

### Solutions for supplying critical raw materials faster and better

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#### Today, the top-5 commodity value chains make up ~80-90% of Metals and Mining revenues



1. Largest commodities in the group include ferrochrome and potash, includes all other metals & mining commodities, e.g., REEs, minor metals, etc.

Thermal coal ~7 Bt and steel ~2 Bt, with other commodities totaling ~200 kt

Source: McKinsey MineSpans, ITC Trade Map, Eurostat, American Chemistry Council, World Bank, IHS Markit, Fastmarkets

# Longer term we will see the materials mix strongly evolve, « from volume to value »



1. Other includes: zinc, silver, diamonds, uranium, graphite, cobalt, silica, platinum, tin, REEs, chrome, iridium

Source: MineSpans



# 2023: Coal, gold and iron ore drive largest revenues; Coal and construction materials (gravel, sand) largest volumes

Rank	All commodities	2023				
		Demand value USD b	Virgin demand volume, kt	ROM, kt	<b>MM</b> , kt	
1	Coal	725,188	7,552,000	10,673,366	53,175,347	
2	Gold	310,479	4	2,934,281	12,362,762	
3	Iron ore	270,299	2,257,146	4,427,616	10,927,358	
4	Aluminum	250,735	71,273	423,263	795,197	
5	Copper	237,106	23,180	4,608,686	10,989,793	
6	Gravel	223,104	22,310,352	22,310,352	22,310,352	
7	Sand	170,546	17,054,551	17,054,551	17,054,551	
8	Nickel	79,105	3,356	328,553	1,010,001	
9	Limestone	66,576	6,657,575	6,657,575	6,657,575	
10	Manganese	51,036	18,392	N/A	N/A	
11	Zinc	35,309	11,667	317,491	644,562	
12	Lithium	28,472	137	35,835	189,263	
13	Silver	26,494	29	N/A	N/A	
14	Palladium	19,681	0	N/A	N/A	
15	Diamonds	14,389	120,707	N/A	N/A	

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4

#### 2050: Aluminum, copper, gold drive largest revenues; Copper and construction materials (gravel, sand) largest volumes; Nickel and Lithium in value top-10

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		2050			
		Demand value	Virgin demand		
Rank	All commodities	USD b	volume, kt	ROM, kt	MM, kt
1	Aluminum	397,546	100,030	526,526	1,042,107
2	Copper	357,693	34,057	8,334,310	21,350,180
3	Gold	329,610	4	2,936,448	12,485,548
4	Gravel	286,672	28,667,186	28,667,186	28,667,186
5	Iron ore	226,054	2,205,410	4,886,486	12,520,460
6	Sand	216,665	21,666,521	21,666,521	21,666,521
7	Coal	165,253	2,280,898	3,674,923	19,751,881
8	Nickel	133,005	4,746	439,502	1,632,109
9	Lithium	119,288	891	81,097	336,446
10	Limestone	81,390	8,139,046	8,139,046	8,139,046
11	Manganese	70,841	25,094	N/A	N/A
12	Zinc	41,217	14,662	382,307	850,380
13	Silver	25,092	32	N/A	N/A
14	Uranium	20,929	162	52,900	214,376
15	Diamonds	19,077	160,595		N/A

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#### In relative terms, Metals linked to the Energy transition will see highest demand acceleration but will the supply follow? 2023-35 versus 2012-23 demand outlook

Select materials – non-exhaustive



1. Detailed supply and demand scenarios available; 2. Different axis scales across materials; 3. Includes Dysprosium, Neodymium, Praseodymium, Terbium; 4. Lithium carbonate equivalent

Source: McKinsey MineSpans, McKinsey Global Materials Insights



#### Issue 1: Bottlenecks on Critical Materials Solution 1: Substitution by less critical materials – Example of new battery chemistries





### Issue 2 : Lead times for making new supply "live" are too long



1. Bauxite is the key material used in the production of aluminum



#### Solution 2: Moving faster through efficient regulation and permitting. The example of Australia and Canada

Illustrative

Length of permitting process, years





Issue 3: Meeting 26Mt copper demand in 2022 required over 400x material volume mined: New technologies are needed for improving mining footprint



1. Cathode equivalent Note: Data may not match due to rounding

Source: MineSpans



Amount of material excavated to produce needed end demand

18%

Of copper demand is covered by scrap

1.5% p.a.

Copper grades have been falling since 1950, recent years show slowdown of the decline

