HORIZON 2020

Leadership in Enabling and Industrial Technologies

Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing

This presentation is based on a pre-published working document and has no legal value

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Horizon 2020 is different

- A strong challenge-based approach, allowing applicants to have considerable freedom to come up with innovative solutions
- Emphasis on innovation, with continuing support for R&D (research and innovation actions with 100% funding; innovation actions with 70% funding)
- Less prescriptive topics, strong emphasis on expected impact
- A strategic approach, with two-year work programmes
- Focus areas bring together different technologies, along entire innovation chain
- Cross-cutting issues mainstreamed (e.g. social sciences, gender, international cooperation)

H2020 – LEIT/KETs: From R&D to close-to-market activities

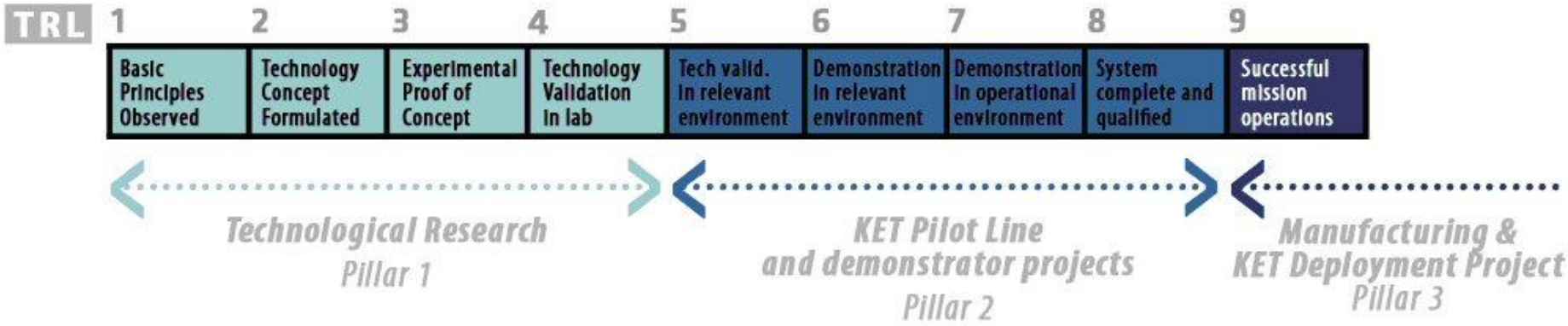
- Use of Technology Readiness Levels (TRLs from 3-4 to 8)
- Two funding rates

  100% funding: TRLs 3-6

  70% funding: TRLs 5-7

  Non-profit participants can claim 100% funding
- Cross-cutting KETs (combinations of KETs and manufacturing)
- Seamless coverage provided by FETs/ERC – LEIT – Societal Challenges
- Ground prepared in FP7 (first pilots and demonstrators, innovation activities)

Technology Readiness Levels (TRLs) – a useful tool in development and deployment of KETs



- NMP in FP7: TRLs 1 – 4;
  up to 5-6 in 2012-13 (pilots and demonstrators)
- LEIT KETs: TRLs 3/4 – 7; centre at TRLs 5-6

Public-private Partnerships (PPPs)

- Industrial Investment Package of 10 July 2013 :
  - Joint Technology Initiatives (JTIs) implemented by Joint Undertakings
  - Contractual PPPs (cPPPs)
  - Public-Public Partnerships (P2Ps)
- PPPs in H2020 :
  - Continuation of existing JTI's: Clean Sky, Innovative Medicines Initiative (IMI), Hydrogen and Fuel Cells (HFC)
  - New JTI's: Joint Technology Initiative on Electronic Components and Systems for European Leadership (ECSEL), Bio-based industries (BBI)

  cPPPs: (contractual PPPs, implemented within H2020 WP)
  - Robotics
  - Photonics
  - Advanced 5G Network Infrastructures
  - **Factories of the Future (FoF)**
  - **Energy-efficient Buildings (EeB)**
  - **Sustainable Process industry (SPIRE)**
  - Green vehicles

Other funding sources

Risk-Finance in H2020

- Part of the Horizon 2020 budget (3.7%) will be in the form of **risk-sharing** (for loans and guarantees) and **risk finance** (equity)

- Goal: **Stimulate more investment in research and innovation**, notably by the private sector - **Leverage effect**

- **Building a bridge from R&D to Innovation**: Effective and cost-efficient way to complement grant funding under Horizon 2020, national/regional programmes (including structural funds) and bring R&D results to the market

Synergies with Structural & Investment Funds (ESIF)

- Increased funding for research and innovation available under regional funding
- *Smart Specialisation*: strategic framework to access funding for Research and Innovation in Structural Funds 2014-2020
- National / regional authorities in charge (not the Commission)
- Policy support measures to be undertaken timely (by the end of 2013)
- Support from other EU, national or regional programmes encouraged (supported or not by ESIF)
- Some topics particularly suitable for additional funding (e.g. to deploy technologies)

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What is Smart Specialisation ?

= Evidence-based considering all assets and problems in a region, incl. External perspective / internal / global market (critical mass? Opportunities? excellence? cooperation? Value chains?)

= No top-down decision, but dynamic /entrepreneurial discovery process uniting key stakeholders around shared vision

= Mobilisation of investments and synergies across different departments and governance levels (EU-national-regional)

= All forms of innovation – not only technology driven

= Differentiation: SWOT analysis (all types of assets), competitive advantages, potential for excellence, opportunities

= Concentration of resources on priorities, problems and core needs (no sprinkler principle, no picking the winners, yes to catalytic investments)

= Place-based economic transformation: rejuvenating traditional sectors through high value-added activities, cross-sectoral links, new market niches, emerging sectors

European Institute of Innovation and Technology (EIT)

How does the EIT work?

Integrating three sides of 'knowledge triangle': higher education, research and business: Knowledge and Innovation Communities (KICs) to promote innovation in Europe.

Three KICs were launched in 2010:

Climate-KIC: climate change mitigation and adaptation
EIT ICT Labs: information and Communication Technologies
KIC InnoEnergy: sustainable energy.

EIT budget ~ EUR 2.7bn for 2014-2020.

Five new KICs:

- **Two in 2014:**
  - Innovation for healthy living and active ageing,
  - Raw materials - sustainable exploration, extraction, processing, recycling and substitution
- **Two in 2016:**
  - Food4Future - sustainable supply chain from resources to consumers;
  - **Added-value manufacturing**
- **One in 2018:**
  - Urban mobility

http://eit.europa.eu/kics/

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Calls in first WP of H2020 for Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing

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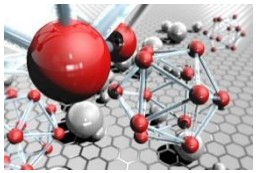
Call for Nanotechnology, Advanced Materials and Production



Bridging the gap between nanotechnology research and markets

- Addresses 3 of key European nano-enabled industrial value chains :
  - Lightweight multifunctional materials and sustainable composites
  - Structures surfaces
  - Functional fluids
- SMEs invited to participate
- Expected activities :

  Deployment and market introduction by scaling up lab experience to industrial scale and by demonstrating viability of variety of manufacturing technologies

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Call for Nanotechnology, Advanced Materials and Production

Nanotechnology and Advanced Materialsfor more effective Healthcare

- Support **more effective therapies** in health care for important diseases.
- Required development : reach point where they can be considered **fit for purpose** in preparation of, but not including, clinical trial stages.
- Gender issues important : technologies and innovations should suit both women and men.

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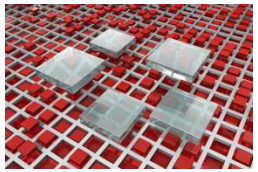
Call for Nanotechnology, Advanced Materials and Production



Nanotechnology and Advanced Materials for low-carbon energy technologies and Energy Efficiency

- Support EU objectives to increase use of **renewable energy sources** and improve **energy efficiency**
- Demonstrate **technology readiness** for further take-up by societal challenge
- Contributions to Materials Roadmap Enabling Low Carbon Energy Technologies
- Time to market should be assessed with view of contributing to **EU2020 targets**

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Call for Nanotechnology, Advanced Materials and Production

Exploiting the cross-sector potential of Nanotechnologies and Advanced materials to drive competitiveness and sustainability

- Boosting European **industry competitiveness** and contributing to a **sustainable economy**
- Enabling **multi-sectorial potential**, by developing and advancing technological readiness of solutions with break-through potential.
- **International cooperation** particularly appropriate.

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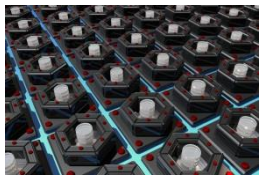
Call for Nanotechnology, Advanced Materials and Production



Safety of nanotechnology-based applications and support for the development of regulation

- **Risk management** to become integral part of supply chain
- All projects should align with the **EU Nanosafety Cluster** and other international activities
- **International cooperation** encouraged, in particular with leading nanotechnology developing Nations (US, Canada, Australia, Korea, Japan, China, Brazil)
- **Responsible governance** determining for future impact of nanotechnologies on society and economy (KET-support)

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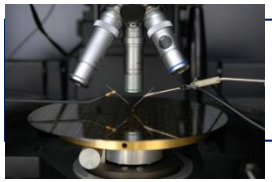
Call for Nanotechnology, Advanced Materials and Production

Addressing generic needs in support of governance, standards, models, and structuring in nanotechnology, advanced materials and advanced manufacturing and processing

- Addressing general, structural needs in areas incl.
  - Infrastructure,
  - metrology and standards,
  - skills and networking,
  - dissemination and communication,
  - business models
- Other funding sources such as structural funds, are vital
- Proactive approach towards international collaboration

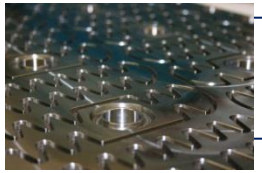


Call for Factories of the Future (FoF PPP)

- ***Aim***: help EU manufacturers (incl. SMEs) to adapt to global competitive pressures
- ***How***: developing necessary key enabling technologies across broad range of sectors
- Meet increasing **global consumer demand** for greener, more customised and higher quality products
- Transition to **demand-driven industry** with lower waste and energy consumption
- Activities :
  - Industry-led R&D projects (incl. Demo activities)
  - Cross-sectoral, addressing needs of SMEs
- Contribution from ICT part (one topic in 2014)

Call for Energy-efficient Buildings (EeB PPP)

- Drive creation of **high-tech building industry** - Turning **energy efficiency** into **sustainable business** - Fostering EU **competitiveness in construction sector** on global level
- Reduce energy consumption & CO^2 emissions in existing and new buildings.
- Effective integration of key technologies into construction operations for sustainable, long-term competitiveness.
- Contributes to EU industrial leadership and grand societal challenges
- Participation of public authorities, asset for some projects as owners of large part of EU building stock.



Call for Sustainable Process Industries (SPIRE PPP)

- Resource efficiency essential factor in industry

- General goal: **optimise industrial processing, reducing energy & resources consumption, minimising waste**

- Specific goals:
  - reduction in **fossil energy intensity** of up to 30% from current levels by 2030.
  - reduction of up to 20% in **non-renewable, primary raw material intensity** compared to current levels by 2030.
  - reduction of **greenhouse gas emissions** by 20% below 1999 levels by 2020, further reductions up to 40% by 2030 and at least 80% by 2050.

List of Topics

Legend :

RIA : Research and Innovation Actions (100% funding)

IA : Innovation Actions (70% funding – 100% for non-profit participants)

SME : SME Instrument (70% funding for Phase 2, lump sums for Phase 1)

CSA : Coordination and Support Actions (100% funding)

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Call for Nanotechnology, Advanced Materials and Production

Bridging the gap between nanotechnology research and markets

Single-stage evaluation: 06/05/2014

Topic code	Topic title	Type of Action
NMP 1 - 2014	**Open access pilot lines for cost-effective nanocomposites**	RIA
NMP 2 - 2015	**Integration of novel nano materials into existing production**	IA
NMP 3 - 2015	**Manufacturing and control of nanoporous materials**	IA
NMP 4 - 2014	**High-definition printing of multifunctional materials**	IA
NMP 5 - 2014	**Industrial-scale production of nanomaterials for printing applications**	IA
NMP 6 - 2015	**Novel nanomatrices and nanocapsules**	RIA
NMP 7 - 2015	**Additive manufacturing for table-top nanofactories**	RIA

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Call for Nanotechnology, Advanced Materials and Production

Nanotechnology and Advanced Materials for more effective Healthcare

Two-stage evaluation: 06/05/2014 & 07/10/2014; Single-stage for NMP 8, 9: 06/05/2014

Topic code	Topic title	Type of Action
NMP 8 - 2014	**Scale-up of nanopharmaceuticals production**	RIA
NMP 9 - 2014	**Networking of SMEs in the nano-biomedical sector**	CSA (max 1)
NMP 10 - 2014	**Biomaterials for the treatment of Diabetes Mellitus**	RIA
NMP 11 - 2015	**Nanomedicine therapy for cancer**	RIA
NMP 12 - 2015	**Biomaterials for treatment and prevention of Alzheimer's disease**	RIA

Call for Nanotechnology, Advanced Materials and Production

Nanotechnology and Advanced Materials for low carbon energy technologies and Energy Efficiency

Two-stage evaluation: 06/05/2014 & 07/10/2014
Single-stage for NMP 17: 06/05/2014

Topic code	Topic title	Type of Action
NMP 13 - 2014	**Storage of energy produced by decentralised sources**	RIA
NMP 14 - 2015	**ERA-NET on Materials (including Materials for Energy)**	Era-Net (Cofund)
NMP 15 - 2015	**Materials innovations for optimisation of cooling in power plants**	IA
NMP 16 - 2015	**Extended in-service service of advanced functional materials in energy technologies (capture, conversion, storage and/or transmission of energy)**	IA
NMP 17 - 2014 *	**Post-lithium ion batteries for electric automotive applications**	RIA

** Contribution to specific initiative on Green Vehicles*

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Call for Nanotechnology, Advanced Materials and Production

Exploiting the cross-sector potential of Nanotechnologies and Advanced materials to drive competitiveness and sustainability

Two-stage evaluation, 06/05/2014 & 07/10/2014

SME Instrument: Phase 1 – 18/06, 24/09, 17/12/2014;
Phase 2 – 09/10, 17/12/2014

Topic code	Topic title	Project type
NMP 18 - 2014	**Materials solutions for use in the creative industry sector**	IA
NMP 19 - 2015	**Materials for severe operating conditions, including added-value functionalities**	RIA
NMP 20 - 2014	**Widening materials models**	RIA
NMP 21 - 2014	**Materials-based solutions for protection or preservation of European cultural**	IA
NMP 22 - 2015	**Fibre-based materials for non-clothing applications**	IA
NMP 23 - 2015	**Novel materials by design by substituting critical elements**	RIA
NMP 24 - 2015	**Low-energy solutions for drinking water production**	IA
NMP 25 - 2014/2015	**Accelerating the uptake of nanotechnologies, advanced materials or advanced manufacturing and processing technologies by SMEs**	SME

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Call for Nanotechnology, Advanced Materials and Production

Safety of nanotechnology-based applications and support for the development of regulation

Two-stage evaluation: 06/05/2014 & 07/10/2014

Single-stage for NMP 27: 06/05/2014

Topic code	Topic title	Type of Action
NMP 26 - 2014	**Joint EU & MS activity on the next phase of research in support of regulation "NANOREG II"**	RIA
NMP 27 – 2014	**Coordination of EU and international efforts in safety of nanotechnology**	CSA
NMP 28 – 2014	**Assessment of environmental fate of nanomaterials**	RIA
NMP 29 – 2015	**Increasing the capacity to perform nano-safety assessment**	RIA
NMP 30 – 2015	**Next generation tools for risk governance of nanomaterials**	RIA

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Call for Nanotechnology, Advanced Materials and Production

Addressing generic needs in support of governance, standards, models, and structuring

Two-stage evaluation for NMP 35: 06/05/2014 & 07/10/2014

Single-stage for CSAs: 06/05/2014

Topic code	Topic title	Type of Action
NMP 31- 2014	**Novel visualisation tools for enhanced nanotechnology awareness**	CSA
NMP 32 - 2015	**Societal engagement on responsible nanotechnology**	CSA
NMP 33- 2014	**The materials "common house"**	CSA
NMP 34- 2014	**Networking and sharing of best practises in management of new advanced materials via eco-design of products , eco-innovation, and product life cycle management**	CSA
NMP 35- 2014	**Business models with new supply chains for sustainable customer-driven small series production**	IA
NMP 36 - 2014	**Facilitating knowledge management, networking and coordination in NMP**	CSA
NMP 37- 2014	**Practical experience and facilitating combined funding for large-scale RDI initiatives**	CSA
NMP 38 - 2014/2015	**Presidency events**	CSA
NMP 39- 2014	**Support for NCPs**	CSA

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Call for Factories of the Future (FoF)

Single-stage evaluation: 20/03/2014 (09/12/2014 for 2015 topics)

Topic code	Topic title	Type of Action
FoF 1 - 2014	**Process optimisation of manufacturing assets**	RIA & CSA (SA)
FoF 2 - 2014	**Manufacturing processes for complex structures and geometries with efficient use of material**	RIA
FoF 3 - 2014	**Global energy and other resources efficiency in manufacturing enterprises**	RIA
FoF 4 - 2014	**Developing smart factories that are attractive to workers**	IA
FoF 5 - 2014	**Innovative product-service design using manufacturing intelligence**	RIA
FoF 6 - 2014	**Symbiotic human-robot collaborations for safe and dynamic multimodal manufacturing systems**	IA
FoF 7 - 2014	**Support for the enhancement of the impact of FoF PPP projects**	CSA (CA)
FoF 8 - 2015	**ICT-enabled modelling, simulation, analytics and forecasting technologies**	RIA & CSA (SA)
FoF 9 - 2015	**ICT Innovation for Manufacturing SMEs (I4MS)**	IA & CSA (SA)
FoF 10 - 2015	**Manufacturing of custom made parts for personalised products**	RIA
FoF 11 - 2015	**Flexible production systems based on integrated tools for rapid reconfiguration of machinery and robots**	IA
FoF 12 - 2015	**Industrial technologies for advanced joining and assembly processes of multi-materials**	IA
FoF 13 - 2015	**Re-use and re-manufacturing technologies and equipment for sustainable product life cycle management**	RIA
FoF 14 - 2015	**Integrated design and management of production machinery and processes**	RIA

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Call for Energy-efficient Buildings (EeB)

Single-stage evaluation: 20/03/2014 (09/12/2014 for 2015 topics)

Topic code	Topic title	Type of Action
EeB 1 - 2014	**Materials for building envelope**	IA
EeB 2 - 2014	**Adaptable envelopes integrated in building refurbishment projects**	RIA
EeB 3 -2014	**Development of new self-inspection techniques and quality check measures for efficient construction processes**	RIA
EeB 4 - 2014	**Support for the enhancement of the impact of EeB PPP projects**	CSA (CA)
EeB 5 - 2015	**Innovative design tools for refurbishment at building and district level**	IA
EeB 6 - 2015	**Integrated solutions of thermal energy storage for building applications**	RIA
EeB 7 - 2015	**New tools and methodologies to reduce the gap between predicted and actual energy performances at the level of buildings and blocks of buildings**	IA
EeB 8 - 2015	**Integrated approach to retrofitting of residential buildings**	IA

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Call for Sustainable Process Industries (SPIRE)

Single-stage evaluation: 20/03/2014 (09/12/2014 for 2015 topics)

Topic code	Topic title	Type of Action
SPIRE 1 - 2014	**Integrated Process Control**	RIA
SPIRE 2 - 2014	**Adaptable industrial processes allowing the use of renewables as flexible feedstock for chemical and energy applications**	IA
SPIRE 3 - 2014	**Improved downsteam processing of mixtures in process industries**	IA
SPIRE 4 - 2014	**Methodologies, tools and indicators for cross-sectorial sustainability assessment of energy and resource efficient solutions in the process industry**	CSA (SA)
SPIRE 5 - 2015	**New adaptable catalytic reactor methodologies for Process Intensification**	RIA
SPIRE 6 - 2015	**Energy and resource management systems for improved efficiency in the process industries**	RIA
SPIRE 7 - 2015	**Recovery technologies for metals and other minerals**	IA
SPIRE 8 - 2015	**Solids handling for intensified process technology**	IA

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Find out more about Horizon 2020:

http://www.ec.europa.eu/research/horizon2020

Participant Portal:

https://ec.europa.eu/research/participants/portal/page/home

Draft Work Programmes:

http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=h2020-documents

Thank you for your attention