANMET), the CANMET Mining and Mineral Sciences Laboratories (CANMET-MMSL), Geomatics Canada, and the geological survey register potential deposits. The federal government is responsible for developing environmental standards covering national and international mining activities, and also helps design and implement environmental regulations. The *Green Mining Initiative* of 2009 led by CANMET-MMSL is responsible for footprint reduction, waste management, ecosystem risk management, and mine closure and rehabilitation.[19] The Environmental Assessment Agency (part of the environment ministry, Environment Canada) is responsible for examining the environmental impact of all new mining projects.[20] Responsibility for environmental regulations is shared by several federal institutions: Environment Canada, Fisheries and Ocean Canada, and Aboriginal Affairs and Northern Development. Where infrastructure is concerned, Transport Canada becomes involved, too, while matters involving international market access and social responsibility concerns of internationally operating Canadian companies bring Foreign Affairs and International Trade Canada and the Canadian Trade Commissioner Service into play.[21] Coordination of the different provincial and federal ministries is achieved through an annual conference of mining ministers, the Energy and Mines Ministers' Conference (EMMC).[22]

The most important industrial associations are the Mining Association of Canada (MAC) and the Prospectors and Developers Association of Canada (PDAC). Workers' organizations also play an important role, partly because unions can assert their interests quite effectively in more rural areas where there is a limited labor pool. There have been a number of significant strikes in recent years.[23] Indigenous workers play an even more important role, with the mining sector employing twice as many indigenous workers as other sectors and thus being the largest private-sector employer for this group. More than one thousand indigenous communities live in close proximity to mining sites,[24] and with many new and promising projects located in regions further north, their number is tending to rise. This gives the sector an important socio-political role. Resource companies, especially the larger ones, often negotiate agreements contain-

18 Klimesch and Sörensen, *Möglichkeiten deutscher Unternehmen für ein Engagement im kanadischen Rohstoffsektor* (see note 10), pp. 23–26.
19 NRCan, *Greening Initiative to Reduce Mining's Environmental Footprint*, 2010, http://www.nrcan.gc.ca/science/story/3573 (accessed September 15, 2012); Canadian Mining Innovation Council, *Green Mining Initiative*, http://www.cmic-ccim.org/en/pancanadiannetwork/green_mining_initiative.asp (accessed September 15, 2012).
20 Canadian Environmental Assessment Agency, *Canadian Environmental Assessment Registry*, 2012, http://www.ceaa.gc.ca/050/index-eng.cfm (accessed September 15, 2012).
21 Foreign Affairs and International Trade Canada, *Building the Canadian Advantage – A Corporate Social Responsibility (CSR) Strategy for the Canadian International Extractive Sector*, March 2009, http://www.international.gc.ca/trade-agreements-accords-commerciaux/ds/csr-strategy-rse-stategie.aspx?view=d (accessed September 15, 2012).
22 NRCan, *Canada's Annual Energy and Mines Ministers' Conference*, 2012, http://www.nrcan.gc.ca/media-room/news-release/2012/6507 (accessed September 15, 2012).
23 MAC, *F&F 2011* (see note 5), p. 60, annex 10; Philip M. Mobbs, "Canada [Advance Release]" (see note 5), p. 5.5.
24 MAC, *F&F 2011* (see note 5), pp. 59, 71–72.

ing provisions on education, employment, business development, and financial compensation with local and indigenous communities.[25]

Concepts and Strategies

Canada has no comprehensive national resource strategy. On the one hand, most of the relevant powers lie with the provinces, on the other, Canada is one of the most open and market-oriented countries regarding its resource policies.[26] Canada also considers itself a resource producer rather than a consumer and prioritizes efforts to attract foreign investment. The last major policy paper[27] dates from 1996 and was the outcome of an agreement between industry representatives, government, trade unions, indigenous groups, and environmental activists, concerning the necessity of social and environmental standards.[28] Environmental protection and sustainable development remain important features of the official Canadian government strategy today.[29] At the same time, the 1996 paper notes that resource production is a matter for the provinces and market forces, pointing out that the international competitiveness of the mining sector cannot be sustained by special treatment, and especially not by protectionism. Quite the contrary, it is for private industry to take risks and use its resources appropriately.[30] In another section, the policy paper declares that Canada is "Open for Business,"[31] with the federal government concentrating on its constitutional powers: tax cuts, international trade and investment, science and technology, and sustainable development. Dialog with indigenous groups is an important aspect of Canadian resource politics, with the hope that mining can increase economic and social cohesion, especially in more rural areas and communities.[32]

In 1998, Natural Resources Canada published another report for the mining industry, entitled *From Mineral Resources to Manufactured Products: Toward a Value-Added Mineral and Metal Strategy for Canada*. It primarily addresses the question of how to increase productivity and value added in the resource sector, identifying measures including the creation of partnerships between businesses and politics, enhancing foreign trade, investing in human capital, consideration of environmental aspects, funding innovation, science, and technology, and making Canada more attractive as an industrial location.[33]

Although no comprehensive policy document for the metals and minerals sector has been published since, that does not mean that Canada has no resource strategy. The federal government is eager to support exploration, extraction, and refining of domestic minerals, to promote Canadian investment abroad, to attract foreign investment to Canada, and to create a fair global environment for trade and investment, for instance by promoting market transparency. Another important aspect for the federal government is to diversify the markets for Canadian resources in order to decrease dependency on the United States, as is sustainable development.

The resource strategies of the provinces comprise the principles of open market access and a sound investment environment.[34] They contain social and environmental dimensions. Although Quebec is the only province to pursue an active industrial policy, discussions about royalties are frequent and provoke controversy among industry representatives.

25 Ibid., pp. 71–72.
26 Ibid., p. 87.
27 NRCan, *The Minerals and Metals Policy of the Government of Canada: Partnerships for Sustainable Development*, 1996, http://www.nrcan.gc.ca/minerals-metals/sites/www.nrcan.gc.ca.minerals-metals/files/files/pdf/poli-poli/mmp-eng.pdf (accessed September 15, 2012), p. 5.
28 NRCan, *Whitehorse Mining Initiative*, 1994, http://www.nrcan.gc.ca/minerals-metals/policy/government-canada/3882#c (accessed September 15, 2012).
29 Canadian Environmental Assessment Agency, *Canadian Environmental Assessment Act*, 2012, http://www.ceaa.gc.ca/default.asp?lang=En&n=16254939-1 (accessed September 15, 2012).
30 NRCan, *The Minerals and Metals Policy of the Government of Canada* (see note 27), p. 6.
31 Ibid., p. 8.
32 Ibid., p. 1.
33 Government of Canada, *From Mineral Resources to Manufactured Products: Toward a Value-Added Mineral and Metal Strategy for Canada* (Ottawa, 1998), http://www.nrcan.gc.ca/sites/www.nrcan.gc.ca.minerals-metals/files/pdf/mms-smm/poli-poli/pdf/val-eng.pdf (accessed September 15, 2012).
34 Ontario Ministry of Northern Development and Mining, *Ontario's Mineral Development Strategy*, 2006, http://www.ontla.on.ca/library/repository/mon/14000/259996.pdf (accessed September 15, 2012); British Columbia Ministry of Energy and Mines, *Mineral Exploration and Mining Strategy: Seizing Global Demand*, 2012, http://www.empr.gov.bc.ca/Mining/Documents/MiningStrategy2012.pdf (accessed September 15, 2012); Québec Ministry of Natural Resources, *Preparing the Future of Québec's Mineral Sector*, 2009, http://www.mrn.gouv.qc.ca/english/publications/mines/strategy/mineral_strategy.pdf (accessed September 15, 2012).

Policy Measures and Instruments

Even if there is no comprehensive federal strategy, Ottawa engages in resource policy through a multitude of measures, including initiatives for transparency and against corruption in resource-producing countries and initiatives for corporate social responsibility and environmentally sustainable practices (for example, Canadian Environmental Assessment Act and the Green Mining Initiative).

Given that Canadian mining companies are global players, the international dimension is significant. Ottawa defends trade liberalization and open market access, especially in the contexts of the WTO, OECD, and NAFTA. In recent years, discussions among the G20 about a specific role for resources have gained momentum.[35] In the 1990s, transparency and economic cooperation were already at the center of the EU-Canada Working Group on Metals and Minerals. Recently, declarations of intent to deepen bilateral German-Canadian collaboration in the resource sector were published in advance of the visit by German Chancellor Angela Merkel in August 2012. In these documents, both partners propose closer cooperation in education and sustainability, also in relation to critical resources and rare earths.[36] The Canadian mining sector hopes for successful completion of the EU-Canada Comprehensive Economic and Trade Agreement (CETA). Canada is also seeking agreements with Latin American states and special bilateral Foreign Investment Protection Agreements (FIPAs).[37] Outside Canada, the mining industry is supported by Canadian diplomatic missions. Canada's international cooperation with developing countries goes beyond industry support, emphasizing sustainability and transparency. The Canadian International Development Agency (CIDA) focuses on promoting environmentally friendly and socially acceptable resource management practices.[38]

35 NRCan, *The Minerals and Metals Policy of the Government of Canada* (see note 27), p. 22.
36 Bundesministerium für Wirtschaft und Technologie, "Heitzer: Marktpotenziale für deutsch-kanadische Zusammenarbeit im Rohstoffsektor nutzen," press release, August 14, 2012, http://www.bmwi.de/DE/Presse/pressemitteilungen, did=503530.html (accessed October 9, 2012).
37 MAC, *F&F 2011*(see note 5), p. 88.
38 Canadian International Development Agency (CIDA), *Natural Resources Management*, http://www.acdi-cida.gc.ca/acdi-cida/ACDI-CIDA.nsf/eng/FRA-102311492-LK7 (accessed December 10, 2012).

International Raw Materials Governance

The Canadian government and mining industry are interested in maintaining a good reputation as investor. In the past, there have been reports of Canadian companies acting unethically, for instance when members of Latin American death squads were hired to guard mines. In 2009, the federal government implemented a strategy to improve the social responsibility of Canadian firms abroad, including CSR consulting and binding obligations. These efforts, however, appear inadequate to some observers, who were disappointed that the Canadian House of Commons rejected a more rigorous bill (C-300) in a close vote.[39]

Concerning international efforts to improve transparency in the mining sector, Canada officially embraced EITI in 2007.[40] Since the publication of the U.S. Securities and Exchange Commission rules for transparency of payments in the resources sector,[41] this topic has also been discussed more intensely. At the beginning of September 2012, two NGOs – Publish What You Pay Canada (PWYP-Canada) and the Revenue Watch Institute – established a working group on transparency in revenue flows (the Resource Revenue Transparency Working Group) seeking to develop a framework for legally binding transparency obligations concerning payments to foreign governments in the resources sector.[42] In the past, the Canadian government has been skeptical toward such initiatives arguing that they would adversely affect smaller Canadian companies that are faced with extra costs to meet the disclosure requirements. Furthermore, it is feared that Canadian firms would find it difficult to compete with foreign rivals that do not have to adhere to such rules.[43] Canada has played an active role in promoting

39 MAC, *F&F 2011* (see note 5), p. 88; International Trade Canada, *Building the Canadian Advantage: A Corporate Social Responsibility (CSR) Strategy for the Canadian International Extractive Sector*, March 2009, http://www.international.gc.ca/trade-agreements-accords-commerciaux/ds/csr-strategy-rse-stategie.aspx?view=d (accessed September 15, 2012).
40 NRCan, *Canada's Role in the EITI: Government*, 2011, http://www.nrcan.gc.ca/extractive-industries/government/2304 (accessed May 22, 2012).
41 See also "United States" in this volume, pp. 150ff.
42 Claire Woodside (One International), *New Canadian Initiative to Improve Transparency in the Extractive Sector*, September 24, 2012, http://www.one.org/international/blog/pwyp-canada-announces-new-initiative-to-improve-transparency-in-the-canadian-extractive-sector/ (accessed October 9, 2012).
43 Shawn McCarthy, "Miners Urge New Rules, More Transparency," *Globe and Mail*, September 6, 2012, http://www.theglobeandmail.com/report-on-business/industry-news/

the international Kimberley Process. Since the diamond certification agreement was concluded, Canada has passed extensive legislation on diamond trade.[44] Of course, Canadian diamond producers benefit from this, too.

Canada's role within the G20 is more ambivalent. The prime minister likes to portray Canada as an emerging energy superpower. Recently, another picture has emerged – that of a resource giant. Internally, reports already exist that discuss the impact of this shift of emphasis. The Canadian government supports international rules on transparency, corruption, and market access and sees the G20 as a suitable institution for promoting that agenda. The discussion about critical resources is perceived more skeptically. Criticality is defined with regard to the socio-economic dimension of certain resources for Canadian regions, not so much as meaning access to resources (scarcity through trade or scarcity through production). This is the perspective of a producer that possesses a range of natural resources. Expansion of the domestic raw materials sector is driven not by reducing import dependencies but improving domestic growth and welfare. This is why so much effort goes into attracting foreign investors. And while Canada criticizes China there is also understanding for its resource policy position as long as core and strategic industries are not affected.

Evaluation and Outlook

Canadian resource policy is affected by geographic location, constitutional and historic predispositions, and extensive deposits of a multitude of resources unevenly spread across the country. This has prevented the emergence of a coherent and extensive federal resource policy. Currently, however, there is also no desire for such a strategy. With the exception of a few core industries, the country trusts the forces of the markets and relies on tax incentives to steer developments.

The international financial crisis may have led to a reduction of demand for resources, but experts at Natural Resources Canada still expect demand to grow, and point out that Canadian resources will remain available in sufficient quantities for some time. New mines have opened since 2010, and global price rises mean that not only the volume but also the value of production increased.[45] In 2010, about 70 percent of mining capacity was in use, with further increases expected as China and India draw in more resources as a result of their predicted growth.[46] Ontario and Quebec both intend to conduct substantial projects exploring the mining potential of their northern regions. The "Ring of Fire" project in northern Ontario promises the extraction of vast deposits of chromite, diamonds, copper, nickel, and platinum.[47] The Quebec government's twenty-five-year *Plan Nord* proposes investments worth over CDN$80 billion in the north of the province,[48] where large deposits of iron ore, cobalt, nickel, platinum metals, and zinc are suspected.[49] Ottawa's *Geo-mapping for Energy and Minerals* (GEM) program will run from 2008–2013 with a budget of CDN$100 million, to explore for new resource deposits, especially offshore and in the Arctic.[50]

The low population density, however, has led to bottlenecks in skilled labor and adversely affects capital mobilization. A study by Ernst and Young expects 40 percent of the current workforce in the mining sector to retire by 2014.[51] And the vast distances to new mines require extensive infrastructure projects. Canada is thus looking abroad to attract capital and labor. Although its resource base is diverse, the country still faces major challenges such as its large carbon footprint and its vulnerability to international market fluctuations as a raw materials exporter. The government considers scarcity of personnel and capital to be its main challenges.

energy-and-resources/miners-urge-new-rules-more-transparency/article4522044/ (accessed September 15, 2012).

44 NRCan, *Canada: A Diamond-Producing Nation*, 2011, http://www.nrcan.gc.ca/minerals-metals/business-market/3630 (accessed September 15, 2012).

45 Philip M. Mobbs, "Canada [Advance Release]" (see note 5), p. 5.2.

46 MAC, *F&F 2011* (see note 5), pp. 10–11, 40.

47 Ontario Ministry of Northern Development and Mines, *Ring of Fire Secretariat*, 2012, http://www.mndm.gov.on.ca/en/ring-fire-secretariat (accessed September 15, 2012).

48 Government of Quebec, *Plan Nord: Building Northern Québec Together*, 2012, http://plannord.gouv.qc.ca/english/index.asp (accessed September 15, 2012).

49 NRCan, *Mineral Production*, March 2012, http://www.nrcan.gc.ca/minerals-metals/publications-reports/3575 (accessed September 15, 2012); Klimesch and Sörensen, *Möglichkeiten deutscher Unternehmen für ein Engagement im kanadischen Rohstoffsektor* (see note 10), pp. 32–34; MAC, *F&F 2011* (see note 5), pp. 39–40.

50 Richard Walker, *Geo-mapping for Energy and Minerals: New Geoscience Maps for Nunavut*, 2011, http://www.nrcan.gc.ca/media-room/news-release/32b/2011-03/mineral/1577 (accessed September 15, 2012).

51 MAC, *F&F 2011* (see note 5), p. 59.

Another important factor to bear in mind is that the strength of the Canadian dollar (due to rising resource prices) makes exports more expensive. Domestically, the resource sector plays an important role in regional, social, and structural policies. The development of new projects in the provinces and territories functions as regional structural policy and development policy for indigenous communities. This also leads to conflicts with affected populations.

Canada's rich deposits of natural resources allow it to diversify its activities away from the United States. China and India are considered important future trading partners. Market access and corporate responsibility remain priorities of resource policy, especially regarding Canadian mining activities in Latin America. At the same time, the government has to address debates about strategic resources, even if Canada has distinct views as a major resource producer. Geopolitical considerations and partnerships with the United States and Europe mean that Canada cannot neglect these discussions. While the G20 is seen as an important forum in this regard, the role of Canada is perceived more of that of a passive follower than an active player. From an economic standpoint, there are many links with countries like China. In the future two questions will be particularly significant: What will happen if Canada's economic and security interests diverge? And will Canada's foreign policy increasingly be driven by its resource wealth?

China

Hanns Günther Hilpert

Since the turn of the century, China's spectacular economic rise has shaped global resource markets. The dynamic growth of the country's consumption of raw materials and the resulting increase in import demand are the principal forces behind the global mining and commodities boom. At the heart of China's sophisticated raw materials policy lie concerns about its own security of supply. The objective of underpinning economic growth, industrialization, and modernization with an adequate supply of raw materials takes priority over considerations of global governance.

Minerals in the National Economy

Mineral raw materials are the tangible base of China's dynamic economic expansion, with average growth rates of 10 percent over the past three decades. Infrastructure development in the world's third-largest country by area, urbanization of its most populous nation (of about 1.3 billion), advancement to become the largest industrial manufacturer, and satisfaction of the consumer demands of a growing middle class: none of these would have been possible without a reliable resource base. Thus it can be expected that China's consumption of minerals and metals will continue to grow for quite some time in absolute terms, per capita, and per unit of GDP.[1]

Thus it comes as no surprise to which extent China dominates global production, consumption, trade, and pricing of raw materials. Currently, as the 2010 global market shares demonstrate, production of bulk metals takes place primarily in China: aluminum 39.1 percent, copper 33.9 percent, lead 44.7 percent, nickel 5.2 percent, pig iron 57,0 percent, steel 44.5 percent, tin 40.6 percent, and zinc 29.8 percent. With an overall share of 25.4 percent of global production of non-energy raw materials (by weight) in 2010, China is the clear global leader.[2] In 2010 it also maintained an extraordinarily strong position for production of most steel additives, precious and rare metals, and industrial minerals.[3] The country's even larger shares of consumption in the same year indicate the extent to which developments are driven by demand: aluminum 39.8 percent, copper 38.4 percent, lead 44,0 percent, nickel 39.3 percent, steel 44.9 percent, tin 41,0 percent, and zinc 42.5 percent.[4]

China is in the fortunate position of being able to cover a large proportion of domestic demand from domestic sources, as it is endowed with ample mineral deposits. It possesses the world's largest reserves of antimony, barite, bismuth, graphite, gypsum, indium, molybdenum, rare earth elements, silicon, strontium, tin, titanium, tungsten, and vanadium, and the second-largest reserves of cadmium, diatomite, lead, lithium, magnesium, and zinc, as well as occupying a leading position on iron ore, fluorspar, gold, and mercury.[5]

1 On the debate about the connection between economic growth and metal consumption, and for a forecast of Chinese metal consumption, see Huw McKay, Yu Sheng, and Ligang Song, "China's Metal Intensity in Comparative Perspective," in *China the Next Twenty Years of Reform and Development*, ed. Ross Garnaut, Jane Golley, and Ligang Song (Canberra: ANU E, 2010), pp. 73–98; considering developments in China's neighbors (Japan, South Korea, Taiwan) and China's particularities, maximum consumption of steel is projected to be 700 to 800 kg per capita per year.

2 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

3 BMWFJ, *World Mining Data 2012* (see note 2). No details for indium.

4 BGR and DERA, eds., *Deutschland – Rohstoffsituation 2010*, DERA Rohstoffinformationen (Hannover, December 2011), pp. 117–36, http://www.bgr.bund.de/DE/Gemeinsames/Produkte/Downloads/DERA_Rohstoffinformationen/rohstoffinformationen-07.pdf?__blob=publicationFile&v=7 (accessed October 15, 2012).

5 U.S. Geological Survey (USGS), ed., *Mineral Commodity Summaries 2012* (Reston, January 2012), http://minerals.usgs.gov/minerals/pubs/commodity/rare_earths/mcs-2012-raree.pdf (accessed October 15, 2012). The USGS data may be unreliable, as China employs its own methods for recording of data and grants the USGS only restricted access, see Pui-Kwan Tse, "The Mineral Industry of China" (China [Advance Release]), in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, February 2012), p. 9.13, http://minerals.usgs.gov/

In 2010 the mining sector employed 5.6 million people, or 4.3 percent of the working population.[6] According to the national statistics office, mining accounted for 4.9 percent of national value added in 2009. The commodity sector has a dual structure: large state-owned enterprises with in some cases modern plants, high productivity, and a leading position in the world market – such as Chalco (aluminum), Baosteel and Hebei Iron & Steel (steel), Jinduicheng (molybdenum), Baotou Steel & Rare Earth (rare earth elements), Yunnan Tin (tin), Zijin Mining (gold, copper, zinc), and Minmetals (metal trading) – coexist with numerous smaller, privately or cooperatively owned companies with small output, low productivity, environmentally harmful methods, and sometimes hazardous working conditions. Informal mining, including criminal structures, is not a rarity.

In 2010, China's external trade in raw materials amounted to US$712.5 billion, or 24 percent of its total external trade. China is the world's leading exporter of antimony, barite, fluorspar, graphite, indium, rare earth elements, and tungsten. But imports of raw materials far exceed exports, with bauxite, iron ore, copper, and nickel especially noteworthy in terms of value and volume. While China has large deposits of these minerals, domestic ores are of poor quality and correspondingly expensive to refine. The country is also highly dependent on imports of chromium, cobalt, potash, manganese, platinum, tantalum, and zirconium. In terms of value, China's metal and mineral imports in 2010 amounted to 14.7 percent of its total imports, which is high in international comparison (see above).

The utilization of secondary raw materials in industrial production is growing. A vibrant recycling industry is now developing, initiated by the *Recycling Economy Promotion Law* passed in 2008 and implemented in 2009, and the national recycling quota is growing fast. China has become a key importer of scrap metals from abroad, with its aluminum industry increasingly processing scrap, about half of which is imported.[7]

The Raw Materials Policy

Since the reform process began under Deng Xiaoping, economic growth has been the main political objective of China's state and party leaderships. Given that economic growth is central to modernization, creating prosperity, and preservating the power of the Communist Party (CCP), the great political value of a secure supply of raw materials (and energy) is obvious. In the Chinese understanding, the state has a crucial role to play in achieving this objective. Historically, China has always been a centralistic agrarian society, in which control over resources (land and water) constitutes a source of political power. The legacy of Maoist paradigms for exploitation and mobilization of resources, preference for national independence and self-sufficiency, and governmental influence on industrial investment can still be felt.[8]

Institutional Setting

The relevant actors for China's mining sector can be broadly divided into three groups: center, economy, and provinces. At the top level are the central institutions of the party and the state. The CCP Politburo, the National Congress (parliament), and the State Council (cabinet) are the most influential actors in China's authoritative decision-making process. On raw materials policy they act only in exceptional cases and in a rather declaratory way. The most important executive organs further down are the Ministry of Land and Resources (MOLAR), the Ministry of Industry and Information Technology (MIIT), the Ministry of Foreign Trade and Economic Cooperation (MOFTEC), the Ministry of Environmental Protection (MOEP), the National Development and Reform Commission (NDRC), and numerous central agencies such as the Chinese Geological Survey (CGS), the Chinese State Reserve Bureau (SRB), and the State-owned Assets Supervision and Administration Commission of the State Council (SASAC). While MOLAR handles the administration of exploration and production of raw materials (as well as soil protection), the raw materials smelting and processing industries belong to the MIIT portfolio. MOFTEC regulates foreign trade and direct investments, but is bound by guidelines set by individ-

minerals/pubs/country/2010/myb3-2010-ch.pdf (accessed October 11, 2012).

6 Tse, "The Mineral Industry of China" (see note 5), p. 9.1.

7 Michael Komesaroff, "Waste Not, Want Not," *China Economic Quarterly* 16, no. 1 (2012): 9.

8 For China's energy and resource policy paradigms see Philip Andrews-Speed, *The Institutions of Energy Governance in China*, Note de l'Ifri (Paris, January 2010), pp. 18–20.

ual ministries and central state commissions. MOEP is responsible for water protection and emission control, while NDRC holds a preeminent position as it shoulders overall economic responsibility for macroeconomic control and industrial policy planning, as well as sectoral competence for energy, chemicals, and large-scale construction projects. Sometimes labeled the "small state council," the NDRC controls government investment and is centrally in charge of the country's economic policy.

Secondly, numerous private and public enterprises are involved in mining, production, refining, and processing, with a wide range of size and productivity. The raw materials sector is organized in quasi-public professional associations, such as the Mining Association (CMA), the Iron and Steel Association (CISA), the Nonferrous Metals Industry Association (CNIA), and the Rare Earth Industry Association. Besides representing interests, these associations also fulfil statutory tasks. State-owned enterprises (SOEs) and their directors occupy leading positions in the political hierarchy. While their management decisions are profit-oriented, they have the power to influence decisions at the central level.

The third and de facto most important group of actors consists of regional and local government and administrative institutions. They grant mining licenses, environmental permits, and explosion permits, giving them the power to promote, permit, or prevent investments, or to actually enforce centrally directed capacity reductions. They monitor compliance with environmental and health and safety legislation, and possess legislative powers of their own. On the other hand, they impose corporate and resource taxes on local enterprises and bear political responsibility for local growth and employment, and thus pursue a regionally focused industrial policy agenda.

Within this institutional setting, raw materials regulation is both a "top-down" and a "bottom-up" process. While in principle the central ministries and authorities are responsible for formulating national laws and decrees, the consensus-based legislative process means that SOEs and provinces are also involved. In the end the legislative outcome amounts to vague rules that more resemble political declarations of intent than administrative regulations. While administrative implementation and oversight of centrally enacted regulations lie with the provinces, districts, and communities, Beijing's monotoring tools to control them are inadequate. Whether or not national environmental and occupational safety laws, investment requirements, and restrictions are observed becomes a matter for local negotiations between SOE directors, private enterprises, and local cadres, who bargain over the distribution of the considerable profits of mining and raw materials production, with the central government playing only a supporting role. However, Beijing is not entirely powerless in this game: flagrant violations of environmental laws or cases where corruption becomes publicly known may provoke central intervention, and all decisive actors are subject to regular internal assessment as CPC members.[9]

The fragmented and chaotic system within which China's mining and raw materials industries operate has in fact generated considerable production growth over the past decades and neutralized deeply entrenched fears of supply shortage. Nevertheless, success in production cannot obscure systemic shortcomings. Due to its weak position within the executive hierarchy, MOLAR is unable to fill its role as the decisive instance on raw materials policy. Without consistent leadership and decision-making powers, coherent regulation on the ground is impossible. An absence of regulatory transparency, the perpetuation of inefficient production, and great deficits in environmental protection and occupational safety are the consequences of these structures.

Concept and Strategies

The de facto priority of China's raw materials policy is security of supply. Yet, there is no explicit strategy stating objectives, preferences, measures, and instruments – neither for developing mining and production nor for satisfying demand. At best, there are strategies for particular products such as rare earth elements. Only the NDRC's five-year plans or statements by the State Council, MIIT, and MOLAR hint at objectives currently pursued. The white paper *China's Policy on Mineral Resources* published by the State Council in 2003 is thus far the only official report to include all relevant areas and aspects of Chinese resource policy.[10] It remains valid, even though the postulated policy has been largely overtaken by events.

9 Similar institutional frameworks can be found China's energy policy and energy economy, see Andrews-Speed, *The Institutions of Energy Governance in China*, pp. 14–30.
10 Information Office of the State Council, *China Policy on Mineral Resources*, http://www.gov.cn/english/official/2005-08/17/content_24165.htm (accessed August 31, 2012).

The white paper emphasizes the importance of minerals as the basis for modernization, providing an overview of the geological and economic situation of raw materials in China (chapter I) and the development of the legal context (VI), defining objectives and priorities for raw materials policy (II), and outlining instruments and measures for the three most important objectives: expansion of capacity and production (III), internationalization by means of investment and trade (IV), and environmental protection and sustainability (V).

As a concrete translation of the white paper, MOLAR's *National Plan on Mineral Resources 2008–2015* provides quantitative production targets and identifies metals and minerals whose exploitation should be increased.[11]

The structure of the white paper for rare earth elements published by the State Council in June 2012 follows that of the white paper of 2003. A detailed description of China's rare earths industry including its various problems (I) is followed by chapters on principles and targets (II), resource protection and production (III), environmental protection (IV), modernization and processing (V), and the international level (VI). The publication describes China's leading position in the sector, identifies goals of environmental protection, consolidation, and technological modernization, and justifies in detail the practice of export restrictions.[12]

The *Strategic Roadmap for Seeking Mining Breakthroughs* (2011–2020), approved by the State Council on October 19, 2011, states concrete objectives for intensifying exploitation, expanding production, and increasing the resource efficiency of eleven strategic minerals (including iron ore, potash, and copper), where China is more than 50 percent dependent on imports.[13]

China's national five-year plans that are drawn up by the NDRC include macroeconomic guidelines for investment and energy consumption as well as sector-based targets, currently for 2011 to 2015. In order to enable the mining and raw materials sectors to ensure China's raw materials supply, the plan calls for exploration efforts to achieve a geological breakthrough within five years and lead to the exploitation of larger sources within the same period.[14]

The annual investment lists identifying promoted, accepted and non-promoted sectors, which are published by the NDRC, provide an important legal framework. These lists are embedded in long-term industrial policy planning, such as the modernization of the ten largest industries, including steel and non-ferrous metals, or the objective of becoming an innovative economy by 2020 and the world's leading economy by 2050. In addition, the government's decision to lower national energy consumption and CO_2 emissions forced the closing of smaller and outdated smelters and the consolidation of the mining sector.

On the basis of these plans and concepts, the official objectives of China's raw materials policy can be summarized in eight points: (1) expansion of domestic production; (2) technological modernization of production and processing; (3) development and industrialization of the interior provinces; (4) consolidation of the raw materials industry; (5) increase energy and resource efficiency; (6) develop strategic reserves; (7) environmental protection; (8) direct investment in foreign sources. An integrated approach encompassing mining, smelting, and processing through to downstream manufacturing can be observed.

However, raw materials policies and plans designed in Beijing do not always harmonize with the rough reality of China's mining regions. In fact, commitment to central concepts, strategies, and plans on the provincial, district, and municipal levels is very limited. Especially with regard to environmental protection and incoming foreign direct investment, the mineral policies white paper is more a diplomatic statement than a decisive blueprint. While foreign know-how is welcomed in the oil and gas sectors, the foreign presence in mining is limited to a few gold mines. Many investors have in fact had to pull out. In general, local

11 Pui-Kwan Tse, "The Mineral Industry of China," in USGS, *2008 Minerals Yearbook: China*, vol. 3, *Area Reports, International* (Reston, August 2010), p. 8.2, http://minerals.usgs.gov/minerals/pubs/country/2008/myb3-2008-ch.pdf (accessed October 11, 2012).

12 Information Office of the State Council, *Situation and Policy of China's Rare Earth Industry*, http://news.xinhuanet.com/english/business/2012-06/20/c_131665123.htm (accessed August 31, 2012).

13 Guowuyuan Bangongting, *Guowuyuan Changwu Huiyi tongguo Zhao kuang tupo zhanlüe xingdong gangyao (2011–2020 nian)* [General Office of State Council, Plenum of the standing committee of the State Council passed the "action plan for the breakthrough strategy for the exploitation of natural resources"], Beijing, 2011, www.chinania.org.cn/html/zhengcefagui/falvfagui/2011/1026/1718.html (accessed October 26, 2012).

14 Agnieszka Winnicka and Joao Santos, *China Industrial Policy: Implementation of the 12th Five Year Development Plan (2011–2015)*, delegation of the EU to China, Beijing 2012, unpublished manuscript.

policy implementation is far more important than central planning.

Policy Measures and Instruments

Exploration, Production, and Processing

Domestic exploration efforts are currently being stepped up to meet high domestic demand. Under Chinese market economy conditions, exploration is nowadays conducted by commercial actors rather than state agencies.[15]

Regional planning shapes the national development of the mining and raw materials economy. Industrial zones for smelting, processing, and downstream manufacturing have been developed in close proximity to deposits of coal, oil, iron ore, copper, and rare earths to efficiently exploit resources and create industrial clusters. The sub-division into five economic regions in the latest five-year plan foresees developing mining and refinery centers in the energy- and resource-rich west of the country, where wages and electricity costs are considerably lower than in the east. By relocating to the west, aluminum smelters, for example, are able to lower their production costs by about one third.[16]

With the objectives of modernizing the sector, enhancing production (for example by increasing yield rates), and improving resource efficiency, the central and regional levels intensely regulate the mining sector through diverse requirements on minimum production output, minimum capacity, environmental protection, occupational safety, and technology.

Industrial Consolidation

For many years, consolidation and restructuring to create a small number of large enterprises has been a stated objective for the raw material sector. Administrative efforts focus on both the mining sector itself and the subsequent primary industries.

Consolidation seeks to improve energy and resource efficiency, environmental protection, mine and occupational safety, productivity, containment of crime and smuggling, and exercise of authority and control. With the realization of economies of scale and technological learning effects, the remaining large-scale SOEs are expected to achieve larger profit margins. Mandatory requirements and centrally administrated mergers are to accomplish the restructuring. The creation of efficient, large, internationally competitive units thriving as Chinese "national champions" on the world markets is the goal.[17] However, the central level does not really succeed in enforcing its own rules, for example to restrict production capacity. For instance, in 2010, the illegal exploitation of rare earths could only be contained by deploying the People's Liberation Army.[18] Moreover, regulations on minimum production capacity, application of technology, and environmental protection have tended to stimulate investment in capacity expansion and modernization rather than reducing production capacity. Thus provincial consolidation efforts end up reducing the number of enterprises, but not their capacity, while consolidation extending across provincial boundaries requires a great deal of political effort.[19]

Industrial Policy

China's capital- and resource-intensive industrialization is supported by a favorable macroeconomic framework. Although the state has not provided direct financial transfers for domestic enterprises since 2005, prices for land, environment, capital, and foreign exchange are still politically determined. Low-interest credit, partial subsidies for energy, political pricing in conjunction with allocation of industrial sites, and almost free use of the environment all function as subsidies for primary producers and manufacturing. As a result, these accounted yearly for 8 to 12 percentage points of domestic value added from 2000 to 2008. This reduction in price factors spurs corporate profits and is responsible for lopsided investment-driven eco-

15 General Office of the State Council, *Plenum of the standing committee of the State Council passed the action plan for the breakthrough strategy for the exploitation of natural resources*, Peking 2011, http://www.chinania.org.cn/html/zhengcefagui/falvfagui/2011/1026/1718.html (accessed October 26, 2012).

16 Tse, "The Mineral Industry of China" (see note 5), pp. 9.1–9.2; Michael Komesaroff, "Off to Desert Pastures," *China Economic Quarterly* 15, no. 4 (2011): 8–10.

17 Peter Thomas in der Heiden, *Chinese Sectoral Industrial Policy Shaping International Trade and Investment Patterns – Evidence from the Iron and Steel Industry*, Duisburger Arbeitspapiere Ostasienwissenschaften 88/2011 (Duisburg, 2011), pp. 7–9; Michael Komesaroff, "Smelters Away," *China Economic Quarterly* 12, no. 2 (2008): 10–12 (10); Michael Komesaroff, "Metals: Good Golly Miss Moly(bdenum)!," *China Economic Quarterly* 11, no. 2 (2007): 8–10.

18 Patti Waldmeir, "Good Luck Beijing's Rare Earth Police, You'll Need It," *Financial Times*, May 5, 2010.

19 For aluminum: Komesaroff, "Smelters Away" (see note 17); for steel: in der Heiden, *Chinese Sectoral Industrial Policy* (see note 17), pp. 7–9.

nomic growth and the development of industrial overcapacity.[20] Large, financially sound, and well-capitalized state-owned enterprises are privileged.

Promotion of industrialization and industry embedded in a macroeconomic framework constitutes a powerful competitive advantage on the international resource markets. Chinese resource consumers are enabled to pay higher prices for raw materials than their foreign competitors. Strong Chinese purchasing power in connection with the enormous volume of demand vigorously pulls in imports, which are largely handled by the Shanghai Metals Exchange (SME). Chinese market power limits the availability of numerous metals to foreign consumers that have to pay higher prices than their Chinese competitors or be content with lower quality.[21] Accordingly, Chinese enterprises enjoy a supply advantage.

These framework conditions, which are favorable for industrial investment, also provide fertile ground for a raw-materials-based industrial policy. In order to maximize both domestic value added and domestic employment gains in downstream production stages, central and regional authorities exercise broad influence on investment, production, foreign trade, and technology transfer by means of low-interest loans, high-tech-driven industrial location policies, and industrial regulation favoring domestic enterprises.[22] Due to its low production costs, virtually unlimited domestic demand, and intense domestic competition, the Chinese raw materials and primary industry sector quickly developed into a dominant power on the world markets and pushed foreign competitors aside through price pressure. These developments are well documented for the sectors of steel[23], aluminum[24] and rare earths.[25] Less well known is China's dominant position in molybdenum, magnesium, fluorspar, graphite, and tungsten.

Export Restrictions

China regulates its foreign trade in raw materials, refined, and semi-finished products to improve its security of supply and strengthen domestic value added, both in processing and in downstream manufacturing. Measures are imposed primarily on the export side, where duties, quotas, obligatory export licenses, mandatory minimum prices, prohibition of third-country refining, and suspension of value-added tax refunds restrict the volume or raise the price of exports. These measures are applied to both commodity metals and to those metals and minerals where China is a dominant world market supplier due to its large domestic deposits (rare earth elements, antimony, fluorspar, gold, graphite, indium, magnesium, molybdenum, silicon, silver, and tungsten).[26] MOFTEC, MOEP, the General Administration of Customs (GAC), and the China Chamber of Commerce of Metals Minerals and Chemicals Importers and Exporters (CCCMC) are responsible for implementing these measures. Confronted with foreign criticism and official complaints to the WTO by the European Union, the United States, and Japan, export restrictions are now officially justified in terms of environmental and resource protection.

Taken together, these measures may result in a price difference of more than 30 percent between China and the world market.[27] While they improve the market supply in China, foreign raw materials consumers suffer a competitive disadvantage in terms of prices and availability. While many countries em-

20 For an analysis and quantitative assessment see Yiping Huang and Bijun Wang, "Rebalancing China's Economic Structure," in *China: The Next Twenty Years of Reform and Development*, ed. Ross Garnaut, Jane Golley, and Ligang Song (Canberra: ANU E, 2010), pp. 302–10.

21 For a report from the perspective of the affected enterprises see Rüdiger Kiani-Kreß, "Chinas Manipulative Rohstoffbörse," *Wirtschaftswoche*, November 25, 2009, http://www.wiwo.de/unternehmen/blei-chinas-manipulative-rohstoffboerse/5596100.html (accessed September 20, 2012).

22 Hanns Günther Hilpert, *Chinas globale wirtschaftliche Herausforderung: Für eine kohärente Außenwirtschaftspolitik Europas*, SWP-Studien 29/2010 (Berlin: Stiftung Wissenschaft und Politik, December 2010), p. 23.

23 in der Heiden, *Chinese Sectoral Industrial Policy* (see note 17).

24 Komesaroff, "Smelters Away" (see note 17); Komesaroff, "Off to Desert Pastures" (see note 16).

25 Hanns Günther Hilpert and Antje Elisabeth Kröger, "Seltene Erden – Die Vitamine der Industrie," in *Konfliktrisiko Rohstoffe? Herausforderungen und Chancen im Umgang mit knappen Ressourcen*, ed. Stormy-Annika Mildner, SWP-Studie 5/2011 (Berlin: Stiftung Wissenschaft und Politik, February 2011), pp. 163–67.

26 For an up-to-date overview see Bundesverband der Deutschen Industrie e.V. (BDI), *Übersicht über bestehende Handels- und Wettbewerbsverzerrungen auf den Rohstoffmärkten*, unpublished manuscript (Berlin, 2012), pp. 7–43; European Union Delegation to China and Mongolia, *Summary Note on Recent Developments on China's Export Quotas on Raw Materials* (Beijing, 2012); for the example of coking coal see in der Heiden, *Chinese Sectoral Industrial Policy* (see note 17), pp. 11–19.

27 For the example of rare earths, see Jane Korinek and Jeonghoi Kim, *Export Restrictions on Strategic Raw Materials and Their Impact on Trade*, OECD Trade Policy Working Paper 95 (Paris: OECD, March 29, 2010), p. 16.

ploy export restrictions on resources, it is China's restrictions that are mostly responsible for broad market disturbances and distortion of competition. Such restrictions exert detrimental effects wherever the exporting country is large enough to be relevant for global supply. Since China holds considerable power on the international raw materials markets and demand is mostly price-inelastic, Chinese export restrictions result in significant price increases on the world market and provoke supply shortages.[28]

Raw Materials Investment Overseas

In order to guarantee supplies to its domestic industries, China's raw materials sector follows the official line of "two markets – two resources" and invests massively in developing and exploiting foreign sources. According to the National Statistics Office, while Chinese enterprises invested only US$40.6 billion in international mining until the end of 2009, the figure exploded to US$101 billion in 2010 and US$219 billion in 2011.[29] China's raw materials economy is active worldwide, wherever there is an opportunity to exploit new sources or buy into established deposits and producers by means of acquisition or equity participation. So far, the regional focus has been on Australia, Canada, Asia (Afghanistan, Indonesia, Philippines), Latin America (Brazil, Peru, Venezuela), and Africa (DR Congo, Guinea, Liberia, Zambia). Beside the large SOEs, there are many smaller private investors that can operate mostly below the official radar in Asian and African markets.

In view of the strategic and financial dimensions, various central agencies (NDRC, SASAC, MOFTEC) support and monitor foreign mining investments financially, administratively, and politically.[30] SOEs receive low-interest loans, for example from the China Development Bank or the Export-Import Bank of China, have access to special capital funds,[31] and can insure themselves against political risk. There is little specific information on the degree of financial advantage, but experts believe that with grace periods extending up to thirty years the terms are exceptionally favorable.

Chinese investments are of course also financially attractive for developing countries rich in raw materials. Recipients, especially in Africa, receive development packages (ODA) for local infrastructure and/or loans with advantageous interest rates and terms. Due to their great experience with energy, railroad, highway, and seaports construction projects, and because wages are relatively still low in China, Chinese enterprises are highly competitive in the infrastructure market, especially in Africa. The volume of ODA credits is considerable. With US$110 billion, China provided more development loans than the World Bank in 2010 and 2011.[32] Moreover, China is a politically attractive partner, since it follows the principle of non-interference in the domestic affairs of partners and has no reservations about cooperating with authoritarian regimes.[33]

Considering the enormous dimensions of the investment process, it should come as no surprise that there have been numerous resource conflicts and commercial failures. Firstly, as outsiders and newcomers, Chinese SOEs have come into conflict with established Western enterprises and structures. In order to meet increasing domestic demand for raw materials, they have had to overbid foreign competitors, buy up established resource companies, interfere in established business relations, or move to politically sensitive locations (Iran, Myanmar, Sudan, Zimbabwe). Secondly, illegal mining organized by Chinese traders results in destruction of the environment, loss of licensing and tax revenues for local authorities, and weakening of the local state due to the development of criminal structures.[34] Thirdly, numerous mining operations are in difficulties: the development costs for an iron ore mine in Western

28 Hilpert, *Chinas globale wirtschaftliche Herausforderung* (see note 22), p. 22.

29 Data from the mining association (CMA); see *Commodity Discovery Fund, Chinese Mining Investments in Africa Increased by $140 Billion Last Year*, www.cdfund.com/en/blog-eng/chinese-mining-investments-in-africa-increased-by-140-billion-last-year/ (accessed September 28, 2012).

30 in der Heiden, *Chinese Sectoral Industrial Policy* (see note 17), pp. 20–24.

31 The Fund for Mining Rights to Overseas Mineral Resources, the Fund for Economic and Technical Cooperation Overseas, the Fund for Reducing Risk in Prospecting of Overseas Mineral Deposits, and the China Africa Development Fund are important; see in der Heiden, *Chinese Sectoral Industrial Policy* (see note 17), p. 21.

32 Geoff Dyer, Jamil Anderlini, and Henry Sender, "China's Lending Hits New Heights," *Financial Times*, January 17, 2011.

33 For details of economic cooperation between China and Africa see Deborah Brautigam, *The Dragon's Gift: The Real Story of China in Africa* (Oxford: Oxford University Press, 2009); Helmut Asche and Margot Schüller, *Chinas Engagement in Afrika – Chancen und Risiken für Entwicklung* (Eschborn: GTZ, 2008).

34 On illegal mining by Chinese enterprises in Indonesia and the Philippines see John McBeth, "Mineral Depletion in Philippines and Indonesia: Plundering Ways of Chinese Mining Firms," *Straits Times*, September 26, 2012.

Australia have increased from US$1.9 to US$7.1 billion; local workers and a Chinese manager have been killed in labor disputes at the Chambishi copper mine in Zambia; Chinese investors are involved in numerous labor, environmental, and land ownership conflicts with local communities in Papua New Guinea and Peru. These examples demonstrate that Chinese enterprises yet have to learn how to deal with legal regulation, with a critical public, and with independent unions, or how to compensate local communities.[35]

Reserves and Stockpiling

As laid out in the white paper of 2003, developing reserves and stockpiling are inherent to national security of supply. Central responsibility resides with the State Reserve Bureau (SRB), which is answerable to the NDRC. Physical stockpiling is the responsibility of the provinces. Reserves of commodity metals (such as aluminum, copper, iron, tin), a number of rare metals (such as chromium, lithium, manganese, molybdenum, rare earth elements, selenium, tantalum, tungsten, vanadium, zirconium), and potash are held, but there is no official list of strategic metals and minerals. Instead, the SRB reserves the right to pragmatically decide which raw materials should be stockpiled in what quantities on an ad hoc basis in relation to forecast demand. Transparency of volumes and flows are avoided to prevent market speculation. The underlying objective of reserves and stockpiling is to avoid price fluctuations and critical shortages.

Evaluation and Outlook

China's modernization and industrialization will not fail due to lack or uncertainty of supply of metals or minerals. Despite deficits in cohesion and transparency, its raw materials policy is effective and successful. A number of factors contributed to privileged access to raw materials for Chinese industrial enterprises: large domestic deposits, the enormous pull on imports by Chinese demand, priority for domestic consumers through export restrictions, and extensive exploitation of foreign sources. China's raw materials policy has certainly made an important contribution to its rapid industrialization and the associated strong growth rates. China does not generate its resource rent by maximizing profits from the sale of national raw materials, but by creating added value and employment domestically. Nevertheless, its raw materials policy rather resembles the sorcerer's apprentice who is no longer able to control the spirits he called. In view of growing overcapacity, pervasive environmental problems, and raging corruption and criminality at the province and district levels, developments in China's mining and raw materials sector seem almost unmanageable. The activities of Chinese enterprises abroad are even less controllable.

The chances of integrating China into international raw materials governance seem poor. If it cannot enforce coherent and transparent regulation within its own borders, efforts on an international level must be viewed with even greater skepticism. While China's main objective is access to existing and new sources of raw materials, Western governance initiatives are fearfully regarded as a further supply risk. Nationalist currents even view Western regulatory proposals as hidden attempts to obstruct China's rightful economic rise. Instead of transparency, China would rather make arrangements for a global competition policy to prevent oligopolistic price manipulation by multinational resource companies, for example by restraining supply and production. In its pursuit of national autonomy in raw materials, China will rely on its own strength – the domestic demand power of its markets and the financial power of state-owned enterprises – rather than on untested international agreements.

35 Michael Komesaroff, "Screwing up in Foreign Climes," *China Economic Quartely* 15, no. 2 (2012): 9–11.

European Union

Stormy-Annika Mildner and Julia Howald

The EU produces numerous metals and many industrial minerals and rocks. With respect to high-tech metals, however, it is strongly dependent on imports from often highly concentrated supply sources. In early 2011, the European Commission issued a comprehensive strategy paper aiming to secure European industry's supply of critical materials. Because raw materials policy is a field where competences are shared between the EU and its member states, the success of the strategy will depend strongly on the member states' willingness to follow the Commission's sometimes very ambitious proposals.

Minerals in the National Economy

With 6.5 percent of global production of non-energy raw materials (by weight, 2010), the EU is one of the G20 members with strong raw materials production. Its twenty-seven member states produce a variety of raw materials. Their share of global production is especially high with respect to industrial minerals. In terms of their significance in world production, the following five stand out (figures for 2010): feldspar (almost 56 percent of world production), perlite (45.1 percent), kaolin (36.6 percent), diatomite (27.7 percent), and salt (21.0 percent).[1] EU member states also posess metal resources including copper, iron, silver, and tin, which satisfy part of domestic demand.

Germany is the top raw materials producer in the EU, responsible for 25.1 percent of total EU production in 2010, followed by Sweden (11.5 percent), France (11.0 percent), Spain (9.9 percent), Italy (8.5 percent), and the United Kingdom (6.4 percent). Estonia, Belgium, and Luxemburg produced no non-energy mineral raw materials in 2010.

Some EU members are among the world's leading producers of secondary raw materials, although recycling rates differ strongly between materials and countries. Germany ranked first among EU members in 2010, recycling 45 percent of municipal waste. Bulgaria came last with no recycling at all.[2]

While the EU can satisfy domestic demand for many industrial minerals through its own production, it is highly dependent on imports of high-tech metals.[3] Its entire consumption of antimony, cobalt, molybdenum, niobium, platinum, rare earth elements, tantalum, titanium, and vanadium must be imported.[4] Many major European industries, such as car-making, aerospace, engineering, and chemicals, depend heavily on reasonably priced supplies of raw materials.

A European Commission working group comprising members of the Raw Materials Supply Group (RMSG) considered which raw materials could become critical for the European economy in the next ten years.[5] The RMSG brings together stakeholders from the Commission, industry, NGOs, trade unions, member states, and EU candidate countries.[6] According to the group, raw materials are "critical" if they are subject to heightened risk of supply shortages that would have a severe impact on the European economy. Of forty-one non-energy minerals and metals examined, fourteen were identified as critical: antimony, beryllium, cobalt, fluorspar, gallium, germanium, graphite, indium, magnesium, niobium, platinum group metals, rare earth elements, tantalum, and tungsten. These are mainly imported from China, Russia, the DR

1 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

2 Eurostat, "Environment in the EU27: Landfill Still Accounted for Nearly 40% of Municipal Waste Treated in the EU27 in 2010," press release, March 27, 2012, http://europa.eu/rapid/press-release_STAT-12-48_en.htm (accessed May 7, 2012).

3 European Commission, *The Raw Materials Initiative — Meeting Our Critical Needs for Growth and Jobs in Europe*, COM(2008) 699 final/2, November 4, 2008, updated May 6, 2010, p. 3, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0699:FIN:en:PDF (accessed May 6, 2012).

4 European Commission, *The Raw Material Initiative – Meeting Our Critical Needs for Growth and Jobs in Europe – Annex*, SEC(2008) 2741, p. 4, http://ec.europa.eu/enterprise/sectors/metals-minerals/files/sec_2741_en.pdf (accessed May 6, 2012).

5 European Commission, Ad-hoc Working Group on Defining Critical Raw Materials, *Critical Raw Materials for the EU*, July 30, 2010, http://ec.europa.eu/enterprise/policies/raw-materials/files/docs/report-b_en.pdf (accessed May 6, 2012).

6 European Federation of Geologists (EFG), *Panels of Experts*, http://www.eurogeologists.de/index.php?page=251 (accessed November 23, 2012).

Congo, and Brazil,[7] and are very difficult to substitute or recycle with current technologies. The list of critical materials is currently being revised, with publication of an updated version due by the end of 2013, perhaps taking a more sector-specific approach.[8]

Against the background of the EU's ambitious climate targets, the European Commission's Joint Research Center (JRC) has identified those metals that will be particularly needed in coming decades for six low-carbon technologies (nuclear, solar, wind, bioenergy, carbon capture and storage, and power grids).[9] These are cadmium, dysprosium, gallium, hafnium, indium, molybdenum, neodymium, nickel, niobium, selenium, silver, tellurium, tin, and vanadium.[10] The JRC expects European companies to experience shortages of dysprosium, gallium, indium, neodymium, and tellurium in the next five to ten years.

The Raw Materials Policy

Institutional Setting

The EU and its member states share responsibility for raw materials policy-making. To what degree each can exert influence varies according to the specific policy field and the extent of Europeanization. Trade policy, for example, falls under the exclusive competence of the EU Commission. Thus, only the EU can legislate on trade matters, and not individual member states. Member states can, however, make their voices heard via the Trade Policy Committee of the Council of the European Union.[11] Shared competence applies to environmental, energy, and internal market policies. Thus, while both the EU and member states can adopt binding acts, member states may exercise their powers only in so far as the EU has not yet done so itself.[12] The legislative powers of the EU and its member states thus compete in these policy fields. Development policy and research and development are special cases. Although they fall under shared competence according to Articles 3 and 4 of the Treaty on the Functioning of the European Union, the legislative powers do not actually compete. In the areas of research, technological development, and space, the EU has the power to carry out activities, in particular to define and implement programs. However, its actions must not prevent member states from pursuing their own policies. Likewise with regard to development cooperation and humanitarian aid, the EU has the competence to conduct a common policy insofar as its exercise of this right does not result in member states being prevented from exercising theirs.[13]

The formulation of a raw materials strategy for the EU falls first and foremost under the responsibility of the European Commission. The Directorate General for Trade (DG Trade) is in charge of implementing the EU's common trade policy, and in this capacity also deals with trade in raw materials. DG Enterprise and Industry handles international aspects of the mining sector (where responsibilities overlap with DG Trade), sustainable supply, recycling, and resource efficiency, the *Innovation Partnership* (involving member states, companies, NGOs, and researchers), and critical raw materials. DG Environment is responsible for environmental protection and thus deals with recycling and resource efficiency. Two executive agencies, the Executive Agency for Competitiveness and Innovation (EACI) and the Research Executive Agency (REA), are concerned with raw materials, among other things.[14] At the European Parliament, the committees on international trade; on environment, public health, and food safety; and on industry, research, and energy are mainly responsible for raw-materials-related topics. The European Parliament's European Raw Materials Group (ERMG), inaugurated in February 2011, is also concerned with raw materials.

7 DG Enterprise and Industry, *Critical Raw Materials for the EU* (Brussels, June 2010), pp. 5f., http://ec.europa.eu/enterprise/policies/raw-materials/files/docs/report-b_en.pdf (accessed June 28, 2012).

8 Discussion with representatives of DG Trade, October 4, 2012.

9 European Commission Joint Research Center, *Critical Metals in Strategic Energy Technologies*, http://setis.ec.europa.eu/newsroom-items-folder/jrc-report-on-criticalmetals-in-strategic-energy-technologies/at_download/Document (accessed June 28, 2012).

10 Unlike *Critical Raw Materials for the EU*, this lists rare earth elements individually and selectively.

11 The Trade Policy Committee is also called the 133 Committee, because it was established by Article 133 of the EEC Treaty (now Art. 207 TFEU). Council of the European Union, *Foreign Affairs*, http://www.consilium.europa.eu/policies/council-configurations/foreign-affairs?lang=en (accessed February 27, 2013).

12 European Union, *Division of Competences within the European Union*, http://europa.eu/legislation_summaries/institutional_affairs/treaties/lisbon_treaty/ai0020_en.htm (accessed February 27, 2013).

13 Ibid.

14 Executive agencies under the European Commission are set up for a limited time to administer EU-wide programs. They are tied to the EU financial framework, currently 2007–2013.

European institutions obtain expert advice on raw materials from the European Federation of Geologists (EFG) and from EuroGeoSurveys (EGS). The EFG consists of geological associations from twenty-one EU member states,[15] while EGS is an umbrella organization for thirty-three European geological surveys, including the German Federal Institute for Geosciences and Natural Resources (BGR). As an independent, nonprofit organization, EGS advises European institutions developing and drafting laws, regulations, and programs.

The Commission conducts public consultations for many of its initiatives to take into account the positions and interests of both industry and civil society. At the European level, industry is represented by Businesseurope, an umbrella organization of forty-one European industrial associations from thirty-five countries.[16] The European mining industry is represented by Euromines. Because the European industrial associations are often unable to agree on common positions, many national organizations also maintain their own offices in Brussels. Numerous NGOs also work on individual aspects of the EU's raw materials policy, including the British NGO Publish What You Pay, which is especially vocal in promoting transparency in the mining sector.

Concepts and Strategies

The Commission first took up the issue of raw materials security in 2006, in its trade strategy *Global Europe: Competing in the World*. This document expresses growing concern about the EU's import dependency, as well as about other countries' raw materials export barriers and their impact on the competitiveness of European companies.[17]

In 2008, the Commission published a first strategy paper on securing access to raw materials, titled *The Raw Materials Initiative – Meeting Our Critical Needs for Growth and Jobs in Europe* (in short: *The Raw Materials Initiative*).[18] Apart from lamenting high raw material prices, the document mainly criticizes the increasing use of export restrictions and other competition-distorting measures by resource-rich emerging economies (especially China and Russia) to create unfair advantages for their processing industries. It also points out that emerging countries such as China and India have significantly increased their foreign commercial activities in recent years, especially in Africa. Starting from these observations, the Commission identifies three general objectives: improving access to raw materials for European companies, increasing the use of domestic raw materials, and reducing raw materials consumption.

In late 2010, DG Trade issued a strategy document outlining the EU's trade policy. With respect to raw materials, the document stresses that a "sustainable and undistorted supply of raw materials [...] is of strategic importance for the competitiveness of the EU economy," and proposes a two-fold strategy: to establish a monitoring mechanism for export barriers and to use bilateral and multilateral negotiations to establish stricter rules on export restrictions.[19]

In February 2011, the Commission published *Tackling the Challenges in Commodity Markets and on Raw Materials*, a new EU raw materials strategy building on the *Raw Materials Initiative* of 2008.[20] Apart from non-energy mineral resources, the strategy also covers markets for energy resources, agriculture, as well as food security. In the context of the global financial and economic crisis, the Commission included price volatility, financial market regulation, and integrity and transparency of markets as central elements of a European raw materials strategy.[21]

With respect to minerals and metals, the strategy upholds the three general goals of the *Raw Materials*

15 European Federation of Geologists (EFG), *Activities*, http://www.eurogeologists.de/index.php?page=161 (accessed June 8, 2012).

16 Businesseurope, *Mission and Priorities*, http://www.businesseurope.eu/content/default.asp?PageID=582 (accessed June 27, 2012).

17 European Commission, *Global Europe: Competing in the World* (Brussels, 2006), 7, http://trade.ec.europa.eu/doclib/docs/2006/october/tradoc_130376.pdf (accessed May 23, 2012).

18 European Commission, *The Raw Materials Initiative – Meeting Our Critical Needs for Growth and Jobs in Europe*, 2008, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0699:FIN:en:PDF (accessed May 23, 2012).

19 DG Trade, *Trade, Growth and World Affairs: Trade Policy as a Core Component of the EU's 2020 Strategy*, 2010, p. 8, http://trade.ec.europa.eu/doclib/docs/2010/november/tradoc_146955.pdf (accessed June 29, 2012).

20 The document is part of the overarching strategy outlined in the Commission's communication *Europe 2020: A Strategy for Smart, Sustainable, and Inclusive Growth* (March 2010).

21 European Commission, *Tackling the Challenges in Commodity Markets and on Raw Materials* (Brussels, February 2, 2011), pp. 8ff., http://ec.europa.eu/enterprise/policies/raw-materials/files/docs/communication_en.pdf (accessed July 5, 2012).

Initiative. Like the German government,[22] the Commission assigns principal responsibility for security of supply to the business sector, while tasking itself with creating the appropriate regulatory framework.

With regard to development policy, the document proposes partnerships with resource-rich countries, especially in Africa. Through cooperation with these countries, the Commission seeks to improve their governance, transparency in resource production and trade, as well as the trade and investment climate. Diplomacy is also the keyword in foreign trade policy. Through bilateral and multilateral negotiations,[23] the Commission hopes to raise other countries' awareness of the problems in global raw materials trade. The Commission looks to the WTO's dispute settlement system and the EU's competition policy to create a level playing field.

To foster domestic production, the Commission recommends that member states take greater account of extraction in their land-use policies and increase transparency in licensing procedures for exploration and mining. Finally, the Commission highlights the need to expand the geological knowledge base across and beyond national borders to cover all of Europe.

The Commission's *Roadmap to a Resource Efficient Europe* outlines measures to improve resource efficiency and promote recycling, including revising the Commission's *Strategy on the Prevention and Recycling of Waste* in 2012,[24] supporting resource efficiency research, and introducing economic incentives for recycling and deposit systems. The Commission also proposed reassessing the effectiveness of existing waste management regulations and revising the *Action Plan for Sustainable Consumption and Production* of 2008. To prevent illicit waste dumping, the Commission proposed strengthening EU-wide inspection standards for waste shipments.

The EU's new raw materials strategy reflects the different interests and concerns of its member states. The sections on mineral resources clearly bear the hallmarks of the German government, describing goals and means similar to the German raw materials strategy.[25] However, the inclusion of agriculture and food security can clearly be ascribed to French influence.[26]

22 See also "Germany" in this volume, pp. 73ff.
23 Meaning dialogs, for example in the G20, UNCTAD, WTO, and OECD.
24 An updated Strategy has not yet been published (as of February 2013).
25 See also "Germany" in this volume, pp. 73ff.
26 See also "France" in this volume, pp. 67ff.

Policy Measures and Instruments

Research, Material and Resource Efficiency, Recycling

The EU supports numerous research projects on resource efficiency, recycling, and substitutes, which are administered by the Executive Agency for Competitiveness and Innovation (EACI) and the Research Executive Agency (REA). In May 2012, the *Competitiveness and Innovation Framework Programme* (CIP), which is administered by the EACI and runs until 2013, was granted an additional €35 million to promote private-sector eco-innovation projects.[27] Because the EU financial framework for 2014–2020 is still being negotiated, it is not yet clear what programs the REA and EACI will be running in the future. There are plenty of ideas as to how the European raw materials economy can be promoted. One idea is to set up an innovation center on sustainability in the raw materials economy, as part of the European Institute of Innovation and Technology.[28]

In December 2008, the *Waste Framework Directive 2008/98/EC* entered into force to protect the environment and human health by preventing the harmful effects of waste generation and waste management. Member states were given two years to implement the directive, which requires them to implement the waste treatment hierarchy (prevention, preparing for reuse, recycling, other recovery, notably energy recovery, and disposal) and to adopt waste management plans and waste prevention programs. The directive also introduces the "polluter pays principle" and "extended producer responsibility" and sets new recycling and recovery targets.[29] In many countries, however, implementation is lagging behind. According to the European Parliament, only six countries have so far implemented the directive.[30]

27 European Commission, "Environment: €34.8 Million in New Funding to Bring Environmental Solutions to Market," press release, May 8, 2012, http://europa.eu/rapid/press-release_IP-12-460_en.htm (accessed July 6, 2012).
28 European Commission, "European Institute of Innovation and Technology (EIT) to Create More Innovation Hubs," press release, November 30, 2011, http://europa.eu/rapid/press-release_IP-11-1479_en.htm (accessed June 29, 2012).
29 European Commission, Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on Waste and Repealing Certain Directives Text with EEA Relevance, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:312:0003:01:en:HTML (accessed June 29, 2012).
30 European Parliament, European Parliament Resolution of 2 February 2012 on the Issues Raised by Petitioners in Relation to the Application of the Waste Management Directive, and Related Directives, in the Member States of the European Union (2011/2038(INI)), February 2, 2012, http://www.

The *Directive on Waste Electrical and Electronic Equipment* (2012/19/EU, *WEEE Directive*) came into force on August 13, 2012. It places new and stricter regulations on the disposal of electrical and electronic appliances, setting recycling and recovery targets of 85 percent of waste appliances (or 65 percent of new electrical and electronic equipment sold) to be achieved by 2019. The Commission also wishes to curb illegal exports of electronic waste, which are often labeled as used equipment to evade EU waste regulations. In the future, the exporter of such shipments will have to test and document the functionality of the appliances. By establishing such strict export controls, the EU seeks to protect workers and the environment in third countries from the risks of electronic scrap processing. Member states have until February 2014 to implement the directive in national law.[31]

In September 2011, DG Environment published its *Roadmap to a Resource Efficient Europe*.[32] The roadmap, among other things, recommends gearing all levels of government and as many policy fields as possible to the objective of increasing resource efficiency. Exact aims and indicators are to be developed by 2013. On May 24, 2012, the European Parliament passed a resolution that is in some respects even more ambitious than the Commission's proposal. It requests the Commission to present by the end of 2014 a legislative proposal to abolish landfill waste disposal, and second to revise the recycling targets for 2020. The *European Resource Efficiency Platform* (EREP) was launched in June 2012, as part of the *Europe 2020* strategy. Its mandate initially runs until mid-2014.

The *Action Plan for Sustainable Consumption and Production* (SCP) is currently being revised, and is due to be replaced by a strategy for a new "green single market for green growth."[33]

On February 29, 2012, DG Environment presented a proposal for a *European Innovation Partnership* (EIP) on raw materials, which is now in its early stages. The EIP brings together member states, companies, NGOs, and researchers to pool capital, know-how, and human resources with the objective of encouraging exploration, mining, and processing of raw materials, development of substitutes, and improvement of recycling within the EU.[34] A strategic implementation plan is to be adopted in early 2013.

Stockpiling

The EU does not stockpile raw materials, but the idea has been discussed occasionally.[35] In response to Chinese export restrictions, the EU Industry Commissioner announced in September 2011 that the EU was considering establishing a stock of rare earths.[36] DG Enterprise and Industry commissioned the British consultancy Risk and Policy Analysts (RPA) to analyze the benefits and feasibility of stockpiling from an economic perspective by comparing the stockpiling programs of China, Japan, South Korea, and the United States. The results, published in March 2012, were inconclusive. RPA noted that each of the fourteen raw materials identified as critical might require a different approach.[37] The member states discussed the RPA report during the meeting of the Raw Materials Supply Group on November 12, 2012.[38] Given that most EU members, including Germany, oppose stockpiling, it is unlikely that the idea will make further progress any time soon.[39]

Trade Policy

DG Trade has put trade barriers onto the agenda of both multilateral and bilateral trade negotiations. In 2006, the EU and Japan proposed revising the multilateral regime on export restrictions in the course of

europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P7-TA-2012-0026+0+DOC+XML+V0//EN (accessed October 2, 2012).

31 European Commission, "Environment: New Rules on E-waste to Boost Resource Efficiency," press release, August 13, 2012, http://europa.eu/rapid/press-release_IP-12-898_en.htm (accessed September 10, 2012).

32 European Commission (Representation in Germany), *Fahrplan Ressourceneffizienz*, http://ec.europa.eu/deutschland/press/pr_releases/10191_de.htm (accessed June 29, 2012).

33 European Commission, *17th IPP/SCP Regular Meeting, Wednesday, the 20th of June 2012 (10:00–16:30), Draft Agenda*, https://circabc.europa.eu/d/d/workspace/SpacesStore/ce3f7af3-d704-4edf-80ea-e9ec6d598594/17%20IPP%20Regular%20Meeting%20Agenda%2020.06.2012.pdf (accessed July 5, 2012).

34 European Commission, "Innovation Partnerships: New Proposals on Raw Materials, Agriculture and Healthy Ageing to Boost European Competitiveness," press release, February 29, 2012, http://europa.eu/rapid/press-release_IP-12-196_en.htm (accessed July 6, 2012).

35 "EU will sich mit Lagerhaltung gegen Rohstoff-Knappheit wappnen," *Agrarheute.de*, January 27, 2011, http://www.agrarheute.com/lagerhaltung (accessed May 31, 2012).

36 "EU legt Lager für Seltene Erden an," *Tagesschau*, September 6, 2011, http://www.tagesschau.de/wirtschaft/selteneerden106.html (accessed May 31, 2012).

37 DG Enterprise and Industry, *Stockpiling of Non-energy Raw Materials*, March 2012, http://ec.europa.eu/enterprise/policies/raw-materials/files/docs/stockpiling-report_en.pdf (accessed October 2, 2012).

38 Written interview with representatives of DG Enterprise and Industry on October 16, 2012.

39 See also "Germany" in this volume, pp. 73ff.

the WTO Doha Round.[40] However, due to opposition from developing countries and emerging economies, these efforts have remained unsuccessful to date – although the EU did succeed in committing Russia to reducing many of its export tariffs and forgoing the imposition of new export tariffs on a broad range of raw materials in the scope of its WTO accession agreement.[41]

The EU currently relies mainly on bilateral negotiations to reduce export barriers on raw materials. The free trade agreement with South Korea, for example, includes a ban on export restrictions that – in contrast to the WTO rulebook – covers not only quantitative restrictions, but also tariffs.[42] Allowing for isolated exceptions and limited transitional periods, export tariffs have also been banned in free trade agreements with Colombia, Peru, and the Ukraine and in the association agreement with Central America. The EU is also pushing for the inclusion of such provisions in ongoing negotiations with Canada, India, Malaysia, MERCOSUR, and Singapore. Negotiations on economic partnership agreements with African, Caribbean, and Pacific (ACP) countries, however, constitute an exception. Most of these merely prohibit the imposition of new export duties or increases in existing tariffs, while leaving ample room for exceptions. Export tariffs are, for example, allowed in the interests of national economic development. Only the economic partnership agreement between the EU and the CARIFORUM countries completely prohibits new export duties and requires that existing duties be abolished within three years of the signing of the agreement in 2008.

Finally, raw materials also play a central role in the talks between the European Union and the United States within the Transatlantic Economic Council (TEC). At the last two meetings in 2010 and 2011, the parties agreed to cooperate more closely on the enforcement of international trade rules and research and development in the raw materials sector.[43]

The EU also makes vigorous use of the WTO dispute settlement system. In December 2009, the EU, Mexico, and the United States filed a complaint against Chinese export restrictions (quotas and tariffs) on bauxite, coke, fluorspar, manganese, magnesium, yellow phosphorous, silicon metal, silicon carbide, and zinc.[44] The WTO dispute settlement body ruled in favor of the complainants in summer 2011, and the WTO's appellate body upheld the ruling in January 2012.[45] Spurred by this success, the EU, Japan, and the United States filed another complaint with the WTO, this time concerning Chinese export restrictions on rare earth elements.[46]

The EU itself imposes very low import tariffs on minerals and metals, or none at all. At a conference in May/June 2012, European steel producers called on the Commission to prohibit scrap exports in order to improve the EU's raw materials supply, but the Commission has yet to take any official steps in this direction.[47] Scrap exports are regulated under the *WEEE Directive*, as described above.

Raw Material Cooperation Agreements

The EU Commission signed a letter of intent with Greenland on June 13, 2012, which it hopes will secure European companies expedited access to Greenland's raw materials. While the EU has yet to sign any raw material cooperation agreements along the lines of the German raw materials partnerships, EU Industry Commissioner Tajani has signed similar letters of intent with Chile and Uruguay. These two agreements, however, also include cooperation in other areas. Similar agreements are planned with Morocco and Tunisia.[48]

40 Martin Kohr, "EU, Japan Propose New WTO Treaties to Prevent Export Taxes, Restrictions," *TWN Info Service on WTO and Trade Issues* (Apr06/17), April 26, 2006, http://www.twnside.org.sg/title2/twninfo396.htm (accessed October 2, 2012).
41 See also "Russia" in this volume, pp. 111ff.
42 European Union, "Free Trade Agreement between the European Union and Its Member States, of the One Part, and the Republic of Korea, of the Other Part," *Official Journal of the European Union*, L127, vol. 54 (May 14, 2011), here: Chapter Two: National Treatment and Market Access for Goods, Section A: Common Provisions, article 2.9 and 2.11, p. 10, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:127:FULL:EN:PDF (accessed October 2, 2012).
43 DG Enterprise and Industry, *EU–USA – Transatlantic Economic Council*, http://ec.europa.eu/enterprise/policies/international/cooperating-governments/usa/transatlantic-economic-council/#h2-5 (accessed June 27, 2012). See also "United States" in this volume, pp. 150ff.
44 See also "China" in this volume, pp. 51ff.
45 WTO, *DS395: China – Measures Related to the Exportation of Various Raw Materials*, http://wto.org/english/tratop_e/dispu_e/cases_e/ds395_e.htm (accessed June 27, 2012).
46 WTO, *DS432: China – Measures Related to the Exportation of Rare Earths, Tungsten, and Molybdenum*, http://wto.org/english/tratop_e/dispu_e/cases_e/ds432_e.htm (accessed June 27, 2012).
47 Silvia Antonioli, "Corrected – Steelmakers Lobby EU Commission for Scrap Export Ban," *Reuters*, June 1, 2012, http://www.reuters.com/article/2012/06/01/steel-export-ban-idUSL5E8H11N920120601 (accessed September 10, 2012).
48 Written interview with representatives of DG Enterprise and Industry on October 16, 2012.

The envisioned cooperation with Greenland includes infrastructure and investment projects and capacity-building in the country's mining sector. Greenland is rich in many materials the EU has identified as "critical" (niobium, platinum, rare earth elements, and tantalum).[49] The Greenlandic government was granted responsibility for administering its own raw materials in 2009. Gold, lead, silver, and zinc are currently mined, but mining rare earths is proving more difficult. One of the world's largest single deposits of rare earths is at Kvanefjeld, which also holds large amounts of uranium.[50] Uranium may currently be explored as an accompanying mineral, but not mined. Environmental organizations, local politicians, and research institutes warn against the potential consequences of uranium mining because Greenland currently has no effective regulatory system for uranium trading.[51] It thus remains to be seen which projects will actually emerge from the cooperation.

Development Policy

The European Investment Bank (EIB) finances mining projects in the context of cooperation between the EU and African, Caribbean, and Pacific (ACP) states. The European Bank for Reconstruction and Development (EBRD) has been supporting mining projects and related infrastructure projects – mainly in the resource-rich countries of Eastern Europe – since 1993. The new EBRD strategy for the mining sector also covers Egypt, Jordan, Morocco, and Tunisia, which officially requested to become countries of operation of the EBRD in February 2012.[52]

Following the third EU-Africa Summit in November 2010, the EU and the African Union agreed on a *Joint Africa EU Strategy Action Plan 2011–2013*, whose implementation was discussed in Brussels in January 2012.[53] This cooperation covers governance, investment and infrastructure, geological knowledge, and capacity-building in the raw materials sector. The EU supports transparency and governance projects through the European Development Fund (EDF), while geological explorations are funded through the EU-Africa Infrastructure Trust Fund.[54]

Transparency

The EU Commission followed the U.S. example in October 2011 by presenting two draft directives on transparency of revenue flows in the raw materials sector: one amending transparency directive *2004/109/EC* for companies whose securities are admitted to trading on a regulated market (COM[2011]683),[55] and one concerning the accounting directives *78/660/EEC* (requirements for the annual financial statements of certain companies) and *83/349/EEC* (consolidated accounts) (COM[2011]684).[56] In contrast to the *U.S. Dodd-Frank Wall Street Reform and Consumer Protection Act* of 2010,[57] the Commission's proposals do not cover transparency in supply chains. Instead, "[t]o increase transparency to the payments made by the extractive and logging industries to governments all over the world, the Commission has proposed to introduce a system of Country-by-Country Reporting (CBCR)."[58] The EU wants to enable citizens of resource-rich countries

49 European Commission, "European Commission Signs Today Agreement of Cooperation with Greenland on Raw Materials," press release, June 13, 2012, http://europa.eu/rapid/press-release_IP-12-600_en.htm (accessed July 4, 2012).
50 DERA, *Das mineralische Rohstoffpotenzial Grönlands* (Hannover, December 2010), http://www.deutsche-rohstoffagentur.de/DE/Gemeinsames/Produkte/Downloads/DERA_Rohstoffinformationen/rohstoffinformationen-01.pdf?__blob=publicationFile&v=7 (accessed July 25, 2012).
51 Reinhard Wolff, "Grönlands strahlende Aussichten," *Taz*, June 11, 2012, http://www.taz.de/!95038/ (accessed July 5, 2012).
52 EBRD, *Draft Mining Strategy* (London, 2012), http://www.ebrd.com/downloads/policies/sector/draft-mining-strategy.pdf (accessed September 10, 2012).
53 DG Enterprise and Industry, *Africa-EU Cooperation on Raw Materials*, http://ec.europa.eu/enterprise/magazine/articles/industrial-policy/article_11029_en.htm (accessed November 13, 2012).
54 DG Enterprise and Industry, *Joint Africa EU Strategy Action Plan 2011–2013*, http://www.africa-eu-partnership.org/sites/default/files/doc_jaes_action_plan_2011_13_en.pdf (accessed July 6, 2012).
55 European Commission, Proposal for a Directive of the European Parliament and of the Council Amending Directive 2004/109/EG on the Harmonisation of Transparency Requirements in Relation to Information about Issuers whose Securities are Admitted to Trading on a Regulated Market and Commission Directive 2007/14/EG, Brussels, October 25, 2011, COM(2011) 683 final, http://ec.europa.eu/internal_market/securities/docs/transparency/modifying-proposal/20111025-provisional-proposal_en.pdf (accessed May 23, 2012).
56 European Commission, Proposal for a Directive of the European Parliament and of the Council on the Annual Financial Statements, Consolidated Financial Statements, and Related Reports of Certain Types of Undertakings, Brussels, 25 October 2011, COM(2011) 684 final, http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0684:FIN:EN:PDF (accessed May 23, 2012).
57 See also "United States" in this volume, pp. 150ff.
58 European Commission, "More Responsible Businesses Can Foster More Growth in Europe," press release, October 25, 2011, http://europa.eu/rapid/press-release_IP-11-1238_en.htm (accessed May 23, 2012).

to retrieve information on government revenues, and to ensure that revenues are used to a greater extent for the benefit of the people. Payments to national, regional, and local governments are to be reported by project as well as by country ("project-by-project" and "country-by-country").

After the proposal was adopted by the Commission, it was referred to the Council and the European Parliament on October 26, 2011, which jointly decide on its implementation in an ordinary legislative procedure. The two bodies have yet to reach agreement. Some member states, including Germany and the United Kingdom, believe that the Commission's proposal goes too far according to economic considerations, especially concerning project-by-project reporting, and push for a higher disclosure threshold (€500,000).[59] In contrast, the European Parliament argues for stricter reporting requirements. The Committee on Legal Affairs of the European Parliament voted in September 2012 for a threshold of €80,000 for project-by-project reporting and simplified rules for small and medium enterprises to lower the burden on them. The rules are to apply to the oil, gas, minerals, and forestry sectors. The European Parliament must still pass the draft in plenary session before it can be referred to the Council. Industry, in turn, criticizes the administrative costs that the EP's proposal would entail and fears competitive disadvantages vis-à-vis foreign rivals not subject to the same reporting requirements, including Chinese or Russian companies. Businesseurope argues for a voluntary system of country-by-country reporting similar to EITI, where companies would have to disclose only payments to central governments, and not to lower tiers. Businesseurope is strictly opposed to project-by-project reporting.[60]

Global Raw Materials Governance

Intensifying the international dialog on raw materials is a matter of special concern for the EU. In its response to the Commission's raw materials strategy *Tackling the Challenges in Commodity Markets and on Raw Materials*, the Council stresses the importance of dialog within the G20: "[T]he G-20 has an important role to play alongside the World Trade Organization and the Organisation for Economic Co-operation and Development (OECD) and the United Nations Conference on Trade and Development (UNCTAD) in addressing the concerns over global supply security and the smooth functioning of markets."[61] So far, however, the EU has not been very successful in putting this idea into action, due to the opposition of many emerging economies. The Commission currently considers it unrealistic to expect the BRICS (Brazil, Russia, India, China, and South Africa) to agree to concerted action by the G20 against export restrictions. The EU is now seeking progress through the OECD and UNCTAD. The EU lauds the OECD list of worldwide export restrictions and numerous research papers. The Commission hopes that these will help to spread awareness of the problem of export barriers, also among emerging economies and developing countries. The Commission is also approaching developing countries that are negatively affected by export barriers to win them over in the campaign against export restrictions.[62]

Evaluation and Outlook

The EU takes the issue of securing access to raw materials very seriously, but lags behind its own aspirations. This is not surprising, since the EU lacks the necessary powers in many policy fields, and the implementation of its strategies often lies in the hands of the member states. The record thus shows a mixed picture in areas such as resource efficiency and waste management. With respect to transparency of revenue flows, the EU could take a leading role, together with the United States, but the outcome of negotiations between the European Parliament and Council is still open due to the opposition of many member states. The member states' diverging interests prevent the EU from taking a more proactive international role.

59 Council of the European Union, *Proposal for a Directive of the European Parliament and of the Council on the Annual Financial Statements, Consolidated Financial Statements and Related Reports of Certain Types of Undertakings – General Approach*, p. 20, http://register.consilium.europa.eu/pdf/en/12/st11/st11442.en12.pdf (accessed February 27, 2013).

60 Businesseurope, *Accounting Directive, Transparency Directive*, Position Paper, May 22, 2012, http://www.nho.no/getfile.php/filer%20og%20vedlegg/BUSINESSEUROPE%20posisjonsdokument%20om%20direktivet%20om%20regnskapsf%F8ring%20og%20om%20gjennomsiktighet,%2022.05.2012.pdf (accessed February 27, 2013).

61 Council of the European Union, *Council Conclusions on Tackling the Challenges on Raw Materials and in Commodity Markets*, March 14, 2011, http://register.consilium.europa.eu/pdf/en/11/st07/st07029.en11.pdf (accessed June 1, 2012).

62 Discussion with representatives from DG Trade on October 4, 2012.

France

Florian Wassenberg

Since around 2010, France has placed mineral resources prominently on its political agenda, and the government has assumed an active role in raw materials policy. Dialog between government and industry is producing its first results, although a coherent and comprehensive strategy has yet to be developed.

Minerals in the National Economy

Once a fairly significant producer (as the world's third-largest producer of iron ore until 1970), France has become a net importer of metal raw materials over the past four decades. Today, the only significant regions where mining still takes place on an industrial scale are the overseas department of French Guiana (gold) and autonomous New Caledonia (nickel). In European France the last significant metal mines closed in the mid-2000s, largely for lack of profitability.[1]

Crude iron, crude steel, aluminum, and cobalt, among others, are still produced in France, but from processed ores exclusively imported from abroad. The total value of imported metal ores and scrap exceeded €4 billion in 2011.[2] Very few French companies are active in mining abroad. The well-known exceptions are the state-owned Areva Group, which operates uranium mines all over the world as well as a number of gold mines, and the Eramet Group, which produces the steel stabilizers manganese and nickel. Recycling of scrap metal has grown steadily to a point where between 40 and 45 percent of scrap iron, aluminum, and zinc are now recycled.[3]

Industrial minerals, on the other hand, are still widely produced in France, which is among the world's ten largest producers of diatomite, feldspar, gypsum, silica, and talc (with a share of 3 to 5 percent of world production in each case).[4] French policy for non-energy mineral resources thus concentrates only on metals that are indispensable for French industry and vulnerable to supply risks. By and large, the French risk assessment concurs with those of the European Commission and other industrial countries.

The French industrial sector has contracted steadily over the past decades to a share of less than 13 percent of GDP.[5] Nevertheless, there are still sectors that depend heavily on metal raw materials and are affected by price fluctuations and supply bottlenecks. As in other industrial economies, these include the automotive industry, chemicals, defense, and aerospace. Also, the new French government has committed itself to the re-industrialization of France. This is one of the main tasks of the Ministry for Industrial Recovery, as the Ministry of Industry was tellingly renamed. Previously part of the Ministry of the Economy, Finance, and Industry, the Ministry of Industry became a separate department under the new government in 2012. According to Industry Minister Arnaud Montebourg, the issue of securing access to strategic metals is about nothing less than the "sovereignty and competitiveness of French companies."[6]

Special attention is also given in France to rare earth elements due to their importance for numerous high-tech products. The French chemical company Rhodia is one of very few companies outside China

1 University of Leoben, *Minerals Planning Policies and Supply Practices in Europe, Commissioned by the European Commission Enterprise Directorate General*, November 2004, p. 264.

2 By comparison the value of oil and gas imports amounted to €60 billion and €17 billion, respectively, in 2011; Eurostat, *Comext Database*, http://epp.eurostat.ec.europa.eu/newxtweb/ (accessed September 5, 2012).

3 Waldemar Duscha, "Recycling- und Entsorgungswirtschaft Frankreich," *GTAI (Branche kompakt)*, 2011.

4 Alberto Alexander Perez, "France [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, July 2012), http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-fr.pdf (accessed September 12, 2012).

5 See the report on France's competitiveness by former EADS boss Louis Gallois, commissioned by the French government and published in November 2012, according to which French industry's share fell from 18 percent in 2000 to 12.5 percent in 2011. The report is available from http://www.gouvernement.fr/sites/default/files/fichiers_joints/rapport_de_louis_gallois_sur_la_competitivite_0.pdf (accessed January 16, 2013).

6 Arnaud Montebourg, Ministre du Redressement Productif, Communiqué de presse N° 156, Paris, October 16, 2012, http://proxy-pubminefi.diffusion.finances.gouv.fr/pub/document/18/13343.pdf (accessed December 3, 2012).

that is technologically capable of separating and refining the whole spectrum of rare earths.[7]

The Raw Materials Policy

Institutional Setting

Within government, mineral resources are first and foremost the responsibility of the Ministry of Industry. The Ministry of the Environment, Ministry of Education and Research, Ministry of Defense, and Foreign Ministry all also deal with specific aspects. The supply of certain metals emerged as a problem – identified first by companies, then also by political leaders – in the course of the tremendous price rises of recent years. The French white paper of June 2008 warns, for example, of future global tensions due to rising demand for raw materials in emerging economies.[8] But the government only became active in April 2010, when then Environment Minister Jean-Louis Borloo presented a communiqué on "strategic metals" to the Council of Ministers, arguing that these metals were indispensable for the competitiveness of French industry.[9]

The heart of the French raw materials policy is the newly established Committee for Strategic Metals (Comité pour les Métaux Stratégiques, COMES) of the Ministry of Industry, established in January 2011 by the French government as a central platform for state/industry cooperation on supply security. Incorporating all relevant government and business actors, the new committee is to prepare a "grande stratégie" for metallic raw materials.[10] COMES is an advisory body without any legislative authority that brings together three groups of actors that are crucial for raw materials policy: (1) ministries dealing with raw materials; (2) relevant technical government agencies; and (3) the industrial sectors represented by their trade associations, as well as certain major companies.[11]

The technical agencies represented are the Geological Survey (Bureau de Recherches Géologiques et Minières, BRGM), the Environment and Energy Management Agency (Agence de l'Environnement et de la Maîtrise de l'Energie, ADEME), the French Research Institute for Exploitation of the Sea (Institut Français de Recherche pour l'Exploitation de la Mer, IFREMER), and the French Development Agency (Agence Française de Développement, AFD). The industrial associations represent the metal processing industry, the automobile industry, the chemical industry, and the recycling industry, among others. Companies operating in the mining sector, such as Areva and Eramet, as well as major users of metals, such as Rhodia and the car producer Renault, are also represented in COMES. The Minister of Industry chairs the Committee; since the 2012 election this has been Arnaud Montebourg. The committee has its own general secretariat headed by a mining specialist, who is appointed for a term of three years.

Both chambers of parliament have also discussed the issue of raw materials in detail during recent months. In March 2011, the Senate Committee on Foreign Affairs and Defense published a report on supply risks emanating from the defense industry's import dependency concerning metals,[12] calling for a renaissance of industrial policy, for example in the form of public investment in new mining and recycling technologies.[13] The Secretariat-General for Defense and National Security (Secrétariat Général de la Défense et de la Sécurité Nationale, SGDSN) is currently conducting a study on strategic metals.[14] And in March 2011, an interparliamentary body of the Senate and the National Assembly held a public consultation focusing on rare earths, in which leading representatives of government and industry participated.[15]

7 Rhodia is the world's leading producer of specialty chemicals and was acquired by the Belgian Solvay Group in 2011.
8 Odile Jacob, La documentation Française, *Le Livre blanc sur la défense et la sécurité nationale*, p. 25, http://www.ladocumentationfrancaise.fr/var/storage/rapports-publics/084000341/0000.pdf (accessed September 12, 2012).
9 Communiqué du Conseil des ministres du 27 avril 2010.
10 Press release from Minister of Industry Eric Besson, *Installation du Comité pour les Métaux Stratégiques*, March 30, 2011, http://www.minefe.gouv.fr/actus/11/110330comes.html (accessed October 5, 2012).
11 Ministère de l'Économie, des Finances et de l'Industrie, "Décret no. 2011–100 du 24 janvier 2011 portant création du comité pour les métaux stratégiques (COMES)," *Journal Officiel de la République Française*, January 26, 2011.
12 Sénat, Rapport d'information fait au nom de la commission des affaires étrangères, de la defense et des forces armées sur la sécurité des approvisionnements stratégiques de la France par M. Jacques Blanc, Senateur, March 10, 2011.
13 Ibid., p. 33.
14 Ibid., p. 36.
15 Office parlementaire d'évaluation des choix scientifiques et technologiques, *Rapport sur les enjeux des metaux strategiques: le cas des terres rares*, August 23, 2011.

Concepts and Strategies

Drafting of a French strategy for non-energy resources is currently in process, so no comprehensive reference document exists yet.[16] The action plan adopted in April 2010 does, however, represent a preliminary package of measures. The first central element is to compile a list of metals to be classified as strategic. The plan proposes the following additional measures: expansion of geological knowledge through exploration, development of a recycling policy for strategic metals, and encouragement of government activities by establishing an ongoing supply security dialog between state and industry.[17] This last point was put into practice by establishing COMES, which is now entrusted with the refining and implementing of a strategy for strategic metals.

However, an elaborate strategy for mineral resources and development cooperation already exists, adopted by the Interministerial Committee for International Cooperation and Development (Comité Interministériel de la Coopération Internationale et du Développement, CICID) in May 2008. The overall objective of this strategy is to enhance the contribution of mineral extraction to the economic and social development of producer countries, identifying the following crucial steps: (1) provision of relevant data for exploration and mining; (2) improving governance and transparency; and (3) transition to an economy based on broad growth rather than raw material revenues alone.[18]

CICID mentions thirteen central, west and southern African countries on which French development cooperation in the mining sector should concentrate.[19]

Policy Measures and Instruments

At its first meetings, COMES identified four essential fields of action to be addressed by working groups: (1) identification of supply risks; (2) identification of France's own raw materials potential; (3) recycling, efficiency, and substitution; and (4) international cooperation.[20]

Identification of Supply Risks

Basic measures such as information gathering are currently the priority of French raw materials policy. First of all, demand and associated industrial vulnerability are to be identified more systematically, and small and medium-sized enterprises especially sensitized to potential risks in the first place. Every company should be able to independently assess the global market situation for the metals it needs.[21]

So far the needs and risk assessments of well-organized larger companies and sectors are best known. The chemicals industry, for example, needs large quantities of non-ferrous metals to produce special steel (tantalum, titanium, zirconium) and as catalyzers (molybdenum, rhenium, rhodium). The Mechanical Engineering Federation points out the key role of chromium in the superalloys used in jet engines, gas turbines, and the nuclear industry. The defense and aerospace companies Dassault Aviation and EADS have reported price surges and scarcities of titanium, carbon fibers, and aluminum, but argue that these bottlenecks are caused not by production shortages but by a lack of ore-processing capacity. Both groups also see supply risks with respect to rare earths, which they say are indispensable in the production of aircraft and various defense products.[22]

In order to improve its ability to estimate the needs of smaller companies, the government is currently conducting an electronic survey of all potentially affected businesses. Simultaneously, the Geological Survey (BRGM) is cooperating with industry to develop profiles for certain metal resources, brief summaries of the most salient facts, including uses in industry, global production, consumption, and recycling data, main industrial actors, and price trends. Each profile concludes with an assessment of the supply risk. BRGM has so far examined more than ten metals.[23]

The COMES working group has put together a list of strategic metals, similar to those prepared by the Euro-

16 According to a senior government official, there are currently no plans for such a document.

17 *Communiqué en Conseil des ministres du 27 avril 2010*, http://www.brgm.fr/dcenewsFile?ID=1098 (accessed September 12, 2012).

18 Comité interministériel de la coopération internationale et du développement, *Ressources minérales et développement en Afrique. Documentation d'orientation stratégique*, May 2008, p. 15.

19 Chosen from the more than fifty countries receiving French development aid as part of the French *Zone de solidarité prioritaire*, most of which are in Sub-Saharan Africa.

20 Besson, *Installation du Comité pour les Métaux Stratégiques* (see note 10).

21 Discussion with a representative of the Ministry of Industry, June 26, 2012, Paris.

22 Sénat, *Rapport d'information* (see note 12), pp. 17–18.

23 Documents at http://www.mineralinfo.org/Substance/substance.htm (accessed October 5, 2012).

pean Union or the United States. This list will probably remain confidential, but is unlikely to differ much from others. In 2002–2008, BRGM already identified short- and medium-term supply risks for sixteen metals, nine of which can also be found in the European Commission list (no surprise given that the work of the BRGM was one of the sources the Commission relied upon).[24]

Reassessing Domestic Geological Potential

The second COMES working group is responsible for reviewing the country's geological potential. The last time BRGM undertook a comprehensive survey was in the 1980s and 1990s, but at that time exploration only extended to a depth of 100 meters.[25] That inventory is now to be updated, also with an eye to the question of strategic metals. Besides searching on the French mainland, the government is also investing in marine exploration, where the exclusive economic zones of certain overseas territories are believed to hold significant deposits on and under the seabed. A focus of the marine research agenda is on manganese nodules around the tiny Clarion Clipperton atoll, situated in the Pacific ocean between Hawaii and the west coast of Mexico. French experts believe that these nodule deposits hold up to 340 million tonnes of nickel and 275 million tonnes of copper, as well as other minerals. Although mining is not yet profitable, IFREMER and the German Federal Institute for Geosciences and Natural Resources (Bundesanstalt für Geowissenschaften und Rohstoffe, BGR) have already examined the impact it would have on the ecosystem (in February 2012).

Industry Minister Arnaud Montebourg has explicitly called on French companies to reengage in mining projects on French soil. While the extraction rights for industrial minerals are held by the landowner, the rights to explore and mine metal ores are held by the state and are awarded by the Ministry of Industry in consultation with the State Council (Conseil d'Etat) and the General Council for the Economy, Industry, Energy, and Technology (Conseil Général de l'Économie, l'Industrie, de l'Énergie et des Technologies).[26]

24 Antimony, cobalt, gallium, germanium, indium, magnesium, platinum group metals, rare earths, tungsten. European Commission, *Commission Staff Working Document Accompanying the Raw Materials Initiative – Meeting Our Critical Needs for Growth and Jobs in Europe*, Brussels, November 4, 2008, p. 17.
25 University of Leoben, *Minerals Planning Policies* (see note 1), p. 106.
26 Ibid., p. 28.

The *Code Minier*, which is the legal basis for mineral extraction, provides for rather lengthy licensing procedures with comprehensive participation of local population.[27] This is probably one reason why so far there are hardly any companies exploring new metal ore deposits in France.[28] Apart from residual questions concerning profitability, social acceptance is likely to constitute an obstacle to larger mining projects. The exploration of shale gas, for example, was suspended by the National Assembly in 2011 after massive public protests.

Minister Montebourg wishes to amend the *Code Minier* to ease exploration and mining license application procedures. He also intends to set up a pilot mine to demonstrate responsible mining.[29] However, it remains to be seen whether new French mines can operate profitably (which in the recent past they could not).

Recycling, Efficiency, and Substitution

Recycling, the topic of the third working group, is also accorded great significance by COMES members. In July 2010, ADEME, which holds the deputy chairmanship of the recycling working group, published a widely noted report on the recycling potential of several rare and/or precious metals used in high-tech products. According to the report, only a proportion of scrapped products are collected, from which only part of the precious metal content is then recycled. It also notes that France is not yet able to recycle rare earths profitably.[30] In the meantime, this has changed. Rhodia, as a large consumer of rare earths, is increasingly successful in developing new recycling methods for "heavy" rare earths, which are especially critical as there are currently no alternative sources.[31] In the

27 *Code Minier*, consolidated version as of March 1, 2011, http://www.legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000006071785&dateTexte=20120910 (accessed September 11, 2012).
28 One exception is Variscan Mines, established in 2010.
29 Ministre du Redressement Productif, Communiqué de presse N° 156 (see note 6).
30 ADEME, *Etude du potentiel de recyclage de certains métaux rares* (Angers, July 2011), http://www.google.de/url?sa=t&rct=j&q=ademe%20recycling%20metaux&source=web&cd=2&sqi=2&ved=0CCQQFjAB&url=http%3A%2F%2Fwww2.ademe.fr%2Fservlet%2FgetBin%3Fname%3DD068A7E2019CCA756F2F7EE8ED2D199F1296548079892.pdf&ei=LfdJUKCNKsLatAah34CgCg&usg=AFQjCNEPV1mYE41au0gni08GEiv-H0SCVA&cad=rja (accessed September 7, 2012).
31 The well-known Australian deposits and the recently reopened Mountain Pass Mine in the United States mainly yield light rare earths. For heavy rare earths there will be no alter-

case of "light" rare earths, Rhodia seeks to diversify imports.[32]

Stockpiling

Strategic stockpiling has a long tradition in France, but of the mineral reserves only oil and uranium remain; the stockpiling of a number of metals between 1980 and 1996 was discontinued for reasons of cost and lack of demand.[33] Although this development is now deemed a mistake in some quarters, it is currently unlikely that stockpiling will be reinstituted. Industry shows little willingness to bear the costs and is skeptical about state-administered schemes.[34]

International Cooperation

The fourth working group, headed by the Foreign Ministry, deals with international cooperation. The most important topic this group currently addresses is the establishment of bilateral partnerships with alternative suppliers. Diversification of imports is considered necessary in France, especially with respect to rare earths. The search for alternatives to Chinese producers has so far centered on Australia and Kazakhstan. In September 2011, the French and Kazakh governments signed a strategic partnership between the French Geological Survey (BRGM) and Kazakhstan's state-owned Kazatomprom.[35] Meanwhile, Rhodia has concluded cooperation and supply contracts for rare earth elements with several French and foreign companies, such as Areva, the Australian mining company Lynas, and the German Tantalus Group.[36]

Among countries that import metal raw materials, Germany is a key partner. At the Franco-German Council of Ministers in February 2012, the two countries agreed to cooperate closely on non-energy mineral resources, including marine raw materials research and the joint development of new exploration technologies.[37] Generally, there has been an active exchange between German and French decision-makers regarding raw materials – both bilaterally and in the context of the international study groups for copper, lead and zinc, and nickel, in which both participate along with several other EU member states.[38]

Raw materials are of growing importance in development cooperation. To date, discussion has focused on how certain developing countries could benefit more from their vast raw material reserves. The BRGM, for example, conducted a study on behalf of the Foreign Ministry on the nine raw materials that are most common in Africa, in order to improve the data available to governments. The study is intended provide guidance to resource-rich developing countries and strengthen their negotiating position vis-à-vis multinational mining companies. The French government also runs cooperation projects with Guinea (consultation and training), Mauretania (financial support to expand a gold mine and for a training center for the state-owned mining company), and Afghanistan (technical assistance). Members of COMES agree that the cooperation with developing countries could contribute significantly to France's future security of supply.

France is open to multilateral cooperation in the field of raw materials, for example supporting the Kimberley Process and the Extractive Industries Trans-

native sources of supply before 2015/2016. For more information on the distinction and on the supply situation see Harald Elsner, *Kritische Versorgungslage mit schweren Seltenen Erden – Entwicklung "Grüner Technologien" gefährdet?* Commodity Top News 36/2011 (BGR, 2011), http://www.bgr.bund.de/DE/Gemeinsames/Produkte/Downloads/Commodity_Top_News/Rohstoffwirtschaft/36_kritische-versorgungslage.pdf?__blob=publicationFile&v=4 (accessed October 5, 2012).

32 Defra, *A Review of National Resource Strategies*, March 2012, p. 20, http://www.defra.gov.uk/publications/files/pb13722-national-resource-strategies-review.pdf (accessed September 2012); for information on import diversificatin, also see section "International Cooperation".

33 "Décret du 26 décembre 1996 portant dissolution de l'établissement public Caisse francaise des matières premières," *Journal Officiel de la République Francaise*, no. 303, December 29, 1996, p. 19433.

34 Fedem, *Mise en oeuvre de l'Initiative matières premières de l'Union européenne (RMI): Réponse à la consultation de la Commission européenne* (Paris, September 19, 2010), http://ec.europa.eu/enterprise/policies/raw-materials/files/pc-contributions/org-061-fedem_en.pdf (accessed September 12, 2012).

35 Kazatomprom wants to begin mining rare earths, starting with 1,500 tonnes in 2012. Franco-Kazakh cooperation is well established: Areva and Kazatomprom are partners, as are the French oil giant Total and the Kazakh Kazmunaigas.

36 Areva and Rhodia intend to cooperate in mining deposits holding uranium and rare earths. Lynas Corporation owns the largest known deposit of (light) rare earths, which is located in Western Australia, and has built a processing and separation plant in Malaysia that is set to begin production. See also "Australia" in this volume, pp. 30ff.

37 BMBF and Ministère de l'Enseignement Supérieur et de la Recherche, *Maßnahmenplan für den Deutsch-Französischen Ministerrat am 6. Februar 2012*, http://www.bmbf.de/pubRD/massnahmenplan_14deutschfranzoesischer_ministerrat_schavan_wauquiez.pdf (accessed October 2, 2012).

38 Discussion with a representative of the Ministry of Industry, June 26, 2012, Paris.

parency Initiative (EITI). Within the EU, France is one of the strongest supporters of two draft directives seeking to impose far-reaching reporting obligations on multinational mining companies.[39] President Sarkozy apparently considered putting metallic raw materials on the agenda of the French G20 presidency in 2011, but the idea was abandoned in favor of agricultural resources to avoid a dispute with China.[40]

Evaluation and Outlook

At least since 2010, the topic of security of supply of non-energy mineral resources has reached the highest echelons of French politics. Risk assessment and strategies of the crucial government and private actors do not differ significantly from those in other industrial countries. The change of government in summer 2012 has done nothing to change that. As in other countries, the debate focuses on specific metals that, according to current trends, play a key role for cutting-edge technologies. By appointing a state-led committee to develop a strategy for these "strategic" metals, the French state has assumed an active role. At the same time, public instances are calling upon companies to assume responsibility. This concerted action seems to function well and, by all accounts, enjoys popularity among all involved. This is, for example, reflected in the numerous partnerships that have emerged between companies represented in COMES, and between companies and government agencies. The French government supports multilateral initiatives for a stricter regulation of raw materials trading. At the same time, government and industry alike rely foremost on bilateral partnerships with resource-rich countries and recycling to secure supplies of rare earths in particular.

39 Stormy-Annika Mildner and Florian Wassenberg, *Rohstoffreichtum darf nicht länger arm machen*, SWP-Aktuell 43/2012 (Berlin: Stiftung Wissenschaft und Politik, July 2012).
40 Discussion with a representative of the Ministry of Industry, June 26, 2012, Paris.

Germany

Stormy-Annika Mildner and Julia Howald

While Germany can satisfy its demand for many industrial minerals and rocks from domestic reserves, it has scarcely any primary metal deposits and is largely dependent on imports to satisfy its industry's large demand for these. The German government regards securing the supply of raw materials as first and foremost the responsibility of companies. But since markets are often distorted and price mechanisms do not always function correctly it does act to provide an appropriate framework. Although the government's raw materials strategy is coherent and transparent, there is debate – also within government – over certain details, such as the exact shape of Germany's bilateral resource partnerships, the degree to which export duties should be abolished, and the ambitiousness of transparency initiatives.

Minerals in the National Economy

Germany possesses large raw material reserves.[1] With 1.6 percent of global production of non-energy raw materials (by weight), it is one of the G20 members with moderate production. In 2010, Germany ranked first in global production of fluorspar (with a share of 23.8 percent), second for kaolin (15.8 percent), and third for salt (7.2 percent).[2] Demand for industrial minerals and rocks can be satisfied domestically.

The situation differs for metals. Germany has almost no reserves and is unable to satisfy its large domestic demand through domestic production, despite having some of the highest recycling rates for many metals.[3] In 2010, the value of metal imports amounted to about €22 billion, according to the German Federal Institute for Geosciences and Natural Resources (Bundesanstalt für Geowissenschaften und Rohstoffe, BGR). Germany is one of the world's largest consumers of metals. In 2010, it was the third-largest consumer of copper (5.4 percent of global consumption) and the fourth-largest of aluminum (4.8 percent), lead (3.6 percent), nickel (5.9 percent), and tin (4.7 percent).[4] Import dependency is high for high-tech metals such as rare earth elements, for many of which supply sources are also highly concentrated.[5] In 2010, for example, about half of all imports of rare earth elements came from China.[6]

In 2011, the KfW Group published a study identifying several raw materials as critical for German industry in the short and medium term. The following factors were taken into account to determine "criticality": import and consumption in Germany, strategic relevance (vulnerability of the supply chain, surge in demand created by new technologies, substitutability), supply risks for the German economy (concentration of global reserves by country), market risks (business concentration of global production), and structural risks (such as recyclability). The three metals found to be most critical for Germany are (in descending order of criticality): germanium, rhenium, and antimony. Tungsten, rare earth elements, gallium, palladium, silver, tin, indium, niobium, chromium, and bismuth are also critical.[7]

1 BGR and DERA, *Deutschland – Rohstoffsituation 2010*, DERA Rohstoffinformationen (Hannover, December 2011), p. 17.
2 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).
3 For example, in 2009, 69 percent of lead, 60 percent of aluminum, 44 percent of crude steel, and 43 percent of copper were produced from recycled material. BGR and DERA, *Deutschland – Rohstoffsituation 2010* (see note 1), p. 24.
4 Ibid., pp. 24, 39–41.
5 The only domestic reserves that have been explored more closely are near Delitzsch in Saxony, where mining is not yet profitable. Ad-hoc-AG Rohstoffe, *Seltene Erden in Deutschland*, November 8, 2010, pp. 4–6, http://www.infogeo.de/dokumente/download_pool/Seltene_Erden_Rohstoffe_Deutschland_November_2010.pdf (accessed April 21, 2012).
6 BGR and DERA, *Deutschland – Rohstoffsituation 2010* (see note 1).
7 Lorenz Erdmann, Siegfried Behrend, and Moira Feil, Kritische Rohstoffe für Deutschland. Identifikation aus Sicht deutscher Unternehmen wirtschaftlich bedeutsamer mineralischer Rohstoffe, deren Versorgungslage sich mittel- bis langfristig als kritisch erweisen könnte (Frankfurt am Main: KfW Bankengruppe, September 30, 2011), http://www.kfw.de/kfw/de/I/II/Download_Center/Fachthemen/Research/PDF-Dokumente_Sonderpublikationen/Rohstoffkritikalitaet_LF.pdf (accessed April 28, 2012).

The raw materials sector accounts for only a small share of GDP. In 2009, 3 percent came from metal processing and 0.5 percent from mineral extraction.[8] According to the Trade Association Steel and Metal Processing (Wirtschaftsverband Stahl- und Metallverarbeitung, WSM), in 2010 approximately 400,000 people were employed in about 5,000 steel and metal processing companies, which generated around €70 billion in revenues.[9] The government envisions the mining sector growing in coming years – at least this is an objective of its raw materials policy. German companies currently active in the mining sector are mostly medium-sized – and mainly operate domestically. According to the Association for Mineral Resources and Mining (Vereinigung Rohstoffe und Bergbau, VRB), the German extractive sector currently comprises around 5,000 companies employing approximately 200,000 people.[10] Their activities are mostly aimed at regional markets rather than the German market.[11] Partly because of low prices during the 1990s, most German companies left the mining business as it was cheaper to purchase raw materials from abroad. Reopening operations now is proving to be quite difficult. Especially for small and medium-sized companies, mining abroad is often too risky. Whether the Raw Materials Alliance (Rohstoffallianz), which was founded in April 2012 by ten of Germany's largest companies,[12] can encourage its members to reengage in the mining business remains to be seen.[13] The Raw Materials Alliance is not a buyer cartel, nor does it intend to operate its own mines.[14] Instead it provides its members with market analyses and investigates potential involvement in projects. It also intends to develop, monitor, and financially support mining projects. Both government and industry rejected the idea of creating a (fully or partly state-owned) German mining company.[15]

The Raw Materials Policy

Institutional Setting

Responsibility for raw materials policy lies first and foremost with the Federal Ministry of Economics and Technology (Bundesministerium für Wirtschaft und Technologie, BMWi), which was also in charge of developing *The German Government's Raw Materials Strategy* (October 2010). Within the ministry, a department for raw materials policy was created in February 2011, to deal with domestic raw materials supply, recycling, and access to raw materials from abroad. It was especially entrusted with developing bilateral resource partnerships.[16]

Several other institutional changes have also been made to support and implement the raw materials strategy. The German Mineral Resources Agency (Deutsche Rohstoffagentur, DERA) was created in October 2010 as part of the Federal Institute for Geosciences and Natural Resources (BGR), to serve as a contact and information platform for industry and politics. One of its main tasks is to observe the international mineral and fossil fuel markets.[17] As the central geoscientific agency, the BGR advises government and industry on geoscience and raw materials issues. It is also involved in implementing development cooperation.

8 Steve T. Anderson, "Germany [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, July 2012), http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-gm.pdf (accessed November 20, 2012), p. 18.1. The mineral extraction sector includes coal, oil, and natural gas.

9 Wirtschaftsverband Stahl- und Metallverarbeitung e.V., *WSM-Industrie*, http://www.wsm-net.de/WSM-Industrie.2.0.html (accessed November 22, 2012).

10 Vereinigung Rohstoffe und Bergbau e.V., *Rohstoffversorgung in Deutschland*, http://www.v-r-b.de/pictures/1295518012.jpg (accessed November 22, 2012).

11 Vereinigung Rohstoffe und Bergbau e.V., *Zur Lage der deutschen Rohstoff gewinnenden Industrie (Rede des Vorstands zur Jahrestagung 2012)*, http://www.v-r-b.de/pictures/1349343406.jpg (accessed November 22, 2012).

12 The ten founding members are Aurubis, BASF, Bayer, Bosch, Rockwood Lithium, Evonik Industries, Georgsmarienhütte Holding, Stahl-Holding-Saar, ThyssenKrupp, and Wacker Chemie.

13 BDI, "Aufbau der Allianz zur Rohstoffsicherung beginnt," press release, January 30, 2012, http://www.bdi.eu/Pressemitteilungen_Pressemitteilung_Allianz_zur_Rohstoffsicherung_30_01_2012.htm (accessed May 10, 2012).

14 Statement made by Dierk Paskert, managing director of the Raw Materials Alliance, at the conference "Tiefseebau – Technologische und rohstoffpolitische Potenziale für die deutsche Wirtschaft" on June 19, 2012, at the BMWi.

15 Discussion with representatives of the BMWi, May 30, 2012.

16 BMWi, "Brüderle: 'Weiter Tempo machen zur Rohstoffsicherung,'" press release, February 2, 2011, http://www.bmwi.de/BMWi/Navigation/Presse/pressemitteilungen,did=378972.html?view=renderPrint (accessed May 3, 2012).

17 DERA, *Über uns*, http://www.deutsche-rohstoffagentur.de/DERA/DE/Ueber-Uns/ueber-uns_node.html (accessed May 3, 2012).

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, BMU) is responsible for resource efficiency. In February 2012, the federal government adopted the *German Resource Efficiency Program* (ProgRess), which was prepared by the BMU.[18] The Federal Ministry for Economic Cooperation and Development (Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung, BMZ) is responsible for those areas of raw materials policy that touch on development policy.

In order to avoid conflicts of interest and power struggles between the different actors, and to establish a common approach in the field, an interagency committee (Interministerieller Ausschuss, IMA) was established in 2007. Headed by the BMWi, its members are the Chancellery, the Foreign Office (Auswärtiges Amt, AA), the BMZ, the BMU, the Ministry of Finance (Bundesministerium der Finanzen, BMF), the Ministry of Food, Agriculture and Consumer Protection (Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz, BMELV), the Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF), the Ministry of Transport, Building and Urban Development (Bundesministerium für Verkehr, Bau und Stadtentwicklung, BMVBS), and the Ministry of the Interior (Bundesministerium des Innern, BMI). Apart from the ministries, several federal agencies and institutions such as the BGR and the German Central Bank participate in the meetings of the IMA. Last but not least, the Federation of German Industry (Bundesverband der Deutschen Industrie, BDI) and other associations represent the industry within the IMA.[19]

Apart from the BDI, which has repeatedly hosted major raw materials conferences attracting great attention (in 2005, 2007 and 2010),[20] other organizations such as the German Chamber of Industry and Commerce (Deutscher Industrie- und Handelskammertag, DIHK) and the Association for Mineral Resources and Mining have also devoted great attention to the topic of supply security. The DIHK, for example, made "Energy and Raw Materials for Tomorrow" its central theme for 2012.

While German industry is closely involved in formulating raw materials policy, many civil society organizations, such as the NGO Global Policy Forum, complain that their positions are not sufficiently taken into account, especially on critical issues such as transparency and resource partnerships. Their main concern, in contrast to industry associations, is not security of supply but improving environmental and social conditions in resource-rich countries.

Concepts and Strategies

In October 2010, the Federal Ministry of Economics and Technology published *The German Government's Raw Materials Strategy*, creating a general framework to align the objectives, strategies and instruments of the different policy fields dealing with raw materials. Strategy papers prepared by the Federal Ministry for Economic Cooperation and Development (2010) and the Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (2008) address issues related to development policy and resource efficiency, respectively.

The German Government's Raw Materials Strategy: Ensuring of Supply Security

Like earlier strategies, the central goal of *The German Government's Raw Materials Strategy* is to secure an adequate supply of raw materials for the domestic economy.[21] Primary responsibility lies with the private sector, while the federal government sees its task as merely creating the necessary political framework. The federal government views the main challenges not in absolute, physical scarcity, but insufficient capacities to explore, produce, and process, as well as transport infrastructure deficiencies in producing countries. The strong regional concentration of reserves and production of many raw materials (often

18 BMU, *Überblick zum Deutschen Ressourceneffizienzprogramm (ProgRess)*, http://www.bmu.de/wirtschaft_und_umwelt/ressourceneffizienz/ressourceneffizienzprogramm/doc/48399.php (accessed May 3, 2012).

19 BMWi, *Zwischenbilanz der Rohstoffaktivitäten der Bundesregierung (Schwerpunkt nichtenergetische Rohstoffe)*, July 2008, p. 3, http://www.bmwi.de/BMWi/Redaktion/PDF/XYZ/zwischenbilanz-der-rohstoffaktivitaeten-der-bundesregierung,property=pdf,bereich=bmwi,sprache=de,rwb=true.pdf (accessed May 3, 2012).

20 BDI, "BDI Rohstoffkongress: Rohstoffmangel gefährdet Industrieland Deutschland," press release, October 26, 2010, http://www.bdi.eu/Pressemitteilungen_BDI_Rohstoffkongress_26_10_2010.htm (accessed May 3, 2012).

21 BMWi, *The German Government's Raw Materials Strategy* (Berlin, 2010), http://www.bmwi.de/English/Redaktion/Pdf/raw-materials-strategy,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf (accessed February 25, 2013).

in politically instable countries) and trade policy interventions (such as export barriers) are also identified as creating supply risks.

The German raw materials strategy rests on four pillars: (1) diversification of supply sources; (2) improving material efficiency, developing substitutes, and advancing recycling; (3) improving information and vocational training, together with a viable political framework for German business activities; and (4) fostering good governance and transparency and promoting a sustainable raw materials economy in developing countries and emerging economies.

In its strategy paper, the federal government points to several instruments designed to encourage German mining companies to invest abroad: guarantees for untied financial loans insure the financing of raw materials projects abroad against political and commercial risks; investment guarantees support direct investment by offering protection against political risks due to state intervention; and export credit guarantees help German manufacturers of mining equipment to develop new or difficult markets by insuring the companies' export transactions against non-payment by foreign clients.

Bilateral resource partnerships are proposed as a way to diversify the sources of supply, while the European Union's common trade policy is expected to foster fair competition in global markets by pressing for the abolition of export restrictions through the WTO and in bilateral free trade negotiations.

Within its *Raw Materials Strategy*, the government announced its intention to step up support for research and development in order to improve resource efficiency. With respect to recycling, it advocates revising the *Closed Substance Cycle and Waste Management Act* (*Kreislaufwirtschafts- und Abfallgesetz*). The government also intends to promote research on substitutes for critical raw materials. Last but not least, an important objective of the government's strategy is expanding domestic mining. It also regards preserving the capacity to process raw materials within Germany an important component of the competitiveness of German industry.

The BMZ Strategy: Mineral and Energy Resources as a Factor in Development

Complementing *The German Government's Raw Materials Strategy*, the Federal Ministry for Economic Cooperation and Development (BMZ) formulated the relevant principles of development policy in its own strategy document,[22] which was also published in 2010. The strategy paper is based on the observation that many resource-rich developing countries are unable to perform their government functions in planning, monitoring, and regulating the mining sector due to a lack of human resources, funding, and institutional capacity. German development policy promotes the socially, ecologically, and economically sustainable use of raw materials in developing countries. German development cooperation therefore supports partners in fostering good governance in the mining sector and in harnessing the economic dynamism generated by the mining sector to promote broader growth. The activities involved include financing (German Investment and Development Corporation, DEG) and technical support (BGR and German Agency for International Cooperation, GIZ) for mining projects, the development of infrastructure and of supply and processing industries, and the establishment of sustainable technologies in the respective partner country, including training and education. Improving mining regulation in developing countries also benefits German industry by improving investment conditions and opening up new markets for mining machinery, equipment, and consulting services. Germany also advises countries on monetary and fiscal transparency in the mining sector (for example Ghana). Apart from the Extractive Industries Transparency Initiative (EITI), the BMZ also supports schemes to certify the origin of raw materials that do not come from conflict zones, such as the Kimberley Process Certification Scheme, and to involve the extractive industry in regional peace processes (such as the DR Congo and the International Conference on the Great Lakes Region). Advisory projects in the raw materials sector are implemented by the BGR and GIZ, whose activities include advising governments in countries such as Laos, Mongolia, Mozambique, and Namibia on sustainable organization of their raw materials sectors. West and Central Africa and Central Asia are also priorities for German development policy.

In early 2012 the BMZ launched the *Global Development Policy Raw Materials Initiative* (GeRI) as a joint undertaking of BGR and GIZ, aiming to bring together existing and future development policy projects under a single roof and make their implementation more

22 BMZ, *Mineral and Energy Resources as a Factor in Development*, http://www.bmz.de/en/publications/type_of_publication/strategies/StrategyPaper301_04_2010_en.pdf (accessed February 2, 2013), p. 3.

efficient and flexible by using the comparative advantages of both institutions.

The BMU Strategy: Sustainable Raw Materials Use

In May 2008, the Federal Ministry for the Environment published a strategy document on resource efficiency. The document starts from the premise that simply securing access to raw materials will not suffice in the long term.[23] Instead, politics, industry, and science must work together to enhance energy and material efficiency in industrial production processes, while society must contribute its share by modifying lifestyles and consumption habits. These changes are necessary because demand for energy and raw materials in many emerging economies will increase in coming years and decades, while the ecosystem is already overburdened today. Thus, if future global distribution conflicts are to be avoided, the search for an environmentally sustainable global growth and development model must start today.[24]

The document goes on to call for non-renewable raw materials to be gradually replaced as far as possible by renewable raw materials. Materials for which no substitutes have yet been developed should be used as efficiently as possible. This shift is seen as an economic opportunity as well as a challenge. The paper points out that more efficient use of raw materials does more than just reduce production costs. If Germany took a leading role in developing resource technologies, its companies could profit from increased competitiveness and sales to other countries.[25]

Conflicting Goals and Controversies

At a first glance, these three strategies seem to fit well together. The BMWi's document focuses on expanding the raw materials supply to fully satisfy German demand. The goal of the BMZ's strategy is to reduce negative effects in resource-rich developing countries and make their raw materials sectors more sustainable and more oriented toward economic development. The BMU's strategy prioritizes reducing domestic demand and using raw materials more efficiently.[26] A closer look, however, reveals several conflicting goals that are the subject of considerable debate in politics and society.

One conflicting goal concerns the resource partnerships. In the case of Kazakhstan, numerous NGOs criticized the neglect of transparency and good governance in favor of economic interests. Questions also arise around the issue of technology transfers. While these can contribute significantly to economic development, they are not always in the immediate interest of German companies. Nor is the establishment of processing industries abroad. Another controversy lies in the degree of ambition relating to financial transparency. While transparency is without doubt indispensable for fighting corruption, industry critics warn of high implementation costs and competitive disadvantages where such rules apply only to single jurisdictions. Banning export quotas and tariffs, which the BMWi calls for, is also controversial, as these are not always levied in order to create a competitive advantage for domestic producers. Especially for the least developed countries that depend heavily on raw material exports and lack a properly functioning taxation system, export tariffs are one way to tax and regulate the raw materials sector at least at the national borders. The BMZ therefore advocates a case-by-case approach rather than a general prohibition.[27]

Policy Measures and Instruments

Domestic Raw Materials Production

The federal legal basis for mining in Germany is the *Federal Regional Planning Act (Raumordnungsgesetz)*, the *Federal Building Code (Baugesetzbuch)*, the *Federal Mining Act (Bundesberggesetz)*, and the *Mineral Deposits Act (Lagerstättengesetz)*. At state level the regional planning laws ("Landesplanungsgesetze") are also important.[28] Laws governing economic activities, including mining and land-use planning, are subject to concurrent legislation under Article 74 (1) of the *Basic Law*, which means that legislative power lies with the states, un-

23 BMU, *Strategie Ressourceneffizienz*, http://www.bmu.de/files/pdfs/allgemein/application/pdf/ressourceneffizienz.pdf (accessed May 4, 2012), p. 9.
24 BMU, *Strategie Ressourceneffizienz*, http://www.bmu.de/files/pdfs/allgemein/application/pdf/ressourceneffizienz.pdf (accessed May 4, 2012), p. 6.
25 Ibid., pp. 10–12.
26 Stefan Werland, *Debattenanalyse Rohstoffknappheit*, PolRess Arbeitspapier AS 5.1, Berlin, July 19, 2012, http://www.ressourcenpolitik.de/wp-content/uploads/2012/07/AS-5-1_Rohstoffkanppheit.pdf (accessed November 27, 2012).
27 Discussion with representatives of the BMZ on September 19, 2012.
28 Staatliche Geologische Dienste der Bundesrepublik Deutschland, *Rohstoffsicherung in der Bundesrepublik Deutschland – Zustandsbericht*, http://www.infogeo.de/dokumente/download_pool/rohstoffsicherung_2008.pdf (accessed May 18, 2012), p. 3.

less and until the federal government passes legislation.[29] However, in the field of land-use legislation the federal states also have the option of deviating from federal law under Article 72 (3) of the *Basic Law*.

The *Federal Mining Act* lays down the rules for exploration, mining, and processing. It is based on a distinction between what is an integral part of the ground ("grundeigene Bodenschätze") and what is not ("bergfreie Bodenschätze"). Resources that are an integral part of the ground, including some industrial minerals and rocks, belong to the landowner.[30] But most minerals and metals (along with energy raw materials and geothermal energy) are categorized as not being an integral part of the land ("bergfrei"), and therefore as not bound to the ownership of the land.[31] Exploration for such resources requires a permit issued by the federal government. Mining requires ownership of the mine or a license. Before a company may start mining, its operating plan must be approved to ensure workplace safety and post-closure land restoration, among other things.[32] State-level agencies are responsible for issuing licenses – in compliance with all relevant laws and environmental regulations.[33]

Because decisions about land use are made by the states, where competition between mining and other land uses such as housing, infrastructure, and environmental protection is fierce, it remains to be seen to what extent the objective of expanding domestic raw materials production can actually be reached.

The Federal/State Committee of Soil Research (Bund-Länder-Ausschuss Bodenforschung) therefore calls for a specialized national law on securing raw materials to regulate the raw materials supply and protect valuable near-surface deposits from other forms of land use.[34] The Committee's recommendations include, among others, better identification and prioritization of raw materials deposits in land-use plans, legal classification of areas where raw materials are protected ("Rohstoffschutzgebiet"), a more consistent approach across the states, and greater involvement of federal geological agencies in all planning phases from exploration to licensing. The 2012 federal budget sets aside €1.5 million to support exploration.[35]

Deep-Sea Mining

Another component of the German strategy for securing raw materials is research on seabed minerals. In August 2011, the government published a *National Masterplan on Marine Technologies* (*Nationaler Masterplan Maritime Technologien*, NMMT) to promote the expansion of German marine technologies.[36] The BGR has been exploring the possibilities of deep-sea mining on behalf of the government since 2006, and has been assigned two areas in the Central Pacific by the International Seabed Authority (ISA). The total size of this area, in which the BGR is exploring manganese nodules and crusts, amounts to 75,000 km^2. Germany is one of the few countries (currently fourteen)[37] that own exploration licenses and are already exploring the opportunities of deep-sea mining.[38]

29 Deutscher Bundestag, *Konkurrierende Gesetzgebung*, http://www.bundestag.de/service/glossar/K/konk_ges.html (accessed September 4, 2012).
30 Minerals that are an integral part of the land ("grundeigen") include basalt, bauxite, bentonite, clay, diatomite, feldspar, kaolin, roof slate, steatite, talc, and trass.
31 Minerals that are not an integral part of the land ("bergfrei") include actinium and actinides, aluminum, antimony, arsenic, beryllium, bismuth, boron, cadmium, cesium, chromium, cobalt, copper, francium, gallium, germanium, gold, hafnium, indium, iridium, iron, lanthanum and lanthanides, lead, lithium, manganese, mercury, molybdenum, nickel, niobium, osmium, palladium, phosphate, platinum, polonium, radium, rhenium, rhodium, rubidium, ruthenium, scandium, sulfur, selenium, silver, strontium, tantalum, tellurium, thallium, tin, titanium, tungsten, vanadium, yttrium, zinc, zirconium – pure and in the form of ores, except in alum and vitriol ores; hydrocarbons; bituminous coal and lignite; graphite; brine, halite, potash, magnesium compounds, and borates; barite and fluorspar.
32 Bundesministerium der Justiz, Juris, *Bundesberggesetz (BbergG)*, http://www.gesetze-im-internet.de/bundesrecht/bbergg/gesamt.pdf (accessed September 4, 2012).
33 Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie, *Genehmigungsrecht*, http://www.stmwivt.bayern.de/fileadmin/Web-Dateien/Dokumente/energie-und-rohstoffe/Genehmigungen.pdf (accessed September 4, 2012), pp. 1–3.
34 Staatliche Geologische Dienste der Bundesrepublik Deutschland, *Rohstoffsicherung in der Bundesrepublik Deutschland – Zustandsbericht* (see note 28).
35 BMF, *Bundeshaushalt 2012: Ausgaben für Investitionen*, http://www.bundesfinanzministerium.de/bundeshaushalt2012/html/ep09/ep09kp03nra10.html (accessed November 23, 2012).
36 BMWi, "Umsetzung des Nationalen Masterplans Maritime Technologien (NMMT) kommt gut voran," press release, March 26, 2012, http://www.bmwi.de/BMWi/Navigation/Presse/pressemitteilungen,did=483074.html (accessed June 22, 2012).
37 ISA, *Contractors*, http://www.isa.org.jm/en/scientific/exploration/contractors (accessed June 22, 2012).
38 Nationaler Masterplan Maritime Technologien, *Marine minerale Rohstoffe: Beschreibung*, http://www.nmmt.de/bal_ims_controler.php?menu=Yms2O2tgbz43ZjplZD01aQ%3D%3D=&field=J&reset=search&letter=&window_close=all (accessed June 22, 2012).

Resource Efficiency, Recycling, and Substitutes

The Federal Ministry of Education and Research (BMBF) promotes research and development work on resource and material efficiency, energy saving, and sustainability through numerous programs and measures. One example is the founding of the Helmholtz Institute Freiberg for Resource Technology (HIF) in August 2011, as proposed in *The German Government's Raw Materials Strategy*. Several of the government's proposals were also realized by the creation of the VDI Centre for Resource Efficiency and Climate Protection (VDI ZER) in June 2009, a collaborative project of the Federal Ministry for the Environment (BMU) and the Association of German Engineers (Verein Deutscher Ingenieure, VDI). One project the center runs is an innovation radar that allows companies to search for creative ideas and resource-efficient technologies.[39]

The *Recycling and Waste Legislation Reform Act (Gesetz zur Neuordnung des Kreislaufwirtschafts- und Abfallrechts)* came into force on June 1, 2012, implementing the EU *Waste Framework Directive* in German law.[40] It introduces a five-level waste hierarchy, tightens the rules for waste separation, and sets targets for significant improvements in recycling rates by 2020.

Stockpiling

Both government and industry are skeptical toward the idea of storing certain raw materials, as currently discussed on the European level,[41] on the grounds of a costs-benefit analysis. Technological advances such as the development of substitutes or the discovery of new deposits could quickly prove the choice of a certain metal wrong. Storing metals is also a costly endeavor. But the idea of stockpiling is also rejected from an economic policy perspective, as it constitutes a political intervention in the markets. In the worst case such interventions could even amplify market distortions. Lastly, it is argued, the interests within Europe are too diverse to realize such a project on the European level. The idea of stockpiling raises numerous as yet unanswered questions: who would administer the stockpile, who would pay for it, who would decide what and when to buy and sell, and how would the distribution of stocks among the EU member states function?[42]

Resource Partnerships

Negotiating bilateral resource partnerships is a central element of *The German Government's Raw Materials Strategy*. While the Federal Ministry of Economics and Technology (BMWi) bears the main responsibility, the Foreign Office, the Federal Ministry for Economic Cooperation and Development (BMZ) and the Federal Ministry for the Environment (BMU) also participate in developing partnerships. The interests of the industry in selecting and negotiating the partnerships are represented by the BDI. These partnership agreements do not grant German companies exclusive access to partners' raw materials sectors. The partner country commits itself to provide transparency, legal security, and non-discrimination. In return, the German government offers support for modernizing the mining sector (including developing processing industries, training and education, and exploiting new deposits), promoting transparency in financial flows and supply chains, and help in establishing a functioning financial and fiscal policy.[43]

The first partnership agreement was signed in October 2011 with Mongolia,[44] which has significant reserves of copper, fluorspar, gold, molybdenum, rare earth elements, and tungsten. Another agreement was signed on February 8, 2012, with Kazakhstan, whose copper, gallium, indium, molybdenum, niobium, rhenium, rare earth elements, and tungsten make it an attractive partner for German companies.[45] The Integrated Mineral Resources Initiative (IMRI) in

39 VDI ZER, *Innovationsradar*, http://www.vdi-zre.de/home/wie-funktioniert-ressourceneffizienz/innovationsradar-ressourceneffizienz/ (accessed May 11, 2012).
40 BMU, *Eckpunkte des neuen Kreislaufwirtschaftsgesetz*, http://www.bmu.de/abfallwirtschaft/abfallpolitik/kreislaufwirtschaft/doc/48431.php (accessed May 18, 2012).
41 "EU will sich mit Lagerhaltung gegen Rohstoff-Knappheit wappnen," *Agrarheute.de*, January 27, 2011, http://www.agrarheute.com/lagerhaltung (accessed May 31, 2012).
42 Discussions with representatives of the BMWi and the BDI. For more information, see also "European Union" in this volume, pp. 59ff.
43 BMWi, *The German Government's Raw Materials Strategy* (Berlin, 2010), http://www.bmwi.de/English/Redaktion/Pdf/raw-materials strategy,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf (accessed February 25, 2013), p. 24.
44 BMWi, *Agreement between the Government of the Federal Republic of Germany and the Government of Mongolia on Cooperation in the Fields of Raw Materials, Industry and Technology*, http://www.bmwi.de/English/Redaktion/Pdf/agreement-between-germany-and-mongolia-cooperation-raw-materials-industry-technology,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf (accessed February 26, 2013).
45 Mark Brinistool, "Kasakhstan [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, June 2012), http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-kz.pdf (accessed October 10, 2012), pp. 24.1–24.12.

Mongolia, in which German development agencies work together with the local private sector, is exemplary for the implementation of resource partnerships.

The second German resource partnership, signed with Kazakhstan in February 2012,[46] was strongly criticized by civil society, with numerous NGOs accusing the government of ignoring human rights and the need for democratization for the sake of securing lucrative contracts for German companies.[47] Indeed, its clauses on transparency are weaker than those found in the agreement with Mongolia.

Both BMWi and BDI are against a rapid negotiation of new resource partnerships. Instead, they argue that existing partnerships should first be given time to develop, and for the moment new agreements should take the form of raw material dialogues, for example to encourage cooperation between the geological agencies of partner countries. Countries like Peru and South Africa would be obvious partners.[48] A first agreement of this kind was concluded with Chile on January 26, 2013, in the form of a declaration of intent regarding cooperation on mining and mineral raw materials.[49]

The Australian-German Joint Declaration on Resources and Energy Cooperation signed in June 2011 attracted less public attention than the agreements with Mongolia and Kazakhstan. Australia and Germany declared their intention to promote free international markets and examine possibilities for cooperation in the areas of research and development, trade and investment opportunities, recycling, substitution, resource-efficient production, and the impact of mining activities on the environment.[50]

Transparency in the Mining Sector

Germany is a strong promoter of the EITI initiative. During its G8 presidency in 2007, it placed strengthening the initiative high on its agenda. Germany backs the initiative financially and supports implementation through its bilateral development projects.[51] The participation of German companies in the initiative, however, has largely failed to materialize so far. RWE AG joined EITI in April 2010 and remains the only German company among stakeholders. The KfW Group is another German stakeholder.

The German government is rather critical of the Commission's proposal for a new EU transparency directive.[52] With the backing of the private sector, the government warns against high bureaucratic costs and competition disadvantages compared to companies subject to less rigorous reporting requirements. Under the Commission's proposal, companies would have to disclose payments in the raw materials sector on a project-by-project as well as country-by-country basis. In the Council of the European Union, Berlin argued that the project-by-project disclosure requirement should be removed from the new directive and that the minimum threshold for disclosure should be raised. It particularly rejected the European Parliament's proposal to extend reporting requirements beyond the raw materials sector.[53]

46 BMWi, Agreement between the Government of the Federal Republic of Germany and the Government of the Republic of Kazakhstan on Cooperation in the Fields of Raw Materials, Industry and Technology, http://www.bmwi.de/English/Redaktion/Pdf/agreement-kazakhstan-germany,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf (accessed February 26, 2013).
47 "Rohstoffpartnerschaft mit Kasachstan beschlossen," *dradio.de*, February 8, 2012, http://www.dradio.de/aktuell/1672442/ (accessed June 14, 2012).
48 "Rohstoffpartner gesucht," *German-Foreign-Policy.com*, May 29, 2012, http://www.german-foreign-policy.com/de/fulltext/58337 (accessed May 30, 2012).
49 BMWi, "Agreement on German-Chilean Raw Materials Partnership," press release, January 26, 2013, http://www.bmwi.de/English/Navigation/Press/press-releases,did=549090.html?view=renderPrint (accessed February 26, 2013).
50 *Australian-German Joint Declaration on Resources and Energy Cooperation*, http://www.auswaertiges-amt.de/cae/servlet/contentblob/577478/publicationFile/154906/110601-ErklaerungRohstoffdialog.pdf (accessed November 26, 2012).
51 BMZ, *Transparenzinitiative im Rohstoffsektor: EITI*, http://www.bmz.de/de/was_wir_machen/themen/goodgovernance/transparenz/eiti/index.html (accessed May 11, 2012).
52 Deutscher Bundestag, Antwort der Bundesregierung auf die Kleine Anfrage der Abgeordneten Viola von Cramon-Taubadel, Volker Beck (Köln), Uwe Kekeritz, weiterer Abgeordneter und der Fraktion Bündnis 90/Die Grünen, Drucksache 17/9080, http://dipbt.bundestag.de/dip21/btd/17/090/1709080.pdf (accessed May 23, 2012); BDI, Vorschlag für eine Änderung der Richtlinie 2004/109/EG zur Harmonisierung der Transparenzanforderungen in Bezug auf Informationen über Emittenten, deren Wertpapiere zum Handel auf einem geregelten Markt zugelassen sind, sowie der Richtlinie 2007/14/EG der Kommission, KOM(2011) 683 endgültig, December 6, 2011, http://www.bdi.eu/images_content/KonjunktурStandortUndWettbewerb/BMF-Tran.pdf (accessed June 1, 2012). See also "European Union" in this volume, pp. 59ff.
53 Misereor, "Bundesregierung blockiert EU-Pläne für mehr Transparenz im Rohstoffsektor," March 28, 2012, http://www.misereor.de/presse/pressemeldungen/pressemeldungen-detais/article/bundesregierung-blockiert-eu-plaene-fuer-mehr-transparenz-im-rohstoffsektor.html (accessed June 7, 2012). For more information on developments concerning the transparency directive (as of November 2012), see "European Union" in this volume, pp. 59ff.

The German government and private sector are also hostile toward the idea of introducing reporting requirements for the use of so-called conflict minerals (from the DR Congo and neighboring countries), which the United States has now established.[54] Berlin believes that an obligation to report the origin and utilization of these materials (all the way from mine to final consumer) would entail disproportionately high bureaucratic costs, while positive effects in the producing countries are anything but certain.[55] Ultimately, the government and private sector prefer to support voluntary initiatives over introducing strict and legally binding rules for single jurisdictions.

European and Global Raw Materials Governance

Germany supports strengthening international raw materials governance. On the EU level this has already been achieved. The European strategy for raw materials of early 2011, *Tackling the Challenegs in Commodity Markets and on Raw Materials*, clearly bears German hallmarks – at least with respect to minerals and metals. German interests are also mirrored in resource-specific aspects of EU trade policy, namely in efforts to reduce export barriers affecting raw materials.

Germany is a member of the international metal study groups on lead and zinc, copper, and nickel, and of the Common Fund for Commodities (CFC).[56] Germany is also an observer at the meetings of the Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development (IGF), which is a discussion platform for mining and mineral resources. The German government participated in the development of the *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas*.[57] The BMZ supports the United Nations Global Compact financially and by functioning as the coordination center for the German Global Compact network.[58] Finally, the federal government favors entrenching the topic more strongly within the G20, although thus far without success.

Evaluation and Outlook

Resource security has become an important issue for the German government. Germany has taken an international lead in resource and material efficiency, waste management, and recycling. Raising industry and public awareness of the risks threatening international raw material markets can also be considered a government success. Institutional reforms such as setting up the German Mineral Resources Agency (DERA) and the Helmholtz Institute Freiberg for Resource Technology, and launching the Global Development Policy Raw Materials (GeRI) and various research programs must also count as successes.

Other aspects of German raw materials strategy, however, are not without contradictions. While Berlin advocates a common EU raw materials policy, it pursues its own individual approach on resource partnerships. Incongruities can also be found in the economic and development components of the strategy. Whereas cooperation with resource-rich countries is supposed to contribute to economic and social development, the agreement with Kazakhstan largely ignores human rights. Nor is the German government fully consistent with respect to transparency. It supports the EITI, but on behalf of its own industries works to weaken further-reaching EU initiatives. Implementation of the strategy is, however, still in its early stages, and these ambiguities could yet turn out to be merely growing pains.

54 See also "United States" in this volume, pp. 150ff.
55 BDI, Fokus Sicherheit und Rohstoffe, Ed. 1, 2012.
56 Common Fund for Commodities, *CFC Project Financing*, http://www.common-fund.org/projects/projects-funded-by-cfc/ (accessed June 6, 2012).
57 OECD, *OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas*, http://www.oecd.org/document/36/0,3746,en_2649_34889_44307940_1_1_1_1,00.html (accessed May 18, 2012).
58 BMZ, *Global Compact*, http://www.bmz.de/de/was_wir_machen/themen/wirtschaft/privatwirtschaft/unternehmensverantwortung/global_compact/index.html (accessed May 18, 2012).

India

Jannic Horne and Christian Wagner

The Indian raw materials sector represents the material base for industrialization. Demand can largely be satisfied by domestic production. With the economy growing by about 7 to 8 percent annually since the mid-1990s, the raw materials sector has been able to expand too. But with a share of 2.3 percent of GDP (2010), it remains relatively insignificant and the government sees great potential for further growth.[1]

Minerals in the National Economy

India possesses large reserves of barite, bauxite, chromium, iron ore, limestone, and manganese. Its iron ore reserves are estimated at 25 million tonnes (fifth in the world) and rare earth reserves at three million tonnes (fourth).[2] Eighty-seven different minerals were produced in 2010.[3] According to *World Mining Data*, India accounted for large shares of global production of barite (15 percent), talc (14 percent), chromium (13 percent), manganese (10 percent), graphite (9 percent), and iron (11 percent).[4] The quarrying of rough diamonds, which has been practiced for centuries, is one of the few extractive sectors in decline: between fiscal years 2002/2003 and 2008/2009, production shrank by 99 percent. By contrast, the diamond-cutting industry retains its significance, with India accounting for 55 percent of global processing.[5]

As well as supplying domestic industries, mining is also a relevant export sector. In 2010, the most important exported mineral was cut diamonds, which made up 66.2 percent of iron and mineral exports (by value), while uncut diamonds were the most important non-energy non-metal mineral import, with a share of 14.2 percent of ore and mineral imports. Other significant exports are iron ore (22.2 percent), granite (3.9 percent), precious and semiprecious stones (0.8 percent), alumina (0.7 percent), chromium, and lead. In the area of metals and alloys, the most important exports are iron and steel (as a single product group), aluminum, and copper.[6]

India remains self-sufficient in many metal minerals, such as bauxite, chromite, limonite, iron ore, manganese ore, and rutile, as well as the industrial minerals barite, dolomite, feldspar, limestone, quartz and quartzite, sillimanite, and talc,[7] but is heavily dependent on imported energy. Oil imports, mainly from the Middle East, represented roughly 70 percent of ore and mineral imports in fiscal year 2009/2010.[8] Other significant imported primary products are copper (3.6 percent), phosphate (0.6 percent), and – last but not least – gold. For cultural reasons, India is the

1 Ministry of Mines (MoM), *Unlocking the Potential of the Indian Minerals Sector: Strategy Paper for the Ministry of Mines* (New Delhi, November 2011), pp. 11, 28, http://mines.nic.in/writereaddata%5CContentlinks%5C9eeb6e3b6113423586029ee88e1f4b36.pdf (accessed October 10, 2012); Peter E. J. Pitfield, Teresa J. Brown, and Naomi E. Idoine, *Mineral Information and Statistics for the BRIC Countries 1999–2008* (Nottingham, Edinburgh, and London, 2010), p. 49, https://www.bgs.ac.uk/downloads/start.cfm?id=1637 (accessed October 9, 2012).

2 Daniel J. Cordier, "Rare Earths," in USGS, *Mineral Commodity Summaries 2012* (Reston, January 2012), p. 129, http://minerals.usgs.gov/minerals/pubs/commodity/rare_earths/mcs-2012-raree.pdf (accessed October 15, 2012).

3 Chin S. Kuo, "India [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, February 2012), p. 11.1, http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-in.pdf (accessed October 8, 2012); "Indiens Wirtschaftswachstum heizt Rohstoffnachfrage an," *GTAI*, April 11, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=554906.html (accessed October 9, 2012); Boris Alex, "Indien steigt wieder in das Geschäft mit Seltenen Erden ein," *GTAI*, March 17, 2011, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=79860.html (accessed October 10, 2012).

4 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

5 Pitfield, Brown, and Idoine, *Mineral Information and Statistics* (see note 1), p. 62.

6 MoM, *Annual Report 2010–11* (New Delhi, August 2011), pp. 53, 161ff., http://mines.nic.in/index.aspx?level=1&lid=549&lang=1 (accessed October 9, 2012).

7 Kuo, "India [Advance Release]" (see note 3), p. 11.2.

8 "Indiens Wirtschaftswachstum heizt Rohstoffnachfrage an" (see note 3); MoM, *Annual Report 2010–11* (see note 6), pp. 53, 165ff.

world's biggest consumer of gold, with more than 700,000 kg annually.[9]

The Indian mining industry is characterized by a multitude of small mines. In 2010, there were 2,628, of which 608 produced metals and 1,446 industrial minerals. Apart from the Vedanta Group, which is listed in London and emerged largely from the Indian Sterlite Group and Hindustan Zinc, the country's mining sector is mainly dominated by mining companies owned by individual states. In 2010, state enterprises accounted for 74 percent of raw materials production (in terms of value) and 82 percent of the total of 500,000 jobs.[10] The iron ore sector is an exception. It is dominated by large private-sector companies like Tata Steel and Arcelor Mittal. Although the state-owned National Mineral Development Corporation is the single largest producer, 70 percent of production is in private hands.[11] Apart from the state-owned enterprises, whose role is declining, two companies – Vedanta and Arcelor Mittal – play a crucial role.

Foreign direct investment in India's mining sector is small, but increasing steadily. While FDI amounted to only US$42 million during fiscal year 2006/2007, it had jumped to US$591 million by 2010/2011.[12] Indian companies are increasingly active abroad, for example in Australia, Canada, Chile, Indonesia, Iran, Congo, Mozambique, Namibia, Singapore, South Africa, Thailand, the United States, and Zambia.[13]

The Raw Materials Policy

The Indian raw materials debate concentrates on fossil fuels – coal, oil, and gas – with metals and minerals playing only a minor part. Corruption and illegal mining are important issues, together with the associated financial, social, and political repercussions.[14] Industry and government recognize the great need to reform an inadequate regulatory regime.[15]

Institutional Setting

At both federal and state level a multitude of government actors deal with raw materials, with the consequence that responsibilities are not always clear-cut. The main actor is the Ministry of Mines (MoM), which is responsible for both the Indian Bureau of Mines (IBM) as the controlling, advising, and evaluating agency, and the Geological Survey of India (GSI).[16] A number of other ministries, such as those for steel, coal, and petroleum and natural gas, also deal with raw materials issues, as does the Department of Atomic Energy. Environmental regulations (environmental impact assessments) are the responsibility of the Ministry of Environment and Forests (MoEF). Below the federal level, each state has several ministries and agencies involved in extraction. While the multitude of federal and state-level actors often causes coordination problems and regulatory overlap, there is broad clarity over mineral rights: deposits within a state's territory belong to the state, offshore resources belong to central government.[17] The national parliament and the state assemblies are generally weak and possess only minor powers with regard to supervision.

Apart from the few major corporations already mentioned, the private sector is fragmented and poorly developed due to a general preference for state-owned enterprises, poor security of investment, unclear and overlapping regulations, insufficient exploration by the Geological Survey (GSI), and interminable licensing procedures. It is therefore not surprising that international companies have to date mainly become involved in trading. Exploration activities are mostly undertaken by large Indian companies such as Tata, Essar, and O. P. Jindal.[18]

9 MoM, *Annual Report 2010–11* (see note 6), pp. 53, 165ff; Pitfield, Brown, and Idoine, *Mineral Information and Statistics* (see note 1), p. 49.
10 Kuo, "India [Advance Release]" (see note 3), p. 11.1.
11 "Indiens Wirtschaftswachstum heizt Rohstoffnachfrage an" (see note 3).
12 Reserve Bank of India, *Annual Report – Foreign Direct Investment Flows to India: Country-wise and Industry-wise*, August 25, 2011, http://rbi.org.in/scripts/AnnualReportPublications.aspx?Id=1029 (accessed October 10, 2012).
13 MoM, *Annual Report 2010–11* (see note 6), pp. 171ff.
14 "Coal Scam: How India Lost Rs.1.86 Lakh Crores," *India Today*, n.d., http://indiatoday.intoday.in/gallery/coal-scam-how-india-lost-rs-1.86-lakh-crores/1/7610.html (accessed October 10, 2012).
15 Ernst & Young Pvt. Ltd., *Exploring India: Mining the Opportunities* (n.p., 2011), p. 29, http://www.ey.com/Publication/vwLUAssets/EY_Exploring_India_Mining_the_opportunities/$FILE/EY_Exploring_India_Mining_the_opportunities.pdf (accessed October 10, 2012).
16 MoM, *Annual Report 2011–12* (New Delhi, 2012), p. 13, http://mines.gov.in/annual-report/ann2011-12.pdf (accessed October 10, 2012).
17 Ibid., p. 69.
18 Ministry of Steel, *Annual Report 2011–12* (New Delhi, 2012), pp. 27ff., http://steel.gov.in/Annual%20Report%20%282011-12%29/English/Annual%20Report%20%282011-12%29.pdf (accessed October 10, 2012); Ernst & Young Pvt. Ltd., *Exploring*

Illegal mining is a major problem. In 2010 alone, 82,000 incidents of illegal mining were recorded. This means that there are thirty illegal mining actitivies for each legal activity.[19] However, the total number of illegal mines is declining and the problem is largely concentrated in eleven rather underdeveloped states.[20] Given the sector's history of environmental harm, population displacement, corruption, and patronage, mining companies often find themselves confronted with local opposition. When, as is often the case, dissent is ignored by companies and government agencies, actual protest movements emerge and revolutionary movements such as the Maoist Naxalites may gain strength.[21]

Concepts and Strategies

The Ministry of Mines recognizes several challenges for India.[22] Manufacturing is confronted with rising production costs due to growing demand for minerals and increasing world market prices, while falling productivity at domestic mines demands intensified exploration. Despite these challenges, the Ministry of Mines is upbeat about the prospects for the Indian raw materials sector, given the country's large reserves and initiated and upcoming regulatory reforms. A scenario for 2025 expects that the mining sector will contribute US$250 billion to GDP, adding 2.5 million additional jobs in the sector itself and another 13 million indirectly.

The Ministry of Mines plans action in several areas to achieve sustainable development of the Indian raw materials sector. Firstly, the national raw materials base is to be expanded and access to foreign sources of rare minerals improved. At home, the GSI will collaborate with the private sector to collect geophysical and geochemical data for up to 30 percent of the country's territory over the next five years. To date, only about 4 percent has been explored. Offshore mining strategies will be developed together with the Ministry of Earth Sciences. GSI's electronic data systems are to be improved significantly, for example to point the private sector to investment opportunities. Private-sector activities will be supported by accelerating licensing procedures, improving legal certainty, simplifying license transfer, and creating financial incentives.

The government will support mining projects of Indian companies for raw materials that are scarce in India and which therefore have to be acquired from abroad. This will involve, for example, cobalt, nickel, phosphate, coking coal, and potash. The Ministry of Mines is planning to conduct a demand analysis for the coming twenty-five years as a basis for selecting especially suitable foreign mining sites for these minerals. It also proposes establishing a central resource planning agency and intends to support the international activities of private companies through information, networks, and easing bureaucracy. Such activities are also to be embedded in Indian development cooperation.

Secondly, the Ministry of Mines intends to improve interagency cooperation, for example with the Ministry of Environment and Forests in the environmental approval process, and proposes to enhance the exchange of information between federal and state agencies by creating a shared interdisciplinary database. These measure should reduce the current five- to eight-year processing time to less than two and give investors greater planning security. A number of improvements have already been introduced in the new *Mines and Mineral (Development and Regulation) Bill* (MMDR).

Thirdly, to ease the actual work of extraction on the ground, the Indian strategy aims to improve infrastructure, train skilled workers, and simplify access to modern technologies. In order to realize major infrastructure mining projects, the Ministry of Mines intends to improve communication with the ministries responsible for railroads, shipping, and roads. In addition to that, important ports are to be expanded, central waterways to be developed and the socio-

India (see note 15), p. 7; Keith Campbell, "India Seeks Natural Resources in Africa but Recognises Continent's Development Needs," *Mining Weekly*, March 25, 2011, http://www.miningweekly.com/article/india-seeks-natural-resources-in-africa-but-recognises-the-continents-development-needs-2011-03-25 (accessed October 10, 2012).

19 Human Rights Watch, *Out of Control. Mining, Regulatory Failure, and Human Rights in India*, 2012, p. 1, http://www.hrw.org/sites/default/files/reports/india0612ForUpload_0.pdf (accessed October 10, 2012).

20 Ernst & Young Pvt. Ltd., *Exploring India* (see note 15), p. 7; MoM, *Annual Report 2011–12* (see note 16), p. 21; MoM, *Unlocking the Potential* (see note 1), p. 12.

21 Human Rights Watch, *Out of Control* (see note 19); "Stop Mining in Naxal-hit Areas: V Kishore Chandra Deo," *The Economic Times*, June 1, 2012, http://articles.economictimes.indiatimes.com/2012-06-01/news/31959103_1_mining-lease-naxal-hit-areas-district-mineral-foundation (accessed October 10, 2012).

22 MoM, *Unlocking the Potential* (see note 1).

economic conditions of the local population in mining areas to be improved through development funds.

Concrete steps are planned to overcome the shortage of skilled labor. The Ministry for Human Resource Development is to triple the numbers of mining engineers trained at India's technical universities in the coming ten years, state vocational colleges will offer more courses on mining, and training activities in the private sector will be promoted. The short-term strategy for promoting modern technologies is to facilitate imports, the longer-term one is to develop international research projects via the Geological Survey (GSI) and the Bureau of Mines (IBM).

Fourthly, the report suggests additional measures to secure sustainability and development, for example calling for improvements in the IBM's monitoring processes. Companies are to bear a larger share of the follow-on costs of mining, and the private sector will be encouraged through research funding to develop more sustainable mining and processing methods.

Fifthly, the Ministry of Mines is planning to develop an information, communication, and education strategy to address the key actors: industry, NGOs, local populations, different levels of government, and the international community. The relevance of the mining sector for economic growth, employment, and industrial development will be emphasized, while also underlining that extraction need not conflict with sustainability.

In light of the scale of planned reforms, a new implementing agency is considered necessary to document progress, harmonize regulations, and provide the necessary knowhow.

Policy Measures and Instruments

National Regulation

Efforts to liberalize, and modernize the Indian raw materials sector started in the 1990s. The *National Mineral Policy* of 1993 provided the basis for these reforms and for the first time allowed foreign direct investment in exploration and mining. A process of decentralization was also initiated. But conditions barely improved, and the sector remained inefficient and opaque. In 2005, the Planning Commission set up the Hoda Committee to draft new reforms. The committee's proposals fed into the current reform efforts, which were launched with the new *National Mineral Policy* in 2008.[23]

Consultation began in 2011 on the *Mines and Mineral (Development and Regulation) Bill*,[24] which seeks to eliminate competitive disadvantages, create an independent regulatory agency, make the licensing process more transparent,[25] make the extractive sector more sustainable, and give local communities a larger share of the proceeds, for example through local development funds funded by mining companies.[26] Critics argue that the changes would increase production costs and expand the powers of central government.[27] The proposal was approved by the Cabinet in January 2012 and subsequently debated by the Parliamentary Standing Committee on Coal and Steel.[28] A decision had not been made by the summer of 2012.

Another new development that evolved from the Hoda Committee's proposals is the *Sustainable Development Framework for Indian Mining* (SDF). Following proposals from the International Council on Mining and Metals (ICMM) and of the International Union for Conservation of Nature (IUCN), the SDF recommends introducing clear guidelines, best-practice standards, and reporting rules.[29] Initially serving as guidance for policymakers and industry, in the long run SDF should become a general benchmark ideally controlled by a specialized agency at the Ministry of Mines.[30]

Several measures have been taken to tackle illegal mining by improving administrative oversight of the

23 MoM, *Annual Report 2010–11* (see note 6), p. 34–46; Campbell, "India Seeks Natural Resources in Africa" (see note 18); Ernst & Young Pvt. Ltd., *Exploring India* (see note 15), p. 28.
24 MoM, *Annual Report 2011–12* (see note 16), p. 1.
25 "Indiens Wirtschaftswachstum" (see note 3).
26 "Mines Bill Seeks Holistic Reforms in the Sector: UPA Report," *Economic Times*, May 22, 2012, http://articles.economictimes.indiatimes.com/2012-05-22/news/31814350_1_mining-sector-mines-bill-mining-projects (accessed October 10, 2012).
27 Confederation of Indian Industry, *Industry Concerned on Compensation in MMDR Act*, September 30, 2011, http://cii.in/PressreleasesDetail.aspx?enc=yIfQ4ugZVn4VBUp34DuYprGl6j19OpEqRPH2icTa5DUuMxYvJdqAXToxF5iv0VV4zoRiMyAZq8+r9dkN2+p+Sg== (accessed October 10, 2012); "Naveen Patnaik Asks PM to Modify MMDR Bill, 2011," *Indian Express*, May 19, 2012, http://www.indianexpress.com/news/naveen-patnaik-asks-pm-to-modify-mmdr-bill-2011/951390 (accessed October 10, 2012).
28 MoM, *Annual Report 2011–12* (see note 16), 1.
29 MoM and ERM, *Sustainable Development Framework (SDF) for Indian Mining Sector* (New Delhi, November 30, 2011), 6, http://mines.nic.in/writereaddata/filelinks/2155afeb_FINAL%20REPORT%20SDF%2029Nov11.pdf (accessed October 10, 2012).
30 Ibid., pp. 8ff.

sector. For example, expanding the scope of regulation to increase transparency of the raw materials processing chain.[31] Coordination between actors such as the Ministry of Shipping, the Ministry of Railways, the regulatory agencies, the states, and the Bureau of Mines has been improved and control mechanisms have been reinforced. Federal and state-level committees supervise implementation of the reforms.[32]

Up to 50 percent of iron ore is exported (mainly to China), and export tariffs have been raised several times to secure supplies for Indian demand.[33] This measure highlights a trend toward resource nationalism, which has no negative connotations in India.[34] India levies a 5 percent import tariff on zinc ores, a 20 percent export tax on iron ore fines, and a 15 percent export tax on iron ore lumps. In July 2011, all mining operations in the Bellary region in the state of Karnataka were suspended. An import tariff of 3 percent is levied on refined copper.[35]

International Activities

Large and medium-sized Indian raw materials enterprises are increasingly active abroad. To date they have mainly invested in African countries with large coal and copper deposits, although other minerals are also coming to the fore.[36] But Indian business activities are not limited to developing countries, as shown by Tata's acquisition of the Dutch-British steel company Corus Group or the purchase of Anglo American's zinc business by the British-Indian Vedanta Resources.[37]

State-owned enterprises have also begun operating abroad, with three principal objectives: initiating technology transfer, drawing investment to India, and acquiring rights to develop foreign deposits.[38] Memoranda of understanding, which the Ministry of Mines has concluded with Afghanistan, Colombia, Mali, and the Canadian provinces of British Columbia and Saskatchewan, are one central instrument. Another are joint working groups, which currently exist with Australia, Malawi, Mozambique, Uzbekistan, and the Canadian provinces of Ontario and Saskatchewan.[39] There are also bilateral agreements, such as one concluded with Japan in 2012 on the joint development of rare earths in India.[40]

In recent years, India has been seeking to present itself as a major mining nation on the global stage, for example at international conferences.[41] The goal is to keep pace in the competition for exploration projects and to attract investors to develop deposits in India.

India's international development record on mining is mixed. On the one hand, it appears more cooperative than China and seeks long-term partnerships that serve both its own national resource interests and the partner's development efforts. The developmental aspect can be seen, for example, in the plan to establish an India-Africa Diamond Institute in Botswana, which dates back to the first India-Africa Summit in 2008.[42] On the other hand, Indian companies are increasingly also criticized for using bribery and corruption.[43]

The Indian government opposes international initiatives such as the Extractive Industries Transparency Initiative (EITI) on the grounds that they fall behind India's *Mines and Mineral (Development and Regulation) Bill*. A spokesperson for the Ministry for Oil and Gas also said that the initiative was driven by Western oil giants that find it difficult to operate in countries with poor governance.[44]

Evaluation and Outlook

India will be able to provide its industries with a multitude of domestic raw materials for the foresee-

31 MoM, *Annual Report 2010–11* (see note 6), p. 45.
32 MoM, *Annual Report 2011–12* (see note 16), pp. 64ff., 70ff.
33 "Indiens Wirtschaftswachstum" (see note 3).
34 Ernst & Young Pvt. Ltd., *Exploring India* (see note 15), p. 34; "Indiens Wirtschaftswachstum" (see note 3).
35 Bundesverband der Deutschen Industrie e.V. (BDI), *Übersicht über bestehende Handels- und Wettbewerbsverzerrungen auf den Rohstoffmärkten*, unpublished document (Berlin, 2012), p. 44.
36 Campbell, "India Seeks Natural Resources in Africa" (see note 18).
37 "Corus Accepts £4.3bn Tata Offer," *BBC News*, October 20, 2006; Eric Onstad, "Vedanta Buys Anglo Zinc Assets for $1.34 Billion," *Reuters*, May 10, 2010; Campbell, "India Seeks Natural Resources in Africa" (see note 18).
38 MoM, *Annual Report 2011–12* (see note 16), pp. 79ff.
39 Ibid.
40 Cecilia Jamasmie, "Japan and India Sign Rare Earth Deal to Reduce Dependency on China," *mining.com*, May 1, 2012.
41 MoM, *Annual Report 2011–12* (see note 16), pp. 87f.
42 Campbell, "India Seeks Natural Resources in Africa" (see note 18); "India to Set up India-Africa Diamond Institute in Botswana," *Indian Express*, June 12, 2012, http://www.indianexpress.com/news/india-to-set-up-indiaafrica-diamond-institute-in-botswana/960925 (accessed October 10, 2012).
43 Naren Karunakaran, "Extractive Industries Transparency Initiative May Help Curb Illegal Mining; India Reluctant to Sign Up," *Economic Times*, February 14, 2012, http://articles.economictimes.indiatimes.com/2012-02-14/news/31059449_1_sashi-mukundan-mining-bp (accessed October 10, 2012).
44 Ibid.

able future. Production of bauxite, alumina, and crude steel can be expected to increase as planned projects come on stream. India is thus likely to maintain its position as an important exporter of raw materials. Given the steady growth of the diamond processing industry, uncut diamond imports will also continue to grow. Because of its enormous potential India will continue to be a country that primarily produces and processes raw materials.[45]

In light of the importance of state-owned enterprises, confusion over responsibilities, and widespread corruption,[46] the Indian government is aiming to create a coherent and transparent regulatory system to ease the licensing process and attract private investment. Licensing procedures are to be made more transparent, simpler, and faster, FDI are to be facilitated, and central agencies such as the Geological Survey (GSI) and Bureau of Mines (IBM) need to be modernized. But to date almost no private company is involved in exploration, which is still mainly conducted by the government-run GSI. The GSI, however, is not able to collect comprehensive data giving a clear overview of potential and undeveloped deposits. Another symptom of inadequate regulation is local opposition to mining companies whose projects are often connected with clientelism, environmental pollution, and resettlement.[47] Future planning of mining projects will therefore take greater account of sustainability, as already seen in the recent *Sustainable Development Framework for Indian Mining* (SDF). This strategic report, published in late 2011, draws a fairly comprehensive picture of intended reforms.[48]

Indian raw materials policy faces several challenges. At home, exploration must be improved to allow domestic and foreign companies to increase production, the often unclear and overlapping responsibilities of central and state governments must be harmonized, and local communities must benefit more from sectoral development. Internationally, the government must support private and state-owned Indian companies investing abroad in order to secure access to rare raw materials in an increasingly contested international market. In both cases, steering capacities have to date proven to be rather poor, and need to be improved. Reforms will therefore remain incremental rather than comprehensive.

45 Kuo, "India [Advance Release]" (see note 3), p. 11.5.
46 MoM, *Unlocking the Potential* (see note 1), p. 11; Vaishnavi Naik, "India Presents a Huge Market for Mining Industry," *Metaworld*, April 2011, 34, http://www.metalworld.co.in/newsletter/apr11/perspective0411.pdf (accessed October 10, 2012).
47 "Stop Mining in Naxal-hit Areas" (see note 21); Kannan Kasturi, "Draft Mining Regulation, Mining vs. Communities," *indiatogether.org*, October 5, 2010, http://www.indiatogether.org/2010/oct/law-mining.htm (accessed October 10, 2012).
48 MoM, *Unlocking the Potential* (see note 1).

Indonesia

Franziska Killiches

Indonesia is endowed with large mineral deposits and plays an important role in regional and international markets. Its raw materials policy has undergone significant changes since the fall of Suharto in 1998. The biggest challenges for the Indonesian mining industry currently ensue from the decentralization process and from restrictive measures imposed by the new *Law on Mineral and Coal Mining (No. 4/2009)*. The Indonesian government strives to utilize the domestic raw materials sector as an engine for economic growth and development. At the local level, some mining projects entail negative impacts such as pollution, corruption, and social tensions.

Minerals in the National Economy

Indonesia is rich in minerals and metals. In 2010, it accounted for 12.4 percent of global nickel production (rank 1), 30.6 percent of tin production (rank 2), 5.4 percent of copper production (rank 5), and 4.7 percent of gold production (rank 7).[1] The Indonesian raw materials economy is shaped mainly by the country's size and its geographical nature as an archipelago. Many deposits are located in remote areas far from the capital, Jakarta, making transport and logistics costly and giving local authorities great importance for the entire sector. Indonesia currently exploits only part of its raw materials reserves. An overall assessment of its national mineral resources is still in progress. Exploration of rare earth elements, for example, began only recently.[2]

The entire extractive sector contributes 11.2 percent of GDP (2010).[3] Of that, the energy sector (mainly coal and natural gas) makes up the largest part, while the mineral industry accounts for only 4 percent of GDP.[4] At the regional and local level, however, the importance of the mineral sector can be far greater. In West Papua, for instance, minerals and metals mining contributes about 63 percent of regional GDP.[5] Often extractive industry is the only source of revenue for regional and local governments.

Non-energy mining products contributed approximately 16.9 percent of Indonesian exports in 2011,[6] principally to China, Japan, and the United States, which together accounted for 70 percent thereof.[7] In 2010, Germany imported nickel (38.9 percent of total by value), tin (40 percent), ferro-nickel (16.4 percent), and copper (8.5 percent) from Indonesia.[8] The country's geography makes it difficult to properly control exports, with nickel exports to China offering a prominent example of the widespread nature of commodity smuggling.[9]

Traditionally, the Indonesian raw materials sector has been dominated by large domestic and foreign companies, with the latter attracted to invest in the underdeveloped resource sector by favorable investment conditions under Suharto (1967 to 1998). The most important foreign companies include Freeport-McMoRan (gold and copper), Newmont Mining Corporation (gold and copper), and Vale (nickel), which have been operating in Indonesia through subsidiaries since the mid-1960s. Freeport-McMoRan and Rio Tinto operate the world's second-largest copper and gold mine at Grasberg in West Papua. Major domestic com-

1 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).
2 Meeting with representatives of GAI, August 9, 2012.
3 Chin Kuo, "Indonesia [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, February 2012), pp. 12.1–12.8, http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-id.pdf (accessed August 30, 2012).
4 Meeting with representatives from IMA, ICEL, and ESDM, August 7/8, 2012.
5 Cut Dian Augustina, Ehtisham Ahmad, Dhanie Nugroho, and Herbert Siagiam, *Political Economy of Natural Resource Revenue Sharing in Indonesia*, Asia Research Center Working Paper 55 (London: Asia Research Center, 2012), http://www2.lse.ac.uk/asiaResearchCentre/_files/ARCWP55-Agustina Ahmad NugrohoSiagian.pdf (accessed August 30, 2012).
6 Kuo, "Indonesia [Advance Release]" (see note 3).
7 "Implementation of New Export Rule a Mess: Kadin," *Jakarta Post*, June 11, 2012, http://www.thejakartapost.com/news/2012/06/11/implementation-new-mineral-export-rule-a-mess-kadin.html (accessed August 30, 2012).
8 BGR Database 2012.
9 Meetings in Jakarta, August 7–10, 2012.

panies include both state-owned and private firms. The principal state-owned enterprises are PT Aneka Tambang (gold, silver, copper, and nickel), PT Timah Tbk (tin), and Krakatau Steel (steel).

Since the 2000s, the Indonesian raw materials sector has undergone significant change. Over the past decade, domestic and foreign (especially Indian and Chinese) small- and medium-size companies have increasingly entered the market. This "new" group of investors represents a major challenge for the Indonesian authorities, as their business activities are often opaque and difficult to regulate. In the course of this development, illegal mining by small companies and local populations has proliferated.[10] Parts of the rural population see small-scale mining as an attractive way to earn a living.

The Raw Materials Policy

Institutional Setting

The Indonesian mining sector is regulated at the national, regional, and local levels. At the national level, in 2009 the *new Law on Mineral and Coal Mining No. 4* of 2009 replaced the old *Mining Law (11/1967)* of 1967. Since then, as the parliament has passed no new legislation for the raw materials sector, it has been the responsibility of the executive to implement the new law with government, presidential, and ministerial decrees (regulations). Within the executive, the Ministry of Energy and Mineral Resources (ESDM), specifically its Directorate General of Mineral and Coal, is in charge of the mining sector. In technical geo-scientific matters, the ESDM is assisted by its subordinate authority, the Indonesian Mining Agency (GAI).

Other relevant national institutions include the Ministry of Commerce, the Ministry of Finance, the Ministry of the Environment, the Ministry of Forestry, and the Ministry of Public Works, which all adopt policies affecting the raw materials sector. Their influence is limited, however, as they fail to coordinate their policies properly and there is no national strategy to guide their actions.[11] The Indonesian Investment Agency (BKPM) regulates incoming FDI and is responsible for granting investment permits. At least officially, there is no discrimination between foreign and domestic companies in the mining sector.

There are thirty-four regions in Indonesia, subdivided into several hundred districts and 95 cities. All – regions, districts, and cities – can adopt their own regulations and laws within the scope of their powers, although the extent to which they exercise this right is not fully known. Regional mining authorities subordinate to the ESDM advise the regional executives and parliaments. In theory, the regions strive to coordinate the mining activities in the districts and cities, but in practice their limited resources and lack of instruments to sanction lower levels leaves them with little influence or control.

Decentralization Law No. 22 of 1999 expanded the political, administrative, and financial autonomy of regional and local authorities, and in 2009 they acquired important additionally responsibilities in the raw materials sector. This shift of responsibilities, however, was not accompanied by a strengthening of administrative capacities in particular at the local level. As a result, few districts and cities have adequately resourced mining authorities, and some have none at all. Instead, in the districts and cities the executive, especially the regent or mayor, often decides unilaterally on resource-related issues and uses its power on behalf of special private interests. Typically, local resource politics are opaque and accompanied by rampant corruption.

While there is no mandatory consultation process for national, regional, and local legislation, various interest groups seek to exert influence, in particular on the national level. The private sector is represented by the Indonesian Chamber of Commerce and Industry (KADIN), specific mining interests by the Indonesian Mining Association (IMA), which has 42 regular and 75 associated members.[12] Many mining companies also have close relations with the Indonesian government and parliament, and patronage and cronyism are widespread. Civil society groups and NGOs such as the Indonesian Center for Environmental Law (ICEL), the Commission for the Disappeared and Victims of Violence (KontraS), and the Mining Advocacy Network (JATAM) also work on resource-related issues. They mostly seek to raise public awareness of environmental and social problems through documentation and education, but exert little influence on national mining legislation.

10 Meeting with representatives of the regional mining authority in West Java, August 9, 2012.

11 Terry OCallaghan, "Patience is a Virtue: Problems of Regulatory Governance in the Indonesian Mining Sector," *Resources Policy* 35 (2010): 218–25.

12 Meeting with representatives of IMA, August 8, 2012.

As a result of the *Law No. 4/2009* the raw materials sector has gained prominence in the public debate in Indonesia and abroad. The public discourse on the national level differs from that on the local one. At the local level, mining projects often lead to serious conflicts (strikes, protests, and violent clashes) between the local populations and investors, security firms, and mining companies, but also between different population groups.[13] However, these local developments attract only limited national public attention and press coverage.[14] Jakarta sees the mining industry primarily as a lucrative economic sector: Companies hope to participate in the resource boom, while the government wants to use the sector as an engine for economic growth and development.

Concepts and Strategies

While there is no official governmental strategy document for the raw materials sector, *Law No. 4/2009* can be read as a national strategy, as it determines long-term goals without laying down detailed regulations. Three overall objectives are identified: (1) implementing *Decentralization Law No. 22/1999* in the mining sector; (2) promoting economic development by strengthening and protecting the domestic raw materials sector; and (3) maximizing state revenues from the mining sector on all administrative levels.

The economic importance of the raw materials sector is also acknowledged in the national *Masterplan for the Acceleration and Expansion of Indonesia's Economic Development* (*Masterplan MP3EI*) of 2011, which seeks to expand the economy and accelerate growth by supporting investment in twenty-two key industries in six economic corridors.[15] Of the twenty-two sectors, four are directly related to mineral mining (bauxite, copper, nickel, steel). The *Masterplan* acknowledges the economic corridors of Sumatra, Kalimantan, Sulawesi, and West Papua/Moluccas as particularly important for mineral and metal production. Infrastructure projects planned under *MP3EI* will improve the connection of some of the more remote mining areas to the domestic economy.[16] The largest single project is the expansion of an underground mining project by PT Freeport Indonesia in the West Papua/Moluccas economic corridor.[17]

Policy Measures and Instruments

Most of the policy measures and instruments affecting the mining industry are comparatively new, introduced only after the adoption of *Law No. 4/2009*. A final assessment will only be possible in several years time. The biggest challenges for the Indonesian mining industry currently result from the implementation of the decentralization process and from restrictive measures imposed by *Law No. 4/2009*.

Decentralization

Two laws – *22/1999* and *25/1999* – initiated the process of decentralizing power in Indonesia, while *Law No. 4/2009* applied the process to the mining sector. Through this legislation, the government sought to break with the centralist tradition of the Suharto regime and strengthen the political, administrative, and financial authority of the regions, districts, and cities.[18] To this day, however, decentralization has produced many negative developments, mainly at the local level (districts and cities), that pose great challenges to all involved in mining. For example, it opened the door to corruption, abuse of power, and patronage in the awarding of mining concessions. Whereas previously, mining concessions were

13 In 2011 alone, KontraS documented around two hundred violent conflicts related to mining, palm oil, and forestry projects in Indonesia. Meeting with representatives of KontraS, August 8, 2012.

14 Prominent cases include the Lapindo mudflow disaster of 2006 and the death of two protesters at the port of Sape in December 2012. In particular the human rights abuses and environmental destruction caused by mining in West Papua have gained international media coverage.

15 Coordinating Ministry for Economic Affairs, *Masterplan: Acceleration and Expansion of Indonesia Economic Development 2011–2025* (Jakarta, 2011), http://www.ekon.go.id/media/filemanager/2011/05/27/p/d/pdf_mp3ei.pdf (accessed August 30, 2012).

16 Necip Bagoglu, "Indonesien treibt Industrie- und Infrastrukturprojekte voran," *GTAI*, April 27, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=563816.html&channel=premium_channel_gtai_1 (accessed August 30, 2012).

17 Hans David Tampubolon, "Government to Launch 84 Projects Worth Rp 536 Trillion This Year," *Jakarta Post*, March 14, 2012, http://www.thejakartapost.com/news/2012/03/14/govt-launch-84-projects-worth-rp-536-trillion-year.html (accessed August 30, 2012).

18 Marco Bünte, "Dezentralisierung in Indonesien: Teil 1: Initiation und Inhalt," *Südostasien aktuell*, November 2003, pp. 565–79, http://www.giga-hamburg.de/openaccess/suedostasienaktuell/2003_6/giga_soa_2003_6_buente.pdf (accessed October 8, 2012).

awarded in the form of contracts between central government and the mining company (mining authorization, MA, or contract of work, CoW), now mining licenses (mostly mining business licenses, IUDs) can be awarded by all levels of government, following the subsidiarity principle.

Due to weakness of local institutions and the powerful position of executives in the districts and cities, this transformation has led to a de facto commercialization of authority at the local level, with local elites using the licensing process to finance their "kingdom of personal interests."[19] This resulted in a virtual sellout of locally available mining licenses in the 2000s. While 152 mining contracts (CoWs) were concluded during the Suharto era, the regions, districts, and cities have already issued more than 10,000 mining licenses (IUDs) in the last decade. Many of these licenses overlap or even duplicate, generating legal uncertainty across the entire mining sector.[20] Decentralization also causes problems in environmental and social protection. Under the subsidiarity principle, the regions, districts, and cities are responsible for mining oversight, but in reality – particularly at the local level (districts and cities) – are not capable. As a consequence, many small and medium-sized mining projects lack any kind of government oversight.[21]

The Law on Mineral and Coal Mining No. 4/2009

Law No. 4/2009 fundamentally changed the legal framework of the Indonesian raw materials sector.[22] The law and its regulations feature two particularly noteworthy aspects for the Indonesian mining industry. First, the new mining law limits foreign ownership in mines to a maximum of 49 percent after the tenth year of production. Second, the law bans the export of unrefined metals (such as bauxite, copper, gold, iron, nickel, and tin) from 2014, requiring mining companies to process minerals before export. The Indonesian government hopes this measure will increase the local value added and strengthen the domestic processing industry. As the construction of smelters and refineries is associated with large capital investments and long-term planning, the Ministry of Energy and Mineral Resources (ESDM) has adopted an interim solution to allow exports of unprocessed raw materials after 2014. The "clean and clear" status will allow a company to continue exporting unprocessed minerals if it can demonstrate that there is no overlap of its licenses, that it fulfils all its tax obligations, and that it has concrete plans to build smelters and refineries in Indonesia. The Ministry reports that 4,626 of the 10,250 IUP holders have achieved "clean and clear" status.[23] To prevent excessive exporting of unprocessed raw materials before the 2014 deadline, the government imposed export quotas on the most important Indonesian mineral products in summer 2012.[24]

While some observers interpret the *Law No. 4/2009* as a sign of rising resource nationalism,[25] this judgment should not be passed too hastily. On the one hand many of the measures represent more personal interests of the elites rather than nationalistic tendencies,[26] and on the other the government has repeatedly shown that it is willing to be flexible about the strict regulations and work with the mining industry to find pragmatic solutions. There are no indications of this changing. Increasingly nationalist rhetoric on raw materials can be attributed largely to the upcoming parliamentary and presidential elections in 2014.[27] Overall, the current mining legislation should

19 Political elites wish to refinance their expenses for local election campaigns by awarding mining licenses in their territory. Sometimes political elites are themselves involved in mining or security businesses and interested foremost in maximizing their own profits. Interviews with representatives of JATAM and KontraS, August 8/10, 2012.
20 Günter Tiess and Sugeng Mujiyanto, *Mineral Resources Policies and Governance in Indonesia*, http://www.minpol.com/Aachen_MP-Indonesia.pdf (accessed August 30, 2012).
21 Discussions with representatives of ICEL, August 7, 2012.
22 Republic of Indonesia, *Law Number 4 of 2009 Concerning Mineral and Coal Mining* (Jakarta, 2009), http://news.mitraismining.com/Link/UU-4-2009-Minerba-Englishversion.pdf (accessed August 30, 2012).
23 Rabby Pramudatama, "Jakarta Should Guide Governors on Mining: IMA," *Jakarta Post*, August 21, 2012, http://www.thejakartapost.com/news/2012/08/21/jakarta-should-guide-governors-mining-ima.html (accessed August 30, 2012).
24 "Editorial: Revisiting the Mining Law," *Jakarta Post*, August 6, 2012, http://www.thejakartapost.com/news/2012/08/06/editorial-revisiting-mining-law.html (accessed August 30, 2012).
25 Michael Buehler, "Resource Nationalism Clouds Indonesia's Economic Prospects," *thediplomat.com*, September 7, 2012, http://thediplomat.com/asean-beat/2012/09/07/resource-nationalism-clouds-indonesias-economic-prospects/ (accessed September 10, 2012).
26 Rizal Ramli, "Insight: It's All about Rent Seeking, Not Nationalism," *Jakarta Post*, July 6, 2012, http://www.thejakartapost.com/news/2012/07/06/insight-it-s-all-about-rent-seeking-not-nationalism.html (accessed August 20, 2012).
27 Bruce Gale, "The 2014 Election Effect on Indonesia's Mining Law," *Jakarta Globe*, September 11, 2012, http://www.thejakartaglobe.com/opinion/the-2014-election-effect-on-

be interpreted not as resource nationalism but as an expression of the growing national confidence of an expanding regional and international economic power.

Fiscal Policy

The most important duties to be paid in the mining sector are royalties, dead rents, and corporate taxes.[28] Revenues are shared between central government (20 percent), the regions (16 percent), and local authorities (64 percent).[29] In 1999 regional and local governments gained the right to levy their own taxes and fees. In summer 2012 the government imposed an export tax of 20 percent on 65 minerals and metals, including antimony, bauxite, chromium, copper, gold, iron ore, iron sand, lead, manganese, molybdenum, nickel, platinum, silver, and tin.[30]

Stockpiling, Research Funding, and Recycling

The Indonesian government neither stockpiles critical raw materials nor supports Indonesian companies in mining projects at home or abroad. There is no explicit strategy document dealing specifically with sectoral research and development or recycling. For several years, however, the number of university courses on geology and mining engineering has been increasing.[31]

Environmental and Social Regulation

There is no strategy or overarching vision for environmental and social protection specifically geared toward the mining sector. Important general legislation includes the *Environmental Law 32/2009* and the *Company Law 40/2007*. According to the latter, all companies operating in Indonesia are required to comply with the principles of corporate social responsibility.[32] In practice, however, vague wording and lack of detail combined with poor implementation regulations render them toothless. Economic interests often prevail over social and environmental concerns, resulting in frequent mining accidents and excessive pollution. Indonesia became an official candidate for EITI membership in 2010, with civil society groups in particular supporting the transparency initiative.[33] The Ministry of Economics is responsible for EITI obligations. But to date the transparency efforts seem not to have had any noticeable effect on the mining sector, and most Indonesian mining companies have failed to comply with their obligations for the EITI initial implementation phase.[34] Moreover, EITI is largely unknown in many state institutions.[35]

Trade Policy

As a leading member of ASEAN, Indonesia's trade policy is aligned on enhancing regional economic integration. In the framework of the ASEAN Free Trade Area (AFTA), Indonesia has free trade agreements with Australia, China, India, Japan, New Zealand, and South Korea.[36] Especially China and Japan hope to improve their access to the raw materials and markets of ASEAN members by concluding free trade agreements to dismantle tariffs and facilitate foreign direct investment. Although Indonesia's overall trade balance remains positive, in particular the free trade agreement with China has been severely criticized.[37] As Indonesia has been flooded with cheap Chinese goods as a result of the free trade agreement, large parts of the Indonesian population are skeptical about further liberalization of foreign trade.

indonesias-mining-law/543750 (accessed September 15, 2012).

28 Dezi Kirana and Robert Reid, "Indonesia," in *Mining 2011*, ed. Michael Bourassa and John Turner (London, 2011), pp. 82–89.

29 Augustina, Ahmad, Nugroho, and Siagiam, *Political Economy* (see note 5), 5.

30 Necip Bagoglu, "Indonesien besteuert Export von Metallerzen," *GTAI*, May 24, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=580766.html (accessed August 30, 2012).

31 Interviews with representatives of GAI, August 10, 2012.

32 PwC, *Mining in Indonesia: Investment and Taxation Guide* (Jakarta, 2012), http://www.pwc.com/id/en/publications/assets/Mining-Investment-and-Taxation-Guide-2012.pdf (accessed August 30, 2012).

33 Publish What You Pay, a network of forty Indonesian NGOs, is of particular relevance.

34 "NGOs Question Indonesia's Commitment to Extractive Industries' Transparency," *Jakarta Globe*, April 19, 2012, http://www.thejakartaglobe.com/news/ngos-question-indonesias-commitment-to-extractive-industries-transparency/512427 (accessed August 30, 2012).

35 Interviews with representatives of ESDM and GAI, 8/9 August 2012.

36 Staatssekretariat für Wirtschaft SECO, *Indonesien* (Bern, 2012), http://www.seco-cooperation.admin.ch/laender/05148/05155/index.html?lang=de&download=NHzLpZeg7t,lnp6I0NTU042l2Z6ln1acy4Zn4Z2qZpnO2Yuq2Z6gpJCDd3x,hGym162epYbg2c_JjKbNoKSn6A (accessed August 30, 2012).

37 Meeting with the delegation of the European Union in Indonesia, Brunei Darussalam and ASEAN, August 8, 2012.

Evaluation and Outlook

The Indonesian raw materials industry is currently undergoing the greatest change in its history. *Law No. 4/2009* sets ambitious goals for future developments. Its positive aspects include updating the legal framework, formulating strategic goals for raw materials policy, and raising public awareness. But poor implementation of the legal framework and weak institutions especially at the local level produce inconsistency and opacity, whose negative consequences (insecure investment climate, weak law enforcement, increasing social tensions, and heavy environmental pollution) prevent the raw materials sector from becoming an engine for economic and social development in Indonesia.

Given its good economic performance and rich resources, Indonesia is likely to continue to play an important role in regional and global raw materials markets.[38] But if the mining sector is to drive sustainable development, important political problems need to be overcome. These include rampant corruption, cronyism, weak local institutions, and lack of legal certainty and policy transparency at all political levels. It remains to be seen whether these challenges will be mastered.

Given the domestic challenges, it is likely that Indonesia will remain a cautious player on the international stage.[39] The government will concentrate on implementing the new mining laws and regulations, but has little appetite for opening markets and liberalizing trade after its experience with the free trade agreement with China. Internationally, Indonesia is primarily interested in investment and technology transfer, specifically processing and environmental technologies.

38 Vikram Nehru, "Indonesian Manufacturing and the Middle-income Trap," *eastasiaforum.org*, August 7, 2012, http://www.eastasiaforum.org/2012/08/07/indonesian-manufacturing-and-the-middle-income-trap/ (accessed August 30, 2012).

39 Howard Loewen and Hanns Günther Hilpert, *Indonesien als Partner deutscher Außenpolitik*, SWP-Studie 6/2012 (Berlin: Stiftung Wissenschaft und Politik, February 2012), http://www.swp-berlin.org/fileadmin/contents/products/studien/2012_S06_lwn_hlp.pdf (accessed August 30, 2012).

Italy

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Apart from certain industrial rocks and minerals, Italy is poor in natural resources, and relies mainly on imports to meet its industrial demand for metals. While there is as yet no official resources strategy, institutional changes in recent years demonstrate that the subject of metals and minerals is gaining in importance. One noteworthy measure is the commodity partnership with Afghanistan. Despite these advances, Italy has not made any extra effort in multilateral forums to promote international cooperation in securing raw materials supplies.

Minerals in the National Economy

Italy is a relatively resource-poor country, with the exception of certain industrial minerals. Although extraction of metal ores ceased with the closure of the last mines in Tuscany in the 1990s, Italy is a major producer of minerals such as feldspar, marble, clay, lime, gypsum, pumice, sand, and gravel.[1] Feldspar has the greatest international importance, with a share of 21.5 percent of world production.[2]

Italy has the second-largest industrial manufacturing sector in Europe (after Germany) and is Europe's second-largest producer and consumer of steel. The leading Italian industries of iron and steel, aluminum, metal processing, mechanical engineering, vehicle manufacturing, and chemicals depend heavily on imports of energy and non-energy raw materials.[3] The domestic availability of industrial minerals is a significant advantage for the ceramics industry, but to produce tiles, sanitary wares and porcelain Italy needs imported clay, barite, fluorite, kaolin, talc, and wollastonite.[4]

In 2010 Italian raw materials production from imported ores and recycled scrap amounted to 1.4 million tonnes of aluminum, 149,000 tonnes of lead, 44,700 tonnes of ferrous alloys, 25,200 tonnes of copper, 8.6 million tonnes of iron, 25.8 million tonnes of crude steel, and 100,000 tonnes of zinc.[5]

Italy's primary production sector is medium-sized. In addition to the major players – Alcoa Italia (alumina and aluminum), KME (copper), Riva (steel), and Italcementi and Buzzi (cement) –, there are many small and medium-sized enterprises focusing on specific market segments in primary production, processing, and trade. Some of these are highly competitive in world markets. At the same time, foreign companies such as Alcoa, Glencore, Rio Tinto, and Solvay have invested in Italy.

Institutional Setting

Institutions on three levels – national, regional, and business – influence Italy's mining policies and law. The most important actor at the national level is the Ministry of Economic Development (Ministero dello Sviluppo Economico, MSE). As the highest state authority on mining issues, it takes charge of bilateral talks, develops strategies for securing Italy's supply of energy and non-energy raw materials, and exerts operational influence on the mining sector through its directorates and offices.

Administrative responsibility within the Ministry rests with the General Directorate of Mineral and Energy Resources (Direzione Generale per le risorse minerarie ed energetiche, DGRME), a division of the Department of Energy (Dipartimento per l'energia). The activities of the DGRME include: (1) preparing strategic priorities and development plans; (2) planning, authorizing, executing, and monitoring explo-

1 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

2 "Feldspar," in USGS, *Mineral Commodity Summaries 2011* (Reston, 2011), p. 54, http://minerals.usgs.gov/minerals/pubs/commodity/feldspar/mcs-2011-felds.pdf (accessed May 22, 2012).

3 Alberto Alexander Perez, "Italy [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, July 2012), p. 23.1, http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-it.pdf (accessed September 20, 2012).

4 Ian Wilson, *Minerals of Italy: Built to Last*, August 2007, http://www.venetamineraria.com/data/recensioni/ITALY%20INDUSTRIAL%20%20IAN%20WILSON.pdf (accessed September 15, 2010).

5 Perez, "Italy [Advance Release]" (see note 3), p. 23.4.

ration and production operations; (3) developing safety standards and technical guidelines for production, transport, and storage; and (4) ensuring the compatibility of all legislative measures.[6] In addition, the Directorate supports the regions in carrying out their statutory duties and offers technical assistance.

Within the DGRME, the National Mining Office for Hydrocarbons and Georesources (Ufficio Nazionale per gli minerario Idrocarburi e le georisorse, UNMIG) is responsible for operational matters. UNMIG was merged into the DGRME in 2008 and now consists of five units: the center, three regional offices (Bologna, Rome, Naples), and a research laboratory. Most of the day-to-day work is done in the regional offices. UNMIG carries out investigations prior to awarding mining licenses, monitors technical and administrative aspects of exploration and production after a license has been awarded, collects and publishes data relevant to the mining sector, conducts studies, evaluations, and surveys on safety, monitors compliance with policies and legislation, and conducts an extensive program of research.[7]

To provide a platform for those interested in exploration and production and to promote research in the resources sector, MSE joined with other government agencies, research institutions, companies, and industry associations to found the Raw Material Laboratory (Laboratorio Materie Prime, LAB-MP).[8] LAB-MP is a critical tool of mineral policy, in particular helping to expand knowledge in the resources sector.

The laboratory is responsible for: (1) research on technologies for the recycling and conservation of mineral resources; (2) support for national raw materials supply planning; (3) support for regional policies concerning resource extraction; (4) promoting programs to reduce wastage of raw materials; (5) reclaiming abandoned mines for tourism, cultural, and other purposes; (6) identifying nationally strategic minerals in line with EU policy; and (7) promoting mine safety.

Italy's mining industry is represented by the Italian Petroleum and Mining Industrial Association (Assomineraria), which is a member of the employers' organization Confindustria. The eighteen companies that produce or prospect industrial minerals form Settore Minerario, the smallest section within Assomineraria. Assomineraria's remit is to represent mining interests to politics and the public, for example seeking to promote its members' interests by analyzing, monitoring, and proposing legislative initiatives on the regional, national, and EU levels. Assomineraria also provides support to members entering new markets. Its activities take the form of working groups, conferences and seminars, monthly newsletters, and an in-house information system called Sesamo.[9]

The mining industry falls under the scope of concurrent legislation. The Italian mining industry was first regulated in 1927 under *Royal Decree 1443*, which stipulated that mineral resources on Italian territory were owned by the government. *Presidential Decree No. 616* of July 24, 1977, gave the twenty regions administrative powers for the first time. *Legislative Decree 112* of March 31, 1998, regulates the division of powers between Rome and the regions.[10] Under the latter, the national government is empowered only to pass framework-setting legislation to: (1) establish a national resources strategy (including associated programs); (2) set maximum ceilings for royalties and fees and minimum standards for environmental protection, operational safety, and occupational health and safety; and (3) regulate the offshore sector. The regions have the right to pass mining laws and regulations within this framework and are ultimately responsible for regulating mining companies operating in Italy's regions, provinces, and municipalities.

Concepts and Strategies

Neither for energy nor the minerals sector does Italy possess an official strategy, a deficiency viewed as a structural weakness in both Rome and Brussels.[11] The

6 Ministero Dello Sviluppo Economico (MSE), *Direzione generale per le risorse minerarie ed energetiche*, http://unmig.sviluppoeconomico.gov.it/dgrme/direzione/struttura/struttura.htm (accessed September 26, 2012).
7 MSE, *Ufficio nazionale minerario per gli idrocarburi e le georisorse*, http://unmig.sviluppoeconomico.gov.it/dgrme/direzione/unmig.asp (accessed September 26, 2012).
8 LAB MP, *Chi Siamo*, http://www.lab-mp.criet.unimib.it/default.asp?idPagine=732&funzione=&lingua=ING (accessed September 26, 2012); MSE, Minerali solidi: *Laboratiro materie prime*, http://unmig.sviluppoeconomico.gov.it/unmig/miniere/laboratorio.asp (accessed September 26, 2012).
9 Assomineraria, *Chi Siamo*, http://www.assomineraria.org/chisiamo/index.php (accessed September 26, 2012).
10 MSE, *Leggi e decreti legislativi: Decreto Legislativo 31 marzo 1998, n. 112*, http://unmig.sviluppoeconomico.gov.it/unmig/norme/112dlg98.htm (accessed September 26, 2012).
11 European Commission, DG Enterprise and Industry, *Member States Competitiveness Performance and Policies: Reinforcing Competitiveness* (Brussels, 2011), pp. 104–10, http://ec.europa.

Ministry of Economic Development (MSE) has repeatedly promised to publish a resource strategy – again in 2012 – but has, so far, failed to deliver.

The establishment of the resource laboratory LAB-MP can be regarded as a pragmatic substitute for an official strategy. In particular, the lack of systematic data on domestic production was cited as a reason to establish LAB-MP. Incompatibilities between standards used by local units responsible for data collection and analysis result in problems with aggregation and harmonization. LAB-MP highlights a gap between the local and the central level and identifies eliminating bureaucratic bottlenecks as an important goal. So it is not surprising that compiling reliable data on domestic production is an important short-term goal. Other projects planned by LAB-MP include: (1) analyzing domestic production of minerals; (2) identifying strategic and critical raw materials; (3) simplifying the administrative processes for the approval of mining activities; (4) analyzing the security of supply of mineral resources; (5) ensuring the health and safety of mining workers; (6) initiating and implementing a commodity partnership with Afghanistan; and (7) improving efficiency in the use of raw materials. An economic analysis of the Italian mining sector has already been concluded.[12]

Measures and Instruments

Resource Partnership with Afghanistan

On April 12, 2011, the Italian Ministry of Economic Development and the Afghan Ministry of Foreign Affairs finalized a cooperation agreement for minerals and hydrocarbons.[13] One of the goals is to foster Italian private-sector investment in the Afghan mining sector. Italy also hopes to support exploration, in particular for marble, by creating incentives for Italian companies, and to strengthen the Afghan mining sector by training geologists and mining engineers and setting up a geoinformation system. Afghanistan is responsible for providing an acceptable investment climate and ensuring security for Italian companies on the ground. Bilateral cooperation will be implemented through contracts between private companies and government institutions.

One particular concern of the agreement is to support the marble industry in the western province of Herat. With the help of the Italian Development Ministry and private actors, a service center offering training, education programs, and technical assistance is to be created there. Precious and semi-precious stones and cement are also mentioned in the agreement. Initially, preparatory studies of the possibilities for encouraging investment in the Afghan cement industry and sectoral cooperation between the two countries are to be conducted.

The agreement with Afghanistan could become a model for further agreements. On September 20, 2011, the Italian Foreign Ministry finalized a framework agreement with Mongolia, identifying mining as one of three particularly important sectors. Italy will provide technology, technical expertise, and equipment in return for access to the country's mining sector, in particular its rare earths.

Government-Financed Research Programs

Non-energy resource research is conducted by two Italian institutions. The first, LAB-MP, has already been mentioned.[14] The Associazione Nazionale Ingegneri Minerari (ANIM), which is part of LAB-MP, concerns itself with the environmental aspects of mining and problems that can occur in production and processing of minerals.[15] The second, CRIET (Centro di Ricerca Interuniversitario in Economia del Territorio), is a consortium of ten universities that examines both energy and mineral resources and is often commissioned by public institutions to do research.[16]

eu/enterprise/policies/industrial-competitiveness/industrial-policy/files/ms_comp_report_2011_en.pdf (accessed September 26, 2012).

12 LAB MP, *La produzione nazionale di minerali di prima e seconda categoria*, http://www.lab-mp.criet.unimib.it/default.asp?idPagine=841&funzione=voce&cod=27 (accessed September 26, 2012).

13 MSE, Memorandum of Understanding on the Promotion of Economic Cooperation Between the Ministry of Economic Development of the Italian Republic and the Ministry of Foreign Affairs of the Islamic Republic of Afghanistan, April 12, 2011, http://unmig.sviluppoeconomico.gov.it/unmig/internazionale/afghanistan/accordo.afghanistan.pdf (accessed September 26, 2012).

14 MSE, Minerali solidi: *Laboratiro materie prime*, http://unmig.sviluppoeconomico.gov.it/unmig/miniere/laboratorio.asp (accessed September 26, 2012).

15 Associazione Nazionale Ingegneri Minerari (ANIM), *Materie prime*, http://www.anim-minerari.it/?cat=30 (accessed September 26, 2012); ANIM, *Chi Siamo*, http://www.anim-minerari.it/?page_id=3 (accessed September 26, 2012).

16 Centro di Ricerca Interuniversitario in Economia del Territorio (CRIET), *SOSE – Rapporti di Monitoraggio Settoriali*, http://www.criet.unimib.it/Default.asp?idPagine=835&funzione=voce&cod=36 (accessed October 5, 2012); CRIET, *Chi Siamo*,

Stockpiling
Unlike natural gas, Italy does not stockpile mineral resources.[17]

Government Guarantees and Insurance
The public insurer SACE supports Italian companies operating abroad, insuring economic and political risks of export and foreign direct investment, and providing credit guarantees for major infrastructure and industrial projects. Mining and metallurgy are not, however, the focus of SACE's business activities.[18]

International Cooperation and Resources Governance
Italy is a stakeholder in EITI,[19] which it supports politically, financially, and through the dissemination of technical information,[20] and supports the efforts of the G8 to tackle corruption in the commodity markets. In the International Copper Study Group (ICSG), the International Nickel Study Group (INSG), and the International Lead and Zinc Study Group (ILZSG), Italy is represented by the DGRME.[21]

Evaluation and Outlook

Although no official resource strategy has yet been published, it is evident that the issue of security of supply is growing in prominence. The establishment of LAB-MP was designed to initiate activities similar to those already implemented in many other G20 countries, including strengthening the domestic mining sector, improving international cooperation, and identifying critical or strategic resources. While Italy has signed a resource partnership with Afghanistan, it remains to be seen what specific projects this will actually produce. Other fields such as resource efficiency and recycling are not particularly developed in Italy. Nor does Italy participate actively in international resource governance, relying instead largely on the work of the EU.

http://www.criet.unimib.it/Default.asp?idPagine=679&funzione=&cod=36 (accessed October 5, 2012).
17 For information on natural gas, see Ministero Dello Sviluppo Economico, *Stoccaggio di gas naturale: Elenco dei pozzi per lo stoccaggio di gas naturale*, http://unmig.sviluppoeconomico.gov.it/unmig/stoccaggio/pozzi/pozzi.asp (accessed September 20, 2012).
18 SACE, *Solutions to Insure Your Business*, http://www.sace.it/GruppoSACE/content/en/consumer/products/products_guide/index.html (accessed October 5, 2012).
19 EITI, *Stakeholders*, http://eiti.org/supporters/countries (accessed September 26, 2012).
20 MSE, *Attività internazionali della direzione generale RME: EITI – Extractive Industries Trasparency Initiative*, http://unmig.sviluppoeconomico.gov.it/unmig/internazionale/eiti.asp (accessed September 26, 2012).
21 MSE, Area internazionale: *Attività internazionali della direzione generale RME*, http://unmig.sviluppoeconomico.gov.it/unmig/internazionale/gruppidistudio.asp (accessed September 26, 2012); MSE, Attività internazionali della direzione generale RME: *Gruppi di Studio sui Metalli non Ferrosi*, http://unmig.sviluppoeconomico.gov.it/unmig/internazionale/nonferrosi.asp (accessed September 26, 2012).

Japan

Hanns Günther Hilpert

As the world's third-largest industrial nation, Japan possesses a large and sophisticated mineral processing sector. Metal and mineral deposits are scarce in Japan, leaving it strongly dependent on reliable imports and encouraging an active policy of security of supply. The strengths of Japanese policy are its conceptually guiding and coordinating Ministry for Economy, Trade and Industry (METI), the strong presence of Japanese companies in international markets, and the large number of activities supporting the sector. In international raw materials governance Japan has been focusing on functioning markets and is open to political initiatives.

Minerals in the National Economy

Japan has a poor raw materials base with considerable reserves of industrial minerals like bentonite, dolomite, feldspar, iodine, limestone, and silica glass, but hardly any metals in quantities worth extracting. Its deposits of non-ferrous metals like lead, silver, and zinc are too small, although one small gold mine operates on the southern island of Kyushu.[1] Japan has a significant share of global production of only a few products: tellurium (57.3 percent), cadmium (8.9 percent), gallium (7.1 percent), sulfur (6.1 percent), talc (4.9 percent), bismuth (4.9 percent), bentonite (3.1 percent), feldspar (3.0 percent), and gold (0.3 percent). With 0.2 percent of global production of non-energy raw materials (2010, by volume), Japan can be considered one of the resource-poor countries of the G20.[2]

The mining sector is correspondingly insignificant in the Japanese economy. According to the *Japan Mining Report 2011*, the sector will contribute less than 0.1 percent of GDP through 2015 (including coal).[3] On the other hand, processing and refining is a distinctly relevant economic factor. Globally, Japan is the second-largest producer and exporter of steel after China. With high shares in the consumption of aluminum (5.1 percent), copper (5.4 percent), lead (2.3 percent), nickel (10.2 percent), steel (5.0 percent), tin (9.6 percent), and zinc (4.1 percent), Japan is also one of the leading consumers of industrial materials after China and the United States.[4]

The Japanese economy has a broad-based and highly diversified industrial structure and distinctive competitive strengths in steel, non-ferrous metals, automotive manufacturing, electrical engineering, electronics, information and telecommunications technologies, plastics, and chemicals. The recent shift towards information and environmental technologies has also significantly modified the demand for metals. While the demand for industrial and platinum group metals has fallen, the need for rare metals, in particular lithium, and rare earth elements has risen sharply.

Given its great demand for industrial raw materials and lack of a domestic resource base, Japan has always been dependent on reliable imports. Only in the case of sulfur is it self-sufficient. With certain metals, dependency is particularly high and concentrated on a single source, as in the case of rare earths and tungsten from China.

The Japanese steel industry has sophisticated integrated steelworks, and eight large private-sector enterprises have successfully specialized in smelting and processing non-ferrous metals. Mitsubishi Materials, Mitsui Mining and Smelting, Sumitomo Metal Mining, JX Nippon Mining and Metals, Nittetsu Mining, Dowa Mining, Furukawa, and Toho Zinc are capable of supplying the demanding Japanese industries with

1 John C. Wu, "The Mineral Industry of Japan," in USGS, *2004 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, 2004), pp. 12.1; 12.23, http://minerals.usgs.gov/minerals/pubs/country/2004/jamyb04.pdf (accessed October 10, 2012).

2 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

3 Business Monitor International, *Japan Mining Report 2011* (abstract), May 5, 2011, http://www.marketresearch.com/Business-Monitor-International-v304/Japan-Mining-6384359/ (accessed October 10, 2012).

4 BGR and DERA, *Deutschland – Rohstoffsituation 2010*, DERA Rohstoffinformationen (Hannover, December 2011), pp. 117–36, http://www.bgr.bund.de/DE/Gemeinsames/Produkte/Downloads/DERA_Rohstoffinformationen/rohstoffinformationen-07.pdf (accessed October 10, 2012).

the high-quality products they require. These companies are global leaders in metal processing, export a large part of their production to Asian neighbors and operate production facilities around the globe.

Japan's raw materials trade and overseas resource development have been formed by a genuinely Japanese phenomenon: the General Trading House (Sôgô Shôsha).[5] Since the beginning of industrialization at the end of the nineteenth century, the Sôgô Shôsha have enabled domestic industry to gain access to foreign export markets, foreign resource supplies, and modern technology. The Sôgô Shôsha have always been much more than simply traders acting on behalf of their domestic and foreign clients, also offering complementary services like finance, insurance, transport, logistics, market research, and marketing. Since the 1970s, the Sôgô Shôsha have developed raw materials deposits internationally and established competitive strength in financing, project coordination, and project development. For foreign raw materials companies and resource-rich countries alike, the Sôgô Shôsha are an attractive partner because of their financial strength, their project development know-how, and their "neutrality". They neither pursue any hidden political agenda nor strive for oligopolistic market power. The six leading Sôgô Shôsha active in the resource business are Mitsubishi Shôji, Mitsui Bussan, Itôchu, Marubeni, Sumitomo Shôji, and Sojitz, which have investments in around fifty mining projects and companies, mainly in North America, Latin America, Australia, Southeast Asia, and southern Africa.[6]

In a 2009 strategy paper, METI identified rare and critical metals on the basis of criteria including market conditions, market trends, concentration of deposits, production, trade, potential for recycling, substitution, and reduction, and technology trends. The list comprises the seventeen rare earth elements plus thirty other metals: antimony, barium, beryllium, bismuth, boron, cesium, chromium, cobalt, gallium, germanium, hafnium, indium, lithium, manganese, molybdenum, nickel, niobium, palladium, platinum, rhenium, rubidium, selenium, strontium, tantalum, tellurium, thallium, titanium, tungsten, vanadium, and zirconium.[7]

Recycling of durable consumption goods has been increasing continuously since a national recycling law took effect in April 2001, with the recycling quota reaching 84 percent in 2008. The actual volume of recycled metals is unknown, however, since private companies that collect junk may use it for very different purposes such as manufacturing input, smelter scrap, or resale.[8]

The Raw Materials Policy

Since Japan is a major consumer of raw materials but lacks domestic deposits, there is no question about the legitimacy and necessity of government action. Maintaining security of supply is regarded as a central concern of foreign and economic policy. However, China's import surge, emerging countries' sometimes nationalistic resource policies, concentration tendencies in the global resource industry, and growing bilateral tensions with China jeopardize the supply of raw materials. Moreover, mineral and metal processing and refining is considered to be of supreme importance for the quality, flexibility, and competitiveness of Japan's manufacturing industry. Without a secure supply, manufacturing, employment, and competitiveness will suffer, it is feared. Japan's identity as an industrial nation could even be called into question.[9]

At the latest when China stopped shipping rare earth elements to Japan in an unexplained move in summer 2010, the subject has also attracted wide public attention and become a top foreign policy priority.

5 For an overview see Harald Dolles and Hanns Günther Hilpert, "Sôgô Shôsha im Zeitalter der Restrukturierung der japanischen Wirtschaft," in Joachim Zentes et al., *B2B-Handel: Perspektiven des Groß- und Außenhandels* (Frankfurt am Main: Deutscher Fachverlag, 2002), pp. 177–94.

6 Yuji Nishikawa, "Road to Recovery: A Search for Secure and Stable Supplies of Raw Materials," *Mining Journal*, June 15, 2012, p. 24, http://www.mining-journal.com/reports/japan-road-to-recovery?SQ_DESIGN_NAME=print_friendly (accessed October 10, 2012).

7 Keizai Sangyôshô, *Raa Metaru Kakuhô Senryaku* (Tokyo, 2009), p. 6, http://www.meti.go.jp/press/20090728004/20090728004-3.pdf (accessed October 1, 2012).

8 Ho-sung Jung et al., "Assessing the Potential Value of Rare Metals in Urban Mines: A Comparative Look at Korea and Japan," *Monthly Focus*, no. 8 (2011): 7.

9 For the perspectives of METI and Japan's mining industry see Shuhei Kojima, *Stable Supply of Mineral Resources* (Tokyo, 2002), http://www.rieti.go.jp/jp/projects/koubutsu/pp01r001-r0712e.pdf (accessed October 1, 2012); Yuji Nishikawa, "A Changing Mining Industry: The Global Mineral Resources Industry Is Becoming Increasingly Polarised," *Mining Journal*, August 1, 2008, pp. 22–25.

Institutional Setting

The Ministry of Economy, Trade and Industry (METI), as Japan's traditional industrial advocate, is responsible for designing and coordinating the country's raw materials policy. Administrative responsibility lies with the Agency for Natural Resources and Energy. Certain issues are handled by other METI departments, such as the Trade Policy Bureau, the Trade and Economic Cooperation Bureau, and the Manufacturing Industry Bureau (with separate departments for steel and non-ferrous metals). Various organizations that are independent but answerable to METI deal more or less extensively with raw materials issues: the Japan Oil, Gas and Metals National Corporation (JOGMEC), the National Institute of Advanced Industrial Science and Technology (AIST), the New Energy and Industrial Technology Development Organization (NEDO), and the Japan External Trade Organization (JETRO).

Raw materials policy is also an issue for the Ministry of Foreign Affairs (MFA) (resource diplomacy), the Ministry of the Environment (ME) (recycling), and the Ministry of Education, Culture, Sports, Science and Technology (MEXT) (basic research). Especially METI and MFA civil servants hold regular discussions. The bicameral parliament influences raw materials policy through its legislative and budgetary approval powers.

JOGMEC was established on February 26, 2006, through legislation merging the two state-run companies, the Japan National Oil Corporation (JNOC) and the Metal Mining Agency of Japan (MMAJ). JOGMEC's mission is to supply capital and equipment for the exploration, development, mining, and production of energy and mineral resources overseas and in Japan's territorial waters, to stockpile energy and mineral resources, and to secure, manage, and rehabilite abandoned mines in Japan.[10] At the end of fiscal year 2010/11 JOGMEC had 466 employees and total assets of US$13.5 billion. JOGMEG supplies investment, loans, and professional services on a worldwide scale and maintains thirteen offices overseas.

While AIST and NEDO are umbrella organizations for applied, interdisciplinary industrial research, the MEXT research institutes focus on basic research, for example the Japan Science and Technology Agency (JST), the National Institute for Materials Science (NIMS), the Japan Agency for Marine Earth Science and Technology (JAMSTEC), and the National Research Institute for Earth Science and Disaster Prevention (NIED). Other government agencies support overseas activities of Japanese mining and processing companies, like the Japan International Cooperation Agency (JICA), the Japan External Trade Organization (JETRO), the Japan Bank for International Cooperation (JBIC), and Nippon Export and Investment Insurance (NEXI).

The Japanese mining industry, the processing and refining sector, and the resource trade are organized in associations and institutions. Keidanren is the overall Japanese business association, wielding great influence on legislation and policy. The Japan Mining Industry Association (JMIA) and the Japan Iron and Steel Federation (JISF) are members of Keidanren. Two Keidanren committees deal with raw materials issues, the Committee on Energy and Resources and the Committee on Oceanic Resources. Apart from Keidanren, there are also sectoral organizations such as the Metal Economics Research Institute (MERI), the Mining and Materials Processing Institute of Japan (MMIJ), the Iron and Steel Institute of Japan (ISIJ), and the Japan Mining Engineering Center for International Cooperation (JMEC). These address technical issues as well as economic, political, and social topics of common interest.

Despite the great number of ministries, independent organizations, corporations, and associations, the Japanese system is well-organized, coherent, and transparent – at least from the industry's insider perspective. Building on its traditionally strong position at the center of all relevant information flows and decision-making, METI can implement long-term industrial strategies and ensure coherent implementation.

Concepts and Strategies

METI has published or initiated four resource supply strategies. While they cover different topics, involve different political objectives, and have different legal implications, they are all complementary.

(1) The *Guidelines for Securing Natural Resources* of March 28, 2008, were adopted by cabinet decision and are thus legally and politically binding for the whole government and its subordinate authorities and institutions.[11] Their stated objective is to increase Japanese

10 Japan Oil, Gas and Metals National Corporation (JOGMEC), *Annual Report Year ended March 31, 2011* (Tokyo, 2012), pp. 28–41; *Japan Oil, Gas and Metals National Corporation Law*, Law No. 94 of July 26, 2002, http://www.jogmec.go.jp/english/aboutus/docs/jogmec_law_2010.pdf (accessed October 1, 2012).

11 Ministry for Economy, Trade and Industry (METI), *Guidelines for Securing Natural Resources* (provisional translation),

participation in key resource acquisition projects. To secure the national supply of oil, coal, gas, uranium, rare metals, and other mineral resources, Japanese enterprises should acquire rights for exploration and development abroad or conclude long-term supply agreements. For this purpose, Japan should develop a supporting (bilateral and multilateral) resource diplomacy and take action in areas such as conducting resource exploration, commissioning development studies, offering financial subsidies to resource investors, and supporting them diplomatically. Japanese development aid should play a complementary role in this endeavor.

(2) The METI *Strategy for Ensuring Stable Supply of Rare Metals* was announced on July 28, 2009, after long expert consultations and public hearings.[12] The strategy prioritizes a secure and stable supply of metals for the survival and the competitiveness of the Japanese manufacturing industry. To maintain security of supply, political priorities need to be set. A four-pillar strategy and a resource-specific infrastructure are proposed.

Pillar One recommends policy measures to support Japanese resource investments abroad, pointing out how Japanese mining investment can contribute positively to the social and economic development of the producer country, for instance by introducing modern technology, by mining in an environmentally friendly manner, by taking social responsibility seriously, and by developing a supportive infrastructure around the investment location. Japanese resource diplomacy and expanded overseas development aid should go hand in hand. The role of JOGMEC should be strengthened and Japanese mining investors should be eligible for attractive financing and insurance. Exploration activities in Japanese territorial waters should also be expanded and deep-sea mining developed. Pillar Two covers the recycling of rare metals. The existing recycling system should be improved and expanded and new recycling technologies developed. In the long run, an Asian recycling economy should be established. Pillar Three calls for the development and utilization of alternative materials, while Pillar Four identifies stockpiling as another measure to secure supply.

In the domains of capital formation, technology development, and public administration, a supportive infrastructure for the mining industry is to be established. First, a pool of domestic and foreign skilled labor is to be developed through university education, vocational training, and by compiling a new international network of personal contacts. Second, technological breakthroughs in the raw materials industry are sought to open up new markets and business opportunities. Prominent examples include satellite remote sensing technology, refining processes for rare metal ores, and BioReach technology. Third, integrated efforts by government agencies and organizations are to support the overseas mining activities of Japanese companies, which should also collaborate with one another.

(3) The *METI Priority Measures to Ensure Stable Supply of Natural Resources and Fuel*, announced on December 20, 2011, were designed to cope with the Great East Japan Earthquake of March 11, 2011, and mostly contain energy policy measures.[13] However, the earthquake destroyed two large refineries and again revealed Japan's vulnerability in the raw materials sector. Moreover, reconstruction has dramatically increased raw materials consumption and import dependency. Accordingly, the priority measures take up some of the points already mentioned in the strategy paper of July 28, 2009, and reiterate their urgency. The document calls for government and business to cooperate even more closely to identify the types and quantities of minerals resources required. Adequate financing should be supplied by JOGMEC or other public sources. And Japan should strengthen efforts to train mining engineers and cooperate with producer countries in the areas of infrastructure development, vocational training, health services, and technology cooperation.

(4) The Japanese cabinet's *Strategy to Secure Resource Supply* of July 24, 2012, can also be understood as a modification of energy and raw materials policy after the devastating earthquake of March 11, 2011.[14] The strategy, published by the Prime Minister's Office, amends and expands the *Guidelines for Securing Natural Resources* of March 28, 2008, with respect to oil, natural gas, coal, and minerals. Henceforth, Japan's foreign policy should focus particularly on resource-rich coun-

(Tokyo, 2008), http://www.meti.go.jp/english/newtopics/data/pdf/080328Guidelines.pdf (accessed October 1, 2012).

12 Sangyôshô, *Raa Metaru Kakuhô Senryaku* (see note 7).

13 METI, *Priority Measures to Ensure Stable Supply of Natural Resources and Fuel* (Tokyo, 2011) http://www.meti.go.jp/english/press/2011/pdf/1220_02b.pdf (accessed October 1, 2012).

14 Prime Minister of Japan and His Cabinet, *Shigen Kakuhô Senryaku. Dai jûgokai pakkeejigatainfura Kaigai Tenkai Kankei Daijin Kaigô Hôkoku Shiryô*, http://www.enecho.meti.go.jp/info/committee/kihonmondai/28th/28sankou1-2.pdf (accessed October 9, 2012).

tries, support Japanese private investment in raw materials production and processing, offer investment packages, participate in the bidding for mining licenses abroad, and utilize bilateral and multilateral diplomatic channels, such as comprehensive trade agreements, the Tokyo International Conference on African Development (TICAD), and the WTO.

Policy Measures and Instruments

Marine Resource Development

Adding up territorial waters, exclusive economic zones, and continental shelf, Japan possesses the sixth-largest waters of any country. Besides energy resources, rich deposits of minerals have also been found in Japanese waters, for instance cobalt-rich ferromanganese crusts, gold, silver, and rare earth elements. If deep-sea mining proves economically viable, resource-poor Japan might be able to meet part of its raw materials needs from domestic sources. In 2001, the Japanese Deep Ocean Resources Development Company (DORD) acquired a license to prospect for polymetallic nodules from the International Seabed Authority (ISA). Japan's *Basic Plan on Oceanic Policy* adopted by the cabinet on March 18, 2008, envisages commercial deep-sea mining by 2018.[15] To establish a legal framework for the exploration and mining of deep-sea resources, the *Mining Act* was amended on January 21, 2012.[16] For the time being, only JOGMEC is actively exploring Japan's oceanic waters, using its new research vessel Hakurei. JOMEC is also developing deep-sea mining robots in cooperation with two Japanese companies.[17]

Raw Materials Investment Overseas

The exploration, development, and operation of metal ore mines overseas is meant to secure Japan's supply of metals and minerals on a long-term basis. As for oil and natural gas, Japan has also set itself self-sufficiency targets for commodity metals (80 percent) and rare metals (60 percent). JOGMEC promotes Japanese mining investments overseas in various ways. First, JOGMEC itself invests in exploration activities overseas, often subsequently is selling its shares on to participating (Japanese) companies. For instance, JOGMEC has invested in rare earth mining projects in Australia and in Vietnam. Second, JOGMEC supports the exploration and mining investments of Japanese companies with equity capital, loans, and guarantees. Third, JOGMEC produces, processes, and disseminates information relevant for the raw materials sector. Fourth, JOGMEC staff teach at mining institutes and universities. Fifth, JOGMEC identifyies technology trends, supports technology implementation efforts, and runs its own technology development activities.[18]

Apart from JOGMEC, there are also specialized government financial institutions providing investment finance, guarantees, and insurance to Japanese companies investing overseas. JBIC, which is a 100 percent state-owned bank, can offer first-class financing conditions at very low rates. NEXI insures the Japanese mining industry against political and business risks.

Resource diplomacy and development cooperation actively support the acquisition efforts of the Japanese raw materials industry. Japan has concluded memoranda of understanding for joint raw materials exploration with numerous countries in Central and Southeast Asia, Latin America, and Africa. The Ministry of Foreign Affairs and Ministry of Economy, Trade and Industry have installed a "one-stop system" for Japanese companies planning exploration and resource development overseas.

In producer countries, further support is provided by Japanese embassies, the local offices of JETRO, and JOGMEC. Additionally, JOGMEC invites decision-makers from producer countries to "Metal Saloons" in Tokyo to initiate business contacts and prepare agreements and contracts. In 2005 JICA has published guidelines for the mining sector stating Japan's development objectives. These include creating a mining-investment-friendly climate and introducting modern and ecologically compatible mining technology into producer countries.[19] In practical terms, Japanese

15 "Marine Resource Plan OK'd: Govt Hopes to Exploit Oceanic Riches, Block Unauthorized Research," *Daily Yomiuri*, March 19, 2008.

16 Davis LLP, *The Mining Act of Japan Amended for the First Time in 61 Years*, June 15, 2012, http://www.davis.ca/en/publication/the-mining-act-amended-for-the-first-time-in-61-years/ (accessed October 1, 2012).

17 JOGMEC, *Annual Report Year Ended March 31, 2011* (see note 10), p. 15; Hiroshi Kawamoto, "Japan's Policies to Be Adopted on Rare Metal Resources," *Science and Technology Trends, Quarterly Review* 8, no. 27 (2008): 70–73; "Govt to Lead Development of Robotic Deep-sea Mining," *Daily Yomiuri* (January 8, 2011), http://www.yomiuri.co.jp/dy/business/T110107004586.htm (accessed October 10, 2012).

18 JOGMEC, *Annual Report Year Ended March 31, 2011* (see note 10), pp. 13–17.

19 Japan International Cooperation Agency (JICA), *JICA Thematic Guidelines on Mining* (Tokyo, 2005), http://gwweb.jica.go.jp/km/FSubject0901.nsf/50e70e491615c34a492571c7002a

development cooperation concentrates on exploration, development and feasibility studies, local skill-formation, and environmental projects.

Recycling

Recycling is to be expanded and exploited more intensively as a source of raw materials. In January 2008 an investigation by NIMS estimated that Japan's metal reserves hidden in "urban mines" were comparable in size to the metal deposits of leading producers.[20] METI and ME have agreed to prioritize developing the recycling of cobalt, dysprosium, neodymium, tantalum, and tungsten. The *Law on Rare Earth Recycling*, passed on August 3, 2012, creates incentives for recycling mobile phones and other small electronic devices. Rare earth recycling will become profitable in the medium term. Both private and government research institutes are working on new recycling technologies. JOGMEC is developing technologies to recycle cobalt and tungsten from hard metal tools and rare earths from used glass polish and fluorescent materials,[21] while Mitsubishi Materials is developing cost-efficient technologies for recycling dysprosium and neodymium from washing machines and air conditioners.[22]

Substitution

Industrial consumption of metals can be reduced effectively by substituting rare metals and miniaturizing components and products. Several institutions and programs are working on this question. METI is promoting collaborative research, where private profit-oriented research facilities are joining forces with public research institutes. Research into substitution focuses primarily on cerium, dysprosium, europium, indium, platinum, terbium, and tungsten.[23] From 2008 to 2013, NEDO ran a research project on the topic of rare metal substitution, specifically indium (in transparent electrodes), dysprosium, (in magnets), and tungsten (in hard metal tools). AIST and Toyota are developing an energy-saving, dysprosium-free high-efficiency electric motor.[24] The *Element Strategy Project*, a basic research project run by MEXI, analyzed the qualities of critical elements and materials between 2007 and 2011. As a result, MEXI announced in June 2012 that research into substitution of rare metals and hazardous materials would be continued in certain promising fields.[25] METI will provide research funding for industrial applications out of its own budget.[26]

Reserves and Stockpiling

Reserves and stockpiling of energy and mineral resources are statutory tasks of JOGMEC. The private raw materials sector is also obliged to hold its own reserves. Governmental reserve are released to the market in response to supply or demand disruptions. Although the METI strategy of July 28, 2008, mentioned chromium, cobalt, gallium, indium, manganese, molybdenum, nickel, niobium, platinum, rare earths, strontium, tantalum, tungsten, and vanadium, neither METI nor JOGMEC will reveal which are stored or in what quantities to avoid market speculation. However, official planning targets indicate that reserve stocks would amount to 60 days in total, with JOGMEC holding stocks for 42 days, the private sector for 18 days.[27] Reserve stocks are said to have increased recently, especially for the critical rare earth metals.

Global Governance

When it comes to global governance, Japan generally trusts the functioning of international raw materials markets. In the light of the numerous problems, however, it is open-minded about multilateral cooperation

982d/7229ff3298e0989d492570a7000d02bc/$FILE/JICA%20Thematic%20Guidelines%20on%20Mining.pdf (accessed October 1, 2012).

20 National Institute for Material Sciences (NIMS), *Japan's 'Urban Mines' Are Comparable to the World's Leading Resource Nations*, http://www.nims.go.jp/eng/news/press/2008/01/p200801110.html (accessed October 1, 2012).

21 JOGMEC, *Annual Report Year Ended March 31, 2011* (see note 10), p. 17.

22 Cindy Hurst, "Japan's Approach to China's Control of Rare Earth Elements," *China Brief* 11, no. 7 (2011), http://www.jamestown.org/single/?no_cache=1&tx_ttnews%5Btt_news%5D=37837 (accessed October 1, 2012).

23 Sangyôshô, *Rare Metaru Kakuhô Senryaku* (see note 7), pp. 20–22.

24 Kawamoto, "Japan's Policies to Be Adopted on Rare Metal Resources" (see note 17), p. 68; *Kishô Kinzoku Daitai Zairyô Kaihatsu Purojekuto*, ed. New Energy and Industrial Technology Development Organization (NEDO), http://www.nedo.go.jp/activities/EF_00123.html (accessed October 1, 2012).

25 Ministry of Education, Culture, Sports, Science and Technology (MEXT), *Kinshô Genso wo Mochiinai Kakushinteki na Daitai Zairyô no Sôsei wo Okonau "Genso Senryaku Purojekuto" no Saitaku Kyoten Kettei*, http://www.mext.go.jp/b_menu/houdou/24/06/1323106.htm (accessed October 1, 2012).

26 Keizai Sangyôshô, *2012 Nendô Mono Zukuri Hakushô*, p. 223, http://www.meti.go.jp/report/whitepaper/mono/2012/pdf/honbun_2.pdf (accessed October 1, 2012).

27 JOGMEC, *Annual Report Year Ended March 31, 2011* (see note 10), p. 19.

initiatives. Japan supports the Extractive Industries Transparency Initiative (EITI) as a stakeholder, participates in the Kimberley process, and is a member of the study groups for copper, lead and zinc, and nickel. Together with the United States and the European Union, Japan participates in the trilateral raw materials dialog. When developing raw materials sources overseas, Japan's private sector and public institutions sometimes cooperate with their South Korean counterparts.

Evaluation and Outlook

For Japan, security of supply of raw materials is an issue of great political relevance. A sophisticated system of government support for overseas exploration and development is in place. Moreover, Japan has numerous large and competitive companies capable of actively realizing these policy aims. Government and business are becoming increasingly ambitious and no longer satisfied with developing and exploiting overseas ore mines as minority shareholders.[28] With clear, transparent information channels and decision-making structures, raw materials policy is coherent and functional. If there is a weakness, it would be budgetary control. Given the strong international competition for metals and minerals, however, it is still unlikely that Japan can overcome its dependence on insecure, instable markets. From the producer perspective, the only potential obstacles to cooperation would be the saturation of Japan's raw materials consumption, the sporadic appearance of resource conflicts with local communities (Philippines, Peru, Bolivia),[29] and the lack of contours in Japanese foreign policy.

28 Nishikawa, "Road to Recovery: A Search for Secure and Stable Supplies of Raw Materials" (see note 6), pp. 24–25.
29 Detlev Rehn, "Japan will bei 'strategischen' Metallen von China unabhängiger werden," *GTAI*, March 28, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=546648.html (accessed October 8, 2012).

Mexico

Claudia Zilla

Mexico has a long mining tradition, stretching back to the colonial era when silver extraction played a central role. Mining has always been regarded as an important sector of the economy, and indeed the country's first business association was the Chamber of Mines founded in 1906. Mexico is experiencing a mining boom that began in 2003. In 2011 it was the top Latin American destination for spending on exploration, and fourth in the world.[1]

Minerals in the National Economy

Production and exports broke value records in 2010, especially as gold and silver prices rose.[2] That year Mexico ranked among the world's major producers of fluorite (18.0 percent of global production), silver (13.8 percent), bismuth (10.6 percent), molybdenum (4.3 percent), zinc (3.1 percent), lead (2.9 percent), gold (2.5 percent), copper (1.4 percent), manganese (1.1 percent), and iron (0.6 percent).[3] It is also a leading producer of non-ferrous and precious metals. The most important active minerals projects involve the metals gold, silver with gold, copper with gold, copper, and also zinc in combination with copper and/or silver with lead. Notable non-metallic production includes barite, diatomite, fluorite, graphite, gypsum, kaolin, limestone, phosphates, rock salt, and strontium minerals. Mexico possesses important reserves of copper (third in the world after Chile and Peru), bismuth, and silver (in both cases fourth). It also possesses major deposits of cadmium, lead, manganese, molybdenum, and zinc, although these represent smaller shares.

Of the 2,462 registered mining companies in 2011, about 42 percent were fully or partly foreign-owned.[4] Mexican mining is a favorite destination for FDI. The firms that invest in Mexico originate primarily from Canada (71.5 percent of firms), including Mexico's biggest gold producer Goldcorp Inc. Other countries of origin are the United States (16.0 percent of firms), China (2.8 percent), and Australia (2.4 percent).[5]

Genuinely Mexican mining companies also play a central role in the sector, with four listed on the Mexican stock exchange (Grupo México, Minera Autlan, Industrias Peñoles, Minera Frisco),[6] and two (Grupo México and Industrias Peñoles) standing out on the world scale. Grupo México is in fact the world's sixth-largest copper miner, its 4.4 percent share originating from mines and smelters in Mexico, the United States, and Peru. With lead, zinc, and silver mines and smelters in Mexico, Industrias Peñoles is also a global leader for those metals.

Total private-sector investment in the sector reached a record $4.7 billion in 2011, representing annual growth of 42.7 percent. Cumulative investment in 2007–2011 was $16.7 billion, a 224 percent increase over 2001–2006.[7] Exploration spending in 2010 concentrated particularly on the search for gold deposits.

In 2010 there were 803 mining investment projects, of which 79.2 percent were in the exploration phase

1 Metals Economic Group (MEG), March 2012, quoted in: Gobierno Federal, ed., *Plan Nacional de Desarrollo 2007–2012; Quinto Informe de Ejecución 2011*, p. 289, http://pnd.calderon.presidencia.gob.mx/quinto-informe-de-ejecuci-n.html (accessed August 20, 2012).

2 Especially for gold, silver, lead, zinc, molybdenum, iron, manganese, fluorite, dolomite, kaolin, phosphorite, and sodium sulfate. Cámara Minera de México (CAMIMEX), ed., *Informe Anual 2011*, http://www.camimex.org.mx/admin/images_publicaciones/08_33_informe12.pdf (accessed August 20, 2012).

3 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013). CAMIMEX, ed., *Informe Anual 2011* (see note 2), p. 6.

4 Gobierno Federal, ed., *Plan Nacional de Desarrollo 2007–2012* (see note 1), p. 290.

5 Secretaría de Economía and Coordinación General de Minería, eds., *Anuario Estadístico de la Minería Mexicana*, Ampliada 2011, Version 2012, p. 535, http://www.economia.gob.mx/files/comunidad_negocios/informacion_sectorial/mineria/anuario_estadistico_mineria_ampliada_2011.pdf (accessed August 20, 2012).

6 The Mexican company Fresnillo has been listed on the London Stock Exchange since 2008.

7 Gobierno Federal, ed., *Plan Nacional de Desarrollo 2007–2012* (see note 1).

and 9.6 percent in production.[8] The projects involved gold and silver in 62.3 percent of cases, copper in 12.3 percent, and polymetallic ores in 16.8 percent.[9] In December 2011 there were 27,022 valid concessions, 3.9 percent more than a year previously.[10]

The most important market for Mexican raw materials, especially copper, silver, and zinc, is the United States, with which Mexico has a customs union under the North American Free Trade Agreement (NAFTA). NAFTA has done a great deal to facilitate U.S. and Canadian FDI into the Mexican mining sector. However, many ores and concentrates are subject to import tariffs.[11]

According to government figures, mining contributes 3.8 percent of Mexico's GDP.[12] In 2011 25,922 new jobs were created in the mining and metals sector, bringing the total to 309,700 (year-on-year growth 9.1 percent).[13] 42 percent of these jobs are located in the extraction of metal ores.[14]

Mining is the fourth most important sector for foreign currency receipts (2011: $15.4 billion), after automotives, oil, and remittances.[15] The mining and metals sector recorded a trade surplus of $9.6 billion in 2011, with year-on-year growth of 79.8 percent. At the same time, its broad manufacturing base (especially vehicle manufacturing) makes Mexico dependent on imports of industrial metals such as aluminum, copper, and iron and steel. In 2010 imports of industrial metals, non-metallic minerals, and precious metals together amounted to $7,6 billion.[16]

8 Secretaría de Economía and Coordinación General de Minería, eds., *Anuario Estadístico de la Minería Mexicana* (see note 5), p. 536.
9 Ibid., p. 537.
10 Gobierno Federal, ed., *Plan Nacional de Desarrollo 2007–2012* (see note 1).
11 Ley de los Impuestos Generales de Importación y de Exportación, http://leyco.org/mex/fed/ligie.html#s5c26 (accessed December 18, 2012).
12 Gobierno Federal and Secretaría de Economía, eds., *Reporte de Coyuntura de la Minería Nacional*, 6 (January 12, 2012) 54, http://www.economia.gob.mx/files/comunidad_negocios/industria_comercio/informacionSectorial/minero/ReporteCoyuntura_Enero2012.pdf (accessed October 11, 2012) However, according to the Mexican Chamber of Mines, mining contributes only 1.6 percent of GDP.
13 Gobierno Federal, ed., *Plan Nacional de Desarrollo 2007–2012* (see note 1), p. 291.
14 Gobierno Federal and Secretaría de Economía, eds., *Reporte de Coyuntura de la Minería Nacional* (see note 12).
15 CAMIMEX, ed., *Informe Anual 2011* (see note 2), p. 5.
16 Secretaría de Economía, *Employment*, http://www.economia.gob.mx/files/comunidad_negocios/industria_comercio/informacionSectorial/minero/ReporteCoyuntura_Enero2012.pdf (accessed December 18, 2012).

The Raw Materials Policy

Institutional Setting

Under Article 27 of the *Constitution of the United Mexican States* all minerals located within its national borders are property of the nation, making the federal government responsible for mining policy, including granting licenses. Together with the *Constitution*, the *Mining Law* of 1992 (*Ley Minera*, as amended in 1996 and 2005) and other regulations form the legal framework for the sector.

Nationally, the General Coordination of Mines (Coordinación General de Minería, CGMinería) is situated on the third tier of the Ministry of Economy (Secretaría de Economía, SE), under the auspices of the Undersecretary of Industry and Commerce (Subsecretaría de Industria y Comercio). CGMinería in turn consists of two departments: the Directorate General of Mines (Dirección General de Minas, DGM) is primarily responsible for questions of regulation,[17] while the Directorate General of Mining Promotion (Dirección General de Promoción Minera, DGPM) largely deals with matters of investment.

The sector also includes two further institutions coordinated by the Ministry of Economy and CGMinería. The remit of the Mexican Geological Service (Servicio Geológico Mexicano, SGM) is to identify and to develop mining projects, thus deepening and expanding knowledge about geology and resources. It maintains offices in eight Mexican states with a budget funded 25 percent from the public purse and 75 percent from its own resources. The Mining Development Trust Fund (Fideicomiso de Fomento Minero, FIFOMI) provides technical support and training to optimize mining and the value added chain.[18] This para-state entity was established seventy-eight years ago and answers to the Finance Ministry (Secretaría de Hacienda y Crédito Público, SHCP). It has been self-funding since 1994 and functions as a sectoral development bank with fourteen branches across the country's regions.

Other ministries and agencies involved in granting mining permits and licenses are: the Labor Ministry (working conditions in mines), the Environment

17 Dirección General de Minas, http://www.economia-dgm.gob.mx (accessed August 20, 2012).
18 Fideicomiso de Fomento de la Minería, http://www.fifomi.gob.mx/web/index.php (accessed August 20, 2012).

Ministry (environmental licenses), the National Water Commission (water management), the Defense Ministry (explosives), and the Ministry of Agricultural Reform (access to private and communal land "ejidos"). There are no specialized committees at the parliamentary level.

Mexican mining engineers, metallurgists, and geologists are organized in two professional bodies, an association, and a chamber (Asociación de Ingenieros de Minas, Metalurgistas y Geólogos de México and Colegio de Ingenieros de Minas, Metalurgistas y Geólogos de México).[19] The Chamber of Mines (Cámara Minera de México, CAMIMEX) represents the interests of businesses in the industry and is organized in twelve sections. With its 4,231 members, CAMIMEX represents 93 percent of the country's mining output. Mining labor is represented by a sectoral trade union founded in 1934, the Sindicato Nacional de Trabajadores Mineros, Metalúrgicos, Siderúrgicos y Similares de la República Mexicana (SNTMMSRM).[20]

Concepts and Strategies

The *National Development Plan for 2007–2012* (*Plan Nacional de Desarrollo*, PND), introduced by President Felipe Calderón Hinojosa of the Partido Acción Nacional (PAN), formed the strategy concept for his term of office (which ended in December 2012), but while this official declaration of intent covers agriculture, energy and fossil fuels, and tourism, it contains no chapter explicitly dedicated to mining. Instead it is the government's annual progress reports that deal with mineral resource extraction (under the heading "Productivity and Competitiveness" in the section on "A Competitive and Employment-generating Economy"). Two mining-specific "strategies" are defined here: increasing FDI in the mining sector and expanding financial resources for small and medium-sized mining enterprises. That reflects the narrow focus of Mexican mining policy, which is primarily about maintaining the country's attractiveness for investment and promoting SMEs.

This tallies with the investor-friendly legal framework that governs mining. Mexico ranks 35th (of 79) in the Fraser Institute's Policy Potential Index, which measures mining companies' perceptions of overall policy attractiveness of countries and regions.[21] Only Chile scores better in the Latin American context. But Mexico dropped seven places in a year because of widespread security problems.

Concessions are granted to Mexican and foreign natural and legal persons on a "first come, first served" basis. They are valid for fifty years (for both exploration and production) with the possibility to extend for a further fifty.[22] Exploration and production rights cover all non-radioactive minerals and may be freely traded. There is no size restriction on concessions, nor is a Mexican stake required. Domestic and foreign investors are treated equally; foreign companies must be registered under Mexican law and may transfer profits abroad. Mexico collects land value and corporate taxes, but not royalties. A fee is payable where the state has invested in exploration, discovery ("prima por descubrimiento"), or similar measures. To address the problem of illegal mining, and curb the associated phenomena of tax evasion, social conflicts, and environmental harm, the Ministry of Economy attempts to restrict exports of illicitly extracted minerals.

Mining concessions must satisfy a series of requirements under environmental law (*Ley General del Equilibrio Ecológico y Protección al Ambiente*, LGEEPA), including an environmental impact assessment (Manifestación de Impacto Ambiental, MIA) approved by the Environment Ministry. But institutional capacities are inadequate for conducting thorough inspections, and on average the Dirección General de Minas awards concessions within just 17.3 working days.[23]

19 Asociación de Ingenieros de Minas, Metalurgistas y Geólogos de México, http://www.geomin.com.mx (accessed August 20, 2012); Colegio de Ingenieros de Minas, Metalurgistas y Geólogos de México, http://cimmgm.org/index.html (accessed August 20, 2012).

20 Sindicato National de Trabajadores Mineros, Metalúrgicos, Siderúrgicos y Similares de la República Mexicana, http://www.sindicatominero.org.mx (accessed September 3, 2012).

21 Fred McMahon and Miguel Cervantes, *Survey of Mining Companies 2011/2012*, Fraser Institute, February 2012, http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/mining-survey-2011-2012.pdf (accessed 26.5.2012), quoted in CAMIMEX, ed., *Informe Anual 2011* (see note 2), p. 7.

22 Until the 2005 reforms there were different types of concession for exploration and for extraction. Today concessions grant prospecting and mining rights together. Engineering and Mining Journal (E&MJ), ed., *Mexican Mining*, October 2011, p. 55, http://www.gbreports.com/admin/reports/EMJ-Mexico.pdf (accessed October 11, 2012).

23 Gobierno Federal, ed., *Plan Nacional de Desarrollo 2007–2012* (see note 1), p. 291.

Policy Measures and Instruments

National Level

Until the wave of privatizations in the mid-1980s the mining sector was dominated by state-owned companies. During the subsequent two decades low global commodity prices caused a decline in public funding. Now the government's interest in supporting the sector is growing again, and bringing with it issues of institutional regime and business law.

Unusually for Latin America, Mexico has a sectoral development bank, the Mining Development Trust Fund (FIFOMI), whose responsibilities include strengthening the competitiveness of Mexican SMEs. It operates with government authorization in the international financial markets. It manages only 10 percent of its portfolio directly, with the rest granted through financial intermediaries. FIFOMI's financial support, which in 2011 was granted to 720 businesses, applies to extraction and subsequent phases of the production chain such as processing and marketing, but not to exploration projects. FIFOMI also supplies training and advisory services for mining companies. A redevelopment program *(Programa de Reactivación de Distritos Mineros)* also provides support to districts where mining operations have ceased.[24]

The Mexican Geological Service runs a geological/mining mapping program *(Programa de Cartografía Geológica-Minera)* to advance cartography and enlarge the scale at which data is available. It is also responsible for the advancement of Mexican mapping and for a digital database on mining geology (Banco Digital de Datos Geológico-Mineros).

The government regards participation in international conferences and holding national events as a way to encourage dynamic development. The first Mexico Mining Day was held at the 2011 conference of the Prospectors and Developers Association of Canada (PDAC) in Toronto; in the same year Acapulco hosted the 29th Convención Internacional de Minería.[25]

Key government, business, and NGO actors discuss a series of challenges for the Mexican mining sector:

The state is considering introducing mining royalties. This is part of a sectoral tax reform that has been under discussion for some years, leaving business representatives complaining about fiscal insecurity.

Labor conflicts and strikes regularly force mining operations to cease for indefinite periods. The Canadian company Gammon Gold Inc. shut its El Cubo mine in Guanajuato for eight months in 2010. Another example is Grupo México's Cananea mine (now renamed Buenavista del Cobre) in Sonora, which was closed for 35 months by an illegal strike.[26] At the same time it is widely known that compliance with health and safety at work rules (norm 023) is usually incomplete.[27] While CAMIMEX calls for a reform of the labor law,[28] civil society actors demand its effective application. There are also widespread complaints of a shortage of skilled labor. Exacerbating an already conflictual situation, the leader of the miners' union SNTMMSRM, who was reelected in 2008, has for the past six years been living in Canadian exile to avoid prosecution in Mexico. He is accused of embezzlement from the Mining Development Trust Fund, but has thus far managed to avoid extradition.[29]

Under the banner of community development ("desarrollo comunitario"), the integration of local groups (above all indigenous peoples and small farmers) in mining projects is regarded as an urgent priority. The social acceptance for mining projects presupposes the trust of local communities, which in turn rests on the population's expectations that they will benefit from rising earnings, more jobs, and education and training programs. Voluntary corporate social responsibility can play only a supplementary role, and the abiding impression in many cases is one of mining companies raking in huge profits at the expense of local populations, while public authorities are interested above all in economic development.[30]

24 Ibid., p. 295.
25 Ibid., p. 290.

26 CAMIMEX, ed., *Informe Anual 2011* (see note 2), p. 15.
27 NORMA Oficial Mexicana NOM-023-STPS-2003, *Trabajos en minas-Condiciones de seguridad y salud en el trabajo*. Secretaría de Trabajo y Provisión Social, http://www.stps.gob.mx/02_sub_trabajo/01_dgaj/nom23.pdf (accessed October 1, 2012).
28 CAMIMEX, ed., *Informe Anual 2011* (see note 2), p. 11.
29 Mariana Hernández, "El mandamiento judicial está solicitando a elementos de la Policía Federal Ministerial de la PGR procedan a la localización y captura de los dirigentes mineros," *El Financiero*, September 30, 2012, http://www.elfinanciero.com.mx/index.php?option=com_k2&view=item&id=42580:ordenan-capturas-a-napole%C3%B3n-g%C3%B3mez-urrutia-y-h%C3%A9ctor-f%C3%A9lix-estrella&Itemid=26 (accessed 1.10.2012).
30 For critical analyses of the negative impact of mining on farming communities see Claudia Garibay, Andrew Boni, Francesco Panico, and Pedro Urquijo, "Unequal Partners, Unenqual Exchange: Goldcorp, the Mexican State, and Campesino Disposession at the Peñasquito Goldmine," *Journal of Latin America Geography* 10, no. 2 (2011): 153–76; and Matthew Fry, "From Crops to Concrete: Urbanization, Deagriculturalization, and Construction Material Mining in Central Mexico,"

The treatment of communal property ("ejidos") is thus a highly sensitive topic. According to the 2007 Censo Ejidal there are more than 35,518 indigenous "ejidos" and agricultural communities ("comunidades agrarias") with a total area of 105.9 million hectares, or about 54 percent of the total Mexican land area.[31] Consultants in this field recommend that mining companies negotiate with the official and informal leaders of the "ejidos," who generally grant ownership or access in return for social and development projects. But there are numerous conflicts in connection with these contracts and compromises.

Environmental problems also crop up in connection with mining. Underground mining tends to be a thing of the past today, with particularly environmentally challenging supersized open-pit mines predominating. The use of cyanide in gold mining presents a particular problem, and there is also a lack of effective regulation of mine closures. At the same time many actors fear that environmental arguments are used to put a brake on mining.

Drug trafficking and organized crime represent a serious problem in Mexico, with repercussions for mining operations, which are often located in remote regions.[32] Resource theft is a growing problem, especially in connection with coal, iron, and more recently polymetallic concentrates.[33] Extraction and transport are threatened by organized crime, and the physical safety of miners is often endangered. Where this leads to a decision to airlift workers to mines, additional costs are incurred.

International Raw Materials Governance

At the international level Mexico is a member of numerous initiatives and working groups. It is one of seventeen members of the Latin American Mining Organization (Organismo Latinoamericano de Minería, OLAMI), established in 1984, which is made up of national coordinating units composed of sectoral representatives (trade unions, businesses, state agencies, researchers, etc.).[34] With more than two hundred participants, the Mexican Global Compact network is the third-largest in Latin America.[35] It was founded in 2005 and is transitioning from a UN frame (under the auspices of the United Nations Industrial Development Organization) to an industry-run model.[36] At the associated relaunch in June 2011 the Minister of the Environment and Natural Resources called on businesses to participate in this international initiative.

Mexico joined the Kimberley Process in 2008,[37] and is a member of the International Copper Study Group, the Common Fund for Commodities (CFC), and the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development. The Chamber of Mines (CAMIMEX) is a member of the International Council on Mining and Metals (ICMM).

Although a proliferation of mining-related international activities can be identified, some Mexican actors complain of the lack of global regulation on money-laundering. The federal government and certain state governments (for example in Coahuila) are currently working together to investigate whether mafia cartels have now moved into the mining sector (most likely in coal mining). Suspicions of this kind fuel demands for international control regimes.

Evaluation and Outlook

Although mining is intimately bound up with Mexican history and identity, today an explicit, comprehensive strategy that could bring together the various dimensions in a concrete mining plan is lacking. Although environmental regulations have been tightened, mining policy still focuses one-sidedly on funding SME projects and attracting investment. That said, the extremely dynamic developments of the past decade demonstrate that Mexico is already a very attractive mining location, while the expansion of exploration suggests that mining's future will not be

Annals of the Association of American Geographers 101, no. 6 (2011): 1285–306.

31 E&MJ, ed., *Mexican Mining* (see note 22), p. 56.

32 CAMIMEX, ed., *Informe Anual 2011* (see note 2), pp. 7f.

33 CAMIMEX, ed., *Informe Anual 2012*, http://www.camimex.org.mx/files/7013/5409/1184/2012.pdf (accessed December 18, 2012).

34 www.olami.org.ar (accessed August 17, 2012). The members of OLAMI are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Paraguay, Peru, Uruguay, and Venezuela.

35 The Regional Center for the Support of the Global Compact in Latin America and the Caribbean was established in October 2009 in Bogota, Colombia.

36 United Nations Global Compact, *Global Compact Relaunches Mexican Network*, June 28, 2011, http://www.unglobalcompact.org/news/135-06-28-2011 (accessed September 5, 2012).

37 Kimberley Process Certification Scheme (KPCS), *Mexico*, http://www.kimberleyprocess.com/web/kimberley-process/participant/mexico (accessed September 10, 2012).

without social and ecological problems. Already miners' working conditions are a political hot potato. In the General Coordination of Mines, which is located rather low in the ministry hierarchy, and other agencies and institutions involved in governance, existing political and administrative structures are inadequate for tackling these questions.

Promoting mining in a socially and environmentally acceptable manner while preserving proftability and observing contracts remains an important task for the government of newly elected President Enrique Peña Nieto of the Partido Revolucionario Institucional (PRI). But key actors in the mining sector are not expecting meaningful change in mining policy.

Russia

Ognian N. Hishow

Russia is one of the world's largest economies. Its economic system is clearly characterized by resource-based growth, with about 40 percent of industrial capital concentrated in the raw materials sector. Extraction and processing contribute 33 percent of GDP and 70 percent of exports by volume. Almost all of its production of aluminum, copper, and nickel is exported, and numerous other minerals are exported unprocessed. The sector is largely inaccessible to foreign investors, but dependent on foreign know-how. Joining the WTO in 2012 and attaining the political insight that an opening of the resource sector is unavoidable are likely to encourage cooperation with the European Union and Germany.

Minerals in the National Economy

The Russian Federation's wealth of metal resources is a function of its size. The country contains about 15 percent of the world's known metal reserves – in about 12 percent of the global land mass. In 2008 mineral fuels, mineral oils, and mineral products accounted for 65.7 percent of Russian exports.[1] In 2011 the mining sector accounted for almost 11 percent of Russian GDP,[2] and employed 866,000 people.[3]

Six of the world's hundred largest mining companies are Russian (as of 2010).[4] United Company Rusal is the world's biggest aluminum producer, although it sources most of its materials from abroad. Russia owes its leading position in aluminum smelting to its Siberian hydropower, which supplies comparatively inexpensive electricity for the energy-intensive process. Russia is the international leader in refining nickel from ores (about 260,000 tonnes in 2010), and production is set to increase.[5] Russia also occupied first place in 2010 for production of asbestos (49.1 percent of global production), palladium (44.2 percent), and gem quality diamonds (28.3 percent). It held second place for aluminum (9.6 percent), industrial diamonds (25.2 percent), potash (18.2 percent), platinum (13.2 percent), rhodium (9.4 percent), rare earth concentrates (1.9 percent), and tungsten (3.6 percent).[6] It is also the fifth-largest producer of copper. In 2009 three firms were producing raw and refined copper: Norilsk Nickel, Ural Mining and Metallurgical Co. (UMMC), and ZAO Russian Copper Company (RCC). Russia's iron ore reserves of 56 billion tonnes are the world's largest.[7] With an estimated 9,000 tonnes, Russia also possesses the third-largest gold reserves.[8]

The Russian non-ferrous metals sector retains its importance for the world market. Russia is a reliable supplier for other countries, while external demand in turn creates jobs and stimulates investment in Russia. The extraction and processing of non-ferrous metals currently contributes 2.6 percent of Russian GDP and represents over one tenth of industrial production. Almost all produced nickel is exported (up to 95 percent), along with 85 percent of aluminum and about three quarters of lead, titanium, and zinc. One reason

1 Statistisches Bundesamt Deutschland, ed., *Länderprofil Russische Föderation* (Wiesbaden, 2009), p. 4, https://www.destatis.de/DE/Publikationen/Thematisch/Internationales/Laenderprofile/Russfoederation.pdf (accessed May 15, 2012).
2 GTAI, ed., *Wirtschaftsdaten kompakt: Russische Föderation*, May 2012, http://www.gtai.de/GTAI/Content/DE/Trade/Fachdaten/PUB/2012/05/pub201205238031_159230.pdf (accessed May 24, 2012).
3 Richard M. Levine, "Russia [Advance Release]," in USGS, *2009 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, February 2011), p. 38.1, http://minerals.usgs.gov/minerals/pubs/country/2009/myb3-2009-rs.pdf (accessed May 15, 2012).
4 Barry Sergeant, "Top 100 Mining Companies: What a Difference a Year Makes," *Mineweb*, January 12, 2010, http://www.mineweb.com/mineweb/view/mineweb/en/page67?oid=95737&sn=Detail (accessed June 6, 2012).
5 Research and Markets, ed., *Russia Mining Report*, Q2 2012, http://www.researchandmarkets.com/reports/544587/metals_and_mining_industry_in_russia (accessed May 24, 2012).
6 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), ed., *World Mining Data* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013). Ranking and figures calculated by adding figures for *Russia (Asia)* and *Russia (Europe)*.
7 InfoMine, ed., *Mining in Russia and CIS*, 2012, http://www.infomine.com/countries/soir/russia/welcome.asp (accessed May 24, 2012).
8 Dave Brown, "Gold Mining in Russia," *Gold Investing News*, November 8, 2010, http://goldinvestingnews.com/8978/gold-mining-in-russia.html (accessed May 25, 2012); InfoMine, *Mining in Russia and CIS*, 2012 (see note. 7).

for this clear export orientation is that Russia produces more raw materials than are required for domestic consumption. WTO membership and the associated opening of its internal market will increase the pressure of competition faced by domestic producers. In its growth strategy of 2011, Norilsk Nickel prioritizes diversification, planning to move into iron ore and coal mining and to increase its production of steel alloy metals (chromium and molybdenum). The company has announced investments worth $35 billion in new plants and technologies. It remains to be seen whether foreign firms will now find it easier to gain a foothold. The ownership structure in the mining sector still features a very small proportion of foreign companies (in 2010 just 96 of 5571 registered firms, plus 125 joint ventures).[9]

One general problem for foreign direct investment and thus for the development of the Russian raw materials sector in the international arena is that the Russian state and Russian private investors are heavily involved both in the banks and directly in the mining sector. Thus the diamond firm Alrosa belongs to the state, the iron ore and steel company Evraz to the Abramovich and Frolov families, Severestal to the Mordashov family. Norilsk Nickel, the world's leading producer of nickel, copper, and palladium, is also family-owned (by the Potanin and Prokhorov families; the Abramovich family is planning to get involved here again). The aluminum firm Rusal (Deripaska, Prokhorov, Vekselberg, Blavatnik families), Uralkali (Kerimov, Nesir, Galchev, Mutsoyev families), and Metalloinvest (Usmanov, Skoch families), to name but the most important, are also owned by private investors.

Because Russia's non-ferrous metals sector is concentrated largely in eastern Siberia, state-owned corporations from neighboring China are actively seeking investment opportunities, despite the aforementioned problems. They favor deposits of non-ferrous metals, especially lead and zinc (China consumed 47 percent of the world's zinc in 2010). Under a partnership agreement signed in 2009 by Lunsin, a subsidiary of Zijin Mining Group, and the eastern Siberian Tuva Republic, the Chinese will invest in the extraction and processing of lead-zinc ores. The Chinese NFC acquired a 50 percent stake in the $1.3 billion expansion of a processing plant for polymetals in Ozerny (Buryatia).

9 See *Statistical Yearbook of the RF 2011*, table 13.7.

While Russia possesses large reserves of rare earth elements (about 28 million tonnes as of 2010), the viably exploitable volume is smaller: for category one (the best) it is 1.4 million tonnes.[10] Russia's rare earth production remains small. In 2009, 73,600 tonnes were extracted at eleven approved mining sites and 6,500 tonnes of concentrate produced. Converted into TR_2O_3, the produced carbonate amounted to 1,900 tonnes.

The economic viability of Russian rare earth extraction is limited. The larger deposits in the Murmansk, Sakha (Yakutia), and Irkutsk regions comprise 40 percent very meager apatite-nepheline ores containing no more than 1 percent rare earth elements.[11] Richer deposits are found in northeastern Yakutia, where the Tomtor deposit is reported to contain ores with rare earth content averaging 8 percent (and up to 12 percent). However, production in Tomtor has not yet been licensed; harsh natural conditions such as the polar winter cause difficulties, as do strict environmental requirements associated with radioactive by-products. Although the Russian Federation possesses one third of global reserves of rare earth elements, it is estimated to need at least ten years to build up adequate capacities in this sector.[12] Russia exported about 2,000 tonnes of rare earth elements annually from 2000 to 2009, but still has to rely on imports from China, the United States and the United Kingdom to cover its own needs (about 2,000 to 3,000 tonnes annually).[13]

After South Africa, Zimbabwe, and the United States, Russia has the world's fourth-largest known reserves of platinum group metals (PGMs). In 2010 the exploitable reserves were put at about 3,800 tonnes, and during the 2000s PGM extraction averaged about 150 tonnes annually. Almost 90 percent of produced platinum group metals are exported.[14] Known reserves of the better categories (A-B-C) remained roughly con-

10 IAZ Mineral, ed., *Russia's Raw Materials Complex, Rare Earth Elements* (in Russian), http://www.mineral.ru/Facts/russia/index.html (accessed October 12, 2012).

11 A. K. Masurov, *Introduction to Geological Exploration* (in Russian), 2009, http://window.edu.ru/library/pdf2txt/299/75299/56009/page7.

12 Alfred Kueppers, "Russia Is in No Position to Fill the Gap" (in Russian), *InfoSMI*, October 22, 2011, http://www.inosmi.ru/economic/20111022/176403514.html (accessed October 12, 2012).

13 IAZ Mineral, ed., *Russia's Raw Materials Complex, Rare Earth Elements* (in Russian) (see note 10).

14 IAZ Mineral, ed., *Platinum Group Metals* (in Russian), March 2011, http://www.mineral.ru/Facts/russia/147/410/19_pt.pdf (accessed October 12, 2012).

stant between 2001 and 2008, at 9,000 tonnes, and have grown somewhat since 2009. Practically the entire PGM production is in the hands of Norilsk Nickel (in the Krasnoyarsk region) and its subsidiary Kola Enrichment Plant near Murmansk on the Kola Peninsula. Regional concentration is also strong, with 95 percent of production coming from Krasnoyarsk.

The Raw Materials Policy

Institutional Setting

At the national level the president and the following ministries and government agencies share significant responsibility for management and oversight of metal resources: the Ministry of Natural Resources and Ecology (Ministerstvo prirodnykh resursov i ekologii Rossiskoi Federatsii, Minprirody), the Federal Agency for Subsoil Usage (Federalnoe agentstvo po nedropolzovaniyu, Rosnedra; subordinate to Minprirody), the Federal Service for Supervision in the Use of Natural Resources (Federalnaya sluzhba po nadzoru v sfere prirodopolzovaniya, Rosprirodnadzor), the Federal Service for Ecological, Technological, and Nuclear Supervision (Federalnaya sluzhba po ekologicheskomu, tekhnologicheskomu i atomnomu nadzoru), the Committee of the Federation Council for Natural Resources and Environmental Protection (Komitet Soveta Federatsii po prirodnym resursam i okhrane okruzhayushchei sredy), the State Commission on Mineral Reserves (Gosudarstvennaya komissiya po zapazam polesnykh izkopaemykh – FBU "GKS"), and other federal agencies such as the Geological Committee (Geolkom).

The central government also pays specialist companies and institutes to supply geological services, including the state-run Central Research Institute of Geological Prospecting for Base and Precious Metals (Tsentralnyi nauchno-issledovatelskii geologorazvedochnyi institut tsvetnykh i blagorodnykh metallov, TSNIGRI) and the N. M. Fedorovsky All-Russian Research Institute of Mineral Raw Materials (VIMS, also state-run). Below the federal level, territorial administrations and municipal geological agencies also play a role.

Cooperation between regional and local administrations on matters of resource exploration and utilization is coordinated by the Government Commission on the Fuel and Energy Complex and Regeneration of the Mineral Raw Materials Base. The Constitution of the Russian Federation stipulates that the earth's interior within the country's borders is property of the state. It cannot be sold, given away, or inherited. On the other hand, resources extracted from the earth's interior may be subject to all kinds of economic activity and pass into the ownership of involved actors, including regional and local authorities. Below the federal level, local authorities make their own decisions about the use of the earth's interior within their boundaries. But because licensing is conducted on the basis of tendering (auctions) regulated by federal mining law (see below, p. 114), federal and local instances make licensing decisions by mutual agreement.[15]

Concepts and Strategies

There is great debate in Russia as to whether its rich mineral and energy resources represent a blessing or a curse. In academic circles, in the big cities of Moscow and St. Petersburg, and abroad, the resource dependency of the Russian economy and the country as a whole is regarded critically. Studies of the so-called resource curse demonstrate that economies with a strong concentration on resource extraction tend to have greater income disparities than societies with stronger manufacturing and services sectors. Russia's Gini coefficient (a measure of income inequality) is considerably greater than the European Union's and the United States's, leading researchers to doubt the sustainability of resource-based growth and to warn against the prospect of the Russian state budget and national income spiraling into resource-dependency.[16]

On the other hand leading Russian politicians hail the country's broad resource base as an advantage. The Russian modernization is based on the idea of efficiently using non-renewable natural resources to accelerate the process of catching up with the West economically. But government documents, including the latest concept for long-term economic development through 2020, propose an innovation model for growth and development superseding the resource-based model in the longer term.

15 "Legislation on the Use of the Earths Interior" (in Russian), http://rudiplom.ru/lecture/ekologicheskoe-pravo/1244.html (accessed October 12, 2012).

16 For a concise discussion see, for example S. N. Bobylev, *Modernization and the Raw Material Model for the Economy* (in Russian), November 10, 2010, http://www.alternativy.ru/ru/node/1419 (accessed October 12, 2012).

Mining is organized and regulated on the basis of laws, decrees, and state programs. The *Mining Law* of the Russian Federation of February 1992, which has been amended many times, regulates the awarding of licenses for geological exploration, development of deposits, and extraction from waste tips. Other legal foundations include the *Law on Precious Metals and Precious Stones* and the *Environmental Protection Law*. The executive institution is the Geological Committee (Geolkom) and its regional departments, which are responsible for licensing mining activities. Once a mining company has received a license it pays fees for utilization rights, as well as taxes, octroi duties, and other levies. Where deposits are already partially exhausted, discounts may be granted on the license dues.

Russia's raw materials strategy is defined in a number of documents, of which *Government Decree No. 494 on the Use of the Earth's Interior*, the long-term *Minprirody Program for Exploration and Expansion of the Resource Base* of the Russian Federation, and *Decree No. 1039, Strategy for Developing the Geological Sector Until 2030* of June 21, 2010, are especially pertinent.[17] The latter document, describing the long-term development of the mining sector through 2030, was signed by then Prime Minister Putin. It treats the mining sector as a fundamental component of the Russian economy contributing to realization of the country's geopolitical interests, which extend to the world oceans and the Arctic.

Reflecting the central role of the state, most exploration companies are state-run or share companies controlled by Rosnedra, with the Russian Federation as principal shareholder. Nonetheless, the state leaves important activities to the private sector. State-owned companies account for 20 percent of spending on exploration of deposits of non-energy raw materials, private-sector firms 80 percent. With respect to size structure, it is planned to strengthen the role of Russian small and medium-sized businesses.

Policy Measures and Instruments

Promotion of Exploration and Investment

Moscow is currently planning to expand the production of important metals sharply by 2030, with copper production to rise by 27 percent compared with 2012, gold by 19 percent, nickel by 13 percent, and iron ore by 11 percent.[18]

To achieve these targets and increase production by opening up new deposits, ways are being sought to strengthen the role of the private sector. *Decree No. 1039* of 2010 establishes a legal basis for funding exploration projects through share capital, guaranteeing natural and legal persons who discover a deposit the right to participate in extraction even if the deposit is of national economic significance.

Bureaucratic and other hurdles are also to be removed to make investment more attractive. Firstly, the list of minerals for which no public information is available has been reduced to beryllium, cobalt, nickel, niobium, lithium, certain rare earth elements, tantalum, and high-purity quartz, which the Russian Federation classified as strategic in 1996.[19] Secondly, fees for geological data collected in the scope of state-run geological expeditions were abolished, through a reform of the *Law on Natural Resources* that the government of Federation laid before the State Duma in early 2010. And thirdly, the list of "strategically important" companies has been reduced to lower market barriers. It is hoped that these moves will ease investment decisions.

Foreign Trade

Foreign trade in many metals and metal ores is treated as a "strategic interest" relevant to national security, and correspondingly tightly regulated. Precious metals and their ores are subject to duties of 6.5 percent and export restrictions. Only one company is authorized to export each precious metal. Other metals are merely subject to export duties or ad valorem taxes, although these can reach 50 percent in some cases. Certain metals, including aluminum, scrap nickel, and other scrap, are not permitted to fall below a particular minimum value per weight. It remains to be seen whether these export restrictions will be pruned back after Russia joins the WTO. Such measures are often justified in terms of "securing domestic supply" or "control over strategic resources."

The export of certain other raw materials is promoted through special export incentives such as sub-

17 Document at http://www.asgeos.ru/article/233.html (accessed October 12, 2012).

18 *Decree No. 1039, Strategy for Developing the Geological Sector Until 2030* (in Russian), June 21, 2010, http://www.asgeos.ru/article/233.html (accessed January 25, 2013).

19 http://enc-dic.com/economic/Strategicheskie-Tovary-15177.html (accessed October 20, 2012).

sidized energy and transport costs. In this case Russia's trading partners could initiate anti-dumping proceedings under WTO rules.

Cautious Opening to FDI

Foreign mining companies currently have no access to deposits of diamonds, cobalt, lithium, nickel, niobium, platinum group metals, tantalum, uranium, and certain other raw materials. Although certain Western corporations have been able to acquire Russian subsidiaries (Alcoa runs two aluminum smelters, for example), as a rule only Russian mining companies are permitted to use the earth's interior – and only if they are at least 50 percent state-owned. While the Russian state and private sector are closely intertwined, the Russian Federation grants only weak protection to foreign investors, who mostly receive concessions only for small deposits or require a Russian joint-venture partner.[20]

There are, however, signs of an opening. In December 2011 the Russian Duma reformed two laws affecting FDI. The acquisition of shares in strategic businesses remains in principle subject to approval, but the exempted share was increased from 10 to 25 percent. Strategic businesses include the raw materials, defense, and media branches, as well as companies with a monopoly position or significance for national defense and security. The reform thus broadens the options for foreign investors and allows the list of strategic minerals and businesses to be "bypassed."[21] However, foreign investors still need patience. Because the state plays a central role in managing exploration, granting licenses, and defining national interests, foreign access to the raw materials sector is likely to improve only slowly.

The Russians emphasize that foreign venture capital and expertise are welcome in relation to the development of remote deposits.[22] According to the Russian Ministry of Natural Resources,[23] pilot projects approved at the highest level on a case-by-case basis represent further steps toward easing international raw materials cooperation. Where approved, Russian and foreign companies may cooperate directly.

Recycling: The Case of Rare Earth Elements

While the development of rich but remote deposits is costly and time-consuming, the Russian Ministry of Natural Resources regards recovery from spoil as more viable. The reserves involved are sufficient to last for decades, and the technological wherewithal can be supplied by foreign partners.

The very extensive spoil heaps left by five decades of apatite ore mining on the Kola Peninsula contain up to 2 percent rare earth elements. It is estimated that about 40,000 tonnes of rare earth elements could be reclaimed annually.[24] The apatite miner, OJSC Apatit, is a subsidiary of PhosAgro Holding, which is largely owned by the politician Andrei Guryev (70.9 percent share as of 2011). PhosAgro has to date expressed no intention of entering the rare earths business. It is problematic that the extraction licenses for areas where rare earth elements occur are held by a handful of owners who show particular inclination to invest in expanding their production. The biggest facilities, the Solikamsk Magnesium Plant (SMZ Perm region) and the Lovozersky Mining Company (LvZ, southeast of Murmansk), are controlled by the oligarch Suleyman Kerimov (co-owner of Uralkali), who has yet to show any interest in rare earth elements.[25] Nonetheless, more movement seems to be appearing in the rare earths market. A subsidiary of the Russian state nuclear operator Rossatom has expressed interest in acquiring the Solikamsk Magnesium Plant and the Lovozersky Mining Company.

Training of Engineers and Specialists

The great demand for skilled labor represents an enormous challenge. In the course of the past fifteen years the number of university graduates in geology has fallen by 60 percent. An aging workforce and a chronic inability to fill at least 10 percent of open posts have become a drag on growth. Currently there is a shortage of about 20,000 young geologists, managers, and entrepreneurs, caused by a lack of incentives, image deficits, better advancement prospects in other branches, and unattractive working conditions in

20 Dave Brown, "Gold Mining in Russia," *Gold Investing News*, November 8, 2010, http://goldinvestingnews.com/8978/gold-mining-in-russia.html (accessed May 25, 2012).
21 Norton Rose Group, ed., *Russland lädt zu mehr Investitionen in die Rohstoffbranche ein*, March 2012, http://www.hik-russland.de/images/stories/russland-wirtschaft-dateien/invest-rohstoff.pdf (accessed May 25, 2012).
22 *Basic Elements* (in Russian), http://www.amtc.ru/publications/articles/2691/ (accessed October 12, 2012).
23 Interview with the author.
24 Ibid.
25 Ibid.

the more remote regions. As a result the average age of skilled workers has reached 50 to 60 years. In response, and in view of the great need for research in the mining sector, steps were taken in the 2000s to reverse the trend. Today the Russian Federation maintains thirty-four university institutes training highly skilled staff and the next generations of researchers.

Transparency

In terms of transparency and coherence of policy, Russia has long been regarded as rather unattractive for investors. The Fraser Institute's Policy Potential Index placed Russia 71st out of 93 countries and regions.[26] Nor does the Russian Federation participate in EITI. But it does rank third globally in the Revenue Watch Index (RWI), which assesses transparency of payments in the raw materials sector.[27] Nonetheless, the Russian raw materials sector is marked by opacity, insider dealing, and bureaucratization.

The further the distance from the center, the weaker the control of the authorities and the larger the informal sector. According to the Duma, one third of companies operating in the scrap metal sector are unlicensed, bypassing the tax authorities as part of the black economy.[28] In the Russian far east transnational Sino-Russian syndicates have sprung up, supplying metal ores and scrap to China. In view of the high unemployment rate in the Russian far east, the city's proximity to markets in China, Japan, and Korea, presence of discharged military personnel, and low incomes, Vladivostok and the Pacific Fleet based there also play an active role in the illegal metal trade. The impact on the country's legal exports is hard to assess. While the reduction in the legal supply causes prices to rise, the illegal supply has a price-reducing effect. "Resource criminality" is not restricted to the private sector.

26 Fred McMahon and Miguel Cervantes, *Fraser Institute Annual Survey of Mining Companies 2011/2012* (Vancouver, February 2012), p. 13, http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/mining-survey-2011-2012.pdf (accessed May 26, 2012).

27 *2010 Revenue Watch Index: Transparency: Governments and the Oil, Gas and Mining Industries* (New York: Revenue Watch Institute, 2010), http://www.revenuewatch.org/rwindex2010/pdf/RevenueWatchIndex_2010.pdf (accessed October 10, 2012).

28 *Explanatory Text to Draft Law "Amendment to Federal Law on the Protection of Natural and Legal Persons ..."* (in Russian), http://asozd2.duma.gov.ru/main.nsf/(ViewDoc)?OpenAgent&arhiv/a_dz_5.nsf/ByID&3D411A2BC1F2E05FC3257448002E3ECF.

Since the beginning of the Putin era, the first-generation oligarchs have been largely brought under the control of the state bureaucracy, and "rent-seeking" in the sector can now be controlled administratively. Influential state instances now possess direct access to resource rents and can influence resource policy without heed to economic efficiency. This tends to reduce the coherence of Russian raw materials policy.

International Raw Materials Governance

Russia participates in various international initiatives on mining and metal production. In 2005 it joined the Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development (IGF), which emerged out of UNCTAD's Global Dialogue on Mining, Metals and Sustainable Development.

In order to secure international recognition of its documentation standards, the Russian Federation in 2008 signed an agreement with the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) of the International Council on Mining and Metals. Russia is a member of the International Study Group for Lead and Zinc, and its equivalent for nickel. However, Norilsk Nickel is not a member of the international business lobby organization, the Nickel Institute, in an indication that Moscow is keeping this strategic company on a tight rein.

In the medium term WTO membership is likely to be helpful in integrating Russia into global governance structures for the raw materials sector. Although the examples of other WTO members show that unilateralism still occurs and monopoly power can still be abused despite international agreements, the Russian economy relies heavily on raw materials and not – like the Chinese for example – largely on labor. Moscow will therefore continue to seek to generate revenue above all through raw materials exports and is unlikely to introduce blanket export restrictions. It will not massively violate WTO rules – which anyway do not fundamentally exclude export duties and taxes.

With a few exceptions, Russian export duties on metals and critical raw materials are low, but there are widespread export restrictions and controls. Consequently it is unclear what dynamics Russia's WTO membership will initiate. With the production of metal ores largely in the hands of major Russian corporations, it could remain difficult for foreign private firms to gain a foothold in the Russian mining industry. At the same time WTO membership could help to expand Russia's raw materials trade, if the lowering of

customs tariffs and the standardization of product norms removes trade barriers.[29]

Evaluation and Outlook

Russian raw materials policy has traditionally been protectionist and keeps private actors – whether Russian or foreign – out of sectors regarded as "strategic." These include no-go areas such as coastal waters and the continental shelf, all uranium deposits, and deposits containing more than 50 tonnes of gold or 500,000 tonnes of copper.[30] From the perspective of Russian political leaders, its wealth of natural resources gives the country an advantage over others. They hope to guide the economy to a new technological path by exploiting this wealth. The Russians know that to achieve that they will need to create possibilities for multilateral and bilateral cooperation.

29 "Russlands Importe werden 2012 voraussichtlich weiter wachsen," *GTAI*, March 9, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=533984.html (accessed May 25, 2012); Florian Willershausen, Mathias Brüggmann, and Georg Watzlawek, "Deutschland profitiert von Russlands WTO-Beitritt," *Wirtschaftswoche*, December 16, 2011, http://www.wiwo.de/politik/ausland/welthandelsorganisation-deutschland-profitiert-von-russlands-wto-beitritt/5968504.html (accessed May 25, 2012).
30 *Law N57-F3* of 2008 on procedures for investments relating to companies with strategic importance and security relevance.

Saudi Arabia

Eckart Woertz

Saudi Arabia has three strategic raw materials priorities: (1) securing demand for its oil products by cooperating with Asian partners on refining and stockpiling; (2) supporting domestic energy supply and diversification in the petrochemicals sector by conserving gas reserves and developing nuclear and solar energy; (3) safeguarding its food supply through agricultural investment abroad and strategic stockpiling at home.[1]

In comparison to energy and agricultural commodities, comprehensive strategic planning is less discernible for minerals and metals, which play a much smaller role in the Saudi economy. But individual products, such as aluminum, gold, phosphates, sulfur, and construction materials, are certainly significant. It is hoped that the mining sector will contribute to Saudi Arabia's economic diversification.[2]

Minerals in the National Economy

Saudi Arabia's extractive sector is dominated by energy. As the world's biggest exporter of crude oil, mineral oils and fuels make up 86 percent of Saudi exports, which in turn accounted for 57 percent of GDP in 2010.[3]

Metals like gold, copper, silver, and zinc are found principally in the western part of the country, while industrial minerals and the major oil deposits are in the east.[4] Saudi Arabia has a notable gold-mining sector and a well developed cement industry. With 0.3 percent of global production of non-energy raw materials (by weight), Saudi Arabia is one of the G20 countries with weak raw materials production (2010).

In 2010 Saudi Arabia produced barite, bauxite, copper, feldspar, gypsum, gold, iron, kaolin, lead, magnesite, salt, silver, sulfur, and zinc, but exceeded 5 percent of global production only for sulfur.[5] There are also undeveloped reserves of bentonite, chromium, iron, fluorite, mica, tungsten, and tin, as well as various types of rocks.[6] Aluminum (bauxite), construction materials, gold, phosphates, and sulfur form the bulk of Saudi mining activities; projects for iron ore, copper, and niobium and tantalum are in planning.

The value of non-energy extraction amounted to US$659 million in 2010, representing just 0.2 percent of GDP and 0.11 percent of total exports. Exports of construction materials, earths, salt, sulfur, and stone amounted to US$254 million, those of ores, ashes, and slag just US$26 million.[7]

1 Giacomo Luciani, "GCC Refining and Petrochemical Sectors in Global Perspective," and "Domestic Pricing of Energy and Industrial Competitiveness," in *Resources Blessed: Diversification and the Gulf Development Model*, ed. Giacomo Luciani, pp. 183–212, 95–114 (Berlin, 2012); "The Role of Nuclear Energy in GCC Economic Development," in *The Nuclear Question in the Middle East*, ed. Mehran Kamrava, pp. 83–104 (New York, 2012); Eckart Woertz, *Oil for Food: The Global Food Crisis and the Middle East* (New York: Oxford University Press, forthcoming); "The Global Food Crisis and the Gulf's Quest for Africa's Agricultural Potential," in *Handbook of Land and Water Grabs in Africa: Foreign Direct Investments and Food and Water Security*, ed. Tony Allen et al., pp. 104–19 (London, 2012).

2 Eckart Woertz, "The Mineral and Mining Industry of the GCC," *GRC Economics Research Bulletin* (Dubai), October 2006 (issue 2), pp. 2f.

3 Kingdom of Saudi Arabia, Ministry of Economy and Planning, *Export Statistics Bulletin 2010*, http://www.cdsi.gov.sa/english/index.php?option=com_docman&task=cat_view&gid=127&Itemid=113 (accessed April 27, 2012); World Bank, *Exports of Goods and Services (% of GDP)* (Washington, D.C., 2012), http://data.worldbank.org/indicator/NE.EXP.GNFS.ZS (accessed April 28, 2012).

4 Kingdom of Saudi Arabia, Ministry of Petroleum and Mineral Resources, *Minerals – Background* (Riyadh, May 2, 2009), http://www.mopm.gov.sa/mopm/detail.do?content=min_bg (accessed April 27, 2012).

5 Ibid.

6 Kingdom of Saudi Arabia, Ministry of Petroleum and Mineral Resources, *Metallic Raw Minerals* (Riyadh, May 2, 2009), http://www.mopm.gov.sa/mopm/detail.do?content=min_bg_metallic (accessed April 27, 2012); Kingdom of Saudi Arabia, Ministry of Petroleum and Mineral Resources, *Non-metallic Raw Minerals* (Riyadh, May 2, 2009), http://www.mopm.gov.sa/mopm/detail.do?content=min_bg_nonmetallic (accessed April 27, 2012); Ashgill Australia, "Kaolin in Saudi Arabia," http://www.ashgill.com.au/pdfs/Kaolin%20in%20Saudi%20Arabia.pdf (accessed April 27, 2012).

7 Kingdom of Saudi Arabia, Central Department of Statistics and Information, *Gross Domestic Product by Kind of Economic Activity at Current Prices*, http://www.cdsi.gov.sa/english/index.php?option=com_docman&Itemid=151 (accessed April 27, 2012); Kingdom of Saudi Arabia, Minstry of Economy and

The Al-Jalamid mine is the pride of Ma'aden, which is far and away the country's largest mining company and largely state-owned. The project is one of the world's largest phosphate mines, with proven reserves of 1.6 billion tonnes and another 1.5 billion tonnes suspected. A US$3.2 billion processing complex is being built at Jubail to produce chemicals, cleaning agents, animal feed, and 3 million tonnes of diammonium phosphate fertilizers (DAP) annually. This will make Saudi Arabia the world's third-largest DAP exporter, with a 10 percent share of global trade. DAP production began in early 2012. Phosphates are now reported to account for more than 60 percent of the value of Ma'aden, which is already considering developing further reserves at Al-Khabra in the Umm Wual area.[8] Because other chemicals required for DAP production, principally ammonia and sulfur, are also available on favorable terms, Al-Jalamid will make Ma'aden one of the world's most competitive DAP producers.

Otherwise, Ma'aden concentrates on aluminum. A joint venture with Alcoa is developing the Arabian Peninsula's first integrated aluminum project, at Al-Zabirah in the north of the country. This connects a bauxite mine to an aluminum smelter at Ras al-Zour on the Gulf coast with a capacity of 623,000 tonnes per annum. When production begins in 2014 Ma'aden will become one of the region's largest aluminum producers alongside Aluminium Bahrain (ALBA) and Dubai Aluminium (DUBAL).

Gold has been extracted in Saudi Arabia for longer than oil. The American mining engineer Karl S. Twitchell began prospecting for metals in the 1930s, and the Saudi Arabian Mining Syndicate he co-founded opened the Mahd al-Dhahab gold mine in 1939.[9] It and four other gold mines are today operated by Ma'aden, which plans to increase its annual gold production by 30 percent by 2014, to 193,000 ounces.[10]

Saudi Arabia is a major sulfur exporter, with a global market share of more than 5 percent. Its main markets are China, Brazil, India, and Morocco. Most production is exported, with less than 10 percent remaining in the country. Given that sulfur occurs as an unavoidable by-product of sour gas (mainly in the Berri, Shedgum, and Uthmaniyah fields in the eastern provinces), additional opportunities to use it, as offered by Ma'aden's Al-Jalamid project, are more than welcome.[11]

The Ghurayyah tantalum deposits are among the world's largest, comparable with the Greenbushes and Wodgina mines in Australia that accounted for about half of global production until 2008, when they had to suspend operations because of economic difficulties.[12] Tantalum is vital for the manufacture of computers and cellphones. Ghurayyah also contains reserves of niobium and rare earth elements. The British Tertiary Minerals acquired a five-year license in 2002, but whether this can be extended has remained unclear for unstated reasons since 2007.

Saudi Arabia also possesses smaller reserves of iron ore, copper, magnesite, and zinc. Experts believe that new and more significant deposits could be found if deep drilling and detailed mapping were to expand the limits of existing geological knowledge. Ma'aden already mines magnesite, while joint ventures by private mining companies are in various stages of exploration for the other three.

Steady expansion of infrastructure has also increased demand for construction materials such as glass, sand, steel, stone, and cement.[13] Domestic production of these is to increase accordingly: sand and gravel from 300 million tonnes in 2010 to 370 million tonnes in 2014, cement raw materials from 49 to 57 million tonnes, and cement from 41,2 to 44

Planning, *Export Statistics Bulletin 2010*, pp. 6–4, 6–13, http://www.cdsi.gov.sa/english/index.php?option=com_docman&task=cat_view&gid=127&Itemid=113 (accessed April 27, 2012).

8 Al Rajhi Capital, "Ma'aden Phosphate Drives Valuation," August 8, 2012, http://content.argaam.com.s3-external-3.amazonaws.com/daa88dca-393e-4777-a45e-87233b1d2585.pdf (accessed September 29, 2012).

9 Karl Saben Twitchell, *Saudi Arabia, with an Account of the Development of Its Natural Resources*, 3d ed. (Princeton, 1958). Twitchell's personal papers are held by Seeley G. Mudd Manuscript Library at Princeton University, http://findingaids.princeton.edu/getEad?id=ark:/88435/pr76f3413 (accessed September 27, 2012).

10 Al Rajhi Capital, "Ma'aden Phosphate Drives Valuation" (see note 8).

11 Samir Pradhan, "World Sulphur Industry Trends: A Gulf Perspective," unpublished working paper, Dubai, 2008; data from PentaSul Consultants, 2008.

12 For analyses of the global tantalum market see http://www.polinares.eu/docs/d2-1/polinares_wp2_annex2_factsheet2_v1_10.pdf and http://www.ttiinc.com/object/me_zogbi_20081208.html (accessed July 22, 2012).

13 Philip M. Mobbs, "Saudi Arabia [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, January 2012), pp. 54.3, http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-sa.pdf (accessed April 26, 2012).

million tonnes. Although Saudi Arabia has a relatively advanced construction materials industry, it is still dependent on imports. The low-price segment is largely covered by Asian suppliers, while high-quality materials mostly come from Germany and other EU member states.[14]

The Gulf steel industry produces for the domestic market, and Saudi Arabia is a net importer of iron and steel. In 2008 45 percent of consumption was imported.[15] There is vigorous demand from construction and plant engineering, whose growth is driven by population and economic growth. According to estimates by the Australian iron ore producer Grange Resources, which explored the possibility of engagement in the region in 2008, demand for iron ore pellets for gas-based direct reduction will rise from 5 million tonnes in 2005 to 24 million tonnes in 2012, and 50 million tonnes in 2017.[16]

The Raw Materials Policy

Institutional Setting

The state occupies a dominant position in Saudi Arabia's economic structures, and its reach extends far beyond distributive and regulatory functions. The largest companies, such as the oil company Aramco, the petrochemicals giant SABIC (Saudi Basic Industries Corporation), and the utility companies are largely or fully state-owned. The state also decisively influences the private sector through orders, public/private cooperation, and advantageous financing through state funds like the Saudi Industrial Development Fund (SIDF) and Public Investment Fund (PIF). The private sector is most active in commerce, services, and construction, but has also advanced into petrochemicals and mining.

Although the Saudi state is hierarchically centralized around the royal family's consensual decision-making, it is also highly institutionally fragmented. In a system of "segmented clientelism" that has grown up over decades, individual ministries function as fiefdoms of different members of the House of Saud and their clients (clans, religious dignitaries, business families, other intermediaries).[17] Ministries communicate little with one another, even though their spheres of competence overlap. The bloated bureaucratic apparatuses have only limited reach within society, which creates further difficulties when it comes to implementation. This can even affect the impact of central directives from the king.

Alongside this fragmented institutional structure, state-owned companies like Saudi Aramco and SABIC have acquired notable freedoms. They are free from political interference and can often bypass administrative licensing procedures. The Saudi state ensures they are insulated from often phlegmatic bureaucratic structures and their political allocation mechanisms. These "efficiency islands" are expected to dedicate themselves above all to profit maximization.[18] The leading Saudi Arabian mining company also stands in this tradition. Ma'aden was founded in 1997 to develop Saudi minerals more extensively, especially to move beyond extraction of gold and non-metals. Originally fully state-owned, half the company was floated in 2008. But not all of these shares are public float, as a considerable proportion are held by state pension funds.

Joint ventures with foreign minority partners are well established in Saudi Arabia, as an instrument for importing technical know-how and management practices. The Saudi Arabian General Investment Authority (SAGIA) was established in 2000 to attract international capital and initiate joint ventures in both the private and the public sector. SAGIA's purpose is to centralize administrative procedures for foreign investors and thus help to overcome vertical bureaucratic segmentation. Although various ministries delegate representatives to SAGIA, it has never succeeded in overcoming the procrastinating resistance of various bureaucracies. In particular the Ministry of Commerce and Industry and Interior Ministry, which issue necessary licenses, have insisted on their autonomy.

14 Robert Espey, "Saudi-Arabien bietet Chancen für hochwertige Baumaterialien," *GTAI*, June 28, 2011, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=76378.html (accessed May 26, 2012).
15 NCB Capital, *In Focus: The Saudi Steel Sector*, Research Report, September 1, 2008, http://www.alahli.com/en-US/About%20Us/News_Reports/EconomicReport/Documents/ER2008En/Sept%202008_The%20Saudi%20Steel%20Sector%20Report%202008.pdf (accessed September 27, 2012).
16 Grange Resources, *Southdown Magnetite and Kemaman Pellet Project, Project Update 2007*, company presentation. Smelting with coke is not practiced in the Gulf states.
17 Steffen Hertog, *Princes, Brokers, and Bureaucrats: Oil and the State in Saudi Arabia* (London, 2010).
18 Steffen Hertog, "Defying the Resource Curse: Explaining Successful State-Owned Enterprises in Rentier States," *World Politics* 62, no. 2 (2010): 261–301.

SAGIA is also involved in strategic planning of economic diversification and associated infrastructure measures. Creating jobs for its growing young population is a top priority for Saudi Arabia, which aims to strengthen the private sector because the state alone can no longer provide the required jobs. The state has conducted cautious partial privatizations and floated shares in state-owned companies at discounted prices, partly as a means of redistributing oil wealth. The market capitalization of the Saudi stock market is the largest in the Middle East, but foreigners remain excluded from investing directly. Private Saudi companies have used the stock exchange to raise capital for new petrochemicals companies, and similar moves by private mining companies are conceivable.

The Saudi Geological Survey (SGS) is an independent agency under the auspices of the Ministry of Petroleum and Mineral Resources. It was founded in 1999 out of various predecessors, including the former Directorate General for Mineral Resources and the missions of the U.S. Geological Survey and the French Bureau de Recherche Géologiques et Minières, which operated in the country until 1999. The SGS has a branch in Riyadh, but its headquarters is in Jeddah, in the geological formation of the Neoproterozoic Arabian Shield. This western mountain region extending north-south the length of the Hejaz is the location of most of Saudia Arabia's known and suspected mineral reserves. The SGS concentrates on basic geological survey work, but may also conduct project-specific research for public and private companies.

The mining sector remained firmly in the hands of state-owned Ma'aden until 2005, when new mining legislation opened the sector to private investors. Since then, a series of joint ventures have been initiated: Australia's Alara Resources holds a mining license for zinc and copper jointly with United Arabian Mining; Canada's Diamond Fields International and the Saudi Manafa International Trade are exploring for copper, silver, and zinc at a depth of 2,000 meters in the Red Sea, 115 kilometers off Jeddah; and the British London Mining and Saudi National Mining own a license to produce iron ore at Wadi Sawawin, where 5 million tonnes of iron ore pellets could be produced annually (although the quality of the ore is poor according to experts).[19]

19 Mobbs, "Saudi Arabia [Advance Release]" (see note 13); telephone interview with a Saudi ministerial adviser, September 17, 2012.

Concepts and Strategies

Because of their lesser economic significance, non-energy minerals and metals play a smaller role in strategic thinking, whereas oil, gas, and food see greater institutional cooperation and the beginnings of strategic policy development (at the King Abdullah Petroleum Studies and Research Center, the King Abdullah City for Atomic and Renewable Energy, and the King Abdullah Initiative for Agricultural Investments Abroad, founded for that purpose). The publications of the SGS and the Ministry of Petroleum and Mineral Resources are more technical in nature. It must also be remembered that Saudi Arabia is a rentier state with restricted transparency and political participation, whose bureaucratic capacities and procedures are not comparable with OECD states or emerging economies. Official statements and policy papers are therefore less frequent and less extensive. In the country's fragmented institutional structure they may also originate from different official instances and contain contradictory information.

Minerals and metals are regarded above all as a means of economic diversification, especially phosphates and aluminum. Known deposits are to be extracted and ideally used to establish processing industries. In areas where Saudi Arabia is dependent on imports, such as construction materials and iron ore, concern over security of supply can be observed. Export restrictions have been imposed and capital invested in foreign mines. Because of its large foreign currency reserves, Saudi Arabia could also develop an interest in deploying its gold deposits for currency diversification.

Phosphates have become the core business of Saudi Arabia's most important mining company Ma'aden, and aluminum will become a second important pillar in 2014, whereas other industrial metals play a subordinate role.[20] With a target global market share of 10 percent for DAP fertilizer, Ma'aden is in the process of establishing itself as a global actor (similar to SABIC, founded in the 1970s and now one of the world's biggest petrochemicals producers). The goal is to combine cheap energy supplies and local mineral resources to create successful export industries, especially for the booming Asian market.

After petrochemicals, aluminum is another branch where the Gulf states wish to extend the value chain

20 Al Rajhi Capital, *Ma'aden Phosphate Drives Valuation* (see note 8).

of their energy production. With energy representing up to 40 percent of aluminum production costs, cheap gas gives the Gulf states a competitive advantage. According to the Gulf Organization for Industrial Consulting (GOIC), they are planning to increase their global market share from 10 to 15 or 17 percent by 2020.[21] The Indian Tata Group, which owns Jaguar Land Rover (JLR), cited cheap aluminum supplies from Al-Zabirah as a reason to consider building a car plant in Saudi Arabia.[22] Creating jobs and establishing a manufacturing sector that does more than produce raw materials are high priorities for the Saudi government.

Saudi Arabia has kept its gold reserves largely stable since 1978, and always shown itself to be a loyal dollar investor. Rather than hoarding gold, Saudia Arabia has sold its own production via its central bank, the Saudi Arabian Monetary Agency (SAMA).[23] In 2011 SAMA President Muhammad al-Jasser denied there was any interest in using gold as a diversification instrument, because of its great price volatility.[24] But this statement contradicts an estimate published by the World Gold Council a year previously indicating a doubling of Saudi gold reserves to 323 tonnes. The revision resulted from a change in SAMA's accounting methods.[25] This would appear to offer further evidence of the international gold market's infamous lack of transparency. Because it holds such large foreign currency reserves – more than US$500 billion – it would come as no surprise if Saudi Arabia undertook some kind of diversification. The country's own gold production could acquire growing importance as part of such a strategic currency diversification.

21 "GCC to Raise Global Share of Aluminum Output to 15%," *Saudi Gazette*, July 12, 2012, http://www.saudigazette.com.sa/index.cfm?method=home.regcon&contentid=20120712129696 (accessed July 22, 2012).
22 "Global Auto Giant Plans Assembly Plant in Saudi Arabia," *Arab News*, September 1, 2012, http://www.arabnews.com/economy/global-auto-giant-plans-assembly-plant-kingdom (accessed September 27, 2012).
23 Interviews with a former SAMA official, Dubai, September 2005, and Frankfurt, August 8, 2012.
24 Martin Dokoupil, "Gold too Speculative to Buy, Says Saudi Central Bank Chief," *Al Arabiya*, Ocotber 16, 2011, http://www.alarabiya.net/articles/2011/10/16/172038.html (accessed September 27, 2012).
25 "Saudi Gold Reserve Guesstimate Doubles," *BBC News*, June 21, 2010, http://www.bbc.co.uk/news/10368746 (accessed September 27, 2012); World Gold Council, *Reserve Statistics*, http://www.gold.org/government_affairs/gold_reserves/ (accessed July 22, 2012).

Policy Measures and Instruments

Investment Law

In 1995 the Deputy Ministry for Mineral Resources identified four measures for a comprehensive mining strategy: modernize the mining law, build a railroad to Al-Jalamid and Al-Zabirah, establish a new national mining company, and found the SGS.[26] The railroad is close to completion, Ma'aden was founded in 1997, the SGS in 2000. Also in 2000, SAGIA was established and a new foreign investment law passed, allowing foreign-owned firms full ownership in certain sectors including mining. For example, in 2011 Australia's Citadel Resources took full control of Bariq Mining, its gold and copper joint venture with the Saudi Consolidated Mining Company Investments. The project was then sold on to Canada's Equinox, which was in turn taken over by Barrick Mining in 2011. However, the start of production has been postponed from 2012 to 2014 because of non-compliance with Saudi safety and security standards. Since 2000 foreign firms have been entitled to the same benefit as domestic Saudi ones, including advantageous financing from SIDF. Taxation of foreign companies was reduced in 2004 from 45 to 20 percent,[27] but still remains higher than the 2.5 percent Islamic "zakat" that is paid by domestic firms on profits and parts of the capital.[28] Goods required for industrial manufacturing are exempt from import duties.

Saudi Mining Law

Under Article 14 of Saudi Arabia's *Basic Governing Law*,[29] all minerals on or below the earth's surface belong to the state, which is also the biggest landowner.[30] The abolition of collective tribal control of grazing rights in 1925 and the introduction of a formal registration system in 1952 gave the Saudi state ownership of large areas of land, which it has

26 Zuhair A. Nawab, *Mining as a Pillar of Economic Diversification: How Can the Kingdom Achieve This Vision?* background paper (Riyadh: Kingdom of Saudi Arabia, Ministry of Planning, 2002).
27 Al Swailem Consulting Group, *Doing Business in the Kingdom*, October 2005, http://www.agn-waa.org/pdf/DoingBusinessInKingdom.pdf (accessed September 12, 2012).
28 KPMG, *Corporate Tax Rates Table*, http://www.kpmg.com/global/en/whatwedo/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx (accessed September 17, 2012).
29 The official constitution is the Koran and the Sunnah.
30 Nawab, *Mining as a Pillar of Economic Diversification* (see note 26).

been distributing to build and maintain clientelist networks especially since the 1970s.[31]

Mining companies must complete the same approval process as all others, which centers on registration by the Ministry of Commerce and Industry. Under the Mining Law of 2005 licenses are awarded by the Deputy Ministry for Mineral Resources; Article 50 grants the state a right of participation after successful exploration.[32]

Opening the Mining Sector, International Raw Materials Governance, and Trade Policy Measures

As the examples of SAGIA and the part privatization of Ma'aden demonstrate, Saudi Arabia is seeking to strengthen the private sector and foreign direct investment in mining. Saudi Arabia's accession to the World Trade Organization in 2005 served as a pacemaker for domestic economic reforms. In the sphere of trade liberalization, it is interested in achieving better market access for its petroleum products. This could also apply to aluminum when production begins in 2014. WTO negotiations are hampered by fragmented bureaucratic structures and restricted capacities.[33] At the level of international organizations, Saudi Arabia plays a comparatively reserved role. Unlike Qatar and Qatar Petroleum, neither Saudi Arabia nor any Saudi mining company is a member of the Extractive Industries Transparency Initiative (EITI).[34]

An expanding heavy industry and a vigorous construction sector in the Gulf region bring with them increasing worries about raw materials supplies. In the interest of securing its supply, Saudi Arabia banned exports of sand, steel, and cement in 2008. These were partially lifted in 2009 but reimposed in 2011 and 2012.[35] There is particular concern about natural gas, which is scarce in all member states of the Gulf Cooperation Council apart from Qatar. In the smaller Gulf states the same also applies to alumina, the intermediate product refined from bauxite. In order to meet its demand, Dubai Aluminium (DUBAL) has invested in alumina refineries in Guinea and the Indian state of Orissa. Given that Ma'aden's Al-Zabirah project can draw on domestic bauxite deposits, comparable bauxite or alumina acquisitions by Saudi Arabia are unlikely in the immediate future. But the country is dependent on imported ore for its steel industry and has invested in foreign iron ore mines.

Environmental Protection, Sustainability, and Recycling

Environmental protection, sustainability, and recycling have to date been rather secondary considerations in Saudi policy. One exception is the shortage of water, which represents a serious production problem for mining (especially gold). The applied solutions include recycling used water, introducing water-saving techniques, tapping fossil water reserves by deep drilling, and – where production sites are not too far inland – the costly option of piping in desalinated seawater.[36]

Evaluation and Outlook

The contribution of metals und minerals to Saudi GDP and exports is small. The country has no major manufacturing industry and little demand for associated raw material imports, apart from steel and other construction materials. Confidence in the functioning of international markets and their ability to provide the necessary supplies is more robust in this area than in the case of food.

Mining is valued as a means of economic diversification, and its expansion has been vigorously encouraged since 2005. Phosphates and aluminum are most important. With its domestic bauxite reserves, Saudi Arabia's nascent aluminum industry will be independent of raw material imports – unlike the United Arab Emirates, where Dubai Aluminium (DUBAL) has invested abroad to secure supplies. But in the case of iron ore the Saudi company Hadeed

31 Toby Craig Jones, *Desert Kingdom: How Oil and Water Forged Modern Saudi Arabia* (Cambridge, MA, 2010); Kiren Aziz Chaudhry, *The Price of Wealth: Economies and Institutions in the Middle East*, Cornell Studies in Political Economy (Ithaca, 1997).

32 Ministry of Petroleum and Mineral Resources, *Mining Code*, http://www.saudiinfocon.com/dmmr/mining-code.htm (accessed September 12, 2012).

33 Hertog, *Princes, Brokers, and Bureaucrats* (see note 17).

34 EITI, *Stakeholders*, http://eiti.org/supporters/companies (accessed September 12, 2012).

35 "Kingdom Stops Cement Exports again as Local Demand Rises," *Saudi Gazette*, February 15, 2012, http://www.saudigazette.com.sa/index.cfm?method=home.regcon&contentID=20120215117617 (accessed September 27, 2012); "Contractors Seek Ways of Tackling Sand Crisis," *Gulf Daily News*, November 4, 2009, http://www.gulf-daily-news.com/NewsDetails. aspx?storyid=263241 (accessed September 27, 2012); "Bahrain Asks to be Excluded from Saudi Steel Export Ban," *Arab Steel*, February 3, 2012, http://www.arabsteel.info/total/long_news_Total_e.asp?ID=854 (accessed September 27, 2012).

36 Interview with a Saudi consultant, Stockholm, August 29, 2012.

has made such investments. It is also conceivable that the importance of Saudi gold mines could increase if Saudi Arabia decides to more strongly diversify its foreign currency reserves in view of global financial crises.

If minerals and metals are to gain greater strategic weight in Saudi planning, bilateral approaches are likely to dominate (as in other policy fields). At the level of multilateral institutions like the G20, Saudi Arabia has to date generally exercised restraint. Administrative capacities are often insufficient to communicate quickly and effectively at the institutional level with international organizations.

South Africa

*Denis M. Tull**

South Africa is one of the world's most resource-rich countries. More than sixty minerals are extracted there, so mining is very diverse and half of all leading international mining companies are active in the country. Nevertheless, the sector is currently experiencing a structural crisis. Domestic problems such as infrastructure inadequacies (e.g. transport and energy) and regulatory deficits prevented South Africa from benefiting from the global resource boom of 2001 to 2008, while the subsequent global economic meltdown – followed by the Euro crisis – entailed further negative effects. Since 2009, there has also been an ongoing debate about strengthening regulation and even nationalization. The Chamber of Mines of South Africa called the present situation a "decade [...] of lost opportunities."[1] While South Africa has no explicit raw materials strategy, the government places great weight on mining because of its potential to help reduce poverty and unemployment. It remains unclear how exactly these goals are to be reached. The potential for political and social conflagration in the mining sector came to light in August 2012, when protests by striking miners escalated into violence and thirty-four workers were shot dead by the police.

Minerals in the National Economy

The South African mining sector is almost a century old and the nation's industrial foundation. The country has the world's largest deposits of platinum group metals (87 percent of global reserves), manganese (80 percent), chromium (72 percent), gold (30 percent), and aluminosilicates, and the second-largest reserves of fluorspar, titanium, vermiculite, and zirconium.[2] It is the leading producer of platinum (77.7 percent of global production), vanadium (36.8 percent), manganese (19 percent), and chromium (43.1 percent), and second-largest producer of palladium (41.9 percent) and titanium (20.3 percent). Once very important, gold production has been declining for years and shrank by 50 percent during the past decade, leaving South Africa merely the fourth-largest producer of gold (7 percent share).[3] Five products – platinum group metals, coal, gold, iron ore, and manganese – made up 84 percent of South Africa's total mineral sales in 2011.[4] About 3 percent of all direct investment in exploration for non-energy raw materials goes to South Africa, ranking the country only tenth globally.[5] With a share of 9.6 percent of GDP (2011), mining remains an important pillar of the national economy.[6] The relative decline in its share of GDP (which was one fifth in the 1980s) results from the diversification of the economy and the simultaneous growth of other sectors. High commodity prices have in fact produced significant growth in the real value of mining production over the past decade. Raw materials represent about 35 percent of total exports earnings (2011). About 500,000 people work in mining and another 500,000 indirectly depending on mining.

In 2010, 20 percent of private investment (12 percent of total investment) went to the raw materials sector.[7] Iron ore in particular is considered to have

* The author would like to thank Maud Salber for her excellent research assistance for this article.

1 Chamber of Mines of South Africa, *Annual Report 2011* (Johannesburg, 2011), p. 10, http://www.bullion.org.za/documents/AR_2011-small.pdf (accessed October 9, 2012).

2 Government Communication and Information Service, *South Africa Yearbook 2010/2011, Mineral Resources* (Pretoria, 2011), p. 372, http://www.gcis.gov.za/content/resourcecentre/sa-info/yearbook2010-11 (accessed October 8, 2012). For comprehensive data on South Africa's minerals production, see Thomas R. Yager, "South Africa," in USGS, *2010 Minerals Yearbook*, vol. 3 *Area Reports, International* (Reston, February 2012), pp. 37.1–37.24, http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-sf.pdf (accessed October 9, 2012).

3 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

4 Chamber of Mines of South Africa, *Facts and Figures 2012* (Johannesburg, 2012), p. 2, http://www.bullion.org.za/documents/F_F_2012_Final_Web.pdf (accessed February 13, 2013).

5 Department of Mineral Resources, *South Africa's Mineral Industry 2009/2010* (Pretoria, 2010), p. 7.

6 Susan Shabangu (MP, Minister of Mineral Resources), *Budget Vote Speech to the National Council of Provinces*, May 24, 2012.

7 Chamber of Mines of South Africa, *Facts and Figures 2012* (see note 4), p. 2.

great medium-term growth potential. Platinum is also growing in significance, although declining demand from the European Union, which receives a quarter of South African platinum exports, has caused a deep production crisis, at least in the short run.

South Africa exports 70 to 90 percent of its raw materials, and the government has declared it a high priority to increase added value ("beneficiation") and the export of processed materials. In 2011, the Department of Mineral Resources published a strategy paper covering these points, but its implementation has yet to be decided.[8] Recycling is addressed by the National Waste Management Strategy. In 2007, 70 percent of metal cans, 54 percent of waste paper, and 22 percent of used plastics were recycled.[9]

The Raw Materials Policy

Institutional Setting

The Department of Mineral Resources (DMR) is responsible for the formulation, implementation, and monitoring of policy for non-energy raw materials.[10] The three main sections of the DMR are responsible for raw materials policy, regulation, and health and safety. South Africa's nine provincial governments have no powers of their own concerning mining. Since mining affects almost all areas of public life, certain other ministries are also tangentially involved, for example the Department of Water Affairs and the Department of Environmental Affairs in the licensing process. The DMR oversees several geological and technological agencies that support its work, including the Council for Geoscience, which is the country's geological survey, and the Council for Mineral Technology Research (MINTEK).

The most powerful political actors after the governing African National Congress (ANC) are undoubtedly the Congress of South African Trade Unions (COSATU) and the mining companies, which are mainly organized in the Chamber of Mines. The National Union of Mineworkers (NUM) is the largest constituent union of COSATU with 360,000 members. Apart from two smaller state-owned mining companies, the sector is in private hands, although the government plans to expand the state's mining activities by establishing a major state-owned mining enterprise. Ownership structures in the mining sector have changed significantly since the fall of apartheid. Major South African firms such as Anglo American, which used to be South African-owned, have been internationalized. At the same time, about 10 percent of the shares of almost all mining companies have passed to black South Africans.

Despite undeniably positive social developments, even twenty years after the end of apartheid South Africa still faces enormous socio-economic problems. Its figures for income inequality remain among the world's worst. About 40 percent of the population lives below the national poverty threshold of 500 rand per month (about €1.60/day). The official unemployment rate is about 25 percent (unofficially nearer 40 percent).[11]

These grave social problems define the framework of the national raw materials policy – and the debate about it. From the government's viewpoint, the top priority is to advance social and economic development, especially for the black majority. Using the resource base for broader development effects and job creation is thus a strategic goal. Two arguments have pushed mining to the center of the South African debate: first, the sector was a pillar of the exploitative and discriminatory system of apartheid; second, the nation has not benefited adequately from its rich raw materials base.

The clash between South Africa's liberal economic order and political demands for intervention reflect the structural heterogeneity of the governing coalition, whose three members are politically homogeneous neither internally nor with one another. The coexistence of almost every political stripe within the ANC (Marxists, neoliberals, black nationalists, etc.) makes it near impossible to find a coherent political course, especially where the domestically weak President Jacob Zuma must take care not to alienate interest groups that are important for his re-election. The debates about state intervention in the mining sector were initiated by the nationalist wings of the ANC; in particular its youth organization and the metalworkers' union have demanded nationalization of mining

8 Department of Mineral Resources, A Benefication Strategy for the Minerals Industry of South Africa (Pretoria, 2011).
9 Department of Environmental Affairs, *Recovery, Re-use and Recycling* (Pretoria, May 2010), http://www.wastepolicy.co.za/home/nwms_v1/2/4 (accessed October 4, 2012).
10 The Department of Minerals and Energy was divided in 2009 into the DMR (www.dmr.gov.za) and the Department of Energy.

11 "South Africa's Textbook Saga Shows Need to Tackle the Basics," *Financial Times*, July 2, 2012.

and other strategic sectors (e.g. land, the banking sector), if necessary without compensation. That debate, however, does not alter the fact that the economy has remained orthodox liberal, even under Zuma's presidency. Hardly anybody in South Africa believes that nationalization of mining is an option, while the heterogeneity of the ANC and the deep international integration of the economy will avert radical policy changes.

Nonetheless, certain structural obstacles will prevent full exploitation of national potential in coming years, with a massive lack of skilled labor and inadequate infrastructure only adding to the problems. After years of neglect, the government is now trying to catch up, for instance investing massively in transport and energy infrastructure (railways).[12] Moreover, two major coal-fired power stations that are vital for creating added value in the mining sector will be added to the energy mix by 2018.

Concepts and Strategies

Even though the government and the ANC publish strategy documents on a regular basis, there is no official, comprehensive strategy on the raw materials sector. Nonetheless, certain strategic pillars can be identified. The government views the country's raw materials endowment as a source of social and economic development. There are two problems with this, the first being the unresolved relationship between state and private business. Like other resource-rich countries, South Africa tends to assign the state a larger role in important economic sectors. In 2007, the ruling party officially adopted the concept of the "developmental state" or a "mixed economy," wherein the state is ascribed a central strategic role in structuring the economy, allocating resources etc. This was done in order to overcome the triple problems of unemployment, poverty, and inequality: "The developmental state should maintain its strategic role in shaping the key sectors of the economy, including the mineral and energy complex and the national transport and logistics system. Whilst the forms of state interventions would differ, the over-riding objective would be to intervene strategically in these sectors to drive the growth, development and transformation of the structure of our economy."[13] This approach coexists with a laissez-faire orthodoxy, with President Zuma advocating an internationally competitive mining sector as an accelerator for growth and employment.[14] A rather optimistic government forecast predicts that 140,000 jobs could be created in the mining sector by 2020.[15]

The second problem is that the South African state lacks the capacity to drive development, as desired by the government. Paradoxically, government representatives and critics agree on this point – but it remains undecided how the government will resolve the contradiction. Since a strategic framework is lacking, it is not surprising that policy measures and instruments have not yet been coordinated into a comprehensive raw materials policy.

Policy Measures and Instruments

Regulatory Framework

While the South African regulatory framework is more investment-friendly than that of many other G20 members,[16] conditions in the mining sector have worsened over the last decade in this respect. South Africa has fallen from 54th to 93rd in the Fraser Institute's Policy Potential Index of investment locations.[17]

Mining is regulated by the *Mineral and Petroleum Resources Development Act (MPRDA)* of 2004, which replaced private ownership of mineral rights with one of state custodianship. The state grants mining licenses to private firms on a first come, first served basis. Currently, the government is considering replac-

12 For an overview of government infrastructure policy, see Standard Bank, *South African Quarterly Review* (Johannesburg, August 2012).

13 Polokwane National Conference Economic Transformation Resolution, quoted in *Maximising the Developmental Impact of the People's Mineral Assets: State Intervention in the Mineral Sector (SIMS)* (Pretoria, February 2012), p. 71, http://www.anc.org.za/docs/reps/2012/simsreport.pdf (accessed October 4, 2012).

14 Jacob G. Zuma, *State of the Nation Address* (Cape Town, February 9, 2012).

15 South African Government, *New Growth Path* (Pretoria, 2001), p. 11, http://www.info.gov.za/view/DownloadFileAction?id=135748 (accessed October 4, 2012).

16 World Bank, *Doing Business 2012: Doing Business in a More Transparent World* (Washington, 2011), http://www.doingbusiness.org/reports/global-reports/doing-business-2012 (accessed October 8, 2012).

17 In 2002/2003, South Africa was ranked 27th out of 47 countries; Fred MacMahon and Miguel Cervantes, *Fraser Institute Annual Survey of Mining Companies 2011/2012* (Vancouver, 2012), http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/mining-survey-2011-2012.pdf (accessed October 8, 2012).

ing this method with public auctions to enhance transparency and competition. Applicants must fulfil certain social, environmental, and economic conditions. Noted observers believe that South Africa missed out on the recent resource boom because of changes in the regulatory framework and the vagueness of some of the *MPRDA* provisions.[18]

The awarding of mining licenses is often a time-consuming process taking more than a year, especially since responsibility is not held by the Department of Mineral Resources alone. The water and environment ministries have their own approval systems with different timetabling, relating to environmental impact assessments, water rights, and advance planning for the environmentally and socially compatible closure of mines. Contamination of soil and groundwater caused by many of the six thousand neglected and abandoned mines is a serious public health problem. The DMR is currently drafting proposals for an integrated and transparent interagency licensing procedure. An internet-based application system was introduced in 2011.

Black Economic Empowerment and Corporate Responsibility

One very distinctive feature of the South African mining business is positive discrimination in favor of historically disadvantaged mostly black citizens (Black Economic Empowerment or BEE).[19] The *Mining Charter*, which is part of the *MPRDA*, regulates BEE. It contains nine specific requirements that mining companies must fulfil in order to support economic participation in the mining industry by black South Africans. The government's aim is for at least 26 percent of every company to be owned by black citizens by 2014. Mining companies must also purchase supplies (40 percent) and services (70 percent) from companies where black South Africans own at least 25 percent (so-called BEE companies).

The *MPRDA* also requires companies to take action to foster economic development and provide social security benefits for workers and mining communities. These measures go well beyond conventional corporate social responsibility, in that they are codified in law and thus legally binding, while CSR elsewhere is most often a discretionary matter. Mining companies are required, for example, to organize and fund development projects and to arrange regular consultation with communities affected by mining activities. These obligations often require the construction of education and health facilities as well as the promotion of job opportunities outside the mining industry.[20]

There is, however, a great discrepancy between the aspirations and reality of the *MPRDA* requirements. In the mining industry (and elsewhere), BEE has failed to produce social transformation. Even representatives of the government admit that its focus on property rights has only contributed to the creation of a small circle of wealthy elites, whose companies often benefit from public procurement and corrupt business practices.[21] Moreover, the DMR has a reputation for being influenced by political lobbying by ANC elites.[22] This is not surprising, given the lack of strict divisions between government and party. As conceived by the ANC, in the political hierarchy of South Africa the ruling party is positioned above the government, which acts as the executive body of the former liberation movement. Conceived as an instrument to correct historical injustices, BEE thus ends up fueling political machines. According to conservative estimates by the National Prosecution Authority, at least 20 percent of the state procurement budget is lost to corruption and mismanagement every year.[23]

Furthermore, mining companies fail to properly implement the social and economic measures listed above. Five years after the *Mining Charter* took effect, the Department of Mineral Resources found "shocking levels of non compliance."[24] Social and labor stan-

18 Peter Leon, *South African Mining Industry at the Cross Roads*, address to the African Mining Network (Johannesburg, June 2012).

19 BEE is obligatory for companies in all sectors that wish to do business with the state, which means *de facto* that BEE is obligatory for all companies.

20 Southern African Institute of Mining and Metallurgy, *The Rise of Resource Nationalism: A Resurgence of State Control in an Era of Free Markets or the Legitimate Search for a New Equilibrium?* (Cape Town, 2012), pp. 228ff., http://www.saimm.co.za/Conferences/ResourceNationalism/ResourceNationalism-20120601.pdf (accessed October 8, 2012).

21 "Mantashe: I Have Serious Issues with BEE," *Fin24*, August 22, 2012, http://www.fin24.com/Economy/Mantashe-I-have-serious-issues-with-BEE-20120822 (accessed October 8, 2012).

22 "Special Report – Why South African Mining's in Decline," *Reuters*, February 4, 2011, http://uk.reuters.com/article/2011/02/04/uk-south-africa-mining-idUKLNE71303020110204 (accessed October 8, 2012).

23 "South Africa's Textbook Saga Shows Need to Tackle the Basics," *Financial Times*, July 2, 2012.

24 Department of Mineral Resources, *Mining Charter Impact Assessment Report* (Pretoria, 2009), p. 22, http://www.info.gov.za/view/DownloadFileAction?id=148849 (accessed October 8, 2012); Bench Marks Foundation, *A Review of Platinum Mining in*

dards in mining regions remain appalling. Health and safety rules are often ignored, resulting in about 120 fatalities every year (2010 and 2011).[25]

The willingness and ability of mining companies to abide by CSR standards is often limited. This is even the case with BEE companies, including those owned by members of the political elite. The prevalence of strikes and social protests has accordingly increased in recent years, and the resulting production losses have become a serious problem not just for the companies. They also represent a growing challenge for the ANC and the mainstream unions (especially the NUM), which claim to represent the interests of the miners and their families. Growing social tensions and unfulfilled promises of economic wealth have repeatedly resulted in violence, either between rival unions, or between miners and the police.[26] These developments culminated in the incident near the Marikana Mine, run by Lonmin, where thirty-four people were shot dead during a strike in August 2012. The event threw the government into its worst political crisis since the end of apartheid and led to an expansion of protests into almost all parts of the mining industry and beyond. Two months after the shootings, almost 20 percent of the mining workforce was on strike.

Support of Domestic Production

As demanded by radical elements in the ruling tripartite alliance, nationalization of the mining sector stands no chance of realization. However, like other major producers, South Africa is considering measures to maximize the income generated by its resource wealth. Even though results from this discussion had yet to be legislated by early 2013, it is already clear that they will include certain elements that can be expected to increase state intervention in the mining sector.

For example, the government is considering raising taxes, perhaps by implementing a "supertax" on exceptionally high company profits similar to the new Australian tax,[27] and hopes to collect revenues as high as US$5 billion.[28] Mining firms currently pay a corporate income tax of 28 percent and royalties of 0.5 to 7 percent of gross revenue.[29]

A second option under consideration is the creation of a major state-owned mining enterprise uniting all state-owned companies in the sector. Industry fears competitive disadvantages if the state were to act as both regulator and market participant, for instance in the form of joint ventures with private firms. It is questionable how competitive such a national mining enterprise would be, considering the performance of other South African state-owned firms. The fate of the ailing state-owned diamond producer Alexkor is a cautionary tale.[30]

Third, the government is likely to declare "strategic" certain metals or minerals that are of central significance for economic growth and employment in downstream sectors (e.g. iron ore). The definition is based on the premise that South Africa's economy has not to date been obtaining domestic raw materials at fair prices. It is argued, for instance, that the state-owned electricity generator Eskom pays excessive prices for low-quality coal, while higher-quality coal is exported. It is argued that this phenomenon leads to bottlenecks and overpricing.[31] Considering the overall objective of creating greater added value, the government will consider imposing export restrictions on minerals deemed to be strategic.

The government hopes that added value (beneficiation) will provide growth and employment at home rather than abroad, but has yet to make any specific proposals for establishing sustainable value chains. Attempts to promote added value in the diamond sector have failed.[32] In any case, the leeway for introducing export duties on un-processed minerals is heavily circumscribed by WTO rules and bilateral

the Bojanala District of the North West Province (Johannesburg, 2012), http://www.bench-marks.org.za/research/rustenburg_review_policy_gap_final_aug_2012.pdf (accessed October 9, 2012).

25 Shabangu, *Budget Vote Speech* (see note 4).

26 On social and labor conditions, see Bench Marks Foundation, *A Review of Platinum Mining in the Bojanala District* (see note 24), pp. 70–9.

27 See also "Australia" in this volume, pp. 30ff.

28 *Maximising the Developmental Impact* (see note 13), p. 352.

29 "Draconian Aussie Taxes Worry AngloGold More than Nationalization," *Reuters Africa*, July 5, 2012, http://af.reuters.com/article/investingNews/idAFJOE86404020120705 (accessed October 8, 2012).

30 *Maximising the Developmental Impact* (see note 13), p. 52.

31 "Coal Mooted as Strategic Resource," *Fin24*, June 15, 2012, http://www.fin24.com/Economy/Coal-mooted-as-strategic-resource-20120615 (accessed October 8, 2012). About 90 percent of the energy produced in South Africa stems from domestic coal.

32 "South African Diamond Industry No Longer Sparkling," *Mining Weekly*, June 8, 2012, http://www.miningweekly.com/article/south-africas-diamond-industry-no-longer-sparkling-2012-06-08 (accessed October 8, 2012).

trade agreements and would provoke the ire of trading partners.[33]

International Governance

The South African debate about the political and economic dimensions of its raw materials policy is still in its infancy. The government expects growth in emerging Asian economies to enhance the diversity and profitability of South Africa's trading relationships – even in light of the financial and economic crisis in the European Union, which has led to a drastic decline in demand for platinum.[34] And South African admission to the BRIC club (to create BRICS) has raised high, albeit vague hopes. Critics note that the economic advantages expected from BRICS membership are by no means guaranteed, especially since South Africa's interests (for instance on added value) are quite different from those of China or India. Resentment towards the European Union, South Africa's most important trading partner, has been articulated more openly, with criticism of the way the EU's trade interests inhibit industrialization and diversification.

On the level of the African Union, raw materials policy is a relatively young topic that has not moved beyond the consultative phase.[35] The South African Department of Trade and Industry has urged the creation of consistent conditions for investment within the Southern African Development Community (SADC).[36] The government supports international initiatives to improve transparency in the raw materials sector, but these so far have remained non-binding on the grounds that South Africa already has transparent procedures and institutions in place. Nonetheless, there are signs that South Africa would not in principle reject shared targets, standards, and norms within the G20 such as including transparency in awarding and negotiating fairer and more sustainable mining contracts, EITI membership of all G20 countries, and reform of economic and trade arrangements (for instance Economic Partnership Agreements) that restrict the freedom of mineral-producing countries to commercialize their raw materials.

Evaluation and Outlook

South Africa's raw materials policy is currently experiencing a phase of great change. The government is under pressure to keep social and economic promises made in the course of the liberation struggle. The potential for social conflagration in the historically tainted mining sector is tremendous, as the Malikana tragedy demonstrated. Even though the political dominance of the ANC will not be challenged for another decade or so, discontent over cronyism and the political arrogance of elites is growing within the country. This has already become an obvious challenge to the National Union of Mineworkers, which has lost members to more radical unions.

A coherent reaction by the South African government is still awaited; enhanced, but moderate state intervention in the mining sector can be expected, which business will no doubt perceive as excessive. The government will have to make the best of the limited capabilities of the state and address the challenge of adapting national priorities to the international economic context. In a context of limited mobility of investment, growing global demand, and an enormous metals and minerals base, South Africa will be able to demand more value for its raw materials. Maximizing taxes collected from mining companies will not suffice, without a coherent policy investing in education and infrastructure and providing a more transparent policy framework for investors, workers, and voters. Such a policy must ensure that state-owned mining companies do not undermine competition and regulations and that licenses are granted through transparent procedures. And it will have to abide by and enforce the laws and principles of CSR and BEE.

33 Peter Leon, "A Fork in the Investor-State Road: South Africa's New Mineral Regulatory Regime Four Years On," *Journal of World Trade* 42, no. 4 (2008): 675.

34 *Building a Better World: The Diplomacy of Ubuntu: White Paper on South Africa's Foreign Policy* (Pretoria, 2011), p. 6, http://www.info.gov.za/view/DownloadFileAction?id=149749 (accessed October 4, 2012).

35 *Africa Mining Vision*, agreed by African national leaders in 2009; http://www.africaminingvision.org (accessed October 9, 2012).

36 "SA's New Investment Policy to Forge Minerals, Industrialisation Link," *Mining Weekly*, July 26, 2012, http://www.miningweekly.com/article/sas-new-investment-policy-to-forge-minerals-industrialisation-link-2012-07-26 (accessed October 8, 2012).

South Korea

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Due to its highly specialized industrial production, South Korea is heavily dependent on reliable imports of raw materials. In order to secure supply in the long term, a program for systematic procurement and development of foreign sources of raw materials, with an allocation in the national budget, was initiated in 2001. The development of organizational and industrial competence in the raw materials sector, the establishment of a recycling industry, and state-run reserve management and stockpiling of critical raw materials complete the South Korean supply strategy.

Minerals in the National Economy

South Korea is a young, modern, industrialized country with specific competitive advantages in the steel, shipbuilding, plant engineering, vehicles, electronics, and information technology sectors. Due to a lack of domestic raw materials, manufacturing production is heavily dependent on imports for metals (99 percent) and minerals (29 percent),[1] as well as for refinery and industrial supplies, which are primarily obtained from Japan.

With a share of 0.1 percent of global production of non-energy raw materials (by volume), South Korea is one of the G20 countries with a small extractive sector.[2] Raw materials also play a secondary role in South Korea's national economy and exports. In 2010, non-energy minerals and metals accounted for 6.7 percent of total exports.[3]

While the country possesses relatively large deposits of non-metallic minerals (feldspar, limestone, siliceous earth, quartz sand, sulfur, serpentine, talc, zeolite), it has only limited domestic deposits of metals (gold, iron, lead, molybdenum, silver, titanium, tungsten, zinc). In 2010, only gold, limestone, and sulfur exceeded the US$100-million threshold.[4] On a global scale, South Korea is the second-largest producer of cadmium (18 percent) and the third-largest of talc (9.6 percent),[5] although the cadmium originates not from domestic extraction, but from the smelting of imported zinc and lead ores. Otherwise, South Korea produces raw materials in small quantities, as evidenced by its small shares of global production (feldspar 2.3 percent, gold 0.01 percent, iron 0.02 percent, kaolin 3.3 percent, silver 0.01 percent, titanium 1.1 percent).[6]

Mining and production are, however, expanding. Woulfe Mining, a Canadian-South Korean joint venture, is leading a consortium reopening an abandoned tungsten mine and is prospecting for gold in an abandoned Korean deposit. Mining and processing of tungsten is scheduled to start in 2013.[7] As documented by this and other examples,[8] foreign direct investment in the South Korean raw materials sector is welcomed, as it introduces innovative modern mining and processing technologies.

The northern part of the Korean peninsula is endowed with far greater mineral resources than the South. Although little is known about the size of the deposits or actual production volumes, it is certain that North Korea possesses major deposits of fluor-

* The author would like to thank Malte Paolo Benjamins for his research and assistance.

1 Data from the Korea Institute of Geoscience and Mineral Resources (KIGAM).

2 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

3 Trade Competitiveness Map, ed., *Trade Performance HS: Exports of Korea, Republic of, 2010 (in USD thousands)*, http://legacy.intracen.org/appli1/TradeCom/TP_EP_CI.aspx?RP=410&YR=2010 (accessed May 9, 2012). The proportion refers to HS-Codes 25, 26, 68, 72, 74, 75, 76, 78, 79, 80, and 81.

4 Production value according to KIGAM. Conversion into US$ at current exchange rates.

5 Lin Shi, "Republic of Korea [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, April 2012), p. 15.1, http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-ks.pdf (accessed May 8, 2012).

6 BMWFJ, *World Mining Data 2012* (see note 2).

7 Frank Robaschik, "Förderung von Rohstoffen wird in Korea (Rep.) wieder attraktiver," *GTAI*, April 4, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=550748.html (accessed August 15, 2012).

8 For example gold mining by the Canadian Ivanhoe Mines Ltd. and the investment in Korean uranium mining by the Australian enterprise Stonehenge Metals Ltd.

spar, gold, graphite, iron ore, lead, magnesium, rare earth elements, silver, tungsten, and zinc. Iron ore, tungsten, and zinc are currently mined. Upbeat estimates claim North Korean mining deposits are worth US$6 trillion.[9] Foreign investment into the North Korean raw materials sector is almost exclusively in Chinese hands. So far, South Korea has no access to deposits in the North.

Its large industrial production makes South Korea one of the most important consumers of raw materials and one of the world's leading importers of commodity metals, non-ferrous metals, and rare metals. South Korean supplies of certain minerals are highly concentrated. In 2011, for example, 99 percent of its magnesium and 78 percent of its rare earth imports originated from China, and 91 percent of lithium imports came from Chile.[10]

Although the state-owned Korea Resource Corp. (KORES) is the country's largest and most important raw materials enterprise, the industry is in fact dominated by private enterprises, including a number of industrial heavyweights. South Korea is one of leading countries for smelting and metal processing. Posco, the world's third-biggest steel producer, is active in raw material importation and processing, and participates in a number of mining projects in Australia and Brazil. According to Posco, raw material inputs today make up roughly 70 percent of the total costs of producing steel. Korea Zinc, which claims to be the largest zinc producer worldwide with a global market share of 8 percent, refines zinc, copper, gold, lead, and silver in Korea and abroad. Major resource trading companies with an emphasis on metals include Daewoo International, Samsung C&T, and LG International. Daewoo and LG have extended their portfolios vertically through direct investment in foreign mines (copper, lithium, nickel, zinc). SK Networks and LS Nikko have also invested in mining and processing overseas (copper, gold, lead, nickel, zinc). LS Nikko also operates a major copper smelting and processing plant in Korea and is expanding its activities into rare earths, deep-sea mining, and recycling.

The recycling sector is in a nascent phase. The recycling rate for electronic scrap rose from 17 percent in 2008 to 20 percent in 2009. A recycling industry association was established in April 2011, and in May 2011 a subsidiary of LS Nikko opened the first recycling smelter for copper, gold, silver, and other metals.[11]

The Raw Materials Policy

South Korea's raw materials debate is rooted in a consensual recognition that value creation in manufacturing is the basis of the nation's economic growth and prosperity, and that hardly any other country is so dependent on reliable imports of energy and resources as resource-poor and highly-industrialized South Korea. Rising and volatile commodity prices, the growing resource nationalism of certain emerging economies, and concentration tendencies in the global resources industry create an increasing sense of the vulnerability of the domestic manufacturing base. Moreover, major challenges emanate both from China, which has been restricting its raw materials exports and aggressively expanding resource investment overseas, and from Japan, which is a leader in metal production and processing. Sandwiched between these two heavyweights, South Korea's manufacturing industry suffers from a lack of raw material resources and a weak supporting industry. Trapped between China and Japan, industrial strategies to escape this position include securing overseas raw materials supplies, stockpiling reserves, technological innovation, and developing a recycling industry.[12] In contrast to many other political issues, the raw materials debate is not ideologically driven. There are controversies regarding the environmental sustainability,

9 Adam Currie, "Could North Korea Be the Next Rare Earth Power House?" *Rare Earth Investing News*, August 20, 2012, http://rareearthinvestingnews.com (accessed August 31, 2012); Lin Shi, "North Korea [Advance Release]," in USGS, *2010 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, July 2012), http://minerals.usgs.gov/minerals/pubs/country/2010/myb3-2010-kn.pdf (accessed August 31, 2012).

10 Frank Robaschik, "Korea (Rep.) steckt Milliarden in Rohstofferschließung im Ausland," *GTAI*, March 30, 2012, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=548434.html (accessed May 27, 2012).

11 Robaschik, "Förderung von Rohstoffen wird in Korea (Rep.) wieder attraktiver" (see note 7).

12 Jung-chan Bae, "Strategies and Perspectives for Securing Rare Metals in Korea," in *Critical Elements for New Energy Technologies: An MIT Energy Initiative Workshop Report*, *April 29, 2010* (Boston, 2010), p. 129, http://web.mit.edu/miteicomm/web/reports/critical_elements/CritElem_Report_Final.pdf (accessed August 15, 2012); Stefania Paladini, "Shopping Abroad the Korean Way: A Study in Resource Acquisition," in *Korea 2011: Politics, Economy, and Society*, ed. Rüdiger Frank et al., Korea Yearbook 5 (Leiden, 2011), pp. 148–50; Robaschik, "Korea (Rep) steckt Milliarden in Rohstofferschließung im Ausland" (see note 10).

the relationship between mining and development cooperation, the role of the state, and efficient use of government funds. Raw material supply issues have received even greater political attention since the conservative President Lee Myung-bak (former CEO of Hyundai Construction Corp. and close to South Korea's business community) came to power in January 2008.

Institutional Setting

Numerous institutions and organizations deal with raw materials policy and the raw materials economy. The Ministry of Knowledge Economy (MKE) is responsible for industry, technology, regional development, trade, international cooperation, energy, and resources, and is the central actor designing and coordinating raw materials policy. Two units with around twenty staff are responsible for metals and minerals. Their tasks include monitoring imports, contingency planning, defining criticality (of raw materials) and identifying strategic resources, managing reserves, and raising funds for investment in exploration and resource development overseas. The technology divisions of the MKE are responsible for promoting innovation and new technologies, including material substitution, recycling, and rare earth processing. A mine registration office and four local mine safety offices are attached to the MKE. The Korea Energy Economics Institute (KEEI), which is answerable to the MKE, analyzes economic, political, and technological trends in the resources sector and provides the MKE with statistical information, expert reports, and advice.

All other ministries play only a complementary or supportive role in raw materials policy. The Ministry of Environment (ME) is in charge of planning in the recycling sector, the Ministry of Strategy and Finance (MOSF) is responsible for approving budgets and managing stockpiling, the Ministry of Land, Transport, and Maritime Affairs (MLTM) arranges domestic exploration, the Ministry for Foreign Affairs and Trade (MFAT) is responsible for trade policy and development cooperation, and the MKE itself is in charge of industrial policy (for example supervising the research programs of the Korean Institute for Rare Metals, KIRAM). Where necessary, the Prime Minister's Office coordinates the ministries. Legislation is the responsibility of the National Assembly (Gukhoe).

The interests of South Korea's raw materials industry are represented and promoted by the Energy and Mineral Resources Development Association of Korea (EMRD), established in 2008. As well as the major state-owned enterprises (KNOC, KOGAS, KORES, KEPCO),[13] virtually all large private sector companies producing or consuming raw materials are members of EMRD, which participates in the drafting of national strategies and concrete measures. EMRD takes an active role in policy implementation, for example in information dissemination, personnel training, and credit risk management.

The fully state-owned Korea Resources Corp. (KORES) plays a central role in the practical implementation of the government's raw materials concepts and strategies. Founded in 1967, its official task is to ensure a stable supply of mineral resources by focusing on three tasks:[14] developing mineral resources overseas (as consultant, investor, creditor, and consortium leader); supplying technical and organizational support and credit to Korean mining companies; and stockpiling mineral resources itself. To allow it to fulfil these obligations, its authorized capital was raised from 600 to 2,000 billion won (approx. US$1.8 billion) in 2009. KORES aims to become one of the world's twenty largest mining companies by 2025. Privatization of KORES is not planned. KORES has committed itself to observing various international standards such as the UN Global Compact, ISO 26000, and the World Bank's Environment, Health, and Safety Guidelines.

Various government institutions support South Korean mining investments overseas, in particular Korea Export-Import Bank (KEXIM), which grants loans and guarantees; Korea Trade Insurance Group (K-sure), which insures political and economic risks; and the Korea Trade-Investment Promotion Agency (KOTRA), which provides foreign trade-related information and services in its 111 offices worldwide. The Korea Institute of Geoscience and Mineral Resources (KIGAM) is the country's leading geological research institute, with a budget of US$118 million in 2011, of which 84 percent came from government sources. The Institute employs 350 staff, including 302 researchers and engineers, to explore and assess mineral deposits in South Korea, abroad, and under the oceans; to develop new technologies for mining, recycling, and waste management; to supply knowledge and information to Korean

13 KNOC = Korea National Oil Corporation, KOGAS = Korea Gas Corporation, KEPCO = Korea Electric Power Corporation.
14 See article 1 of the Korea Resources Corporation Act, http://eng.kores.or.kr:8080/gpms/eng/gpms/resources/down/eng_law1.pdf (accessed August 15, 2012).

Figure 1
Self-supply rates and foreign sources for strategic metals

Metal	*Self supply rate (%)*				*Foreign sources*	
	2009	*2012*	*2016*	*2019*	*Current investments*	*Planned investments*
Iron ore	14.2	17	30	35	Australia, India, Brazil	South Africa
Copper	5.1	15	33	38	Chile, Peru, Indonesia, Australia, Canada	Myanmar, Argentina, Mongolia, Zambia
Zinc	33.8	34	40	42	Canada, China, Australia, Peru, United States, Kazakhstan	DR Congo, Iran
Nickel	32.6	29	34	40	Madagascar, Indonesia, Australia, New Caledonia	
Lithium	–	12	20	26	–	Bolivia
Rare Earths	–	12	20	26	–	Vietnam, Australia, South Africa

Source: Own research, based on data from MKE, KEEI, KORES.

businesses; and to teach geosciences to foreign specialists. KIGAM attaches great importance to international cooperation and invests extensively in exchanges of scientists, engineers, and students, as well as organizing joint international research conferences and projects and conducting joint exploration projects abroad.[15] Presently, exploration activities focus on the DR Congo, Mongolia, Peru, Uzbekistan, and Vietnam. Two new copper deposits have been discovered in Peru.

Concepts and Strategies

MKE's *Basic Plan for the Development of Foreign Resources* contains South Korea's authoritative raw materials strategy.[16] In legal terms, the *Basic Plan* is not a law but merely a government document, on the basis of which the MKE spends funds for specified purposes and cooperates with the private sector. Since the MKE published the first *Basic Plan* in February 2001 it has been revised every three years, most recently in 2010. The basic plan originally named the energy resources of oil, gas, bituminous coal, and uranium, as well as non-energy resources copper, iron ore, nickel, and zinc as strategic. Lithium and rare earth elements were added in 2010. Identification as a strategic resource is a precondition for the allocation of budget funding, which in the case of non-energy metallic resources amounted to roughly 90 billion won (ca. US$90 million) annually between 2001 and 2010.[17] The *Basic Plan* seeks a gradual increase in self-supply rates for the six strategic metals and sets ten-year targets (see Figure 1), which KORES is responsible for meeting. Self-sufficiency rates exceeding 50 percent are the long-term objective.

The *Basic Plan* specifies further measures and objectives for developing the national raw materials supply, notably, improving the technological and professional competence of the domestic raw materials sector. Vis-a-vis resource-rich developing countries, the *Plan* recommends a specific national model based on the South Korean experience of rapid development and industrialization. Further promotion measures include developing a complementary raw-materials-related service sector, workforce training, stockpiling, and stepping up exploration for rare earths in South Korea.

Although South Korea's industrial, environmental, and development policies each have their own paradigmatic objectives, they each also have a specific focus on raw materials. For example, MKE introduced industrial incentives to nurture the development of South Korea's domestic rare metal and rare earths industries. And South Korea's *National Strategy for Green Growth*, which seeks to reduce CO_2 and encourage green industries, promotes the recycling of industrial and household waste.[18] The country's official development assistance (ODA) has basic development objec-

15 KIGAM, *Annual Report 2011* (Daejeon, 2012).
16 Jisik Gyongje Bu, *Je Sacha Hae Oi Ja Won Gae Bal Gibon Gye Hoek 2010–2019* [Ministry of Knowledge Economy, Basic Plan for the Development of Foreign Resources] (Seoul, 2010).
17 At an assumed exchange rate of US$0.80 for 1,000 KRW.
18 For a full description and assessment of the plan see United Nations Environment Programme (UNEP), *Overview of the Republic of Korea's National Strategy for Green Growth* (Geneva, 2010).

tives, but pursues political and economic interests, too. In foreign policy, South Korea is gaining international status as a new donor country taking action in the OECD Development Assistance Committee (DAC) and in the G20. ODA offers an instrument for gaining privileged access to foreign energy and raw materials and creating a favorable investment climate for South Korean companies.[19]

Policy Measures and Instruments

Exploration, Processing, and Recycling

Given that increasing domestic production is the simplest way to reduce dependency on foreign sources, the South Korean government is promoting resource-related exploration, research, development, and recycling through various programs.

Exploration, research, and development are fundamental responsibilities of the KIGAM, which has been compiling geological maps of South Korea by airborne geophysical survey for approximately thirty years. Deposits of niobium, rare earths, and tungsten have recently been discovered.[20] Feasibility studies will examine whether these deposits can be developed profitably. If so, licenses will be awarded under the *Mining Act* and Article 120 of the *Constitution of the Republic of Korea*. Other activities of the KIGAM include developing geophysical exploration technologies for ore deposits, conducting a feasibility analysis of deep-sea manganese nodule lifting pipes, and developing of new ore processing technologies. KIGAM's recycling research focuses on carbonation technologies to turn industrial waste into an alternative resource, on the leaching of low grade uranium ore, and on technologies for extracting minerals from seawater. In the latter case, the KIGAM has developed a system for extracting lithium and is operating a pilot plant with POSCO.[21]

As mentioned above, the MKE's industrial policy specifically incentivizes rare metal production to create a strong vertical basis in production and processing for South Korea's manufacturing industry. Between 2010 to 2019, technological capacity and industrial locations are to be established. A budget of US$300 million is available to develop technologies in refining, smelting, processing, recycling, substitution, and reduction, controlled by the Rare Metals Industry Governing Committee comprising the MKE, businesses, universities, and institutes. The newly established Korea Institute for Rare Metals (KIRAM) addresses technology issues and manages research and development programs. There are also three local rare metal commercialization centers specializing in indium, magnesium, niobium, platinum, and titanium. KORES is investing US$820 million to fund specialist rare metals companies, such as the Kwang-Yang FerroAlloy Co.,[22] and in 2011 the MKE announced it would spend 300 billion won promoting rare earths processing technologies.[23] The MKE also funds teaching staff and materials for resource-related courses at South Korean universities, as well as vocational training run by the EMRD.[24] To support domestic copper refining, a 5 percent tariff is levied on imports of refined copper.[25]

The government places increasing weight on recycling and "urban mining." Recycling laws and regulations for waste separation, recycling, waste management have been tightened up. Increasing recycling rates in order to develop new raw materials sources and reduce industrial consumption is an overarching objective.[26]

Raw Materials Investment Overseas

Foreign direct investment in overseas mining operations is pursued to secure South Korea's industry its supply of strategic metals. State-owned KORES is the most important vehicle promoting foreign investment, offering an attractive and specifically South

19 Philipp Olbrich and David Shim, *Südkorea als globaler Akteur: Internationale Beiträge in Entwicklung und Sicherheit*, GIGA Focus Global 1/2012 (Hamburg: GIGA, 2012), pp. 4–5.
20 Robaschik, "Förderung von Rohstoffen wird in Korea (Rep.) wieder attraktiver" (see note 7).
21 KIGAM, *Annual Report 2011* (see note 15), pp. 34–59; KIGAM, ed., *Change and Challenges Beyond History* (Daejeon, 2012), pp. 19–26.
22 Min-ha Lee, "Current Status and Perspectives of Rare Metals in Korea: Industrial Technology Aspect," in *The EUREKA Day Seminar on Industrial Manufacturing and Transport*, March 17, 2011, http://new.eurekaday.kr/download/4_Korea_Institute_of_Industrial_Technology_KITECH_Min_Ha_Lee.pdf (accessed August 31, 2012).
23 "Yonhap, Korea to Spend 300 Bil Won on Rare Earth Processing R&D," *Korea Times*, October 6, 2011, http://www.koreatimes.co.kr/www/news/biz/2012/08/123_88678.html (accessed August 31, 2012).
24 Verbal statement by a representative of the Korea Energy Economics Institute (KEEI).
25 BDI, Übersicht über bestehende Handels- und Wettbewerbsverzerrungen auf den Rohstoffmärkten, unpublished manuscript (Berlin, 2012), p. 53.
26 "Koh Young-aah, Korea to Boost Mineral Recycling," *Korea Herald*, April 15, 2011, http://view.koreaherald.com/kh/view.php?ud=20110415000707&cpv=0 (accessed August 31, 2012).

Korean package in global competition for access to raw materials: employing only workers from the host country in its mining and production and providing training; supplying benefits to local communities through donations, new school buildings, and community centers; constructing hospitals and a sustainable, environmentally friendly energy and transport infrastructure; transferring South Korean industrial development knowledge through courses and on-the-job-training of local managers; and developing concrete suggestions for industrial diversification. South Korea's successful experience in industrial development and democratization serves as a reference case.[27]

Resource development financing is not offered only by KORES. Loans and guarantees are also provided by the state-owned financial institutions KEXIM and K-sure. KEXIM grants loans of up to 100 percent to finance equity purchases, development, and operating costs with a maturity of up to seventeen years and a grace period of mostly seven years. KEXIM also provides guarantees to cover political and commercial risks. Being a government-owned financial institution, KEXIM holds only South Korea's A rating, and is thus at a competitive disadvantage against certain other commercial and development banks. In order to provide Korean companies with competitive financing, KEXIM is permitted to improve its terms and conditions to remain competitive. The trade insurer K-Sure offers similar financing terms for raw materials investments abroad. While K-Sure insures political and commercial investment risks, an international commercial bank with an excellent rating supplies the long-term financing.[28]

Further financial and tax incentives also facilitate investments in extractive operations abroad. South Korean companies that participate in a KORES-led development consortium receive a temporary financial subsidy. Profits earned in a foreign resource investment enjoy a 3 percentage point tax discount.[29]

Trade and economic cooperation policy play a supportive role. In bilateral free trade agreements, chapters on raw materials grant South Korean companies special access rights. South Korea has already concluded bilateral free trade agreements with resource-rich developing economies, such as Chile, Peru, Indonesia, the Philippines, and Vietnam, and is negotiating with Australia, Canada, and China. South Korea's economic cooperation policy pursues both trade and investment goals. While countries with abundant natural resources or attractive markets are preferred ODA recipients,[30] there is no direct link between ODA and mining project acquisition. The ministerial responsibilities are strictly separate.

South Korea's efforts to develop sources of minerals have born fruit. The most important metal projects (in terms of investment volume) are the iron ore mines at Roy Hill (Australia) and Namisa (Brazil), and the nickel ore project at Ambatovy (Madagascar). In a forward-thinking agreement, KORES, POSCO, and the Bolivian state enterprise Comibol have set up a joint venture to manufacture lithium-ion battery parts, tapping the vast lithium deposits of Salar de Uyuni.

Reserves and Stockpiling

Strategic reserves are held to secure South Korea's economy against the risks of supply disruption or unexpected price increases.[31] The Public Procurement Office (PPO) draws up plans for building and stockpiling reserves according to MKE requirements. KORES, which runs nine domestic storage facilities, is in charge of implementation. Its management system is regarded as cost-efficient and innovative. Stocks are released to the markets on MOSF approval, with small and medium-sized enterprises given priority. Reserves of the commodity metals aluminum, copper, lead, nickel, tin, and zinc are held, as well as the rare metals cobalt, indium, lithium, manganese, molybdenum, silicon, vanadium, and rare earth elements. Metal stocks have increased from 8.1 days (2010) to 13.5 days (2011),[32] and are reported to have been raised further in 2012, especially in the case of rare metals (60 days). It is planned to increase rare earth

27 Paladini, "Shopping Abroad the Korean Way" (see note 12), pp. 148–50, 161–62; verbal statement by a representative of the Korea Resources Corp. (KORES).

28 Export-Import Bank of Korea, *Guide to the Export-Import Bank of Korea* (Seoul, 2012), pp. 29–30; verbal statement by a representative of the Korea Export-Import Bank (KEXIM).

29 Verbal statement by a representative of the Korea Energy Economics Institute (KEEI).

30 For empirical data see Eun-mee Kim and Oh, Jinhwan, "Determinants of Foreign Aid: The Case of South Korea," *Journal of East Asian Studies* 12, no. 2 (2012): 251.

31 For stockpiling policy see Public Procurement Service, http://www.pps.go.kr/englis (accessed August 30, 2012); Paladini, "Shopping Abroad the Korean Way" (see note 12), pp. 159–61.

32 Paladini, "Shopping Abroad the Korean Way" (see note 12), p. 160.

reserves from 10.8 days (April 2012) to 100 days (2014).[33]

Evaluation and Outlook

Raw materials security is of great importance for South Korea, which lacks its own domestic deposits and is vulnerable to external market shocks. By experience and tradition, politicians and government rely on industrial planning and are ever ready to provide sufficient funding. From the private-sector perspective, raw materials planning and administration are well-organized, coherent, and transparent. National programs promoting research and development, recycling, and mineral investments overseas are all clearly focused on the supply security goal, and harmonize efficiently and smoothly. Given growing engagement in international raw materials markets and positive returns on recent foreign investments, the national supply strategy can be expected to be successful.

The idea of global governance of the international raw materials economy is not yet an issue in South Korea's resource policy. To date the country has joined only the International Lead and Zinc Study Group (ILZSG). However, policymakers are open-minded about multilateral cooperation.

South Korea's one-sided focus on security of supply has its own risks and weaknesses, however. Problems with environmental and developmental sustainability are foreseeable, and since KORES is a state-owned enterprise, investment disputes can easily turn into foreign policy conflicts. A general question also arises regarding investment risks. It is not unlikely that South Korean companies' lack of experience in the international mining business will cause some investments to fail, confronting government and industry with the question: Is the use of tax revenues for mining investments actually justifiable during the current high-price phase, in light of the low level of social security provided by the South Korean state?

33 Yonhap News Agency, "S. Korea Insulated from Immediate Rare Earth Elements Shortage: Gov't," *Yonhap News*, April 24, 2012, http://english.yonhapnews.co.kr/news/2012/04/23 (accessed August 30, 2012).

Turkey

Günter Seufert

Turkey possesses numerous minerals and metals, but sells few on world markets. It is the world's largest importer of scrap iron,[1] and one of the largest of gold. Domestic industry's great demand for raw materials produces a strongly negative foreign trade balance for mining products. The Turkish government is working on an import substitution strategy to address its structural current account deficit, but this touches only tangentially on mining and strategic raw materials.

Minerals in the National Economy

Turkey has comparatively large reserves[2] of metallic and non-metallic raw materials such as bentonite, pumice (3 million cubic meters), boron (866 million tonnes), chromium (25 million tonnes), feldspar (130 million tonnes), gold (6,500 tonnes), limestone, calcite, magnesite, marble (3,8 billion tonnes), perlite, strontium, and trona.[3] Borates (72 percent of known global reserves), feldspar (23 percent), and perlite (about 50 percent) are particularly significant.[4] According to *World Mining Data*, Turkey is among the world's top ten producers of boron (first); chromium, bentonite, feldspar, magnesite, and perlite (fourth in each case); barite and antimony (sixth); and gypsum and anhydrite (ninth).[5]

The main markets for Turkish mining exports are China (39 percent) and the United States (8.9 percent).[6] The European Union sources 4 percent of its mining imports from Turkey.[7] There are no export restrictions on mining products.[8] The most important Turkish mining exports in 2011 were marble (45 percent by value), chromium (13 percent); copper (10 percent); borates, zinc, and feldspar (5 percent each); magnesite and ferrochrome (3 percent each); bentonite and quartz (1 percent each); other metals (3 percent); and industrial minerals (5 percent).[9] Marble aside, there is plainly considerable untapped potential for export and processing. Turkey is a net importer of ores, with an average import surplus for 2007–2011 of 32.7 percent.[10]

From 2005 to 2011 Turkish mining contributed only about 1.4 percent of GDP, while its share of exports rose from 2.1 to 2.9 percent. Because of the country's long economic boom, these figures fail to adequately reflect the sector's strong absolute growth – an annual average of 21.6 percent.[11]

1 "Türkei will Wiedergewinnung von Rohstoffen steigern," *GTAI*, June 6, 2011, http://www.gtai.de/GTAI/Navigation/DE/Trade/maerkte,did=76484.html (accessed October 8, 2012).

2 Turkish data on raw materials deposits and production are not always reliable, partly because certain companies use outdated systems for data collection and analysis, which do not conform to international reporting standards; see *Mining Turkey: Mining & Earth Science Magazine* 2, no. 2 (March 1, 2012): 32f., http://www.madencilik-turkiye.com/engdergi/sayi2/MiningTurkey_sayi2.pdf (accessed October 11, 2012); Engineering and Mining Journal (E&MJ), ed., *Mining in Turkey*, January 2012, p. 42, http://www.gbreports.com/admin/reports/EMJ-Turkey2012.pdf (accessed October 12, 2012). Finally, there are often discrepancies between the figures given by the two main state agencies, the Turkish Office of Statistics (TÜİK) and the General Directorate for Mining Affairs (MİGEM). DPTM (State Planning Organization), *Dokuzuncu Kalkınma Planı 2007–2013, Madencilik Özel Ihtisas Raporu* (ninth development plan), March 2006, pp. 29f.

3 Ministry of Energy and Natural Resources, ed., *Natural Resources*, http://www.enerji.gov.tr/index.php?dil=en&sf=webpages&b=tabiikaynaklar_EN&bn=216&hn=&nm=40718&id=40718 (accessed May 13, 2012).

4 "Turkey," *Mining Journal*, March 2012, p. 2, http://www.mining-journal.com/__data/assets/supplement_file_attachment/0010/295579/Turkey_scr2011.pdf (accessed October 11, 2012).

5 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), ed., *World Mining Data* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/Welt Bergbau Daten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

6 Deloitte, ed., *Turkish Mining Industry Report*, July 2010, http://www.invest.gov.tr/en-US/infocenter/publications/Documents/MINING.INDUSTRY.PDF (accessed October 8, 2012).

7 Günther Tiess, *General and International Mining Policy* (Vienna and New York, 2011), p. 73.

8 World Trade Organization (WTO), *Trade Policy Review Turkey*, January 17, 2012, pp. 52ff.

9 E&MJ, ed., *Mining Turkey* (see note 2), p. 19.

10 Ekonomi Bakanlığı (EB; Ministry of Economy), ed., *Sektör Raporu Madencilik*, 2012, p. 9, http://www.ibp.gov.tr/pg/sektorpdf/sanayi/madencilik_2012.pdf (accessed December 7, 2012).

11 General Directorate for Mining Affairs, http://www.migem.gov.tr (Istatistikler); Sahil Madencilik, http://www.sahilmadencilik.net/index.php/tr/turkiye-maden-haritasi (both accessed August 18, 2012).

The Turkish construction sector is traditionally strong both at home and abroad. In the current boom this allowed the domestic steel industry to double production within ten years. Turkey is today the world's tenth-largest steel producer, but 80 percent of the iron processed in the country has to be imported[12] and known domestic iron ore is likely to be exhausted within ten years.[13] Only 31 percent of the raw material for iron production is mined ore; the rest is recycled scrap.[14] Imports of iron ore and scrap have topped the import statistics since 2006, and are largely responsible for Turkey's large current account deficit. Aluminum, gold, and copper are also significant imports.

Most mining companies are small or medium-sized, and often lacking in basic management, training, and exploration skills. Turkey has none of the large companies that set standards and drive innovation, and domestic capital has been slow to get involved in mining. Foreign investment has flown primarily into gold extraction, and the great wave of investment that had been expected from privatization has failed to materialize.[15] Hopes are directed toward stronger international cooperation.

Beneficiation and processing capacities are still underdeveloped. Although Turkey does today export significantly more processed than raw boron and marble products,[16] capacity expansion – especially for base metal processing – is still hindered by the long-term nature of required investments and unusually high energy prices. As a consequence the value added in mining remains limited.

To a certain extent the problems of mining reflect structural weaknesses of Turkish industry. Between 2004 and 2011 Turkey's GDP grew from $392 billion to $772 billion and per capita income rose from $5,862 to $10,444. But at the same time the current account deficit also increased,[17] largely because of the absolute volume of imports resulting from dependency on imported energy, the widespread use of imported semi-finished products, and the relatively high share of imported raw materials.

The Raw Materials Policy

Institutional Setting

In 1997 state-owned companies still accounted for 85 percent of Turkish mining activities, private firms just 15 percent. Since then, privatizations have reversed the figures.[18] The only remaining state corporation of any significant size is the Eti Mine Works, which holds a monopoly on the extraction and processing of borates as well as producing zeolites, sulfuric acid, and pyrite. In 2011 Eti Mine Works ranked fourth in the list of Turkish businesses with the highest net profits, and third in terms of profitability.[19] The National Boron Research Institute (BOREN) established in 2003 concentrates on diversifying the production and application of borates.[20]

Minerals in Turkey are the property of the state, regardless of land ownership, which grants public and private businesses exploration and extraction licenses for a specific area, mineral, and period.

The Ministry of Energy and Natural Resources (ETKB) has two general directorates: the General Directorate for Energy and the General Directorate for Mining Affairs (MİGEM). The latter is responsible for tendering and issuing licenses, which as a rule run for ten years and may be extended for a further ten. MİGEM verifies that labor law, health and safety, and environmental regulations are observed. The General Directorate for Mining Affairs also watches over the national interest, ensures that production, stockpiling, and marketing plans are observed, and maintains data on mines.

Answerable directly to the Ministry, the General Directorate of Mineral Research and Exploration (MTA) is a research agency conducting geological and geophysical studies, preparing exploration projects, and conducting research commissioned by state instances and private firms. More than 3,000 staff, 1,500 of them

12 Information provided by Dr. Abdülkerim Yörükoğlu, deputy director of the General Directorate of Mineral Research and Exploration (MTA), Ankara, September 6, 2012.
13 E&MJ, ed., *Mining Turkey* (see note 2), p. 20.
14 *Ninth Development Plan* (see note 2), p. 116.
15 Information provided by Engin Yalçin, head of the mining department at the Minerals and Metals Exporters Association (İMMİB), September 4, 2012, in Istanbul.
16 *Ninth Development Plan* (see note 2), p. 47.
17 Müstakil Sanayici ve İş Adamları Derneği (MÜSIAD), ed., *Türkiye Ekonomisi Raporu*, 2012, p. 15.
18 E&MJ, ed., *Mining in Turkey* (see note 2), p. 40.
19 Eti Maden, http://www.etimaden.gov.tr/turkiyenin-500-buyuk-sanayi-kurulusu-arastirmasinin-2011-yili-sonuclari-acikland-44h.htm (accessed September 4, 2012).
20 National Boron Research Institute, http://www.boren.gov.tr/en/ (accessed August 20, 2012).

academics, work in its Ankara headquarters and twelve regional offices.[21]

The Planning Ministry (KalkB) prepares five-year development plans for all branches of the economy.[22] In earlier decades, when the state still occupied a stronger position in the economy, such plans were implemented directly. Today they principally influence the course of state development and investment policy. It is the experts in the Planning Ministry who follow the international and European discussion on questions of mining and raw materials.

The central legal basis for raw material extraction is the *Mining Law* (*Maden Kanunu*, MK) of 1985. Reforms in 2004 and 2010 accelerated the license-granting process, improved transparency, legal security, and efficiency, defined the responsibilities of the various ministries more clearly (decoupling approval procedures in other ministries from the process at the General Directorate for Mining Affairs), and gave companies more time for geological exploration. Turkey's rate of corporation tax, which at 20 percent is among the lowest in the OECD, has a positive effect on the branch. Profits are taxed at 15 percent, while the level of license fees depends on the ore; for gold and silver there is no fee at all. Businesses that process ores after extracting pay only half the license fee.[23]

The trend to lower environmental protections is welcomed by investors – and condemned by environmentalists. One such example is the absence of any requirement for an environmental impact assessment for exploratory drilling. The health and safety situation is also poor. Turkey has Europe's worst record for fatal accidents at work, with coal mining particularly badly affected.[24]

21 *Ninth Development Plan* (see note 2), p. 106, and Maden Tetkik ve Arama Genel Müdürlügü (MTA; General Directorate of Mineral Research and Exploration), ed., *Stratejik Plan 2010–2014*, p. 14, http://www.mta.gov.tr/v2.0/pdf_doc/stratejik-plan.pdf (accessed August 20, 2012).

22 Although the name of the institution (Kalkınma Bakanlığı) literally means "development ministry," the term Planning Ministry better describes its nature, as it emerged from the State Planning Organization (DPT, later DPTM), and is therefore used here; http://www.dpt.gov.tr/Kalkinma.portal (accessed August 18, 2012).

23 MBendi Information Services, ed., http://www.mbendi.com/index.htm (accessed August 20, 2012), and E&MJ, ed., *Mining in Turkey* (see note 2), p. 43.

24 In past five years 5,400 miners have died at work; parliamentary question by the CHP on January 11, 2012, http://www2.tbmm.gov.tr/d24/7/7-2813s.pdf (accessed August 20, 2012).

Concepts and Strategies

In the interests of efficient public administration and putting political initiatives into practice rapidly, all government agencies prepare strategic plans. To date, however, mining and security of raw materials supply have played only a marginal role in these, for reasons that include Turkey's great dependency on energy imports and the associated financial and political costs (centrality of relations with Russia, Iran, and Azerbaijan). Even in the responsible ministry, securing industrial raw materials is a secondary consideration. For some time there have been calls for the establishment of a separate mining ministry.[25] The *2010–2014 Strategic Plan of the Ministry of Energy and Natural Resources* mentions mining on only six of forty-three pages, solely in the context of increasing marble production and further diversifying boron products.[26]

The most recent five-year development plan already demands fundamental reforms: expand and systematize exploration, restructure the MTA research agency, annual reporting, an overhaul of the relevant statistics, formation of an expert commission for research and development, preparation of a strategic mining plan, and establishment of a separate mining ministry.[27] Work on the *Strategic Mining Plan* has made progress and the document is with the Planning Ministry for preparation of the next five-year plan.[28]

A specially created expert commission for export production in the Ministry of Economy (EB) has begun work on a strategy for securing raw materials and substituting imported semi-finished products. One priority of its work is vehicle manufacturing. In 2010 semi-finished products for vehicles and machine-building (machine construction) represented 19 percent of total imports of semi-finished products (compared to just 9.5 percent for textiles). Vehicle manufacturing is the Turkish industry with the smallest domestic production share.[29]

25 *Ninth Development Plan* (see note 2) and information provided by Engin Yalçin (see note 15).

26 Enerji ve Tabii Kaynaklar Bakanlığı (ETKB; Ministry of Energy and Natural Resources), ed., *2010–1014 Stratejik Plan*, pp. 50–5, http://www.enerji.gov.tr/index.php?dil=tr&sf=webpages&b=yayinlar_raporlar&bn=550&hn=&id=3273 (accessed August 15, 2012).

27 *Ninth Development Plan* (see note 2), pp. 179–86.

28 Information provided by Engin Yalçin (see note 15).

29 All figures from EB, *Ihracata dönük üretim stratejisi ve GITES*, pp. 5, 20, http://www.ekonomi.gov.tr/upload/B294AC88-D8D3-8566-45202AF6BBF47BA9/gitessunumu.pdf (accessed August 18, 2012).

Policy Measures and Instruments

The thrust of current proposals for reducing dependency on semi-finished products is that industry and government-administered research facilities should cooperate more closely, and that universities and research centers should conduct more applied research under the direction of the Research Council.[30] But mining and raw materials are not mentioned directly. Nor does the *Industrial Strategy 2011–2014* of the Ministry of Industry and Commerce (SvTB) touch more than briefly on the central role of raw materials for vehicle manufacturing and the textiles and steel industries. And it says nothing about the necessity of drawing up a coherent raw materials strategy.[31]

Nonetheless, attempts are being made to address certain structural weaknesses in mining. Although limited in its financial scope, the *2012 Investment Program* takes up at least some of the guidelines of the *Ninth Development Plan* and in particular improves the situation for exploration by increasing the budgetary and extra-budgetary mining research and documentation funding available to the MTA research agency, the state-owned Eti Mine Works, Istanbul University, and Istanbul Technical University.[32] Expanded state research funding and easing conditions for private exploration increased the number of explored areas thirteen-fold between 2002 and 2011, with the discovery of 45 tonnes of gold, 4.5 billion tonnes of calcite, 300,000 tonnes of copper, and 40 million tonnes of raw material for the ceramics industry.[33] The MTA in particular increased the efficiency of its work and identified lead, nickel, sodium sulfate, and tin deposits.[34] New iron ore and molybdenum deposits have also been found. In order to safeguard the supply of iron ore, the MTA has expanded its contacts, especially to Kazakhstan.[35] The agency is generally intensifying its international engagement, working with the Japan International Cooperation Agency (JICA) to deepen contact with geologists in Afghanistan, Azerbaijan, Bosnia-Herzegovina, Georgia, Iraq, Kazakhstan, Kyrgyzstan, Moldova, Pakistan, Palestine, Syria, and Uzbekistan. In collaboration with the International Cooperation and Development Agency (TİKA), the MTA is exploring possibilities of joint research with the newly independent Turkic states and Georgia,[36] and has agreed an exchange with South Africa on mining technology and the marketing of mining products, as well as joint projects with South Korea on marine geology.[37] The MTA also expresses great interest in an exchange with Germany.[38]

The mining industry is pushing for further-reaching reforms. Although domestic and foreign companies are basically legal equals today, foreign firms tend to be more concerned about unpredictability of bureaucratic and legal decisions,[39] and mistrustful over transparency and impartiality in the licensing process. One focus of anxiety is the absolute centrality of the General Directorate of Mineral Research and Exploration (MTA) as the final arbiter of resource licensing.[40]

Financing represents another structural weakness of the sector. A specially established mining fund was diverted to other purposes during the crisis of 2001.[41] Turkish banks possess little experience in this sector and have yet to adapt to its needs, and the country has few qualified and certified experts capable of preparing geological reports of the kind required by banks, nor are its mining companies familiar with international reporting systems. Few are registered on the Istanbul Stock Exchange (which has yet to make specific rules for mining companies anyway).[42] On the other hand, the government's new *Industrial Development Strategy*, which replaces an outdated system of incentives for underdeveloped regions with support for particular sectors including mining, is likely to have a positive effect. The new funding guidelines of June 2012 provide a raft of investment stimuli including exemption from sales taxes and customs duties, income tax breaks, and subsidization of social security taxes.[43]

30 Ibid., pp. 21ff. Similar research and planning can be found on chemicals, textiles, and agriculture.
31 Bilim, Sanayi ve Teknoloji Bakanlığı (SvTB; Ministry of Industry and Commerce), ed., *Türkiye Sanayi Stratejisi Belgesi*, http://www.sanayi.gov.tr/Files/Documents/sanayi_stratejisi_belgesi_2011_2014.pdf (accessed August 28, 2012).
32 Kalkınma Bakanlığı (KalkB; Planning Ministry), ed., *2012 Yılı Yatirim Programi*, pp. 27f., 32f., 191, http://www.dpt.gov.tr/PortalDesign/PortalControls/WebicerikGosterim.aspx?Enc=83D5A6FF03C7B4FC5ED2838F4FEDF414 (accessed August 16, 2012).
33 ETKB, ed., *2012 Plan ve Bütce Konusmasi*, p. 12, http://www.enerji.gov.tr/index.php?dil=tr&sf=webpages&b=yayinlar_raporlar&bn=550&hn=&id=3273 (accessed August 18, 2012).
34 ETKB, ed., *2012 Plan ve Bütce Konusmasi* (see note 33), p. 25.
35 Information provided by Abdülkerim Yörükoğlu (see note 12).
36 MTA, http://www.mta.gov.tr/v2.0/birimler/uiab/index.php?id=tika (accessed September 2, 2012).
37 Ibid.
38 Information provided by Abdülkerim Yörükoğlu (see note 12).
39 E&MJ, ed., *Mining in Turkey* (see note 2), pp. 41, 43.
40 Ibid., p. 43.
41 *Ninth Development Plan* (see note 2), p. 108.
42 E&MJ, ed., *Mining in Turkey* (see note 2), p. 65.
43 İstanbul Serbest Muhasebeci Mali Müşavirler Odası

Rare Earth Elements

No coherent strategy for promoting and securing rare earth elements can be discerned to date either. Turkish industry is hardly yet in a position to process and use these metals,[44] so its participation as a third party in the WTO complaint against China by the European Union, the United States, and Mexico over export restrictions imposed on numerous metals must be regarded as a precautionary measure.[45] Turkish reserves of bastnaesite-fluorite-barite and thorium in particular were long regarded as unviable, with thorium discussed exclusively as an alternative fuel for nuclear power.[46] Figures in the exporters' association and the Planning Ministry report, however, that the new development plan will discuss the export importance of rare earth elements in detail.[47] The MTA reports that mining industry applications to explore for rare earth elements have jumped, and plans to step up its own search efforts. In fall 2012 the state-owned Eti Mine Works invited tenders for "the production of oxides of rare earth elements" in the thorium deposits of Sivrihisar in the province of Eskişehir,[48] where it intends to implement a new business model including technology transfer and joint marketing.[49] The authorities in Ankara were largely unaware of reports that U.S.-based Black Sea Metals (formerly Texada Ventures) had gained access to deposits of dysprosium, erbium, gadolinium, lanthanum, neodymium, samarium, and yttrium by taking a 95 percent stake in Ankara-based Anadolu Madencilik. Anadolu Madencilik is also reported to be planning a production facility for heavy rare earth elements in Karasu, in Sakarya province on the Black Sea coast.[50]

Evaluation and Outlook

Turkey does not yet possess a comprehensive and coherent raw materials strategy, but government documents do underline the importance of mining for ameliorating dependency on the export of raw materials. In recent years recycling has attracted increasing attention. Research and development are being expanded to allow technologically advanced products to be produced domestically, in the interests of import substitution. But there is a lack of joined-up planning linking the manufacture of new products with the necessary raw materials and their sourcing from domestic production and/or import.[51] Accordingly there is also no list of raw materials whose production or export is of medium- or long-term strategic importance and whose extraction, processing, or import should be supported by incentives or specific legislation. One reason for this deficit is certainly that to date none of the major business associations (TÜSİAD, MÜSİAD, TUSKON) has embraced mining. Nor do non-energy raw materials play any great role in foreign policy.[52] Turkey participates in none of the transparency initiatives such as EITI. But in particular the Planning Ministry and the MTA research agency have begun to devote greater attention to the national raw materials supply and especially rare earth elements. The mining industry itself is also directing more attention to the issue of rare earth elements, if primarily with the goal of opening up a new source of exports.

(İSMMMO; Chamber of Certified Public Accountants of Istanbul), ed., *Yeni teşvik sistemi 2012* (the new incentive system 2012), http://archive.ismmmo.org.tr/docs/yayinlar/kitaplar/2012/yeni_tesvik_sistemi.pdf (accessed September 10, 2012).

44 Information provided by Ismail Gencay Oguz and M. Kemal Günay, General Directorate of Economic Research and Assessment, Ministry of Economy, Ankara, September 5, 2012.

45 European Union, *China – Measures Related to the Exportation of Various Raw Materials (DS395)*, http://trade.ec.europa.eu/doclib/html/146779.htm (accessed September 27, 2012).

46 Muammer Kaya, *Toryum nükleer yakit dönüsümün perspektifi*, http://www.slidefinder.net/t/toryum_nukleer_yakit_donusumun_perspektifi/200912239494/22812073 (accessed August 8, 2012).

47 Information provided by Engin Yalçın (see note 15) and by Tülay Yikdirim and Anil Altunay, mining coordinators at the Planning Ministry, Ankara, September 5, 2012.

48 Eti Maden, ed., *Ihale Ilanları*, http://www.etimaden.gov.tr/tender.php (accessed September 16, 2012).

49 Information provided by Abdülkerim Yörükoğlu (see note 12).

50 Black Sea Metals, http://www.blackseametals.com/default.aspx?ID1=1 (accessed August 14, 2012), and "Black Sea Metals – Global Player Seltener Erden?" *Ariva.de*, http://www.ariva.de/forum/Black-Sea-Metalls-Global-Player-Seltener-Erden-453568 (accessed August 14, 2012).

51 Information provided by contacts at the Planning Ministry and the Ministry of Economy, and by Erbay Dökmeci, Director of Investor Relations at the Ministry of Energy and Natural Resources, Ankara, September 6, 2012.

52 Numan Hazar, *Turkey in Africa*, Orsam Report 124 (Ankara: Ortadoğu Stratejik Araştırmalar Merkezi [Orsam; Center for Middle Eastern Strategic Studies], July 2012), http://www.orsam.org.tr/en/enUploads/Article/Files/201318_124ingTUM.pdf (accessed February 5, 2013); Gero Erdmann and Olga Herzog, *Die Türkei in Afrika: Im Schatten des Neo-Osmanismus?* GIGA Focus Afrika 1/2012 (Hamburg: GIGA, 2012).

United Kingdom

Anja Dahlmann and Johannes Häußler

The United Kingdom of Great Britain and Northern Ireland (UK)[1] is one of the G20 countries with a comparatively weak extractive sector. Strategies to reduce supply risks focus mainly on resource efficiency and recycling. The country supports free trade and (voluntary) international transparency initiatives, but has not asserted an active role on minerals and metals within the G20.

Minerals in the National Economy

Industrial minerals such as barite, limestone rocks, salt, clay, and fluorite and construction minerals like sand and gravel were particularly important in the British extractive sector in 2009. The value of domestic production amounted to £2,671 million (about €3,313 million) in 2010. The United Kingdom also produced smaller amounts of gold, silver, and aluminum (from imported ore), as well as lead, tin, and tungsten. British production of most minerals is below the world average (2009). The small iron ore production has ceased, and exploration for nickel has been abandoned. The reasons for declining production include high energy costs for production and processing and falling demand in the course of the economic and financial crisis. Because of high energy costs, aluminum production will remain at a relatively low level. British manufacturing is therefore strongly dependent on imports.[2]

With regard to other minerals, however, domestic production could rise again. The British Geological Survey (BGS) believes that the United Kingdom has major deposits of barite, gold, and base metals like tin and tungsten.[3] According to the Department for Environment, Food and Rural Affairs (DEFRA), the Hemerdon Mine in Devon contains the world's fourth largest deposit of tungsten, which is often listed as critical and is currently produced mainly in China. Annual production in Hemerdon could meet British demand with surplus to export, covering 4 percent of global demand.[4]

Domestic and foreign-owned private companies can be found in the British mining sector. One foreign-owned company is Rio Tinto Alcan Ltd., which is headquartered in Canada, but belongs to British Rio Tinto. Castle Cement UK belongs to Heidelberg Cement AG, while Cleveland Potash Ltd. is a subsidiary of Israel Chemicals Ltd.[5]

Mining and processing firms listed on the London Stock Exchange play an important role in international projects. Six of the world's twenty largest mining companies in 2011 were partly or completely British or listed on the London Stock Exchange: Australian-British BHP Billiton, Rio Tinto plc (part of the Rio Tinto Group); formerly South African Anglo American plc; Indian Vedanta Resources; European-Indian ArcelorMittal, and the Kazakh Eurasian Natural Resources.[6]

The Raw Materials Policy

Institutional Setting

The British government considers a secure supply of raw materials an important topic, but regards itself merely as a catalyst for the markets.

UK raw materials policy is decentralized, with England, Northern Ireland, Scotland, and Wales each

1 In the following: "United Kingdom"; "British" as adjective.
2 Alberto Alexander Perez, "United Kingdom [Advance Release]," in USGS, *2009 Minerals Yearbook*, vol. 3, *Area Reports, International* (Reston, June 2011), p. 46.1, http://minerals.usgs.gov/minerals/pubs/country/2009/myb3-2009-uk.pdf (accessed April 22, 2012).
3 British Geological Survey (BGS), *Minerals UK – Mineral Potential UK* (Nottingham, 2012), http://www.bgs.ac.uk/mineralsuk/exploration/potential/home.html (accessed August 21, 2012).
4 Department for Business, Innovation, and Skills (BIS) and Department for Environment, Food and Rural Affairs (DEFRA), *Resource Security Action Plan: Making the Most of Valuable Materials* (London, March 2012), p. 18, http://www.defra.gov.uk/publications/files/pb13719-resource-security-action-plan.pdf (accessed August 21, 2012).
5 Perez, "United Kingdom [Advance Release]" (see note 2), pp. 46.7–46.10.
6 PricewaterhouseCoopers (PwC), *Mine 2011 – The Game Has Changed: Review of Global Trends in the Mining Industry* (n.p., 2011), p. 39, http://www.pwc.com/en_GX/gx/mining/pdf/mine-2011-game-has-changed.pdf (accessed May 28, 2012).

responsible for their own sphere but cooperating with one another and following broadly the same goals.

British raw materials policy, especially in the case of minerals, revolves around DEFRA. Together with the Department for Business, Innovation and Skills (BIS), DEFRA published a *Resource Security Action Plan* outlining the framework for cooperation between government and industry.[7] The Department for Transport (DfT), the Technology Strategy Board (TSB) (via the Small Business Research Initiative, SBRI), and the British Geological Survey (BGS) are also concerned with minerals and metals policy. The BGS, for instance, advises the House of Commons Science and Technology Committee on strategically important metals.[8] During its recent deliberations, the Committee interviewed representatives of government, industry, and science, and concluded that domestic raw materials production had to be supported, urging the government to recognize mineral deposits as strategically important infrastructure.[9] The bipartisan Associate Parliamentary Minerals Group also addresses the topics of raw materials consumption, policy, and regulation and acts as link between parliament and industry.[10] The Parliamentary Office of Science and Technology (POST) also sporadically informs and consults parliament on matters of security of supply.

Like the government, representatives of British industry consider security of supply of metals and minerals to be an important topic, pointing to three major risks: competition, price volatility, and supply risks. These problems are believed to stem from a combination of different factors, such as growing global demand, concentration of supply in certain states, trade barriers, lack of alternative materials, and delays in balancing supply and demand.[11] Supply risks and price volatility already impact the economy today. According to a survey by Ernst & Young, 29 percent of British companies' profit warnings in 2011 were based on rising raw materials prices. The Confederation of British Industry (CBI) and the manufacturers' organization EEF urged the government to address resource risks. In its report, *Made to Last: Creating a Resource Efficient Economy in 2010*, the CBI stressed the importance of resource efficiency and advocated policies that specifically focus on this topic.[12]

Non-governmental organizations lobbying in particular for transparency, environmental protection, and human rights in the mining sector are also important policy actors. The Green Alliance is particularly noteworthy, having headed a working group on resource risks aiming to connect government, business, and other actors more closely with one another.[13] In connection with transparency in revenue flows, the NGO Publish What You Pay (PWYP) is particularly important, urging the government to adopt the transparency rules of the Extractive Industries Transparency Initiative (EITI).[14] The London Mining Network (LMN) is a network of environmental and human rights groups that in 2009 published a report on human rights abuses and environmental degradation by mining companies listed on the London Stock Exchange. LMN calls on the government to monitor more strictly at least whether these companies comply with UK law.[15]

The Material Security Working Group (MSWG), a consortium of various business associations and environmental organizations,[16] urges the government to more strongly support recycling and to formulate raw

7 BIS and DEFRA, *Resource Security Action Plan* (see note 4), p. 23.

8 BGS, *Annual Report 2010–11* (Nottingham, 2012), http://nora.nerc.ac.uk/16702/1/Annual_Report_2010_2011.pdf (accessed August 29, 2012).

9 House of Commons Science and Technology Committee, *Strategically Important Metals: Summary*, May 17, 2011, http://www.publications.parliament.uk/pa/cm201012/cmselect/cmsctech/726/72603.htm (accessed August 29, 2012).

10 "Register of All-Party Groups [as at 13 September 2012], Minerals," *Parliament.uk*, http://www.publications.parliament.uk/pa/cm/cmallparty/register/minerals.htm (accessed September 18, 2012).

11 BIS and DEFRA, *Resource Security Action Plan* (see note 4), p. 5.

12 Confederation of British Industry (CBI), *Made to Last: Creating a Resource Efficient Economy* (London, 2010), http://www.cbi.org.uk/media/1218447/cbi_-_made_to_last_-_creating_a_resource_efficient_economy.pdf (accessed September 4, 2012).

13 BIS and DEFRA, *Resource Security Action Plan* (see note 4), p. 9.

14 Publish What You Pay (PWYP), *Activities United Kingdom*, http://www.publishwhatyoupay.org/where/coalitions/united-kingdom (accessed September 5, 2012).

15 London Mining Network (LMN), *UK-listed Mining Companies and the Case for Stricter Oversight* (February 2012), http://londonminingnetwork.org/docs/lmn-the-case-for-stricter-oversight.pdf (accessed September 4, 2012).

16 Members: ADS, British Glass, British Plastics Federation, Confederation of Paper Industries, the manufacturers' federation EEF, Packaging Federation, UK Steel, Metal Packaging Manufacturers Association, Institute of Environmental Management and Assessment, the environmental organization Friends of the Earth, the Resource Association, Professor Steve Evans (University of Cambridge, Institute of Manufacturing), North East Sustainable Resources Board.

materials policy with a longer time horizon than that of the *Resource Security Action Plan* of 2012. In August 2012, the MSWG proposed establishing an Office of Resource Management to coordinate the commodity policies of the different ministries, criticized the waste of raw materials due to inadequate recycling, and urged the government to take appropriate action.[17]

The United Kingdom is a center for global commodities trading, especially due to the London Metal Exchange (LME). The LME is where more than 80 percent of all non-ferrous metal futures are traded, including contracts for aluminum, aluminum alloys, lead, cobalt, copper, molybdenum, nickel, ferrous steel, zinc, and tin,[18] and sets global prices for these commodities.[19] In June 2012, the LME was taken over by the Hong Kong Stock Exchange (HKSE), allowing its traders greater access to the Chinese market and strengthening the HKSE's position in the commodities business.[20]

The London Bullion Market (LBMA) is an important over-the-counter market for gold and silver, loosely overseen by the Bank of England. Trading takes place between its members, which are mostly major international banks, bullion dealers, or refiners. Twice daily, five member banks negotiate the gold price, which serves as an important reference point for traders worldwide. A similar procedure takes place daily for silver.[21] Prices for platinum and palladium are fixed daily at the over-the-counter London Platinum and Palladium Market (LPPM).

17 EEF, "Government Must Take Stronger Action over Looming Raw Material Shortage," August 20, 2012, http://www.eef.org.uk/releases/uk/2011/GOVT-MUST-TAKE-STRONGER-ACTION-OVER-LOOMING-RAW-MATERIAL-SHORTAGE.htm (accessed August 29, 2012).

18 "Londoner Metallboerse heute (LME)," *Marketmetal.de*, http://www.marketmetal.de/pages/page_421 (accessed May 29, 2012).

19 London Metal Exchange (LME), *A Guide to the LME* (London, 2011), p. 6, http://www.lme.com/downloads/Guide_to_the_LME_V2_WEB.pdf (accessed May 29, 2012).

20 LME, "Board of LME Holdings Limited Recommends GBP1,388 Million Cash Offer (GBP107.60 Per Share) by Hong Kong Exchanges and Clearing Limited Be Proposed to Ordinary Shareholders," London, June 15, 2012, http://www.lme.com/media_resources/13341.asp (accessed September 11, 2012).

21 The City UK, *Commodities Trading*, March 8, 2011, p. 7, http://www.thecityuk.com/assets/Uploads/Commodities-Trading-2011.pdf (accessed May 29, 2012).

Concepts and Strategies

Until recently, the *National Minerals Policy Statement* of 2006 was the central planning document of Britain's raw material policy.[22] It refers exclusively to domestic raw material production and emphasizes the need for an adequate supply of raw materials and environmentally friendly production. But this is a land-use planning document and thus not equivalent to the commodity strategies of certain other G20 countries. With the *Resource Security Action Plan* of 2012, the government has published a document more closely resembling a raw materials strategy.[23] The Action Plan identifies risks relating to security of supply and offers guidance on how to address them.[24] Its central elements are sustainability and resource efficiency, recycling, research on critical raw materials, and analysis of vulnerable sectors.

Security of supply is also part of the British Geological Survey's (BGS) *Five Year Plan* for 2009 to 2014. According to the BGS, connecting British geoscientific institutions more closely with one another and with stakeholders from government, local authorities, the private sector, and universities represents a particular challenge. The aim is to improve the advice given to politics and business and the sustainable use of raw materials.[25]

The BGS has also conducted a study on the supply risks of forty-one raw materials of central importance to the British economy; factors used to classify the risks are availability, location of production and reserves, political stability in producer countries, recycling rate, and the substitution options. In 2012, the supply of antimony, bismuth, molybdenum, tungsten, and rare earths was considered particularly vulnerable. The main producer of the nine most critical raw materials is China. To manage the supply risk, the BGS

22 Department for Communities and Local Government, *Mineral Policy Statement 1: Planning and Minerals* (London, November 2006), http://www.communities.gov.uk/documents/planningandbuilding/pdf/152993.pdf (accessed September 5, 2012).

23 BIS and DEFRA, *Resource Security Action Plan* (see note 4).

24 While the action plan relates primarily to England, it assumes close cooperation between the four parts of the United Kingdom in the areas under discussion, BIS and DEFRA, *Resource Security Action Plan* (see note 4), p. 6.

25 BGS, *BGS Science Strategy 2009–2014* (Nottingham, 2009), http://www.bgs.ac.uk/about/strategy2009-2014.html (accessed August 29, 2012).

recommend promoting recycling and reducing demand.[26]

Apart from the aforementioned studies, a multitude of analyses and reports on the British raw materials situation have been conducted by or on behalf of government ministries. Like the *Resource Security Action Plan*, these focus mainly on the economic importance of raw materials and recycling. For example, in its *Review of the Future Resource Risks Faced by Business and an Assessment of Future Viability*, DEFRA found long-term supply risks in various sectors concerning indium, lithium, phosphorus, and rare earth elements, and recommends that companies should closely monitor developments on the markets and within supply chains and increase their use of recycled materials.[27] In 2010, the Department for Transport and the Department for Business, Innovation and Skills (BIS) took a closer look at the supply and demand for rare earth elements. The authors of the study recommended in particular improving recycling infrastructure, fostering international cooperation in research and development, and increasing transparency in commodities trade.[28]

Policy Measures and Instruments

Domestic Extraction

In England, Wales, and Scotland, energy resources such as coal, oil, and uranium belong to the state, as do silver and gold, while most other mineral resources are privately owned. In Northern Ireland all minerals rights are owned by the state.[29] The law on exploration and exploitation is formulated in the *Minerals Act* of 1971, while the opening of new mines and related exploration activities are also regulated at the local level by the *Town and Country Planning (Minerals) Regulations* of 1971 and the *Town and Country Planning (Minerals) Act* of 1981. Prime responsibility for mining activities lies with local land-use planning authorities (Mineral Planning Authorities, MPA), which are coordinated and overseen at the national level by the Department for Communities and Local Government (DCLG). In England, the county councils serve as MPAs.

Mineral Planning Authorities (MPAs) are responsible for planning and licensing mining projects, including land-use planning and oversight of exploration and extraction activities. Furthermore, the MPAs are responsible for extending exploration projects, which are usually limited to six months (in England).[30] Since 2004, MPAs have been required to prepare a Minerals and Waste Development Framework (MWDF), setting goals for raw materials supply and waste disposal. In order to coordinate the raw materials policies in England, the DCLG published the *National Planning Policy Framework* in 2012.[31] This core document replaces multiple earlier planning documents.[32] Similar provisions apply in Scotland, Wales, and Northern Ireland.[33]

Domestic resource extraction in the United Kingdom has been in decline for several years. This could change, however, as rising global demand for raw materials and corresponding price increases make extraction of certain raw materials profitable once again. The British Geological Survey (BGS) is therefore working on a project to study local raw material deposits, focusing in particular on rare earths in northwestern Scotland.[34] The BGS supports the

26 BGS, *Risk List 2012* (Nottingham, 2012), http://www.bgs.ac.uk/mineralsuk/statistics/riskList.html (accessed September 29, 2012).

27 DEFRA, *Review of the Future Resource Risks Faced by Business and an Assessment of Future Viability – EV0458* (London, 2010), http://randd.defra.gov.uk/Default.aspx?Menu=Menu&Module=More&Location=None&ProjectID=17161&FromSearch=Y&Publisher=1&SearchText=EV0458&SortString=ProjectCode&SortOrder=Asc&Paging=10#Description (accessed August 29, 2012); DEFRA, *A Review of National Resource Strategies and Research* (London, March 2012), pp. 71–72, http://www.defra.gov.uk/publications/files/pb13722-national-resource-strategies-review.pdf (accessed August 29, 2012).

28 Oakdene Hollins – Research and Consulting, *Metals and Mining* (Aylesbury), http://www.oakdenehollins.co.uk/metals-mining.php (accessed August 29, 2012); DEFRA, *A Review of National Resource Strategies and Research* (see note 27), pp. 72–73, http://www.defra.gov.uk/publications/files/pb13722-national-resource-strategies-review.pdf (accessed August 29, 2012).

29 Minerals UK, *United Kingdom Mineral Statistics*, http://www.bgs ac.uk/mineralsuk/statistics/UKStatistics.html (accessed May 1, 2012).

30 Minerals UK, *Legislation and Policy* (Nottingham 2012), http://www.bgs.ac.uk/mineralsuk/planning/legislation/home.html (accessed February 2, 2013).

31 Department for Communities and Local Government, *National Planning Policy Framework* (London, March 2012), http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf (accessed 1 September 2, 2012); formerly Planning Policy Statements or Planning Policy Guidance Notes.

32 For example, *Minerals Policy Statement 1 and 2, and the Mineral Planning Guidance Notes*.

33 BGS, *Minerals UK – Legislation and Policy* (see note 30).

34 BGS, *Annual Report 2010–11* (see note 8), p. 14.

management of local raw materials through a series of documents such as *Minerals Safeguarding in England: Good Practice Advice*[35] and the website "Planning 4 Minerals,"[36] which offers an interactive introductory course on regional planning for local government officers.

Marine Resources

In 1997, the United Kingdom ratified the United Nations Convention on the Law of the Sea (UNCLOS) and is a member of the International Seabed Authority (ISA). In July 2012, UK Seabed Resources Ltd. was awarded an exploration license for manganese nodules in the Pacific Ocean.[37]

Sand, gravel, and salt are extracted in British coastal waters, in particular off southern and eastern England. According to DEFRA, eleven companies were involved in the extraction of British marine minerals in 2008, producing 19.3 million tonnes of construction materials. The achieved turnover amounted to £116 million, the gross value to £54 million.[38] The British Marine Aggregate Producers Association (BMAPA) is responsible for documenting these activities, while the Aggregate Levy Sustainability Fund monitors and analyses their environmental impact. The volume of reserves would suggest that extraction of these seabed minerals on the sea floor will continue. No other minerals or metals are extracted from the seabed.

Resource Efficiency, Recycling, Development of Substitutes

In 2010/2011, 40 percent of English household waste was recycled, representing a significant increase over the figure for 2000/2001 (11 percent). The British government aims to increase the recycling rate to 50 percent by 2020, with availability of minerals and metals for industry also in mind. This goal has already been reached for industrial waste, of which 52 percent was recycled in 2009.[39]

The Government Review of Waste Policy in England documents existing action, obstacles, and future steps for recycling and improving resource efficiency.[40] Under the *Resource Security Action Plan*, numerous projects are in planning or have already been implemented. Five of seven key measures in the Action Plan concern waste management and recycling. Thus, DEFRA's *Innovation Challenge Fund* will collaborate with the *Small Business Research Initiative* to support research and development in 2012 and 2013. The deadline for proposals and applications expired on 18 September 2012. Furthermore, producer liability is to be increased and overseen by the Department for Business, Innovation and Skills (BIS). Under BIS leadership, resource processing companies are to be kept better informed about recycling capabilities regarding electronic equipment in order to increase the availability of recycled materials. A network of the Environmental Sustainability Knowledge Transfer Network, the BGS, the BIS, and DEFRA's *Waste and Resource Action Programme* (WRAP) will inform the business sector on critical raw materials. In addition, WRAP will conduct a material flow analysis for critical raw materials and evaluate recycling opportunities.

The central government also wants to support the authorities of the four countries in the fight against the illegal trade in waste and scrap, and encourage the exchange of information between ministries. The British government's focus on recycling and resource efficiency was confirmed at a workshop at the British Embassy in Berlin, led by the Royal Society of Chemistry, the UK Science and Innovation Network, and Security Special Interest Group, where participants emphasized that good cooperation between politics, science, and business will determine the success of measures taken.[41]

35 BGS, *Mineral Safeguarding in England: Good Practice Advice*, Minerals and Waste Programme, Open Report OR/11/046 (Nottingham, 2011), http://www.bgs.ac.uk/mineralsuk/planning/legislation/home.html#safeguarding (accessed September 3, 2012).

36 BGS, *Planning 4 Minerals*, http://www.bgs.ac.uk/Planning4Minerals/ (accessed September 3, 2012).

37 International Seabed Authority – Council, *Decision of the Council Relating to a Request for Approval of a Plan of Work for Exploration for Polymetallic Nodules Submitted by UK Seabed Resources Ltd.* (Kingston, Jamaica, July 26, 2012), http://www.isa.org.jm/files/documents/EN/18Sess/Council/ISBA-18C-27.pdf (accessed September 11, 2012).

38 DEFRA, *Charting Progress 2 – Productive Seas: Mineral Extraction* (London, July 21, 2010), http://chartingprogress.defra.gov.uk/mineral-extraction (accessed September 2, 2012).

39 DEFRA, *Government Review of Waste Policy in England 2011* (London, March 27, 2012), pp. 6, 23, 28, http://www.defra.gov.uk/publications/files/pb13540-waste-policy-review110614.pdf (accessed May 29, 2012).

40 Ibid.

41 Royal Society of Chemistry, *Resources that Don't Cost the Earth* (Berlin, 2011), p. 11, http://www.rsc.org/images/Resources-that-dont-cost-the-earth_tcm18-223030.pdf (accessed December 15, 2012).

Stockpiling

From 1983 to 1996, the British government held a reserve of strategic minerals, in order to secure supply for at least three months in case of interruption. The concept of "strategic minerals" takes into account both the economic and military importance of each material.[42] Today, the government rejects national or European stockpiling, preferring to advocate free markets and the lowering of trade barriers.[43]

Trade Policy and Support for British Companies in their International Business

Although it does not outline trade measures specifically targeted at raw materials, the *Resource Security Action Plan* emphasizes the government's support for free trade and rejection of trade restrictions. Accordingly, the country participated in the formulation of the EU strategy for commodities trading.

The government does not strongly promote the activities of British mining companies abroad. Although the Export Credits Guarantee Department of the UK export finance agency, UK Trade and Investment, offers Overseas Investment Insurance, there are no special programs tailored to mining companies. UK Trade and Investment provides a platform for the international tendering of resource projects.

Development Initiatives

The Department for International Development believes the mining sector in developing countries to be an important socio-economic factor and an integral part of sustainable development.[44] It supports various projects designed to strengthen government institutions involved in raw materials policy, for example in Sierra Leone and Afghanistan. In the Democratic Republic of Congo, British development cooperation focuses especially on strengthening the legal mining sector.

42 D. E. Highley, G. R. Chapman, and K. A. Bonel, *The Economic Importance of Minerals to the UK* (Nottingham: British Geological Survey, 2004), p. 15, http://www.bgs.ac.uk/downloads/start.cfm?id=1301 (accessed May 1, 2012).

43 Pratima Desai and Silvia Antonioli, "Government Says Critical Material Stockpiles Undesirable," *Reuters*, September 14, 2012, http://uk.reuters.com/article/2011/09/14/uk-britain-criticalmaterials-idUKTRE78D2JY20110914 (accessed September 11, 2012).

44 Department for International Development (DFID), *Growth*, October 3, 2011, http://www.dfid.gov.uk/What-we-do/Key-Issues/Economic-growth-and-the-private-sector/Growth/ (accessed September 11, 2012).

Transparency

The United Kingdom initiated EITI and supports it financially. After the British parliament called for full membership,[45] the government seems to be following that path. In late 2011 the government strongly opposed the application of EITI rules on its own extractive sector, arguing that membership is not necessary given the United Kingdom's marginal mineral resources. Joseph Williams, Senior Advocacy and Communications Officer at Publish What You Pay, however, believed the real reason to be the country's position as the European Union's largest oil producer and second-largest gas producer.[46]

In an about-face, British Prime Minister David Cameron in January 2013 urged the G8 member states to follow EITI rules and stated that the United Kingdom would re-evaluate its attitude towards the organization. This change of mind comes with the British G8 presidency in 2013, which aims to foster global transparency and accountability.[47]

The United Kingdom takes an ambivalent position on the European Commission's proposals for transparency and accounting directives.[48] While the government broadly supports the proposals, it calls for a higher disclosure threshold for payments (€500,000 rather than €25,000) and opposes project-by-project reporting.[49] The British branch of the International

45 House of Commons, ed., *Tax in Developing Countries: Increasing Resources for Development – Conclusions and Recommendations*, (London, August 8, 2012), www.publications.parliament.uk/pa/cm201213/cmselect/cmintdev/130/13008.htm (accessed September 3, 2012).

46 Sean O'Hare, "UK Refuses to Sign up to Oil, Mining and Gas Transparency Initiative," *Telegraph*, September 21, 2012, http://www.telegraph.co.uk/finance/personalfinance/offshorefinance/8779905/UK-refuses-to-sign-up-to-oil-mining-and-gas-transparency-initiative.html# (accessed September 3, 2012).

47 David Cameron, *Announcement: Prime Minister's Letter to G8 Leaders* (London, January 2, 2013), https://www.gov.uk/government/news/prime-ministers-letter-to-g8-leaders (accessed February 7, 2013); Publish What You Pay, *PWYP UK Letter to David Cameron* (London, January 24, 2013), http://www.publishwhatyoupay.org/resources/pwyp-uk-letter-david-cameron-january-2013 (accessed February 7, 2013).

48 COM[2011]683 on revising transparency directive 2004/109/EC, and COM[2011]684 on revising the former accounting directives 78/660/EEC and 83/349/EEC; see also "European Union" in this volume, pp. 59ff.

49 Benjamin Fox, "David Cameron Must Force Extractive Companies to Be Transparent," *guardian.uk*, July 26, 2012, http://www.guardian.co.uk/commentisfree/2012/jul/26/david-cameron-extractive-companies-transparent (accessed September 3, 2012).

Chamber of Commerce also supports the two proposals, while opposing project-by-project reporting, pointing to high implementation costs for companies.[50] British government and industry thus hold the same position as their German counterparts.[51]

With regard to due diligence in raw material supply chains, the United Kingdom welcomes the transparency rules of the *U.S. Dodd-Frank Act* (Section 1502)[52], but in general prefers voluntary transparency initiatives that seek to curtailing the trade in so-called conflict minerals from the DR Congo and neighboring countries.[53] The United Kingdom supports the OECD Working Group on Bribery in International Business Transactions, the OECD Guidelines for Multinational Enterprises, the Kimberley Process, the UN Convention against Corruption, and the UN Global Compact, and heads a G20 working group on raw materials. In 2000, the United Kingdom and the United States compiled the *Voluntary Principles on Security and Human Rights*, whose participants – the UK and the U.S. governments, companies in the extractive and energy sectors, and non-governmental organizations – commit to respect and promote human rights in mining.[54] At the national level, the UK Bribery Act, which makes bribery in British business illegal at home and abroad, also contributes to transparency in commodity trading.

International Raw Materials Governance

The United Kingdom is a member of the Nickel Study Group and is represented by the EU in the Copper Study Group and the Study Group for Lead and Zinc. It is also involved in the Common Fund for Commodities (CFC) and is a founding member of the Intergovernmental Forum on Mining, Minerals, Metals, and Sustainable Development. A British network within the United Nations Global Compact acts as a contact and coordination point for signatory companies.

50 International Chamber of Commerce UK, "EU Transparency Directive" (London, April 26, 2012), http://www.international-chamber.co.uk/blog/2012/04/26/eu-transparency-directive/ (accessed September 4, 2012).
51 See also "Germany" in this volume, pp. 73ff.
52 Foreign and Commonwealth Office (FCO), "Introduction to Conflict Minerals," 2012, http://www.fco.gov.uk/en/global-issues/conflict-minerals/intro-to-conflict-minerals/ (accessed September 3, 2012).
53 See also "United States" in this volume,pp. 150ff.
54 Governments of the United States of America and the United Kingdom, *Voluntary Principles on Security and Human Rights*, December 4, 2000, http://www.fco.gov.uk/resources/en/pdf/pdf7/fco_voluntaryprinciples (accessed September 27, 2012).

The *Resource Security Action Plan* stresses that the United Kingdom supports EU raw materials projects, notably the *Raw Materials Initiative*, and their consequences, for instance the European Union's WTO complaint against China's export restrictions on certain minerals.

Business Initiatives

One key measure of the *Resource Security Action Plan* is the creation of a new consortium led by the British industry and convened by Green Alliance, which brings together interested companies to strengthen cooperation between government and the business sector, discuss problems and opportunities, and promote innovation.

Evaluation and Outlook

The *Resource Security Action Plan* underlines the growing importance of raw materials security in British politics. It constitutes the first document to bundle measures fostering raw materials security. The driving force is the British industry, but the number of other interested parties such as think-tanks and research institutes is increasing steadily.

Overall, the leading UK decision-makers focus on national action to address supply risks. Strengthening recycling and resource efficiency is the preferred route. Increasingly, domestic resource extraction attracts the attention of politics and economy. The United Kingdom's own approaches regarding international collaboration outside the EU framework (e.g. via raw materials partnerships) mainly aim at promoting a transparent raw materials sector. Britain's new attitude to EITI membership gives this aspect greater importance. While the government and industry representatives broadly support these initiatives, they favor voluntary arrangements over legally binding regimes.

United States

Stormy-Annika Mildner and Julia Howald

The United States of America has large reserves of many minerals and metals and is one of the world's largest raw materials producers, but still depends on imports. This is partly because it is also one of the largest consumers and partly because domestic production of certain raw materials (including rare earths) was unprofitable for many years and now requires time to restart. Washington's raw materials policy currently focuses on the supply of critical and strategic raw materials for the "green tech" and defense sectors by encouraging domestic production and research into recycling, substitution, and resource efficiency. The United States is open to international cooperation in many fields of raw materials policy, for example trade policy. With respect to improving transparency, it has already taken a leading role internationally.

Minerals in the National Economy

The United States is among the leading producers of numerous minerals and metals. A share of 5.2 percent of world production of non-energy raw materials (by weight) puts it among the G20 members with strong raw materials production. In 2010, the United States was the world's largest producer of bentonite (28.7 percent of world production), diatomite (34.7 percent), kaolin (19.7 percent), and sulfur (16.3 percent). It was also the second-largest producer of boron minerals (30.1 percent), molybdenum (22.4 percent), perlite (26.3 percent), phosphate (16.6 percent), salt (14.6 percent), and vermiculite (21.1 percent).[1]

One of the major U.S. mining companies, operating at home and globally, is the integrated aluminum producer Alcoa. Alcoa is a world leader in mining of bauxite and its processing into alumina and then aluminum. Other noteworthy operators include the leading copper miner Freeport-McMoRan, gold producer Newmont, iron and steel companies Cliffs and U.S. Steel, and the potash and phosphate producer Mosaic.

While the United States was not a major producer of rare earths during the past decade, that could soon change. With almost 12 percent of global reserves of rare earths located in the United States, the only country with larger reserves (as of 2011) is China. In 1990, the United States still accounted for one third of global rare earth production, in particular from the Mountain Pass Mine in California. But a global price collapse, high labor costs, and strict environmental laws made domestic production unprofitable and imports from China grew. Today, however, the situation has changed, with the owner, Molycorp Inc., reopening the mine in February 2012. The area around the mine holds the bulk of the country's estimated 13 million tonnes of rare earths.[2] The principal elements extracted here are cerium, lanthanum, neodymium, and praseodymium, and in smaller quantities heavy rare earths such as dysprosium, europium, terbium, and yttrium.[3]

Despite relatively large raw material reserves, the mining sector makes only a minor contribution to GDP and employment. In 2011, its share of GDP was 1.9 percent (2010: 1.6 percent).[4] The non-energy minerals and metals component of total U.S. exports (by value) was 3.8 percent in 2010 and therefore also of minor importance. In 2010, 122,000 persons were employed in the mining industry, compared to 166,000 in 1990. The states with the largest mining production (2010) were Nevada (13.2 percent of

1 Österreichisches Bundesministerium für Wirtschaft, Familie und Jugend (BMWFJ), *World Mining Data 2012* (Vienna, 2012), http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed February 27, 2013).

2 USGS, *Rare Earth Elements in U.S. Not So Rare – Significant Deposits Found in 14 States*, November 17, 2010, http://www.usgs.gov/newsroom/article.asp?ID=2642#.T8PTGdV1CSo (accessed May 28, 2012); Daniel J. Cordier, "Rare Earths," in USGS, *Mineral Commodity Summaries* (Reston, 2012), http://minerals.usgs.gov/minerals/pubs/commodity/rare_earths/mcs-2012-raree.pdf (accessed May 9, 2012).

3 Molycorp, *Current and Future Production*, http://www.molycorp.com/Technology/CurrentFutureProduction.aspx (accessed May 28, 2012).

4 U.S. Bureau of Economic Analysis (BEA), *Durable-Goods Manufacturing Led Growth in 2011 – Advance GDP Industry Statistics for 2011*, April 24, 2012, http://www.bea.gov/newsreleases/industry/gdpindustry/2012/pdf/gdpind11_adv.pdf (accessed May 3, 2012), p. 7.

national production), Arizona (11.7 percent), Utah (7.7 percent), Minnesota (6.8 percent), and Alaska (5.7 percent).[5]

Because of its great demand, the U.S. economy remains dependent on imports. In 2010, the United States was the second-largest consumer of aluminum (10.7 percent of global consumption), copper (9.0 percent), lead (15.1 percent), steel (6.2 percent), and zinc (7.3 percent), and the third-largest consumer of nickel (10.2 percent) and tin (9.6 percent).[6] In 2011, the United States had a net import quota of 100 percent for nineteen raw materials (including arsenic, bauxite, fluorspar, indium, niobium, and the rare earths group). It also sources many of its metals from just a few countries, especially China.[7] For example, in 2011, 79 percent of U.S. rare earth imports came from China.[8]

In December 2010, the U.S. Department of Energy (DOE) published a report identifying critical metals in the "green tech" sector (technologies for renewable energy, e-mobility, etc.),[9] which it updated in December 2011.[10] Critical materials are those which are of great relevance for the sector and subject to considerable supply risks. The report names the rare earth elements dysprosium, europium, neodymium, terbium, and yttrium as critical in the short and medium term.

Materials required for defense applications have also been subjected to a criticality analysis. In the context of the defense industry, the government calls critical materials "strategic." In March 2012, the U.S. Department of Defense (DOD) published a report identifying seven of the seventeen rare earth elements – dysprosium, erbium, europium, gadolinium, neodymium, praseodymium, and yttrium – as strategic for the U.S. defense industry. According to the DOD's projections, however, domestic production of these metals is increasing, and it is anticipated that by 2013 the defense industry's demand could be satisfied from domestic sources (except in the case of yttrium).[11]

The Raw Materials Policy

Institutional Setting

The federal government and the states share responsibility for raw materials policy. The administration of land and resources resides with the U.S. Department of the Interior (DOI) and is executed by the Bureau of Land Management (BLM), the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEM), and the Office of Surface Mining Reclamation and Enforcement (OSMRE).[12] The U.S. Geological Survey (USGS), a scientific agency of the DOI, collects and manages raw materials data. The Department of Energy (DOE) deals with minerals and metals required in renewable energy technologies.[13] The most important agencies of the DOE in this respect are the Energy Information Agency (EIA), the Office of Science, the Office of Energy Efficiency and Renewable Energy (EERE), and the Advanced Research Projects Agency – Energy (ARPA-E). The Office of the United States Trade Representative (USTR) is responsible for foreign trade policy and thus also for matters concerning raw materials trade. The U.S. State Department is responsible for international aspects of raw materials policy. For example, it works through government-to-government diplomacy to end the use of "conflict" minerals that fund armed violence in the Democratic Republic of the Congo and elsewhere.[14] In this matter, it works hand in hand with the United States Agency for International Development (USAID), the federal agency primarily responsible for administering foreign aid. Since March 2010, the Office of Science and Technology Policy (OSTP), in close coordination with the National

5 U.S. Census, *Statistical Abstract, Forestry, Fishing, and Mining: Mining, Mineral Industries,* 2012, Table 901, 902 und 907, http://www.census.gov/compendia/statab/2012/tables/12s0907.pdf (accessed May 9, 2012).
6 BGR and DERA, *Deutschland – Rohstoffsituation 2010*, DERA Rohstoffinformationen (Hannover, December 2011), http://www.bgr.bund.de/DE/Gemeinsames/Produkte/Downloads/DERA_Rohstoffinformationen/rohstoffinformationen-07.pdf (accessed October 10, 2012).
7 National Mining Association (NMA), *U.S. Mineral Material Ranked by Net Import Reliance – 2011*, April 2012, http://www.nma.org/pdf/m_reliance.pdf (May 28, 2012).
8 Cordier, "Rare Earths" (see note 2).
9 Department of Energy (DOE), *Critical Materials Strategy*, December 2010, http://energy.gov/sites/prod/files/piprod/documents/cms_dec_17_full_web.pdf (accessed May 3, 2012).
10 DOE, *Critical Materials Strategy*, December 2011, http://energy.gov/sites/prod/files/DOE_CMS2011_FINAL_Full.pdf (accessed May 3, 2012), p. 3.
11 Department of Defense (DOD), *Report to Congress: Rare Earths Materials in Defense Applications*, 2012, http://www.hsdl.org/?view&did=704803 (accessed July 30, 2012).
12 Department of the Interior (DOI), *Strategic Plan for Fiscal Years 2011–2016*, http://www.usgs.gov/budget/docs/DOI_StrategicPlan_FY11-16.pdf (accessed July 12, 2012), pp. 5f.
13 DOE, *Critical Materials Strategy*, 2011 (see note 10), p. 100.
14 State Department, "Conflict Minerals," http://www.state.gov/e/eb/tfs/tfc/minerals/index.htm (accessed February 27, 2013).

Economic Council (NEC), the USTR, and the National Security Council (NSC), has been convening an interagency working group to improve coordination between the different departments and to develop the necessary understanding of the critical materials situation.[15]

Congress holds the legislative power over the mining sector through legislation. Congress also partakes in the decision which raw materials are to be stockpiled for strategic purposes and can influence the mining sector through the allocation of funds (for example for research and development). Various House of Representatives and Senate committees are responsible for raw materials issues, including those for natural resources, energy, trade, research, technology, and defense.

Two industry associations are particularly noteworthy with regard to raw materials policy: the National Electrical Manufacturers Association (NEMA) and the National Association of Manufacturers (NAM). The mining industry is represented in Washington by the National Mining Association (NMA). The U.S. Chamber of Commerce, unlike its German counterpart, does not specifically address raw materials issues, illustrating the point that U.S. industry is still not too concerned about its raw materials supply. A number of NGOs, such as Enough, Resolve, and Global Witness, raise specific issues especially concerning transparency in financial flows and supply chains in the mining sector.

Concepts and Strategies

Security of supply of minerals and metals has played an important role in the country's defense policy for decades. The *Strategic and Critical Materials Stockpiling Act of 1939* established a national stockpiling system for the defense industry, and the *Defense Production Act* of 1950 sought to increase the capacity of the defense industry and improve the supply of strategic raw materials at the beginning of the Korean War.

15 John P. Holdren, *Statement of Dr. John P. Holdren, Director, Office of Science and Technology Policy, Executive Office of the President of the United States, to the Subcommittee on Investigations and Oversight, Committee on Science, Space and Technology, on the Administration Perspective on a National Critical Minerals Strategy*, June 14, 2011, http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/061411_Holdren.pdf (accessed July 12, 2012).

While the topic fell off the radar during the 1990s due to low world market prices, recent price hikes and great dependency on imports (especially from China) of many critical metals used in the high-tech and defense industries have created a new awareness of the problem. It was China's unexplained rare earth export embargo against Japan that painfully demonstrated the vulnerability of an import-dependent economy.[16] China's export restrictions on various raw materials are a particular concern of the United States, in terms not only of supply risk but also competitive disadvantage. By protecting its manufacturing sector through low domestic raw material prices, China gives its domestic producers a competitive edge vis-à-vis U.S. producers. In general, the United States views the country's unfair trade policies as an important reason for its large trade deficit with China. In 2011, the trade deficit with China accounted for about 40 percent of the United States' entire US$738 billion trade deficit in goods.[17] New strategic moves on raw materials must also be seen in the context of President Barack Obama's climate and energy policy, which seeks to substantially increase the share of renewable energy.[18]

Despite this new awareness, only the DOE has so far published a raw materials strategy, the *Critical Materials Strategy* (2010).[19] It aims to secure the production of renewable energy by safeguarding supplies of the raw materials required for the relevant technologies: permanent magnets used in wind turbines and electric cars, batteries in electric cars, phosphorescent materials in energy-efficient lamps, and thin-film semiconductors in photovoltaic cells. In order to reduce supply risks, (1) global supply chains are to be diversified, (2) alternative materials and technologies are to be developed, and (3) increased recycling and more efficient use of raw materials are to significantly reduce global demand. The following elements of a raw materials policy are put forward: research and development; collection of data on production and con-

16 See also "Japan," pp. 98ff., and "China," pp. 51ff., in this volume.

17 U.S. Census, *U.S. Trade in Goods and Services – Balance of Payments (BOP) Basis*, June 2012, http://www.census.gov/foreign-trade/statistics/historical/gands.pdf (accessed October 10, 2012); U.S. Census, *Trade in Goods with China*, http://www.census.gov/foreign-trade/balance/c5700.html (accessed October 10, 2012).

18 Discussion with representatives of the DOE, October 3, 2012.

19 DOE, *Critical Materials Strategy*, 2010 and 2011 (see notes 9 and 10).

sumption, trading prices, material intensity, and substitutability; accelerated approval of mining claims and increased financial support for domestic mining projects; improved education and training for the mining sector; and cooperation with countries facing similar challenges, for example on research and development, data collection, and enforcement of international trade rules. Additionally, the report on critical minerals and metals is to be updated regularly. The *Critical Materials Strategy* of 2011 upholds the three core objectives listed above.

The DOD has not yet published an official strategy on raw materials but picked up the conclusions of a 2010 report by the Government Accountability Office (GAO), *Rare Earth Materials in the Defense Supply Chain*, in early 2012. The GAO report concluded that the lack of domestic production had put the country in a dangerous position of dependency.[20] The DOD *Report to Congress: Rare Earth Materials in Defense Applications* thus includes, apart from the criticality analysis mentioned above, certain strategic considerations. The DOD recommends a three-pronged approach: (1) diversify suppliers, (2) develop substitutes, and (3) improve the recycling of rare earth elements.[21]

Measures and Instruments

Mining Law and Domestic Raw Material Production

Mining law in the United States is based on a multitude of laws and regulations. Mineral deposits on and below public lands are administered by the federal government on behalf of the people, and thus – strictly speaking – belong to the people rather than the government.[22] *The Federal Land Policy and Management Act (FLPMA) of 1976, as amended* charges the Bureau of Land Management (BLM) with the administration of public lands and their resources.[23] Deposits on private land usually belong to the landowner, although in the case of "split estate" surface and subsurface have different owners. In this case, the landowner (i.e. the owner of the surface) has no direct claim to any raw material reserves beneath his or her land.[24] The "split estate" phenomenon dates back to the settlement of the western United States. Initially the federal government granted settlers ownership of mineral rights together with the land. As the settlement process extended into western areas rich in gold, coal, and oil reserves, the federal government began to fear the concentration of reserves in the hands of a few, with negative (price) consequences for industry. At the same time, demand for cattle pasture was strong. In order to reconcile these competing interests, Congress passed a number of laws, such as the *Agricultural Entry Act of 1914*, to enable "split estate."[25]

Mineral reserves on public lands are divided into three categories: locatable, leasable, and salable. Locatable minerals, including various metals (such as copper, gold, lead, nickel, and zinc) and nonmetals (such as fluorspar), are regulated under the *General Mining Law of 1872, as amended*, which allows U.S. citizens to search for raw materials on designated public lands in nineteen different states[26] and to claim possessory rights to the minerals found ("stake a claim"). Exploration projects entailing significant disturbance ("surface disturbance greater than casual use"; casual use activities are those that cause only negligible disturbance of public lands and resources) must be registered in advance with the BLM. Claims must be renewed regularly.[27]

To extract locatable minerals, a mining permit or patent must be obtained. A mining patent gives the applicant the exclusive title to the locatable minerals, and in most cases, also grants the title to the surface. Since 1994, when a moratorium was imposed on new patent applications, mining permits have become more common. The application process for mining

20 Government Accountability Office (GAO), *Rare Earth Materials in the Defense Supply Chain*, GAO-10-617R, 2010, http://www.gao.gov/new.items/d10617r.pdf (accessed July 30, 2012), pp. 14–16.
21 DOD, *Report to Congress: Rare Earths Materials in Defense Applications*, 2012, http://www.hsdl.org/?view&did=704803 (accessed May 23, 2012), pp. 4f.
22 Discussions with representatives of the BLM and the USGS, October 2 and 3, 2012.
23 Bureau of Land Management (BLM), *Mining Claims and Sites on Federal Lands*, 2011, http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/energy.Par.28664.File.dat/MiningClaims.pdf (accessed July 12, 2012), i.
24 BLM, *Split Estate*, http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/split_estate.print.html (accessed August 29, 2012).
25 Timothy Fitzgerald, *The Role of Split Estate in Environmental Performance of Coalbed Methane Development*, working paper (University of Maryland, 2010), http://www.montana.edu/timfitz/Water.pdf (accessed November 12, 2012).
26 These are Alaska, Alabama, Arizona, Arkansas, California, Colorado, Florida, Idaho, Mississippi, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming.
27 BLM, *Mining Claims and Sites on Federal Lands*, 2011 (see note 23), 27ff.

permits is very complex and time-consuming due to the need to satisfy numerous laws and application procedures at both federal and state level.

Apart from the *General Mining Law of 1827, as amended*, states may enact their own mining and environmental laws. States laws must comply with federal law, but they may set their own rules governing the location and recording of mining claims and sites as long as they are consistent with federal law. Although several states have negotiated agreements with federal agencies to avoid duplication of administrative efforts,[28] it still takes ten years on average (and six years minimum) for a mining permit to be awarded.[29] Royalties are not collected.

Leasable minerals are regulated under the *Mineral Leasing Act of 1920*, the *Mineral Leasing Act for Acquired Lands of 1947*, and the *Geothermal Steam Act of 1970*, as respectively amended. A lease is necessary for extracting oil, natural gas, geothermal resources and associated by-products, other oil-bearing materials (such as oil sands and oil shale), coal, and certain non-energy mineral resources such as phosphates, sodium, and potassium.[30]

Finally, the *Materials Act of 1947, as amended*, regulates salable minerals such as sand, gravel, stone, and pumice,[31] allowing the BLM to sell these at fair market prices or grant government agencies (and on a small scale also non-profit organizations) a free-use permit.[32]

Whether domestic production can be increased, as recommended in the DOE strategy, is questionable. The time-consuming and expensive licensing process is not the only obstacle. Since newly identified reserves are often located in remote areas where infrastructure is lacking and finding skilled staff is difficult, their development often requires high upfront investment. Mining projects also often face the opposition of local communities due to environmental concerns or conflicting land uses such as housing.[33] Mining has an especially bad reputation in the United States, not least because of the disastrous environmental harm caused by open-cast coal mining, for example in West Virginia. It is thus no surprise that the individual states rank rather low in the Fraser Institute's Policy Potential Index of attractiveness for mining investment.[34]

So far, the United States has shown no interest in deep sea mining of non-energy minerals, in contrast to its interest in offshore gas and oil. One reason could be that the United States still has not ratified the *United Nations Convention on the Law of the Sea* (UNCLOS).

Congress has devoted great attention to the issue of domestic raw materials production in recent years and discussed numerous legislative proposals. Most bills introduced since 2011 focused on rare earths. Those that were not adopted during the 112th Congress, however, died with the end of the legislative period.

Regulation of Foreign Direct Investment

The *Foreign Investment and National Security Act of 2007* (FINSA) allows the President to prohibit a foreign direct investment into the United States if he or she is advised by the Committee on Foreign Investment in the United States (CFIUS) that national security would be threatened. A CFIUS review is compulsory where an acquisition concerns critical infrastructure. Potential effects on critical technologies (especially those crucial to the defense sector such as strategic raw materials) must be taken into consideration. Thus, for example, FINSA applies where a foreign investor plans to purchase a mining company producing strategic raw materials. In 2009, a Chinese company planned to purchase the U.S. gold miner Firstgold Corporation, but the sale was stopped by CFIUS.[35]

28 BLM, *Mining Claims and Sites on Federal Lands*, 2011 (see note 23), pp. 1, 23f.
29 DOE, *Critical Materials Strategy*, 2010 (see note 9), p. 104. And discussions with representatives of the BLM and the USGS, October 2 and 3, 2012.
30 BLM, *Leasable Minerals*, 2009, http://www.blm.gov/nv/st/en/fo/ely_field_office/blm_programs/minerals/leasable_minerals0.html (accessed July 31, 2012).
31 BLM, *Mining Claims and Sites on Federal Lands*, 2011 (see note 23), p. 1.
32 BLM, *Mineral Material Sales*, 2008, http://www.blm.gov/nv/st/en/fo/carson_city_field/blm_programs/more_-_other_management/mineral_material_sales.html (accessed July 31, 2012).
33 PwC, *Mining in the Americas*, 2012, pp. 19f., http://www.pwc.com/en_CA/ca/mining/publications/pwc-mining-in-the-americas-2012-03-en.pdf (accessed September 5, 2012).
34 Fred McMahon and Miguel Cervantes, *Survey of Mining Companies 2011/2012*, Fraser Institute, February 2012, p. 11, http://www.fraserinstitute.org/uploadedFiles/fraser-ca/Content/research-news/research/publications/mining-survey-2011-2012.pdf (accessed May 26, 2012).
35 Matthew C. Sullivan, "Mining for Meaning: Assessing CFIUS's Rejection of the Firstgold Acquisition," *Berkeley Journal of International Law Publicist* 4 (2010), http://bjil.typepad.com/publicist/2010/02/mining-for-meaning-assessing-cfiuss-rejection-of-the-firstgold-acquisition.html (accessed September 19, 2012).

Supporting Research and Development in Recycling, Substitutes, Material and Resource Efficiency

Research promotion currently focuses on renewable energy, including mineral raw materials needed for associated technologies. One example is the company Toxco's Vehicle Technologies Program: Toxco was awarded US$9.5 million by the DOE to expand its battery recycling facilities in order to conduct research on the recycling of lithium-ion batteries.[36]

The DOE Office of Science is planning to set up an *Energy Innovation Hub* for critical raw materials. Energy Secretary Steven Chu announced in May 2012 that the hub will be granted up to US$120 million over the next five years to help expand the security of supply of rare earths and other critical materials, improve the resource efficiency of these materials, and develop substitutes to reduce absolute consumption.[37]

Several bills introduced during the 112th Congress proposed to increase support for research on critical raw materials, with most also calling for an expansion of domestic production. Various bills demanding the expansion of recycling were also discussed. None of these proposals were signed into law before the end of the session.

The U.S. government also strives for international cooperation in research on critical materials. In October 2011, the DOE, the Japanese Ministry of Economy, Trade and Industry (METI), and the EU Commission held a conference in Washington, bringing together experts from politics, science, and industry to enhance critical raw materials cooperation among them. A subsequent trilateral conference took place in Tokyo in March 2012.[38]

National Defense Stockpiling

Since World War II, the federal government has been storing critical (strategic) metals for the defense industry. These are administered by the Defense Logistics Agency's Strategic Materials Division (DLA Strategic Minerals), which belongs to the Department of Defense (DOD). The stockpiling program lost significance during the 1990s due to falling raw materials prices, leading the DOD to sell off various stocks. In recent years, however, the debate on national defense stockpiling has regained momentum, even if no major expansion of stocks has yet occurred.

In 1994, the DLA was still storing ninety different materials at eighty-five sites across the country. By 2010, the stockpile had been reduced to twenty-five materials at seventeen sites,[39] including base metals such as zinc, cobalt, and chromium as well as precious metals such as platinum, palladium, and iridium. The DLA currently maintains constant stocks of beryl, beryllium, germanium, iridium, niobium, quartz, tantalum and tin, but is selling chromium, cobalt, ferrochromium, ferromanganese, manganese ores, platinum, talc, tungsten metal powder, tungsten ores and concentrates, and zinc. Stocks of aluminum oxide, antimony, bauxite, beryllium copper master alloy, cadmium, chromite, and fluorspar have already been completely sold, while the sale of vacuum-cast beryllium metal has been suspended.[40] Rare earths are currently not stored.[41]

In 2006, in response to changing conditions, Congress requested the DOD to review its stockpiling strategy. In response, the DLA developed the *Strategic Materials Security Program* (SMSP), which is designed to adjust reserves more rapidly. The fact that rare earths are currently not stockpiled provoked the introduction of various bills in the 112th Congress. Section 853 of the *National Defense Authorization Act for Fiscal Year 2012* (H.R. 1540, April 2011), which President Obama signed into law in December 2011, directs DLA Strategic Materials to determine the feasibility of establishing a rare earths reserve.[42] Stockpiling for the manufacturing sector, of the kind conducted in Japan and South Korea,[43] is rejected by Washington on the

36 DOE, *Critical Materials Strategy*, 2011 (see note 10), pp. 129, 184ff.

37 White House, *Blueprint for a Secure Energy Future*, 2011, http://www.whitehouse.gov/sites/default/files/blueprint_secure_energy_future.pdf (accessed July 19, 2012); DOE, *Energy Department Announces Launch of Energy Innovation Hub for Critical Materials Research*, May 31, 2012, http://energy.gov/articles/energy-department-announces-launch-energy-innovation-hub-critical-materials-research-0 (accessed July 19, 2012), 39.

38 New Energy and Industrial Technology Development Organization (NEDO), *Trilateral EU-Japan-U.S. Conference on Critical Materials*, http://www.nedo.go.jp/english/event_20120326_index.html (accessed July 19, 2012).

39 DOE, *Critical Materials Strategy*, 2010 (see note 9), p. 59.

40 Defense Logistics Agency (DLA) Strategic Materials, *Commodities for Sale*, https://www.dnsc.dla.mil/Commodities.asp (accessed March 29, 2012).

41 DOE, *Critical Materials Strategy*, 2010 (see note 9), p. 59.

42 Govtrack, *H.R. 1540: National Defense Authorization Act for Fiscal Year 2012*, http://www.govtrack.us/congress/bills/112/hr1540 (accessed August 3, 2012).

43 See also "Japan," pp. 98ff., and "South Korea," pp. 131ff., in this volume.

grounds that government purchases on such a scale would disrupt the markets.[44]

Transparency

As well as supporting international initiatives such as the Extractive Industries Transparency Initiative (EITI), the United States has taken a leading role in promoting transparency in raw materials markets with sections 1502 and 1504 of the *Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010*. On August 22, 2012, the U.S. Securities and Exchange Commission (SEC) published the final rules for implementing the two sections.

Section 1502 (and the respective implementation guidance) requires all SEC issuers (domestic and foreign) whose products include conflict minerals (tin, tantalum, tungsten, or gold) to disclose whether these minerals originated from the Democratic Republic of the Congo (DRC) or a neighboring country. Where a producer knows or has reason to believe this is the case, they must also report what measures they have taken to exercise due diligence with respect to origin and trading. A product is "DRC conflict-free" if neither production nor functionality require the use of conflict minerals from the DR Congo or a neighboring country. If the minerals originate from DR Congo or a neighboring country, the company must prove through its due diligence framework that they were not used to finance violent conflict.[45] In so doing, the company may follow nationally or internationally recognized due diligence guidelines, such as those of the OECD. Companies will have to disclose their information on conflict minerals for the first time on May 31, 2014 (for 2013), and thereafter submit annual reports to the SEC. If a company is unable to demonstrate that the minerals used were conflict-free, it may indicate for two years (or four years, in the case of small companies) that the conflict-free character of the minerals cannot be determined with certainty ("DRC conflict undeterminable").[46]

Section 1504 requires all SEC issuers (domestic and foreign) that are engaged in the commercial development of oil, natural gas, or minerals to disclose in an annual report certain payments made to the United States or a foreign government. Payments must be reported by country (or government, including lower tiers) and by project. The term "project" is not precisely defined in the implementation rules, in order to grant mining companies a certain degree of flexibility. Under SEC rules, payments exceeding US$100,000 must be disclosed. Reporting is mandatory for all fiscal years ending after September 2013.[47]

Industry harshly criticizes the reporting requirements, with the National Association of Manufacturers (NAM) lamenting the high cost of compliance and warning of competitive disadvantages compared with companies that are not subject to strict reporting rules.[48] While NGOs such as Enough, Global Witness, and Resolve consider sections 1502 and 1504 a success, they also stress that the initiative alone will not lead to good governance in resource-rich countries.

On November 15, 2011, the U.S. Department of State and USAID launched the *Public-Private Alliance for Responsible Minerals Trade* (PPA) to bring together companies such as Motorola Solutions, Blackberry, Nokia, Sony, the German company H. C. Stark, and NGOs like Resolve to develop supply chain systems enabling them to use conflict-free minerals that are validated, certified, and traceable all the way back to the conflict-free mine on the basis of common standards and mechanisms. The overall aim is to promote responsible and sustainable minerals trading in the African Great Lakes region and to avert disadvantages for producing countries that might result from the new rules.

Trade Policy and International Raw Materials Governance

The U.S. government is actively trying to ban export restrictions on raw materials. In June 2009, the U.S. together with the EU filed a complaint against Chinese export restrictions on a number of raw materials at the World Trade Organization (WTO); Mexico later joined the complainants. The WTO ruled in favor of the complainants. Motivated by their success, the U.S. and the EU, together with Japan, filed another com-

44 DOE, *Critical Materials Strategy*, 2010 (see note 9), p. 107.
45 Dodd Frank Section 1502, *Dodd Frank Section 1502*, http://section1502.com (accessed February 21, 2012).
46 Securities and Exchange Commission (SEC), *SEC Adopts Rule for Disclosing Use of Conflict Minerals*, August 22, 2012, http://www.sec.gov/news/press/2012/2012-163.htm (accessed August 30, 2012).
47 SEC, *SEC Adopts Rules Requiring Payment Disclosures by Resource Extraction Issuers*, August 22, 2012, http://www.sec.gov/news/press/2012/2012-164.htm (accessed August 30, 2012).
48 National Association of Manufacturers (NAM), *Testimony of Franklin Vargo Before the House Committee on Financial Services, Subcommittee on International Monetary Policy and Trade*, May 10, 2012, http://financialservices.house.gov/UploadedFiles/HHRG-112-BA20-WState-FVargo-20120510.pdf (accessed July 18, 2012).

plaint in March 2012 – this time against Chinese export restrictions on rare earths.[49]

The United States also strives to improve the general information available on export restrictions, which have traditionally been monitored less systematically than import restrictions, and successfully advocated an OECD database on export restrictions. Together with the EU, the United States is seeking to establish a compliance checklist for the raw materials trade that could be used in ongoing and future WTO accession procedures. Also in cooperation with the EU, the United States is seeking to intensify the work of the OECD on raw materials in three different areas (timeframe 2013–2014): global interdependences in the raw materials trade, involving non-OECD members of the G20 in OECD work on raw materials, and monitoring of trade-distorting activities in the raw materials trade.[50] Ways to cooperate on research and development for recycling and substitutes are under discussion at the Transatlantic Economic Council (TEC).[51] The United States is a member of the international metal study group on lead and zinc, and the copper study group, but has not joined the nickel study group.

Many of the legislative proposals presented during the 112th Congress concerning raw materials focused on single aspects of supply security, such as programs promoting rare earths, supplying the renewable energy sector with lithium, or examining the potential ofoffshore mining. These proposals have been tabled equally by Democrats and Republicans, and clear party alignments on specific topics cannot be observed. That almost none of the proposals have made it through one chamber, let alone Congress as a whole, can be attributed to the general political stalemate.

The prospects for international cooperation vary from issue to issue. The Department of Energy strategy explicitly calls for cooperation with countries facing similar challenges. Initiatives in research and development can already be seen in the form of trilateral conferences with the EU and Japan. The United States is already working closely with the EU on trade policy, but in 2010 chose to act alone on transparency in the form of sections 1502 and 1504 of the *Dodd-Frank Act*, which offered a unique opportunity to lay down stricter reporting obligations in federal law.

Evaluation and Outlook

While the United States is a resource-rich country it is also highly dependent on imports of minerals and metals. Nonetheless, there is no comprehensive raw materials strategy for the economy as a whole. The Department of Energy seeks to secure domestic production of renewable energy, while the Department of Defense focuses on guaranteeing the defense sector's supply of strategic raw materials, especially of rare earth elements. Despite these different aims, the two departments propose similar threefold strategies: 1. to diversify the supply chain, for example through substantially expanding domestic raw materials production during the coming years; 2. to advance material and resource efficiency and the development of substitutes for critical raw materials; and 3. to promote recycling.

49 See also "European Union," pp. 59ff., and "China," pp. 51ff., in this volume.
50 U.S. Department of State, Bureau of European and Eurasian Affairs, *TEC Work Plan for Cooperation on Raw Materials Progress Report*, April 3, 2012, http://www.state.gov/p/eur/rt/eu/tec/190817.htm (accessed July 18, 2012).
51 See also "European Union" in this volume, pp. 59ff.

Annexes

Overview

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Annex 2: List of Abbreviations

AA	Auswärtiges Amt (Federal Foreign Office) (Germany)
ABARE	Australian Bureau of Agricultural and Resource Economics
ACCC	Australian Competition and Consumer Commission
ACP	African, Caribbean, and Pacific
ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie (Environment and Energy Management Agency) (France)
ADIMB	Agência para o Desenvolvimento Tecnológico da Indústria Mineral Brasileira (Agency for Technological Development of the Brazilian Mining Industry)
AFD	Agence Française de Développement (French Development Agency)
AFTA	ASEAN Free Trade Area
AIST	National Institute of Advanced Industrial Science and Technology (Japan)
ALBA	Aluminium Bahrain
ALGA	Australian Local Government Association
ANC	African National Congress
ANIM	Italian National Association of Mining Engineers
ANM	Agência Nacional de Mineração (National Mining Agency) (Brazil)
AOMA	Asociación Obrera Minera Argentina (Argentine Union of Mineworkers)
ARPA-E	Advanced Research Projects Agency-Energy (United States)
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
BDI	Bundesverband der Deutschen Industrie (Federation of German Industry)
BEE	Black Economic Empowerment
BGR	Bundesanstalt für Geowissenschaften und Rohstoffe (German Federal Institute for Geosciences and Natural Resources)
BGS	British Geological Survey
BIS	Department for Business, Innovation and Skills (United Kingdom)
BKPM	Indonesian Investment Agency
BLM	Bureau of Land Management (United States)
BMAPA	British Marine Aggregate Producers Association
BMBF	Bundesministerium für Bildung und Forschung (Federal Ministry of Education and Research) (Germany)
BMELV	Bundesministerium für Ernährung, Landwirtschaft und Verbraucherschutz (Federal Ministry of Food, Agriculture and Consumer Protection) (Germany)
BMF	Bundesministerium der Finanzen (Federal Ministry of Finance) (Germany)
BMI	Bundesministerium des Innern (Federal Ministry of the Interior) (Germany)
BMU	Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety) (Germany)

BMVBS	Bundesministerium für Verkehr, Bau und Stadtentwicklung (Federal Ministry of Transport, Building and Urban Development) (Germany)
BMWi	Bundesministerium für Wirtschaft und Technologie (Federal Ministry of Economics and Technology) (Germany)
BMZ	Bundesministerium für Wirtschaftliche Zusammenarbeit und Entwicklung (Federal Ministry for Economic Cooperation and Development) (Germany)
BOEM	Bureau of Ocean Energy Management, Regulation and Enforcement (United States)
BOREN	National Boron Research Institute (Turkey)
BRGM	Bureau de Recherches Géologiques et Minières (Geological Survey) (France)
BRICS	Brazil, Russia, India, China, South Africa
BREE	Bureau of Resources and Energy Economics (Australia)
CAM	Cámara de Empresarios Mineros (Argentine Mining Chamber)
CAMINEX	Cámara Minera de México (Mining Chamber of Mexico)
CANMET	Canada Centre for Mineral and Energy Technology
CANMET-MMSL	CANMET Mining and Mineral Sciences Laboratories (Canada)
CBI	Confederation of British Industry
CCCMC	China Chamber of Commerce of Metals Minerals & Chemicals Importers & Exporters
CCP	Communist Party (China)
CETA	EU-Canada Comprehensive Economic and Trade Agreement
CETEM	Centro de Tecnologia Mineral (Center for Mining Technology) (Brazil)
CFC	Common Fund for Commodities
CFEM	Compensação Financeira pela Exploração de Recursos Minerais (Financial Compensation for the Exploration of Mineral Resources) (Brazil)
CFIUS	Committee on Foreign Investment in the United States
CGMinería	Coordinación General de Minería (General Office of Mining) (Mexico)
CGS	Chinese Geological Survey
CICID	Comité Interministériel de la Coopération Internationale et du Développement (Interministerial Committee for International Cooperation and Development) (France)
CIDA	Canadian International Development Agency
CIP	Competitiveness and Innovation Framework Program (European Union)
CISA	Chinese Iron and Steel Association
CLG	Department for Communities and Local Government (United Kingdom)
CMA	Chinese Mining Association
CME	Commissão de Minas e Energia (Committee for Mining and Energy) (Brazil)
CNIA	China Nonferrous Metals Industry Association
CO_2	Carbon Dioxide
COAG	Council of Australian Governments
Cofemin	Consejo Federal de Minería (Federal Mining Council) (Argentina)
COMES	Comité pour les Métaux Stratégiques (Committee for Strategic Metals) (France)
COSATU	Congress of South African Trade Unions
CPRM	Serviço Geológico do Brasil (Brazilian Geological Survey)
CRIET	Centro di Recerca Interuniversitario in Economia del Territorio (Inter-University Research Center for Local Development) (Italy)
CRIRSCO	Committee for Mineral Reserves International Reporting Standards
CSIRO	Commonwealth Scientific and Industrial Research Organization (Australia)
CSN	Comanhia Siderúrgica Nacional (National Steel Company) (Brazil)
CSR	Corporate Social Responsibility
CTC	Certified Trading Chains
DAC	Development Assistance Committee (OECD)
DAP	diammonium phosphate (fertilizer)
DEFRA	Department for Environment, Food and Rural Affairs (United Kingdom)
DEG	Deutsche Investitions- und Entwicklungsgesellschaft (German Investment and Development Corporation)
DERA	Deutsche Rohstoffagentur (German Mineral Resources Agency)
DFAT	Department for Foreign Affairs and Trade (Australia)
DfT	Department for Transport (United Kingdom)
DG	Directorate General (European Union)
DGM	Dirección General de Minas (General Directorate of Mines) (Mexico)
DGPM	Dirección General de Promoción Minera (General Direction of Mining Promotion) (Mexico)
DGRME	Direzione generale per le risorse minerarie ed energetiche (General Directorate of Mineral and Energy Resources) (Italy)
DIHK	Deutscher Industrie- und Handelskammertag (German Chamber of Industry and Commerce)
DLA	Defense Logistics Agency (United States)
DMR	Department of Mineral Resources (South Africa)
DNPM	Departamento Nacional de Produção Mineral (National Department for Mining Production) (Brazil)
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DORD	Deep Ocean Resources Development Company (Japan)
DRC	Democratic Republic of the Congo
DUBAL	Dubai Aluminium
EACI	Executive Agency for Competitiveness and Innovation (European Union)
EADS	European Aeronautic Defence and Space Company
EB	Ministry of Economy (Turkey)
EBRD	European Bank for Reconstruction and Development
EEF	Manufacturers' organization for UK manufacturing companies
EERE	Office of Energy Efficiency and Renewable Energy (United States)

EITI	Extractive Industries Transparency Initiative
EIA	Energy Information Agency (United States)
EFG	European Federation of Geologists
EGS	EuroGeoSurveys
EIB	European Investment Bank
EIP	European Innovation Partnership
EMMC	Energy and Mines Ministers' Conference (Canada)
EMRD	Energy and Mineral Resources Development Association of Korea
EP	European Parliament
EPA	Economic Partnership Agreement
EREP	European Resource Efficiency Platform
ERMG	European Raw Materials Group
ESDM	Ministry of Energy and Mineral Resources (Indonesia)
ETKB	Ministry of Energy and Natural Resources (Turkey)
EU	European Union
FATA	Foreign Acquisitions and Takeovers Act (Australia)
FATR	Foreign Acquisitions and Takeovers Regulations (Australia)
FDI	foreign direct investment
FIFOMI	Fideicomiso de Fomento Minero (Mining Development Trust Fund) (Mexico)
FINSA	Foreign Investment and National Security Act of 2007 (United States)
FIPAs	Foreign Investment Protection Agreements (Canada)
FIRB	Foreign Investment Review Board (Australia)
FLPMA	Federal Land Policy and Management Act of 1976, as amended (United States)
FTA	Free trade agreement
G20	Group of 20
GA	Geoscience Australia
GAC	General Administration of Customs (China)
GAI	Indonesian Mining Agency
GAO	Government Accountability Office (United States)
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
GEM	Geo-mapping for Energy and Minerals
GEMERA	Grupo de Empresas Mineras Exploradoras de la República Argentina (Group of Exploring Mining Companies of Argentina)
GEO	Group on Earth Observations
GeRI	Global Development Policy Raw Materials Initiative (Germany)
GIZ	Gesellschaft für International Zusammenarbeit (German Agency for International Cooperation)
GOIC	Gulf Organization for Industrial Consulting
GSI	Geological Survey of India
HKSE	Hong Kong Stock Exchange
IBRAM	Instituto Brasileiro de Mineração (Brazilian Mining Institute)
IBM	Indian Bureau of Mines
ICAA	Instituto Correntino del Agua y del Ambiente (Corrientes Province Water and Environment Institute) (Argentina)
ICEL	Indonesian Center for Environmental Law
ICMM	International Council on Mining and Metals
ICSG	International Copper Study Group
IEF	International Energy Forum
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer (French Research Institute for Exploitation of the Sea)
ILZSG	International Lead and Zinc Study Group
IMA	Interministerieller Ausschuss (interagency committee) (Germany)
IMA	Indonesian Mining Association
IMRI	Integrated Mineral Resources Initiative (Germany)
INSG	International Nickel Study Group
IRENA	International Renewable Energy Agency
IRP	International Resource Panel
ISA	International Seabed Authority
ISIJ	Iron and Steel Institute of Japan
ITV	Instituto Tecnológico Vale (ValeTechnological Institute) (Brazil)
IUCN	International Union for Conservation of Nature
IUD	Mining business license (Indonesia)
JAMSTEC	Japan Agency for Marine Earth Science and Technology
JATAM	Mining Advocacy Network (Indonesia)
JBIC	Japan Bank for International Cooperation
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
JISF	Japan Iron and Steel Federation
JLR	Jaguar Land Rover
JMEC	Japan Mining Engineering Center for International Corporation
JMIA	Japan Mining Industry Association
JNOC	Japan National Oil Corporation
JODI	Joint Organizations Data Initiative
JOGMEC	Japan Oil, Gas and Metals National Corporation
JST	Japan Science and Technology Agency
KADIN	Indonesian Chamber of Commerce and Industry
KalkB	Planning Ministry (Turkey)
KEEI	Korea Energy Economics Institute
KEPCO	Korea Electrical Power Cooperation
KEXIM	Korea Export-Import Bank
KfW	Kreditanstalt für Wiederaufbau (German Bank for Reconstruction)
KIGAM	Korea Institute of Geoscience and Mineral Resources
KIRAM	Korea Institute for Rare Metals
KNOC	Korea National Oil Cooperation
KOGAS	Korea Gas Cooperation
KontraS	Commission for the Disappeared and Victims of Violence (Indonesia)
KORES	Korea Resources Corporation
KOTRA	Korea Trade Investment Promotion Agency
KPCS	Kimberley Process Certification Scheme
LAB-MP	Laboratorio Materie Prime (Raw Material Laboratory) (Italy)
LBMA	London Bullion Market Association
LGEEPA	Ley General del Equilibrio Ecológico y Protección al Ambiente (General Law of Ecological Equilibrium and Environment Protection) (Mexico)
LME	London Metal Exchange
LMN	London Mining Network
LPPM	London Platinum and Palladium Market
MAC	Mining Association of Canada

MCTI	Ministério da Ciência, Tecnologia e Inovação (Ministry for Science, Technology and Innovation) (Brazil)
ME	Ministry of Environment (South Korea)
ME	Ministry of the Environment (Japan)
MERCOSUR	Mercado Común del Sur (Southern Common Market)
MERI	Metal Economics Research Institute (Japan)
METI	Ministry for Economy, Trade and Industry (Japan)
MEXT	Ministry of Education, Culture, Sports, Science and Technology (Japan)
MFA	Ministry of Foreign Affairs (Japan)
MFAT	Ministry for Foreign Affairs and Trade (South Korea)
MIA	Manifestación de Impacto Ambiental (Environmental Impact Assessment) (Mexico)
MIGEN	General Directorate for Mining Affairs (Turkey)
MIIT	Ministry of Industry and Information Technology (China)
Minprirody	Ministerstvo prirodnykh resursov i ekologii Rossiskoi Federatsii (Ministry of Natural Resources and Ecology) (Russia)
MINTEK	Council for Mineral Technology Research (South Africa)
MK	Maden Kanunu (Mining Law) (Turkey)
MKE	Ministry of Knowledge Economy (South Korea)
MLTMA	Ministry of Land, Transport and Maritime Affairs (South Korea)
MMAJ	Metal Mining Agency of Japan
MMDR	Mines and Mineral (Development and Regulation) Bill (India)
MME	Minsterio de Minas e Energia (Ministry of Mines and Energy) (Brazil)
MMIJ	Mining and Materials Processing Institute (Japan)
MoEF	Ministry of Environment and Forests (India)
MOEP	Ministry of Environmental Protection (China)
MOFTEC	Ministry of Foreign Trade and Economic Cooperation (China)
MOLAR	Ministry of Land and Resources (China)
MoM	Ministry of Mines (India)
MoS	Ministry of Steel (India)
MOSF	Ministry of Strategy and Finance (South Korea)
MP3EI	Master Plan for the Acceleration and Expansion of Indonesia's Economic Development
MPAs	Mineral Planning Authorities (United Kingdom)
MPRDA	Mineral and Petroleum Resources Development Act (South Africa)
MRRT	Mineral Resources Rent Tax (Australia)
MSE	Ministero dello Sviluppo Economico (Ministry of Economic Development) (Italy)
MSWG	Material Security Working Group (United Kingdom)
MTA	General Directorate of Mineral Research and Exploration (Turkey)
MÜSIAD	The Independent Industrialists' and Businesmen's Association (Turkey)
MWDF	Minerals and Waste Development Framework (United Kingdom)
NAFTA	North American Free Trade Agreement
NAM	National Association of Manufacturers (United States)
NDRC	National Development and Reform Commission (China)
NEC	National Economic Council (United States)
NEDO	New Energy and Industrial Technology Development Organization (Japan)
NEMA	National Electrical Manufacturers Association (United States)
NEXI	Nippon Export and Investment Insurance (Japan)
NGO	Non-governmental organization
NIED	National Research Institute for Earth Science and Disaster Prevention (Japan)
NIMS	National Institute for Materials Science (Japan)
NMA	National Mining Association (United States)
NMMT	Nationaler Masterplan Maritime Technologien (National Masterplan for Maritime Technologies) (Germany)
NNTT	National Native Title Tribunal (Australia)
NRCan	Natural Resources Canada
NSC	National Security Council (United States)
NUM	National Union of Mineworkers (South Africa)
ODA	Official Development Aid
OECD	Organisation for Economic Co-operation and Development
OFEMI	Organización Federal de Estados Mineros (Federal Organization of Mining States) (Argentina)
OLAMI	Organismo Latinoamericano de Minería (Latin American Mining Organization)
OSMRE	Office of Surface Mining Reclamation and Enforcement (United States)
OSTP	Office of Science and Technology Policy (United States)
PAN	Partido Acción Nacional (The National Action Party) (Mexico)
PDAC	Prospectors and Developers Association of Canada
PGM	Platinum group metals
PIF	Public Investment Fund (Saudi Arabia)
PND	Plan Nacional de Desarollo (National Development Plan) (Mexico)
PNM	Plano Nacional de Mineração (National Mining Plan) (Brazil)
POST	Parliamentary Office of Science and Technology (United Kingdom)
PPA	Public-Private Alliance for Responsible Minerals Trade (United States)
PPO	Public Procurement Office
PRI	Partido Revolucionario Institucional (Institutional Revolutionary Party) (Mexico)
ProgRess	German Resource Efficiency Program
PWYP-Canada	Publish What You Pay Canada
REA	Research Executive Agency (European Union)
RET	Department for Resources, Energy and Tourism (Australia)
RMSG	Raw Materials Supply Group (European Union)
Rosnedra	Federalnoe agentstvo po nedropolzovaniyu (Federal Agency for Subsoil Usage) (Russia)
RPA	Risk and Policy Analysts
RSPT	Resource Super Profits Tax (Australia)
RWI	Revenue Watch Index

SABIC	Saudi Basic Industries Corporation
SACP	South African Communist Party
SADC	Southern African Development Community
SAGIA	Saudi Arabian General Investment Authority
SAMA	Saudi Arabian Monetary Agency
SASAC	State-owned Assets Supervision and Administration Commission of the State Council (China)
SBRI	Small Business Research Initiative (United Kingdom)
SCP	Action Plan for Sustainable Consumption and Production (European Union)
SDF	Sustainable Development Framework for Indian Mining
SE	Secretaría de Economía (Ministry of the Economy) (Mexico)
SEC	U.S. Securities and Exchange Commission
SEGEMAR	Servicio Geológico Minero Argentino (Geological and Mining Survey of Argentina)
SGDSN	Secrétariat Général de la Défense et de la Sécurité Nationale (Secretariat-General for Defense and National Security) (France)
SGM	Secretaria de Geologia, Mineração e Transformação Mineral (Secretary of Geology, Mining, and Mineral Processing) (Brazil)
SGM	Servicio Geológico Mexicano (Mexican Geological Service)
SGS	Saudi Geological Survey
SHCP	Secretaria de Hacienda y Crédito Público (Ministry of Treasure and Public Credit)
SIDF	Saudi Industrial Development Fund
SME	Shanghai Metals Exchange
SMSP	Strategic Materials Security Program (United States)
SNTMMSRM	Sindicato Nacional de Trabajadores Mineros, Metalúrgicos, Siderúrigicos y Similares de la República Mexicana (National Mininig and Metalworkers Union) (Mexico)
SOEs	State-owned enterprises
SRB	State Reserve Bureau (China)
SvTB	Ministry of Industry and Commerce (Turkey)
TEC	Transatlantic Economic Council
TFEU	Treaty on the Functioning of the European Union
TICAD	Tokyo International Conference on African Development
TIKA	International Cooperation and Development Agency (Turkey)
TSB	Technology Strategy Board (United Kingdom)
TSX	Toronto Stock Exchange
TUSCON	Confederation of Businessmen and Industrialists of Turkey
TÜSIAD	Turkish Industry and Business Association
UK	United Kingdom
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environment Program
UNMIG	Ufficio nazionale minerario per gli idrocarburi e le georisorse (National Mining Office for Hydrocarbons and Georesources) (Italy)
U.S.	United States
USAID	United States Agency for International Development
USGS	United States Geological Survey
USTR	Office of the United States Trade Representative
VDI	Verein Deutscher Ingenieure (Association of German Engineers)
VDI ZER	VDI Center for Resource Efficiency (Germany)
WEEE Directive	Waste Electrical and Electronic Equipment Directive 2012/19/EU
WRAP	Waste and Resource Action Program (United Kingdom)
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
YCF	Yacimientos Carboníferos Fiscales (national mining company) (Argentina)
YCRT	Yacimientos Carboníferos Rio Turbio (Rio Turbio Coalfields [Company]) (Argentina)

Annex 3: Selected Global Governance Initiatives in the Area of Mineral Resource Markets

Civil Society and (Inter-)Governmental Global Initiatives on Transparency in Revenue Flows and Supply Chains		Stakeholders/ G20 Members
Extractive Industries Transparency Initiative (EITI)	The Extractive Industries Transparency Initiative (EITI) was launched in 2002 at the World Summit on Sustainable Development in Johannesburg and is headquartered in Oslo. It aims to enhance transparency in the raw materials sector in countries that struggle with corruption and bad governance and remain poor despite their wealth in natural resources. Resource producing countries can participate in the initiative, disclosing their revenues from the raw materials sector on a voluntary and non-binding basis. Corporations disclose the payments they make to governments. Payment figures are compared and published by an independent auditing consultancy, and government misconduct is publicly censured. This mechanism is designed to enable citizens to keep track of payments made to their governments and to steer revenues from raw materials away from fraud and corruption and toward public goods like reducing poverty. The goals of the initiative were adopted by the United Nations in a resolution passed in 2008. The IMF, the World Bank, and numerous private enterprises, NGOs, and investment funds have committed to the EITI standards. http://eiti.org	*Stakeholders:* Australia, Canada, Germany, France, Italy, Japan, United Kingdom (UK), United States of America (USA) *Candidate:* Indonesia
Publish What You Pay (PWYP)	The Publish What You Pay Initiative (PWYP) is a global network of various civil society groups that aims to enhance transparency in the oil, gas, and mining sectors. The initiative seeks to help the public in resource-rich countries to monitor payments in these sectors by organizing public campaigns and advising political leaders. It has more than 650 member organizations. http://www.publishwhatyoupay.org	*Member organizations from:* Australia, Canada, Germany, France, Indonesia, Mexico, United Kingdom (UK), United States of America (USA)
Kimberley Process Certification Scheme (KPCS)	The Kimberley Process Certification Scheme (KPCS) is a sectoral initiative for a single product, uncut diamonds. Its import-export certification system seeking to diminish the trade in so-called conflict or blood diamonds was launched in 2003 after negotiations between governments, industry, and civil society organizations. The initiative has 54 members (the EU counting as one), and covers 99.8 percent of global rough diamond production. Members agree to trade only with other members, to have their diamonds certificated by another member, and to prove their conflict-free origin. Participants agree to allow inspections and to report their trading and production activities. The chair of the scheme rotates between members. http://www.kimberleyprocess.com	Australia, Brazil, Canada, China, European Union (EU), India, Indonesia, Japan, Mexico, Russia, South Africa, South Korea, Turkey, United States of America (USA)

Civil Society and (Inter-)Governmental Global Initiatives on Corporate Responsibility		G20 Members
OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas	The OECD's non-binding guidance on due diligence in the minerals sector was adopted and published in winter 2010. It gives recommendations for responsible minerals trading and helps corporations to conform to social and ecological standards. The guidance contains specific sections on tin, tantalum, tungsten, and gold. The OECD runs events and workshops to disseminate the recommendations and standards among corporations worldwide. http://www.oecd.org/daf/investment/mining	Australia, Canada, France, Germany, Italy, Japan, Mexico, South Korea, Turkey, United Kingdom (UK), United States of America (USA)
Global Compact	The Global Compact is a worldwide initiative for corporate responsibility that provides a platform for the exchange of experiences and ideas between corporations, civil society organizations, and governments. The ten principles of the Global Compact address human rights, labor rights and standards, environmental protection, and anti-corruption. The aim of the initiative is to disseminate and anchor these principles in corporate activities worldwide, and to initiate measures that support the UN Millennium Development Goals. The Global Compact is constantly growing and has accumulated more than 8,700 participants from more than 140 countries. It is thus the biggest initiative of civil society organizations, corporations, and other stakeholders. The participants are private companies (which pay a membership fee), as well as civil society organizations, business associations, trade unions, academic institutions, and cities. www.unglobalcompact.org/index.html	Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United Kingdom (UK), United States of America (USA)
World Bank Group Environmental, Health, and Safety (EHS) Guidelines (previously: World Bank General Environment Guidelines)	The World Bank's Environmental, Health, and Safety Guidelines are applied as binding standards by members of the World Bank Group. Both the General EHS Guidelines and the sector-specific documents cover: 1) the environment, 2) workplace and community health, 3) workplace and community security, and 4) opening and closing of projects. The sector-specific guidelines for the mining industry contain recommendations for mine lighting and limits for metal contamination of waste water. The guidelines are regarded as realistic and not excessively costly when applied in new facilities with a certain level of technology. The guidelines were created in 2007; the ecological guidelines originated from the Work Bank General Environment Guidelines. http://www1.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/IFC+Sustainability/Sustainability+Framework/Environmental,+Health,+and+Safety+Guidelines	Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United Kingdom (UK), United States of America (USA)

Civil Society and (Inter-)Governmental Global Initiatives on Corporate Responsibility (ctd. I)		G20 Members
World Bank Operational Policy and Bank Procedure on Involuntary Resettlement (OP & BP 4.12) (previously: World Bank Operational Directive 4.30 – Involuntary Resettlement)	Involuntary resettlement measures caused by development projects dislocate people from their working and social environment and can have negative economic, social, and environmental effects. Residents may be relocated to areas where competition for natural resources is especially strong. The World Bank's Operational Policy on Involuntary Resettlement is designed to help prevent poverty and ecological harm. The guidelines apply to all projects that the World Bank is involved in and seek to avoid resettlement where possible. If resettlement is unavoidable, those affected must be advised about their options and enabled to participate in planning and implementation of resettlement measures. Resettled persons must be compensated financially to allow them at least to maintain their standard of living. The Bank Procedures provide recommendations for specific actions. http://go.worldbank.org/GM0OEIY580	Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United Kingdom (UK), United States of America (USA)
Sector-Specific Corporate Initiatives for Transparency and Due Diligence in the Resource Sector		**G20 Members**
iTSCi (ITRI Tin Supply Chain Initiative)	The iTSCi Initiative is a program run by the International Tin Research Institute (ITRI), a UK-based NGO that advises a large part of the tin industry. iTSCi was created to provide information on provenance and due diligence in the field of conflict minerals (for instance cassiterite) in the DR Congo and neighboring countries. The initiative seeks to help corporations – especially those operating at the beginning of the production chain, such as mines, traders, and refiners – to adhere to OECD and UN due diligence guidelines, as well as national laws, guidelines, and rules such as the U.S. Dodd-Frank Act. Members of the initiative are required to abide by the due diligence recommendations of the UN Security Council and the OECD. https://www.itri.co.uk/index.php?option=com_zoo&view=frontpage&Itemid=60	*Corporations from:* Canada, China, Japan, South Africa, United Kingdom (UK), United States of America (USA)

Sector-Specific Corporate Initiatives for Transparency and Due Diligence in the Resource Sector (ctd.)		G20 Members
Initiative by the EICC (Electronic Industries Citizenship Coalition) and GeSI (Global e-Sustainability Initiative): Conflict-Free Smelter Program (CFS) and the Conflict Minerals Reporting Template and Dashboard	The EICC and the GeSI have created an internet-based platform to inform corporations about their due diligence obligations concerning conflict minerals. The aim of the initiative and its "Reporting Template and Dashboard" is to reduce trade in conflict minerals. The platform is strongly orientated on the aims of the CFS program, which was initiated jointly by the EICC and the GeSI. The template, which is available in English, Chinese, Korean, and Japanese, allows corporations to review their supply chains by answering a range of questions (such as who they purchase materials from). The dashboard uses the information supplied via the template to aggregate the data from different suppliers and analyze them together. Companies can register free of charge for the template and the dashboard. The CFS program seeks to help companies purchase conflict-free minerals. Participation in the program is voluntary. An independent third party monitors the activities of program participants and determines whether the materials they use used are conflict-free. Thus the complete supply and production chain is tracked. The program covers the so-called 3TG minerals (tin, tantalum, tungsten, and gold). Most of the participating companies come from China, Indonesia, Malaysia, Russia, and the United States. The EICC and the GeSI regularly publish lists of CFS-compliant companies for all four metals. The names of non-compliant companies are not disclosed. Members of the EICC and the GeSI are not obliged to purchase exclusively from CFS-compliant companies. http://www.conflictfreesmelter.org/ConflictMineralsReportingTemplateDashboard.htm http://www.eicc.info/CFSProgram.shtml	The lists of CFS-compliant firms for tin and tungsten are currently still under preparation. G20 states with CFS-compliant firms for tantalum include Australia, Brazil, Canada, China, Germany, the United Kingdom, and the United States; G20 states with CFS-compliant firms for gold include Australia, Canada, Indonesia, Japan, and the United States.
Trade Regimes		**G20 Members**
World Trade Organization	The World Trade Organization (WTO) succeeded the General Agreement on Tariffs and Trade (GATT) in January 1995. The WTO regulates international trade and other international economic activities of its members (currently 159, as of March 2013). Its mandate includes staging multilateral trade negotiations and a dispute settlement mechanism for trade conflicts. Together with forestry products, fish and fuels, the WTO defines mineral and mining products as natural raw materials subject to its mandate. http://wto.org	Argentina, Australia, Brazil, Canada, China, European Union (EU), France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United Kingdom (UK), United States of America (USA)

Initiatives on Data Exchange and Transparency		G20 Members
International Metal Study Groups	There are three international metal study groups: 1) the International Lead and Zinc Study Group (ILZSG), established by the UN in 1959; 2) the International Copper Study Group (ICSG), formed in 1992; and 3) the International Nickel Study Group (INSC), formed in 1990. The study groups are independent intergovernmental organizations open to all countries involved in the production, use, or international trade of the respective resource. These are generally industrialized countries, newly industrializing countries, and resource-rich developing countries. All three study groups are headquartered in Lisbon and have shared a general secretariat since 2006. They work to enhance the exchange of information, to gather information on supply and demand in the international markets, and to provide solutions for problems in the raw materials trade. Their principal aim is to enhance market transparency. The groups publish monthly or biannual statistics and surveys. They generally meet twice a year, with national delegations often accompanied by industry representatives. Within each group there are various committees on topics such as statistics or the environment, each chaired by a representative of one of the national delegations. ILZSG: http://www.ilzsg.org/static/home.aspx ICSG: http://www.icsg.org INSG: http://www.insg.org	*ILZSG:* Australia, Brazil, Canada, China, France, Germany, India, Italy, Japan, Russia, South Africa, South Korea, United States of America (USA) *ICSG:* Australia, China, European Union (EU), France, Germany, India, Italy, Japan, Mexico, Russia, United States of America (USA) *INSG:* Australia, Brazil, European Union (EU), France, Germany, Italy, Japan, Russia, United Kingdom (UK)
Civil Society and (Inter-)Governmental Global Initiatives on Sustainable Resource Provision		**G20 Members**
UNEP International Resource Panel (IRP)	The UNEP International Resource Panel was created in 2007 as a first step towards a comprehensive approach to the management of natural resources. It aims to provide independent, reliable scientific reports on the sustainable use of resources and the effects of resource production on the environment, and to supply information on the possibilities of economic growth without negative effects on the environment. Twenty-three countries, the European Commission, the OECD, and three civil society organizations participate in the IRP, which meets twice a year. The work of the Panel is linked to other initiatives such as the Marrakech Process on sustainable use and production, the 3R Initiative ("reduce, reuse, and recycle"), the Global Environment Outlook, and the UN's Millennium Ecosystem Assessment, and is associated with the closed-loop economy approach. http://www.unep.org/resourcepanel/Home/tabid/52020/Default.aspx	Canada, China, EU Commission, France, Germany, India, Indonesia, Italy, Japan, Mexico , Russia, South Africa, United States of America (USA)

Civil Society and (Inter-)Governmental Global Initiatives on Sustainable Resource Provision (ctd.)		G20 Members
OECD Working Group on Waste Prevention and Recycling	The OECD's first project for minimizing waste ran from 1994 to 2004 and concentrated on information exchange on strategies to reduce waste within OECD countries. The first workshop was held in 1995, hosted by the United States, Canada, and Mexico. The Working Group on Waste Prevention and Recycling seeks to encourage the sustainable use of materials by OECD members, with a focus on "sustainable material management," on which it staged a first workshop in 2005 in Seoul, South Korea. Events and publications followed to provide institutional backing for the Working Group.	Australia, Canada, France, Germany, Italy, Japan, Mexico, South Korea, Turkey, United Kingdom (UK), United States of America (USA)
Broader Civil Society and Governmental Initiatives		**G20 Members**
ISO 26000	ISO 26000 is the global standard of the International Organization for Standardization (ISO) for sustainability in the sense of community responsibility. It provides companies and organizations with guidance on ethics and transparency by defining social responsibility and proposing effective measures that promote health and wellbeing in society. The standard is not awarded as a certificate like other ISO Standards. It was developed over a period of five years and published in 2010. http://www.iso.org/iso/home/standards/iso26000.htm	Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkey, United Kingdom (UK), United States of America (USA)
Sectoral Corporate Initiatives for Sustainable Resource Supply		**G20 Members**
International Council on Mining & Metals (ICMM)	The International Council on Mining and Metals was created in 2001, and brings together 22 mining companies and 34 regional and national mining associations and global resource associations. The ICMM seeks to support ongoing improvements in resource production and mining management and thus to contribute to sustainable development in the fields of environment, labor, and social issues. Since 2009, member states have been obliged to disclose their improvements in this regard publicly. http://www.icmm.com	*Mining companies from:* Australia, Brazil, Canada, France, Japan, South Africa, United Kingdom (UK), United States of America (USA) *Mining associations from:* Argentina, Australia, Brazil, Canada, European Union (EU), India, Japan, Mexico, South Africa, United States of America (USA)
Initiatives for Development Cooperation		**G20 Members**
Common Fund for Commodities (CFC)	The Common Fund for Commodities was created by the United Nations and is headquartered in Amsterdam. It funds projects that support social and economic development in resource-rich countries, especially in the least developed countries. The three metal study groups are partners of the Fund. Agreement on the Common Fund was finalized in 1980 in Geneva and took effect in 1989. The Fund has 105 member states and ten institutional members including the EU and CARICOM. http://www.common-fund.org	Argentina, Brazil, China, Germany, India, Indonesia, Italy, Mexico, Russia, Saudi Arabia, South Korea, United Kingdom (UK) *Institutional member:* European Union (EU)

Initiatives for Development Cooperation (ctd.)		**G20 Members**
Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (previously: Global Dialogue on Mining/Metals and Sustainable Development)	The Intergovernmental Forum is a discussion platform for the mining sector. It succeeded the Global Dialogue on Mining/ Metals and Sustainable Development, which brought together 53 states in a partnership to implement the Johannesburg Plan of Action agreed at the United Nations World Summit for Sustainable Development in 2002. The members of the Global Dialogue decided in 2003 and 2004 to create the Forum, and drew up its terms of reference, draft rules of procedure, and guidance for the program of work. The Forum began work in February 2005 after reaching 25 members. http://www.globaldialogue.info/intro_e.htm	Argentina, Brazil, Canada, India, Mexico, Russia, South Africa,United Kingdom (UK)

Annex 4: Mineral Resource Strategies of the G20 Countries

G20 Member	Strategic document	Key elements
Argentina	**2004:** (first and only) Mining Plan (President Néstor Kirchner)	Declared goals: ▸ Mining policy as long-term national policy ▸ Establishment of a stable investment environment ▸ Promotion of a national production model, of regional integration, of international cooperation and of the democratization of official (public) information in this area Numerous tax concessions for the mining sector.
Australia	No central strategic document, but reports and statements issued by various ministries, research institutes and consultancies in the different states and on the national level	Federal government intervention only in the following cases: ▸ Where the "national interest" is concerned ▸ If a single foreign investor acquires a dominant position, especially in the case of state actors ▸ If the production process cannot function properly, for example when infrastructure is lacking or dysfunctional
Brazil	**2011:** National Mining Plan 2030 (Ministry of Mining and Energy)	Identification of strategic minerals in terms of: ▸ Import dependency: fertilizer minerals (nitrogen, phosphorus, potassium) ▸ Future importance: minerals used in high-tech products (cobalt, lithium, rare earths, tantalum) ▸ Comparative advantage in production and export (iron ore, niobium, etc.) Goals: ▸ 1. Effective public governance; 2. Expansion of geological knowledge; and 3. Management of strategic minerals. ▸ 1. Raw materials production in protected areas; 2. Formalization and strengthening of micro- and small enterprises; 3. Research, development and innovation; 4. Education and training (human resources); and 5. Infrastructure and logistics. ▸ 1. Sustainable production; 2. Value added by enhanced competitiveness; and 3. Promoting sustainable development in mining regions.

Canada	**1998** From Mineral Resources to Manufactured Products: Toward a Value-Added Mineral and Metal Strategy for Canada	Goals: ▸ Supporting sustainable development and use of minerals and metals ▸ Promoting public health and environmental protection ▸ Securing an attractive investment climate Government measures to secure access to raw materials include: ▸ Exploration of new deposits ▸ Governmental support for exports ▸ Transparency in the mining sector ▸ Harmonization of federal and provincial rules ▸ Stockpiling
	2008 Geo-mapping for Energy and Minerals (GEM) Program	Program runs from 2008 to 2013 to explore for minerals in the Arctic territories and the northern seabed.
China	**2003** white paper on China's Policy on Mineral Resources (State Council) **2008** National Plan on Mineral Resources 2008–2015 (MOLAR) **2011** Five-year Plan 2011–2015 (NDRC) **2011** Mining Development Plan: Strategic Roadmap for Seeking Mining Breakthroughs (2011–2020) (State Council) **2012** white paper on Situation and Policies of China's Rare Earth Industry (State Council)	▸ Expansion of domestic production ▸ Technological modernization of production and processing ▸ Development and industrialization of inland provinces ▸ Consolidation of the raw materials industry ▸ Increasing energy and resource efficiency ▸ Establishing strategic resource reserves ▸ Environmental protection ▸ Direct investments in foreign sources of raw materials

Annex 4: Mineral Resource Strategies of the G20 Countries (ctd. I)

G20 Member	Strategic document	Key elements
European Union (EU)	**2008** The Raw Materials Initiative – Meeting Our Critical Needs for Growth and Jobs in Europe	Three basic objectives: ▸ A fair and sustainable supply through the global markets ▸ Increased use of domestic raw materials ▸ Reduction of overall raw materials consumption through resource efficiency, recycling, substitution Proposed measures: ▸ Dialog with like-minded countries on common efforts, with Africa on access to raw materials, and with China and Russia on the removal of trade barriers ▸ Promotion of transparency initiatives and good governance in resource-rich countries ▸ Promotion of domestic mining through a regulatory framework ▸ Research promotion
	2010 Critical Raw Materials for the EU	▸ Identification of 14 critical materials (especially for the high-tech and "green tech" sectors) ▸ Selection criteria: strong supplier concentration and restricted possibilities for substitution and recycling ▸ Linking raw materials policy with a regulatory framework for financial markets
	2011 Tackling the Challenges in Commodity Markets and on Raw Materials	Same three basic objectives as Raw Materials Initiative of 2008; proposed measures: ▸ Ensuring a fair and sustainable supply of raw materials on the global markets through a new "raw materials diplomacy"; promoting multilateral dialog on trade barriers affecting raw materials ▸ Partnerships with resource-rich countries to include promotion of transparency in the raw materials sector and good governance in the partner countries ▸ Protecting raw materials production in the EU through better coordination of national resource policies ▸ Improving recycling, waste management, resource efficiency, and resource efficiency research ▸ Promoting innovation in all areas
France	Interdepartmental Committee for International Cooperation and Development, Mineral Resources and Development in Africa: A Strategy Paper, May 2008	▸ Overall objective: raw materials production in resource-rich countries should contribute more to the economic and social development of these countries ▸ Most important steps to reach this overall objective: (1) providing data that is relevant to the exploration and production of raw materials; (2) improving governance and transparency; and (3) transitioning into an economy based on broad economic growth instead of resource revenues alone ▸ Current addressees: 13 countries in Central, West and Southern Africa ▸ Selection criteria: the economic and societal relevance of the mining sector, the respective government's institutional need and will to reform, development potential based on geological data and investor interest, and the likelihood that agreed measures will be implemented

Germany	**2007:** Elements of a Raw Materials Strategy (BMWi)	▸ Improving materials efficiency, recycling, and substitution ▸ Linking national and European raw materials strategies, interlinking different policy fields, and improving access to international raw materials data and information ▸ Diversifying supply through guarantee instruments, strengthening international market discipline, increasing involvement of German mining companies abroad, expanding domestic mining activities ▸ Promoting transparency in the mining sector and good governance in partner countries
	2008: Strategie Ressourceneffizienz (BMU) [Strategy on Resource Efficiency]	Focus on energy and materials efficiency in combination with new (consumer) habits; five central strategy elements: ▸ Establishing goals and indicators for resource efficiency, emissions, etc. on the national, European and international level ▸ Adjusting regulatory law (tightened EU emission standards, new reporting and labeling standards, etc.) ▸ Creating incentive systems for resource-efficient technologies ▸ Cooperation and communication measures to promote efficient use of resources in production and consumption ▸ Promotion of research and development
	2010: The German Government's Raw Materials Strategy (BMWi)	Builds on the 2007 strategy; four main components: ▸ Diversification of supply through increased use of domestic sources, investment in mining projects abroad, negotiation of resource partnerships, and enforcement of international market discipline via EU trade policy ▸ Materials efficiency, development of substitutes, and improvement of recycling ▸ Improving information and vocational training in the raw materials sector; political support for the activities of German companies ▸ Supporting good governance and anti-corruption measures in resource-rich countries
	2010: Mineral and Energy Resources as a Factor in Development (BMZ)	Formulates the goal of enabling developing countries to use their resource potential successfully in favor of a social, economic, and ecological development, while simultaneously securing Germany's sustainable supply of raw materials. The strategy paper identifies the following fields of action, through which partner countries of German development cooperation are to be supported: ▸ Using the raw materials sector to develop and strengthen the economy ▸ Developing efficient structures in the raw materials sector ▸ Achieving transparency ▸ Taking into account the ecological and social impact ▸ Improving the utilization of resources ▸ Improving the international trade regime ▸ Raw materials and conflicts

Annex 4: Mineral Resource Strategies of the G20 Countries (ctd. II)

G20 Member	Strategic document	Key elements
India	**2011:** Unlocking the Potential of the Indian Minerals Sector	Measures in six areas: ▸ Expanding the raw materials base (nationally and internationally) ▸ Reforming the regulatory framework ▸ Improving basic conditions (infrastructure, qualified personnel, technology) ▸ Ensuring sustainable mining and development ▸ Creating a plan for information, education, and communication ▸ Ensuring implementation through adjustment of governance structures
Indonesia	No explicit strategy documents	Law No. 4/2009 on Mineral and Coal Mining states three overall objectives: ▸ Implementing Law No. 22/1999 on Decentralization in the mining sector ▸ Promoting national economic development by strengthening and protecting the domestic raw materials sector ▸ Maximizing state revenues from the mining sector on all administrative levels
Italy	No explicit strategy document yet	▸ Establishing an office for raw materials (LAB-MP) to coordinate cooperation between government agencies, research institutes, companies, and associations ▸ Improving information and data ▸ Research and development in the raw materials sector ▸ Resource partnership with Afghanistan
Japan	**2009:** Strategy for Ensuring Stable Supplies of Rare Metals **2010:** One-stop System for Supply Security of the Industry	▸ Identification of 31 strategic raw materials ▸ Three components: – Strategic approach: Government to evaluate the supply situation and identify priorities for the various raw materials – Four pillars for securing the raw materials supply: Securing access to resources from abroad Recycling Development of alternative materials Stockpiling – Development of a shared infrastructure for securing access to rare metals: human resources development in the raw materials sector, improved technical capacities and integrated efforts, e.g. in the form of a multi stakeholder process ▸ Government support for seabed exploration for raw materials

Mexico	No mining plan, but the annual "National Development Plan, Implementation Report" of the federal government includes chapters on mining	Strategies presented in the Implementation Reports: ▸ Increase FDI in the mining sector ▸ Promote small and medium-sized enterprises in the mining sector Sectoral development bank: ▸ Mining Development Trust (Fideicomiso de Formento Minero, FIFOMI)
Russia	Government of the Russian Federation, Decree No. 494 of April 21, 2003, on the Utilization of the Earth's Interior Long-term Federal Program of the Ministry of Natural Resources and Environment on the Exploration and Reproduction of the Raw Material Base of the Russian Federation Decree No. 1039, Strategy for the Development of the Geological Sector until 2030, 21 June 2010	▸ Establishing conditions for financing exploration projects through share capital ▸ Guarantees for natural persons or corporate entities that discover a resource deposit (including deposits of national importance) that they may be involved in production of the resource ▸ Shortening the list of resources for which no publicly available information exists; only beryl, cobalt, lithium, nickel, niobium, tantalum, certain rare earth elements and high-purity quartz remain on the list ▸ Abolishing fees for geological data collected by government surveys ▸ Shortening the list of strategically important companies. In 2010, the government drafted a presidential decree to remove about 240 publicly listed companies and other firms from the list. The intended goal is to make investment decisions easier ▸ Simplifying mining companies' access to sectors of strategic importance ▸ Easier access for foreign capital to Russian companies – Revision of two laws regarding foreign investment; the purchase of shares in strategic companies remains in principle subject to approval, but the share for which no approval is needed was raised from 10 to 25 percent. Strategic companies are those active in the raw materials, defense, or media sectors, as well as other companies with a monopoly position that are of national importance for defense and national security
Saudi Arabia	No central strategic document per se, but sporadic statements, such as Zuhair A. Nawab (Deputy Minister for Mineral Resources), Mining as a Pillar of Economic Diversification: How Can the Kingdom Achieve This Vision? Background Paper (Riyadh: Ministry of Planning, Kingdom of Saudi Arabia, 2002).	Saudi Arabia's main strategic focus in the area of resources: ▸ Energy exports ▸ Increased use of nuclear and solar energy to meet domestic demand ▸ Securing food imports Strategic planning is more obvious for energy resources and agricultural goods than for minerals and metals. While minerals and metals play a less significant role in the Saudi Arabian economy, aluminum, building materials, gold, phosphates, and sulfur are significant. The country imposed export restrictions on cement, sand, and steel. Abroad, Saudi-Arabia invested in iron ore. The domestic mining sector should contribute to economic diversification.

Annex 4: Mineral Resource Strategies of the G20 Countries (ctd. III)

G20 Member	Strategic document	Key elements
South Africa	**2002:** Mining Charter	▸ Promotion of historically disadvantaged groups – Black Economic Empowerment, BEE
	2004: Mineral and Petroleum Resource Development Act (MPRDA)	▸ Ownership of mineral rights returned from private hands to national government ▸ Positive discrimination of historically disadvantaged, mostly Black citizens (BEE) – At least 26 percent of every enterprise should be owned by Black South Africans (by 2014) – 40 percent of managerial staff of mining companies should be from historically disadvantaged groups (by 2014)
	2012: State Intervention in the Mining Sector (Sims) Report	Objectives: ▸ Maximize state intervention in the mining sector ▸ Promote growth and employment in downstream sector and beneficiation Focus areas and proposals – outcome to be expected by December 2012: ▸ Identify strategic metals ▸ Introduce a "supertax" on exceptionally high company profits ▸ Strengthen the state-owned mining company
South Korea	**2010:** Basic Plan for the Development of Foreign Resources (Ministry of Knowledge Economy)	▸ Identification of strategic raw materials: copper, iron (ore), lithium, nickel, rare earths, zinc ▸ The most important objective is a gradual increase in domestic production of strategic resources by South Korean enterprises. Implementation through the state-owned enterprise KORES and through policy instruments in domestic and foreign suppliers: infrastructure packages, training of skilled workers, favorable financing, advertising South Korean development expertise ▸ Promotion of metal processing through industrial policy ▸ Supporting role of trade and development policy
Turkey	No explicit strategy for mineral and metallic raw materials; these are, however, mentioned in the Ninth Development Plan 2007–2013 (Turkish Grand National Assembly)	The Ninth Development Plan proposed the following measures: ▸ Expansion and systematization of exploration and restructuring of the research agency MTA ▸ Annual reporting ▸ Revision of the relevant statistics/data ▸ Establishing an expert commission dealing with research and development ▸ Preparation of a Strategic Mining Plan ▸ Creation of a Ministry of Mining
	and in the Ministry for Energy and Natural Resources Strategic Plan (2010–2014)	The Strategic Plan 2010–2014 only briefly mentions mining; an increase in the production of marble and the further diversification of boron products are the only objectives mentioned.

United Kingdom (UK)	**2006**: Minerals Policy Statement 1: Planning and Minerals	▸ Guidance for domestic production ▸ Relates to national/regional land-use planning, no focus on international raw materials policy and access/supply
	2012: Resource Security Action Plan	▸ National strategic document on securing the raw materials supply ▸ Emphasis on national solutions, especially recycling, material efficiency, R&D; no international elements (such as resource partnerships, bilateral agreements) ▸ Seven new key elements: – Financing an "Innovation Challenge" for local projects in the area of recycling management – Feasibility analyses for producer responsibility in WEEE (Waste Electrical and Electronic Equipment) – Enhanced data gathering in the area of WEEE – Creation of a "critical resources dashboard" to support companies with relevant information – Developing a material flow analysis for WEEE key products – Trials of new recycling techniques for electrical waste – Creation of a new industry-led consortium for improving cooperation between government, industry, and other organizations

Annex 4: Mineral Resource Strategies of the G20 Countries (ctd. IV)

G20 Member	Strategic document	Key elements
United States of America (USA)	**2010:** Rare Earth Materials in the Defense Supply Chain	▸ Report of the Government Accountability Office (GAO); raw materials scarcity in the defense sector is classified as a geopolitical risk
	2010: U.S. DOE Critical Materials Strategy	▸ To ensure the production of renewable energy ▸ Examination of 14 materials in view of their criticality; six materials are identified as critical in the short term and five as critical in the medium term Three pillars: ▸ Diversify supply chains by promoting domestic extraction and encouraging other countries to diversify their supply too ▸ Development of alternative materials and technologies ▸ Improved recycling and resource efficiency Proposed measures: ▸ Promotion of research and development in the areas of recycling, substitution, and resource and materials efficiency ▸ Collection of data on the raw materials economy and on international raw materials markets ▸ Faster issuing of licenses for domestic mining (mining claims and patents) as well as financial support for domestic mining activities ▸ Considering stockpiling as a possible option ▸ A sophisticated recycling policy ▸ Improving education and training for careers in the raw materials sector ▸ Cooperating with countries that face similar challenges with regard to their raw materials supply, for example in the area of research and development, the collection of data, or the enforcement of international trade rules
	2011: U.S. DOE Critical Materials Strategy	▸ Updated report on critical materials ▸ Same core objectives as the previous DOE strategy
	2012: Report to Congress: Rare Earth Materials in Defense Applications (DOD)	▸ Identification of 17 strategic metals (all are rare earth elements) ▸ Recommends a three-step approach to secure the defense industry's access to rare earths: – Diversification of sources of supply – Development of substitutes – Improving the recycling of rare earths

Annex 5: Policy Instruments of the G20 Countries Affecting Raw Materials

Measure/instrument	Argentina	Australia	Brazil	Canada	China	EU	France
Domestic raw materials management							
National raw materials strategy			x		X	x	(x) (in preparation)
Identification of critical raw materials			x			x	(x) (in preparation)
Promotion of domestic exploration and extraction		(x)		x	x	x	x
Promotion of private-sector recycling efforts					x	x	x
Promotion of the development of substitutes						x	x
Promotion of efforts to improve production and material efficiency				x	x	x	x
National stockpiling				x	x		
National raw materials/mineral resources agency	x		x				
Promotion of innovation/R&D					x	x	x
Market regulation/intervention							
Improving transparency (e.g. publication of data)		x	x	x		x	x
Subsidization of domestic production		x			x		
Subsidization of domestic processing		x			x		
Permission necessary for private investment	x	x	x		x		x
Competition laws/antitrust agency		x			x	x	
Taxation of the raw materials sector	[a]/x	x	–/x		x		
Permission necessary for foreign direct investment	x	x	x		x		
Restrictions on resource exports					x		
Non-tariff barriers					x		
Import subsidies					x		

Comments/explanations: a Differs from province to province.

Annex 5: Policy Instruments of the G20 Countries Affecting Raw Materials (ctd. I)

Measure/instrument	Argentina	Australia	Brazil	Canada	China	EU	France
Social and environmental laws, land use laws							
Social security and labor laws	x	x	x	x	x	x	x
Environmental legislation affecting the raw materials sector	x	x	x	x	x	x	x
Foreign (economic) policy affecting raw materials							
Technical support for companies		x	x	x	x	x	x
Raw materials partnerships (including bilateral investment agreements)			x		x	x	x
State investment guarantees				x	x	x	
Bilateral trade agreements		x		x	x	x	[b]
Utilization of the WTO dispute settlement mechanism		x		x	x	x	[b]
International cooperation seeking to pool interests/ promote research		(x)		x		x	x
Development policy							
Technical and financial development cooperation		x	x	x	x	x	
Instruments to improve transparency of supply chains		x					
National legislation							
Promotion of the development of certification systems				x		x	
Instruments for improving transparency of financial flows							
National legislation		(x)				x[c]	
Member of EITI (or supporter/stakeholder)		(x) (Stakeholder)		(x) (Stakeholder)		(x) (Stakeholder)	(x) (Stakeholder)

Comments/explanations: b No bilateral trade agreements or utilization of the WTO dispute settlement mechanism specifically by France due to common EU trade policy;
c The new Transparency Directive has not come into force (as of March 2013).

Measure/instrument	Germany	India	Indonesia	Italy	Japan	Mexico	Russia
Domestic raw materials management							
National raw materials strategy	x	x			x		x
Identification of critical raw materials	x	x			x		x
Promotion of domestic exploration and extraction	x[a]	x			x		x
Promotion of private-sector recycling efforts	x				x		x
Promotion of the development of substitutes	x	x			x		x
Promotion of efforts to improve production and material efficiency	x			x			x
National stockpiling					x		x
National raw materials/mineral resources agency		x			x	x	x
Promotion of innovation/R&D	x			x			x
Market regulation/intervention							
Improving transparency (e.g. publication of data)	x	x	x	x	x	x	x
Subsidization of domestic production		x					
Subsidization of domestic processing							x
Permission necessary for private investment		x	x			x	x
Competition laws/antitrust agency	x				x		x
Taxation of the raw materials sector	x	x	x	x	x	–/x	x
Permission necessary for foreign direct investment		x	x		x	x	x
Restrictions on resource exports			x				x
Non-tariff barriers			x				
Import subsidies					x		

Comments/explanations: a Through the coordination of federal and state laws.

Annex 5: Policy Instruments of the G20 Countries Affecting Raw Materials (ctd. II)

Measure/instrument	Germany	India	Indonesia	Italy	Japan	Mexico	Russia
Social and environmental laws, land use laws							
Social security and labor laws	x	x		x	x	x	x
Environmental legislation affecting the raw materials sector	x	x		x	x	x	x
Foreign (economic) policy affecting raw materials							
Technical support for companies	x	x		x	x	x	
Raw materials partnerships (including bilateral investment agreements)	x			x	x		x
State investment guarantees	x			x	x		
Bilateral trade agreements	b			b	x		x
Utilization of the WTO dispute settlement mechanism	b			b	x		
International cooperation seeking to pool interests/ promote research	x	x			x		
Development policy							
Technical and financial development cooperation	x	x		x	x		
Instruments to improve transparency of supply chains							
National legislation		x					
Promotion of the development of certification systems	x						
Instruments for improving transparency of financial flows							
National legislation		x					
Member of EITI (or supporter/stakeholder)	(x) (Stakeholder)	against EITI	(x) (candidate since October 2010)	(x) (Stakeholder)	(x) (Stakeholder)		

Comments/explanations: b No bilateral trade agreements or utilization of the WTO dispute settlement mechanism specifically by Germany or Italy due to common EU trade policy.

Measure/instrument	Saudi Arabia	South Africa	South Korea	Turkey	United Kingdom (UK)	United States of America (USA)
Domestic raw materials management						
National raw materials strategy			x		(x)	
Identification of critical raw materials	x[a]	x	x		x	x
Promotion of domestic exploration and extraction	x		x	x[d]	x	[g]
Promotion of private-sector recycling efforts			x		x	x
Promotion of the development of substitutes			x		x	x
Promotion of efforts to improve production and material efficiency	x		x		x	x
National stockpiling		x	x			x
National raw materials/mineral resources agency	x	x	x			
Promotion of innovation/R&D	x	x	x	x	x	x
Market regulation/intervention						
Improving transparency (e.g. publication of data)	x	x	x	x[e]		x
Subsidization of domestic production	x			x[f]	x	
Subsidization of domestic processing	x	x				
Permission necessary for private investment	x	x			x	
Competition laws/antitrust agency		x	x	x	x	x
Taxation of the raw materials sector	x	x[c]	x			x
Permission necessary for foreign direct investment	x	x	x			x[h]
Restrictions on resource exports	x	x				
Non-tariff barriers	x					
Import subsidies	x					

Comments/explanations: see page 187.

Annex 5: Policy Instruments of the G20 Countries Affecting Raw Materials (ctd. III)

Measure/instrument	Saudi Arabia	South Africa	South Korea	Turkey	United Kingdom (UK)	United States of America (USA)
Social and environmental laws, land use laws						
Social security and labor laws	x[b]	x	x	x	(x)	x
Environmental legislation affecting the raw materials sector		x	x	x	x	[g]
Foreign (economic) policy affecting raw materials						
Technical support for companies	x		x			x
Raw materials partnerships (including bilateral investment agreements)		x	x			
State investment guarantees	x	x	x		x	x
Bilateral trade agreements		x	x			x
Utilization of the WTO dispute settlement mechanism		x	x	x	x (through EU)	x
International cooperation seeking to pool interests/ promote research			x	x		x
Development policy						
Technical and financial development cooperation	x	x	x		x	x
Instruments to improve transparency of supply chains						
National legislation		x				x
Promotion of the development of certification systems		x				x
Instruments for improving transparency of financial flows						
National legislation		x			x	x
Member of EITI (or supporter/stakeholder)					(x) (Stakeholder)	(x) (Stakeholder)

Comments/explanations to pages 185–186.

a Concerning agricultural products, but not for minerals and metals.

b Program for the "Saudization" of the workforce.

c Resource rent tax has not yet been implemented.

d Promotion of exploration.

e Turkish information on raw materials and production data is not always reliable due to outdated systems for collecting and analyzing data in some companies, which are not necessarily consistent with international reporting standards.

f Investment support for the mining sector is planned, including exemption from turnover tax and customs duties, income tax breaks, and reduced social security contributions.

g Various legislative proposals for the abolishment of (administrative) barriers to domestic mining projects were introduced during the 112th Congress; no proposal was signed into law.

h According to the *Foreign Investment and National Security Act of 2007* (FINSA), the U.S. president can prohibit acquisitions of U.S. companies by foreign investors if the Committee on Foreign Investment in the United States (CFIUS) advises that national security is threatened. A review is compulsory if the acquisition concerns critical infrastructure, i.e. potential effects on critical technologies have to be taken into consideration (especially on those that are crucial to the defense sector, which include strategic raw materials). FINSA thus affects acquisitions of mining companies that produce strategic raw materials.

Annex 6: Fundamental Economic Data for the G20 Countries

	GDP in billion $, 2011 (current prices)	*GDP at PPP[a] in billion $, 2011 (current international dollar, valuation of country)*	*Annual GDP growth in %, 2011 (constant prices)*	*Per capita GDP in US$, 2011 (current prices)*	*Share of world GDP, 2010 (based on PPP)*	*Share of world imports in %, 2011[b]*	*Share of world exports in %, 2011[b]*	*Current account balance as % of GDP, 2011*	*Share of global outward FDI stock, 2011, %[c]*	*Share of global inward FDI stock, 2011, %[c]*	*Unemployment in %, 2011*
Argentina	*447.64*	*716.42*	*8.87*	*10,944.71*	0.86	0.41	0.43	*−0.50*	0.15	0.47	*7.15*
Australia	1,488.22	914.48	2.04	65,477.03	1.18	1.41	1.52	−2.22	1.82	2.44	5.1
Brazil	2,492.91	2,294.24	2.73	*12,788.56*	2.93	1.35	1.44	−2.11	0.96	3.28	5.97
Canada	1,736.87	1,396.13	2.46	50,435.50	1.79	2.69	2.54	−2.81	3.17	2.91	7.47
China	7,298.15	11,299.97	9.24	5,413.57	13.58	9.45	10.67	*2.75*	1.73	3.48	4.0
France	2,776.32	2,217.90	1.72	44,008.18	2.86	3.81	3.28	−2.23	6.48	4.72	9.68
Germany	3,577.03	3,099.08	3.06	43,741.55	3.95	6.73	7.81	5.74	6.81	3.49	5.98
India	1,676.14	4,457.78	7.24	*1,388.78*	5.46	2.51	1.72	*−2.82*	0.53	0.99	*n/a*
Indonesia	845.68	1,124.65	6.46	3,508.61	1.39	0.96	1.14	0.25	0.04	0.85	6.56
Italy	2,198.73	1,846.95	0.43	*36,266.85*	2.41	2.85	2.89	−3.19	2.42	1.63	*8.37*
Japan	5,869.47	4,440.38	−0.75	45,920.30	5.87	4.64	4.63	2.05	4.55	1.10	4.55
Mexico	*1,154.78*	*1,661.64*	*3.97*	*10,153.30*	2.10	2.09	1.96	*−0.76*	0.53	1.48	*5.23*
Russia	1,850.40	2,383.40	4.3	12,993.36	3.00	1.60	2.78	5.47	1.71	2.24	6.5
Saudi Arabia	577.60	682.75	6.78	*20,504.36*	0.84	0.69	1.86	*24.43*	0.14	0.91	*n/a*
South Africa	*408.07*	*555.13*	*3.15*	*8,066.15*	0.71	0.59	0.55	*−3.30*	0.34	0.64	*24.51*
South Korea	*1,116.25*	*1,554.15*	*3.63*	*22,777.93*	1.97	2.85	3.16	*2.38*	0.75	0.64	*3.41*
Turkey	*778.09*	*1,073.57*	*8.46*	*10,521.82*	1.30	1.31	0.76	*−9.91*	0.11	0.69	9.89
UK	2,417.57	2,260.80	0.66	*38,592.10*	2.95	3.48	2.60	−1.92	8.18	5.87	8.01
USA	15,094.03	15,094.03	1.74	*48,386.69*	19.47	12.30	8.31	−3.14	21.26	17.17	8.95

Abbreviations: FDI = Foreign direct investment; GDP = Gross domestic product; PPP = Purchasing power parity.

a Source: IMF, *Direction of Trade Statistics* (accessed August 21, 2012).

b Source: UNCTAD, *UnctadStat Database* (accessed August 21, 2012).

Source: IMF, *World Economic Outlook Database*, April 2012 edition, numbers in italics are IMF estimates.

Annex 6a: Composition of GDP by sector in %

Argentina		**Australia**		**Brazil**	
Manufacturing	18.9	Agriculture, forestry, fisheries	2.5	Manufacturing	14.6
Retail and wholesale	11.6	Mining, manufacturing	20.4	Retail	12.6
Agriculture, forestry, livestock farming	9.6	Construction	7.6	Real estate	7.9
Real estate	9.1	Retail and wholesale, gastronomy	11.8	Insurance and finance	7.4
Education, health and social services	8.2	Transport, logistics, communication	8.7	Construction	5.8
Transport, logistics, communication	7.3	Other	49.1	Agriculture	5.5
Construction	5.3			Transport, logistics	5.1
Financial services	5.2			Mining	4.1
Mining	3.1			Electricity, gas, water, waste	3.1
Hotel and hospitality industry	2.2			Information services	3.0
Other	19.5			Other	30.9
Canada		**China**		**France**	
Agriculture, forestry, fisheries	2.3	Agriculture, forestry, fisheries	10.0	Services	54.0
Manufacturing	12.8	Mining, manufacturing	39.9	Manufacturing	16.5
Mining, oil, gas	4.5	Construction	6.8	Construction	3.9
Construction	6.0	Retail and wholesale, gastronomy	11.1	Other	25.6
Retail and wholesale	11.7	Transport, logistics, communication	4.6		
Transport, logistics	4.7	Other	27.6		
Professional, scientific, and technical services	4.9				
Insurance, finance, real estate	20.9				
Public administration	6.0				
Other	26.2				
Germany		**India**		**Indonesia**	
Finance, renting, corporate services	26.3	Agriculture	17.3	Agriculture, forestry, fisheries	15.3
Manufacturing	22.6	Manufacturing	14.1	Mining, manufacturing	36.8
Retail and wholesale, hospitality, transport	16.0	Mining	2.7	Construction	10.3
Construction	4.6	Construction	8.1	Retail and wholesale, gastronomy	13.7
Information services and communication	3.8	Trade, transport, communication	25.2	Transport, logistics, communication	6.5
Other	26.7	Banking, insurance, real estate	16.9	Other	17.4
		Electricity, gas, water	1.6		
		Public administration, other	14.2		

Note: Differences in the collection and classification of GDP components can cause large variances in the statistics issued by different statistical offices.

Annex 6a: Composition of GDP by sector in % (ctd.)

Italy		**Japan**		**Mexico**	
Agriculture, forestry, fisheries	1.9	Agriculture, forestry, fisheries	1.4	Agriculture	3.8
Mining, manufacturing	19.4	Mining, manufacturing	21.4	Mining	10.1
Construction	6.0	Construction	5.9	Manufacturing	18.0
Retail and wholesale, gastronomy	14.9	Retail and wholesale, gastronomy	13.1	Construction	6.7
Transport, logistics, communication	7.3	Transport, logistics, communication	6.4	Retail and wholesale	16.4
Other	50.6	Other	51.7	Transport, postal services, storage	7.0
				Financial and insurance services	3.6
				Real estate	9.5
				Other services	18.3
				Other	6.6
Russia		**Saudi Arabia**		**South Africa**	
Agriculture, forestry, fisheries	4.0	Agriculture, forestry, fisheries	2.0	Agriculture, forestry, fisheries	2.5
Mining, manufacturing	31.0	Mining	53.2	Mining, manufacturing	27.0
Construction	5.7	Manufacturing	10.1	Construction	3.8
Retail and wholesale, gastronomy	19.2	Construction	4.0	Retail and wholesale, gastronomy	13.9
Transport, logistics, communication	9.7	Retail and wholesale, gastronomy	4.8	Transport, logistics, communication	9.1
Other	30.3	Transport, logistics, communication	3.2	Other	43.7
		Financial services and real estate	6.4		
		Other	16.3		
South Korea		**Turkey**		**United Kingdom**	
Agriculture, forestry, fisheries	2.6	Housing	10.0	Agriculture, forestry, fisheries	0.6
Mining, manufacturing	32.8	Manufacturing	16.3	Construction	6.8
Construction	6.5	Transport, communication	13.3	Manufacturing	16.5
Retail and wholesale, gastronomy	11.8	Retail and wholesale	11.8	Public administration, defense, education	19.1
Transport, logistics, communication	7.1	Agriculture, forestry	7.9	Retail and wholesale, hospitality, transport	18.9
Other	39.2	Financial institutions	3.2	Manufacturing	10.8
		Construction	4.5	Information and communication	5.9
		Other	33.0	Other	21.4

United States of America
Agriculture, forestry 1.2
Mining 1.9
Manufacturing 12.2
Construction 3.4
Wholesale 5.6
Retail 6.1
Transport, logistics 2.8
Information and communication services 4.4
Finance and insurance 8.3
Real estate 11.6
Other services 25.2
Public sector 13.2
Other 4.1

Note: Differences in the collection and classification of GDP components can cause large variances in the statistics issued by different statistical offices.

Source: GTAI, *Wirtschaftsdaten kompakt*, separate reports for each country, from http://www.gtai.de/GTAI/Navigation/DE/trade.html (accessed December 18, 2012). Most of the data as of November/December 2012.

Annex 7: Production of Non-Energy Mineral Resources by G20 Countries (as of 2010)

G20 Member	Total	Iron and ferro-alloy metals	Non-ferrous metals	Precious metals	Industrial minerals	
China						
Production in tonnes	570,803,426	346,544,600	53,269,985	3,841	170,985,000	*Countries with more than 5 percent of global raw materials production*
Share of world output in %	25.39	26.47	20.33	14.93	25.26	
Australia						
Production in tonnes	368,915,046	277,396,117	73,420,499	2,141	18,096,290	
Share of world output in %	16.41	21.19	28.02	8.32	2.67	
Brazil						
Production in tonnes	265,524,452	217,329,890	30,985,121	81	17,209,360	
Share of world output in %	11.81	16.60	11.82	0.31	2.54	
India						
Production in tonnes	191,208,599	145,917,000	15,138,452	167	30,152,980	
Share of world output in %	8.51	11.15	5.78	0.65	4.46	
EU-27						
Production in tonnes	145,352,312	17,480,825	6,598,134	1.700	121,271,653	
Share of world output in %	6.47	1.34	2.52	6.61	17.92	
United States						
Production in tonnes	117,379,282	31.126,900	3,975,957	1,525	82,274,900	
Share of world output in %	5.22	2.38	1.52	5.93	12.16	
Russia						
Production in tonnes	88,490,402	53,066,620	10,490,502	1,458	24,922,822	*Countries with between 1and 5 percent of global raw materials production*
Share of world output in %	3.94	4.05	4.00	5.67	3.68	
Canada						
Production in tonnes	57,966,361	24,476,210	4,248,987	697	29,240,467	
Share of world output in %	2.58	1.87	1.62	2.71	4.32	
South Africa						
Production in tonnes	51,776,832	47,393,210	980,539	516	3,402,567	
Share of world output in %	2.30	3.62	0.37	2.01	0.50	
Germany						
Production in tonnes	36,435,379	41,337	402,800	0	35,991,242	
Share of world output in %	1.62	0.00	0.15	0.00	5.32	
Mexico						
Production in tonnes	26,016,326	8,125,194	737,097	3,180	17,150,855	
Share of world output in %	1.16	0.62	0,28	12.36	2.53	

Turkey						*Countries with less than 1 percent of global raw materials production*
Production in tonnes	18,391,526	4,301,465	1,121,810	406	12,967,845	
Share of world output in %	0.82	0.33	0.43	1.58	1.92	
France						
Production in tonnes	15,954,000	0	356,000	0	15,598,000	
Share of world output in %	0.71	0.00	0.14	0.00	2.30	
Italy						
Production in tonnes	12,377,700	700	132,500	0	12,244,500	
Share of world output in %	0.55	0.00	0.05	0.00	1.81	
United Kingdom						
Production in tonnes	9,292,272	0	186,251	1	9,106,020	
Share of world output in %	0.41	0.00	0.07	0.00	1.35	
Saudi Arabia						
Production in tonnes	7,723,355	198,000	291,043	12	7,234,300	
Share of world output in %	0.34	0.02	0.11	0.05	1.07	
Japan						
Production in tonnes	6,514,887	700	7,303	9	6,506,875	
Share of world output in %	0.29	0.00	0.00	0.03	0.96	
Argentina						
Production in tonnes	4,692,165	150,468	619,045	752	3,921,900	
Share of world output in %	0.21	0.01	0.24	2.92	0.58	
Indonesia						
Production in tonnes	3,446,894	215,243	2,272,296	455	958,900	
Share of world output in %	0.15	0.02	0.87	1.77	0.14	
South Korea						
Production in tonnes	2,630,859	353,080	4,566	2	2,273,211	
Share of world output in %	0.12	0.03	0.00	0.01	0.34	
World production	2,248,143,586	1,309,217,317	262,067,722	25,735	676,832,987	

Source: BMWFJ, *World Mining Data 2012*, pp. 43–46, http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed January 31, 2013).

Annex 8: The Five Most Important Mineral Resources Produced by Each G20 Country (Share of Global Production in %, 2010)

Countries with a high share of world production (in percent)

China		**Australia**		**Brazil**		**India**	
Rare earths*	97.89	Zircon*	44.79	Tantalum – columbium*	92.29	Barite	15.15
Antimony*	86.64	Bauxite*	36.52	Iron	16.95	Talc	13.76
Tungsten*	85.29	Lithium	21.98	Bauxite	15.48	Chromium	13.26
Graphite*	73.38	Iron	21.42	Asbestos	13.26	Iron	11.19
Bismuth*	69.87	Titanium*	20.79	Vermiculite	10.52	Manganese	10.10

EU-27		**United States of America**	
Feldspar	55.85	Diatomite*	34.72
Perlite	45.07	Boron minerals	30.09
Kaolin	36.64	Bentonite*	28.69
Salt	20.96	Pelite	26.29
Gypsum and anhydrite	17.34	Molybdenum	22.37

Countries with a moderate share of world production (in percent)

Russia		**Canada**		**South Africa**		**Germany**	
Asbestos*	49.10	Potash*	28.92	Rhodium*	85.83	Feldspar*	23.77
Palladium*	44.21	Titan	16.49	Platinum*	77.69	Kaolin	15.85
Diamonds (gem)*	28.32	Diamonds (gem)	15.98	Chromium*	43.08	Potash	9.82
Diamonds (industrial)	25.16	Nickel	10.30	Vermiculite*	41.96	Salt	7.22
Vanadium	24.39	Sulfur	9.46	Palladium	41.85	Bentonite	2.60

Mexico	
Flourspar	18.06
Silver	13.78
Bismuth	10.56
Cadmium	6.41
Diatomite	5.52

Countries with a low share of world production (in percent)			
Turkey	**France**	**Italy**	**United Kingdom**
Boron minerals* 38.32	Talc 5.42	Feldspar 21.47	Kaolin 3.46
Feldspar 8.22	Diatomite 4.78	Gypsum and anhydrite 3.95	Salt 2.16
Perlite 7.95	Feldspar 2.69	Talc 1.86	Gypsum and anhydrite 1.21
Chromium 7.20	Gypsum and anhydrite 2.45	Sulfur 1.22	Potash 1.20
Magnesite 4.43	Salt 2.33	Salt 0.82	Aluminum 0.45
Saudi Arabia	**Japan**	**Argentina**	**Indonesia**
Sulfur 5.27	Tellurium* 57.30	Lithium 15.59	Tin 30.59
Gypsum and anhydrite 1.50	Perlite 10.44	Boron minerals 10.03	Nickel* 12.40
Salt 0.67	Cadmium 8.87	Silver 3.07	Copper 5.41
Barite 0.38	Gallium 7.14	Diatomite 2.92	Gold 4.72
Feldspar 0.19	Sulfur 6.11	Gold 2.29	Silver 1.48
South Korea			
Cadmium 18.01			
Talc 9.64			
Kaolin 3.33			
Feldspar 2.27			
Titanium 1.09			

* Country is leading world producer (except EU).

The following mineral resources are included in this analysis:
Iron and ferro-alloy metals: Chromium, cobalt, iron, manganese, molybdenum, nickel, tantalum-niobium, titanium, tungsten, vanadium.
Non-ferrous metals: Aluminum, arsenic, bauxite, bismuth, cadmium, copper, gallium, germanium, lead, lithium, mercury, rare earths, tellurium, tin, zinc.
Precious metals: Gold, platinum-group metals (palladium, platinum, rhodium), silver.
Industrial minerals: Asbestos, barite, bentonite, boron minerals, diamonds (industrial or gem), diatomite, feldspar, fluorspar, gypsum and anhydrite, graphite, guano, kaolin, magnesite, perlite, phosphate, potash, salt, sulfur, talc (also steatite and pyrophyllite), vermiculite, zirconium.

Source: BMWFJ, *World Mining Data 2012* (Vienna, 2012), pp. 183–215, http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed January 31, 2013).

Annex 9: Value of Production and Global Share

Country	Total	Iron and ferro-alloy metals	Non-ferrous metals	Precious metals	Industrial minerals	
China						
Production in million US$	181,221	90,305	61,419	17,216	12,281	*Countries with more than 5 percent of global raw materials production (by value)*
Share of world production in %	20.75	22.23	23.45	12.12	19.41	
Australia						
Production in million US$	103,073	71,340	17,798	12,589	1,346	
Share of world production in %	11.80	17.56	6.80	8.86	2.13	
Brazil						
Production in million US$	69,643	58,622	6,571	2,694	1,756	
Share of world production in %	7.97	14.43	2.51	1.90	2.78	
Russia						
Production in million US$	52,682	19,338	14,900	12,717	5,727	
Share of world production in %	6.03	4.76	5.69	8.95	9.05	
South Africa						
Production in million US$	51,367	28,452	2,599	19,763	553	
Share of world production in %	5.88	7.00	0.99	13.91	0.87	
India						
Production in million US$	47,609	39,589	5,964	217	1,839	
Share of world production in %	5.45	9.75	2.28	0.15	2.91	
United States						
Production in million US$	41,689	9,454	14,443	11,262	6,530	*Countries with between 1 and 5 percent of global raw materials production (by value)*
Share of world production in %	4.77	2.33	5.51	7.93	10.32	
Canada						
Production in million US$	33,750	9,910	12,040	4,678	7,122	
Share of world production in %	3.86	2.44	4.60	3.29	11.26	
EU-27						
Production in million US$	31,149	5,699	14,016	1,824	9,610	
Share of world production in %	3.57	1.40	5.35	1.28	15.19	
Indonesia						
Production in million US$	18,831	4,217	9,142	5,410	62	
Share of world production in %	2.16	1.04	3.49	3.81	0.10	

Mexico						ctd.:
Production in million US$	11,201	2,489	2,833	4,995	884	*Between 1 and 5 percent of*
Share of world production in %	1.28	0.61	1.08	3.52	1.40	*raw materials production*
Turkey						
Production in million US$	7,006	3,669	1,051	969	1,317	*Countries with less than*
Share of world production in %	0.80	0.90	0.40	0.68	2.08	*1 percent of global raw*
Argentina						*materials production*
Production in million US$	5,495	54	2,083	3,003	355	*(by value)*
Share of world production in %	0.63	0.01	0.80	2.11	0.56	
Germany						
Production in million US$	5,087	10	875	0	4,202	
Share of world production in %	0.58	0.00	0.33	0.00	6.64	
France						
Production in million US$	1,583	0	773	0	810	
Share of world production in %	0.18	0.00	0.30	0.00	1.28	
United Kingdom						
Production in million US$	1,172	0	405	8	759	
Share of world production in %	0.13	0.00	0.15	0.01	1.20	
Italy						
Production in million US$	906	1	288	0	617	
Share of world production in %	0.10	0.00	0.11	0.00	0.98	
Japan						
Production in million US$	901	0	30	369	502	
Share of world production in %	0.10	0.00	0.01	0.26	0.79	
Saudi Arabia						
Production in million US$	659	46	33	199	381	
Share of world production in %	0.08	0.01	0.01	0.14	0.60	
South Korea						
Production in million US$	418	72	17	12	317	
Share of world production in %	0.05	0.02	0.01	0.01	0.50	
Total value of global production	873,493	406,248	261,915	142,070	63,259	

Source: BMWFJ, *World Mining Data 2012* (Vienna, 2012), pp. 46–49, http://www.bmwfj.gv.at/EnergieUndBergbau/WeltBergbauDaten/Documents/WMD2012druckbar.pdf (accessed January 31, 2013).

Annex 10: Countries with the Largest Reserves (Absolute Values)

Metal/ mineral	Global reserves*	Country 1	Country 2	Country 3	Country 4	Country 5
Antimony	1,800,000 (t)	China 950,000	Russia 350,000	Bolivia 310,000	Tajikistan 50,000	South Africa 21,000
		52.8%	19.4%	17.2%	2.8%	1.2%
Bauxite	29,000,000 (tmdt)	Guinea 7,400,000	Australia 6,200,000	Brazil 3,600,000	Vietnam 2,100,000	Jamaica 2,000,000
		25.5%	21.4%	12.4%	7.2%	6.9%
Copper	690,000 (t)	Chile 190,000	Peru 90,000	Australia 86,000	Mexico 38,000	USA 35,000
		27.5%	13.0%	12.5%	5.5%	5.1%
Gold	51,000 (t)	Australia 7,400	South Africa 6,000	Russia 5,000	Chile 3,400	Indonesia 3,000
		14.5%	11.8%	9.8%	6.7%	5.9%
Iron ore: Crude ore	170,000 (mmt)	Australia 35,000	Brazil 29,000	Russia 25,000	China 23,000	India 7,000
		20.6%	17.1%	14.7%	13.5%	4.1%
Iron content	80,000 (mmt)	Australia 17,000	Brazil 16,000	Russia 14,000	China 7,500	India 4,500
		21.3%	20.0%	17.5%	9.4%	5.6%
Nickel	80,000,000 (t)	USA 24,000,000	New Cale- 12,000,000	Brazil 8,700,000	Russia 6,000,000	Cuba 5,500,000
		30.0%	donia 15.0%	10.9%	7.5%	6.9%
Platinum-group metals	66,000,000 (kg)	S. Africa 63,000,000	Russia 1,100,000	USA 900,000	Canada 310,000	
		95.5%	1.7%	1.4%	0.5%	
Rare earths	110,000,000 (t)	China 55,000,000	CIS** 19,000,000	USA 13,000,000	India 3,100,000	Australia 1,600,000
		50.0%	17.3%	11.8%	2.8%	1.5%
Tin	4,800,000 (t)	China 1,500,000	Indonesia 800,000	Brazil 590,000	Bolivia 400,000	Russia 350,000
		31.3%	16.7%	12.3%	8.3%	7.3%
Tungsten	3,100,000 (t)	China 1,900,000	Russia 250,000	USA 140,000	Bolivia 53,000	Austria 10,000
		61.3%	8.1%	4.5%	1.7%	0.3%
Yttrium	540,000 (t)	China 220,000	USA 120,000	Australia 100,000	India 72,000	Malaysia 13,000
		40.7%	22.2%	18.5%	13.3%	2.4%

* kg = kilograms; mmt = million metric tonnes; t = metric tonnes; tmdt = thousand metric dry tons.

** Commonwealth of Independent States.

Source: USGS, *Mineral Commodity Summaries 2012*, http://minerals.usgs.gov/minerals/pubs/mcs/ (accessed August 28, 2012).

Annex 11: Consumption of Selected Metals in G20 Countries, 2010

Metal	t = metric tonnes	Very high Consumption (> 40%)	High Consumption (> 10%)		Medium Consumption (mostly > 2%)					
		China	EU	USA	Brazil	Germany	India	Italy	Japan	South Korea
Aluminum	Absolute (t)	15,804.9	6,766.9	4,242.5	985.1	1,911.8	1,474.8	870.7	2,025.0	1,254.6
	Share (%)	43.8	18.7	11.8	2.7	5.3	4,1	2.4	5.6	3.5
Copper	Absolute (t)	7,418.6	3.432.3	1,751.0	469.5	1,312.2	404.9	618.8	1,060.3	856.1
	Share (%)	43.4	20.1	10.2	2.7	7.7	2.4	3.6	6.2	5.0
Lead	Absolute (t)	4,212.7	1,515.2	1,500.0	198.1	342.5	190.9	244.9	223.8	381.8
	Share (%)	48.0	17.3	17.1	2.3	3.9	2.2	2.8	2.5	4.3
Nickel	Absolute (t)	561.5	345.8	118.8	10.5	100.3	27.2	62.3	177.0	101.2
	Share (%)	39.6	24.4	8.4	0.7	7.1	1.9	4.4	12.5	7.1
Tin	Absolute (t)	152.8	54.9	34.7	8.0	17.4	10.7	3.7	35.7	17.4
	Share (%)	44.6	19.3	11.0	2.2	5.6	3.1	2.9	7.0	5.0
Zinc	Absolute (t)	5,305.6	2,114.5	907.0	245.8	493.7	537.7	338.9	516.2	550.3
	Share (%)	47.0	18.7	8.0	2.2	4.4	4.8	3.0	4.6	4.9

Metal		Low Consumption (mostly < 2%)									
		Argentina	Australia	Canada	France	Indonesia	Mexico	Russia	South Africa	Turkey	UK
Aluminum	Absolute (t)	161.0	390.7	576,6	549.3	414.5	145.7	685.0	474.0	703.2	270.0
	Share (%)	0.4	1.1	1,6	1.5	1.1	0.4	1.9	1.3	1.9	0.7
Copper	Absolute (t)	25.9	140.7	148,6	193.5	210.7	318.5	420.5	67.3	369.2	43.0
	Share (%)	0.2	0.8	0,9	1.1	1.2	1.9	2.5	0.4	2.2	0.3
Lead	Absolute (t)	66.7	34.4	24,0	65.7	95.5	188.1	13.4	61.1	75.9	207.6
	Share (%)	0.8	0.4	0,3	0.7	1.1	2.1	0.2	0.7	0.9	2.4
Nickel	Absolute (t)	0.8	1.6	4,3	20.9	0.8	1.9	24.0	40.8	3.1	32.4
	Share (%)	0.1	0.1	0,3	1.5	0.1	0.1	1.7	2.9	0.2	2.3
Tin	Absolute (t)	2.1	0.4	3,0	5.4	1.4	4.1	2.5	0.8	2.1	3.0
	Share (%)	0.4	0.8	0,9	1.4	0.8	1.1	1.5	1.1	1.2	1.2
Zinc	Absolute (t)	39.2	235.8	148,8	214.0	93.8	122.9	202.7	93.0	182.3	96.6
	Share (%)	0.3	2.1	1,3	1.9	0.8	1.1	1.8	0.8	1.6	0.9

Comments: **a** No data available for Saudi Arabia; **b** Share values refer to the G20 (without Saudi Arabia). Percentages add up to more than 100 due to double counting of EU member states (France, Germany, Italy, United Kingdom) in the value for the EU.

Source: World Bureau of Metal Statistics, http://www.world-bureau.com/ (accessed September 12, 2012).

Annex 12: Imports and Exports of Selected Metals by G20 Countries, 2010, Metric Tonnes

		Large im- and exporters (> 15 million tonnes imported and/or exported)						Moderate importers and exporters (> 8 million tonnes total)	
		Australia		China		Indonesia		Brazil	
		Import	Export	Import	Export	Import	Export	Import	Export
Aluminum	Bauxite	7	7,950,738	30,360,024	150	1	27,410,375	13	6,220,737
	Crude	9	1,694,850	365	757	320	159	55	606
	Scrap	6	196	2,853,511	1,096	37,731	9,900	47	1,884
Copper	Crude	92,701	320,924	3,380,194	39,538	104,218	162,482	255,659	45,702
	Scrap	1,371	73,337	4,364,362	2,264	14,153	45,582	1,491	23,233
	Ores and concentrates	220	1,884,957	6,475,510	187	165	2,642,087	467,868	630,993
Lead	Crude	6,655	NA	62,369	25,496	89,487	5,075	89,487	12
	Scrap	581	23,018	NA	NA	NA	NA	NA	NA
	Ores and concentrates	32,979	524,555	NA	142	570	24,537	42	19,966
Nickel	Crude	2,707	0	182,693	54,970	546	0	3,023	11,169
	Scrap	45	697	28	19	0	1,006	0	367
	Oxides, sintered products, sulfides	1	346,608	25,080,246	475	222	17,566,047	2,106	245
Tin	Crude	693	21	18,540	713	358	92,277	641	1,254
	Scrap	35	8,279	NA	NA	0	278	0	468
	Ores and concentrates	0	13,571	18,783	24	1,303	0	79	1,114
Zinc	Crude	1,461	400,156	477,603	43,395	111,637	190	39,307	80,079
	Scrap	42	4,880	68,924	0	78	402	0	140
	Ores and concentrates	149,328	2,317,208	3,242,414	0	352	25,873	209,164	0

		Moderate importers and exporters (> 8 million tonnes total) (ctd. I)							
		Canada		Germany		Japan		South Korea	
		Import	Export	Import	Export	Import	Export	Import	Export
Aluminum	Bauxite	3,375,614	13	2,005,053	26	1,158,059	120	283	0
	Crude	136	1,261,354	2,391,771	473	1,369,936	17	1,318,154	38
	Scrap	118,191	2,522,708	479,413	823,810	76,917	98,602	545,690	6,509
Copper	Crude	60,784	209,134	803,514	149,386	64,066	554,380	462,690	134,628
	Scrap	73,706	158,075	626,442	578,448	159,406	286,942	202,963	100,237
	Ores and concentrates	44,564	263,062	1,128,472	48,761	5,354,992	0	1,729,534	3,864
Lead	Crude	5,130	261,395	157,301	203,007	15,809	63,778	165,605	105,632
	Scrap	8,089	1,292	39,653	9,892	14	2,998	4,424	24
	Ores and concentrates	59,601	827	184,018	4,296	155,554	19	226,800	3,896
Nickel	Crude	1,962	88,304	77,305	5,617	43,877	11,410	24,321	10,589
	Scrap	13,463	4,311	8,584	9,563	5,586	2,156	433	17,459
	Oxides, sintered products, sulfides	21,681	394	621	NA	4,517,081	3,402	1,443,221	841
Tin	Crude	3,282	930	19,000	2,209	35,502	911	18,068	438
	Scrap	29,540	56,581	714	1,440	145	152	366	70
	Ores and concentrates	NA	NA	NA	32	NA	NA	90	15
Zinc	Crude	6,711	559,221	438,370	84,070	32,617	113,436	67,290	372,980
	Scrap	546	21,542	23,694	74,208	1,420	8,944	4,486	612
	Ores and concentrates	217,290	196,196	285,331	1,674	990,161	0	1,420,422	83,713

Comments:
No data available for the EU and Saudi Arabia.
Data verified by the BGS for France, Germany, Italy, Turkey, and the United Kingdom.
"Crude" aggregates imports/exports in alloyed and non-alloyed form.
"NA" = data not available.

Source: British Geological Survey (BGS), *World Mineral Statistics* (included by permission of the BGS), http://www.bgs.ac.uk/mineralsuk/statistics/worldStatistics.html (accessed September 12, 2012).

Annex 12: Imports and Exports of Selected Metals by G20 Countries, 2010, Metric Tonnes (ctd. I)

		Moderate importers and exporters (ctd. II) (> 8 million tonnes total)		Small importers and exporters (< 8 million tonnes total)					
		United States of America		Argentina		France		India	
		Import	Export	Import	Export	Import	Export	Import	Export
Aluminum	Bauxite	7,315,935	44	62	105	985	12	55	252
	Crude	2,766,448	449	2	277,687	469	218	218	353
	Scrap	480,090	1,824,057	5	2	260,871	405,847	428,295	2,062
Copper	Crude	616,605	132,951	9,954	129	48,765	236,513	14,970	553,934
	Scrap	95,808	1,064,615	NA	NA	292,631	72,220	91,622	2,853
	Ores and concentrates	22,404	175,505	3,520	565,673	NA	NA	1,717,814	40,073
Lead	Crude	273,452	79,333	1,155	22,873	34,090	36,293	218,900	51,835
	Scrap	20,087	43,669	NA	NA	12,848	37,654	54,556	191
	Ores and concentrates	2	319,433	0	10,290	NA	NA	8,556	50,221
Nickel	Crude	116,706	8,936	706	1	18,993	10,683	25,743	94
	Scrap	18,264	22,257	NA	NA	2,164	30,601	1,005	244
	Oxides, sintered products, sulfides	895	5,771	89	0	524	NA	398	8
Tin	Crude	36,680	19,327	1,109	0	6,176	566	7,259	124
	Scrap	57,308	10,790	NA	NA	100	342	43	80
	Ores and concentrates	6	2,347	NA	NA	NA	341	195	0
Zinc	Crude	635,687	16,766	5,864	7,853	166,198	81,578	81,492	238,196
	Scrap	31,226	155,742	NA	NA	3,003	51,755	54,744	26
	Ores and concentrates	32,246	764,053	29,120	0	222,580	49,652	73,798	256,720

		Small importers and exporters (< 8 million tonnes total) (ctd. I)							
		Italy		Mexico		Russia		South Africa	
		Import	Export	Import	Export	Import	Export	Import	Export
Aluminum	Bauxite	63	66	130	1	29	2	28	28
	Crude	920	270	557	75	23	4,876,389	39	594
	Scrap	372,686	107,131	126,783	184,181	2,931	17	1,053	33,353
Kupfer	Crude	643,004	31,491	104,382	76,214	3,199	448,607	9,675	19,369
	Scrap	129,074	167,424	49,576	126,151	10,593	2,116	1,224	73,360
	Ores and concentrates	NA	NA	32,902	374,116	75,091	11,478	572	237,604
Blei	Crude	111,301	7,821	47,786	121,960	3,243	89,873	12,253	9,268
	Scrap	2,609	9,776	661	1,281	NA	NA	7,634	1,364
	Ores and concentrates	20	NA	15,240	99,048	11	352,306	10	64,291
Nickel	Crude	40,757	2,408	1,885	70	1,664	252,351	2,263	7,382
	Scrap	1,063	3,537	5	2,978	99	57	73	181
	Oxides, sintered products, sulfides	NA	NA	137	3,062	137	102,622	420	964
Zinn	Crude	4,902	367	4,449	199	1,365	293	1,569	16
	Scrap	NA	289	76	699	0	0	45	23
	Ores and concentrates	3	NA	51	222	900	0	22	5,002
Zink	Crude	279,849	17,448	7,386	205,414	21,360	78,430	9,116	6,147
	Scrap	27,740	16,427	0	6,344	84	50	88	3,044
	Ores and concentrates	184,192	98,211	6,161	477,550	35,959	147,525	31,309	7,848

Comments:
No data available for the EU and Saudi Arabia.
Data verified by the BGS for France, Germany, Italy, Turkey, and the United Kingdom.
"Crude" aggregates imports/exports in alloyed and non-alloyed form.
"NA" = data not available.

Source: British Geological Survey (BGS), *World Mineral Statistics* (included by permission of the BGS), http://www.bgs.ac.uk/mineralsuk/statistics/worldStatistics.html (accessed September 12, 2012).

Annex 12: Imports and Exports of Selected Metals by G20 Countries, 2010, Metric Tonnes (ctd. II)

		Small importers and exporters (< 8 million tonnes total) (ctd. II)			
		Turkey		United Kingdom	
		Import	Export	Import	Export
Aluminum	Bauxite	36	331	42	3
	Crude	743	79	202	408
	Scrap	24,952	405,847	126,584	443,466
Copper	Crude	344,975	8,871	48,430	21,803
	Scrap	3,943	12,426	27,495	421,868
	Ores and concentrates	1,329	421,536	189	NA
Lead	Crude	73,057	400	151,653	105,235
	Scrap	NA	NA	8,858	69,404
	Ores and concentrates	NA	64,247	NA	NA
Nickel	Crude	3,391	292	17,510	23,169
	Scrap	NA	519	196	19.361
	Oxides, sintered products, sulfides	144	NA	NA	NA
Tin	Crude	2,558	79	4,692	2,245
	Scrap	NA	NA	196	13,115
	Ores and concentrates	NA	NA	NA	163
Zinc	Crude	185,474	NA	100,039	18,141
	Scrap	161	1,536	447	14,903
	Ores and concentrates	NA	392,725	574	8,405

Comments:
No data available for the EU and Saudi Arabia.
Data verified by the BGS for France, Germany, Italy, Turkey, and the United Kingdom.
"Crude" aggregates imports/exports in alloyed and non-alloyed form.
"NA" = data not available.

Source: British Geological Survey (BGS), *World Mineral Statistics* (included by permission of the BGS), http://www.bgs.ac.uk/mineralsuk/statistics/worldStatistics.html (accessed September 12, 2012).


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