



The EU Framework Programme for Research and Innovation

HORIZON 2020

NMBP calls in 2016-2017

**Leadership in Enabling and
Industrial Technologies**



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*Research and
Innovation*

Policy Context

Five of the President's priorities:

- To boost jobs, growth and investment;
- To realise a connected digital single market;
- To implement a resilient Energy Union with a forward looking climate change policy;
- To develop a deeper and fairer internal market with a strengthened industrial base;
- To make Europe a stronger global actor

Strategic priorities of Commissioner Moedas:

- Open innovation, Open science, Open to the world

Horizon 2020: Key elements

- A single programme with three pillars: **societal challenges, industrial competitiveness and excellence in science**
- **Less prescriptive topics – strong emphasis on expected impact**
- More emphasis on **innovation and involvement of industry**
e.g. industrial deployment of key enabling technologies,
Public-Private Partnerships
- **Strategic approach, two-year work programmes**
- **Focus areas** bring together different technologies
- **Simplification** – in access and in participation rules



Horizon 2020

Total indicative budget: 75 Bio. €*

Excellent science

- *European Research Council*
- *Future and Emerging Technologies*
- *Marie Skłodowska-Curie actions*
- *Research infrastructures*

24.2 Bio. €*

Industrial leadership

- ***Leadership in enabling and industrial technologies***
- *Access to risk finance*
- *Innovation in SMEs*

16.5 Bio. €*

Societal challenges

- *Health, demographic change and wellbeing*
- *Food security, sustainable agriculture, marine and maritime research and the bioeconomy*
- *Secure, clean and efficient energy*
- *Smart, green and integrated transport*
- *Climate action, resource efficiency and raw materials*
- *Inclusive, innovative and reflective societies*
- *Secure societies*

28.6 Bio. €*

* July 2015 – includes EIT, JRC, "Science with and for Society", "Spreading Excellence / Widening Participation", in addition to three priorities above

NMBP in Horizon 2020

Priority 1: Excellent Science

Priority 2: Industrial Leadership

Leadership in enabling and industrial technologies (LEIT)

(i) ICT including micro- and nano-electronics and photonics

(ii) Nanotechnologies

(iii) Advanced Materials

(iv) Biotechnology

(v) Advanced Manufacturing & Processing

(vi) Space

**NMBP part
of Work Programme**

Access to risk finance

Leveraging private finance and venture capital for R&I

Innovation in SMEs

Fostering all forms of innovation in all types of SMEs

Priority 3: Societal Challenges

A large part of Industrial Leadership (~6Bio€) is about mastery and deployment of Key Enabling Technologies (KETs)

What are KETs?

- Six strategic technologies
- Driving competitiveness and growth
- Contributing to solving societal challenges
- Knowledge- and Capital- intensive
- Cut across many sectors

- Nanotechnologies
- Advanced Materials
- Micro- and nano-electronics
- Photonics
- Biotechnology
- Advanced Manufacturing and Processing

European KET Strategy

- EC Communications (2009)512 & (2012)341
- KET High-level Group
 - final report '*KETs: Time to Act*', June 2015

Strategic context: Importance of EU Manufacturing

- **66% of private R&D investment**
- **2.1 million enterprises** (10% of total)
- **33 million jobs** (20% of total)
+ twice as many indirect jobs via related services
- **Turnover:** €7.1 trillion
- **Value added:** €1.7 trillion (27% of European value added)
- **Biggest purchaser and user of KETs**
Huge potential for innovation

Source: Eurostat ES 2011 "Structure of the business economy" EU-27, 2008,
NACE Section D

EU Manufacturing in a global context

Figure 1.3a: EU, Chinese and US shares of world manufacturing production value, 2004–2012

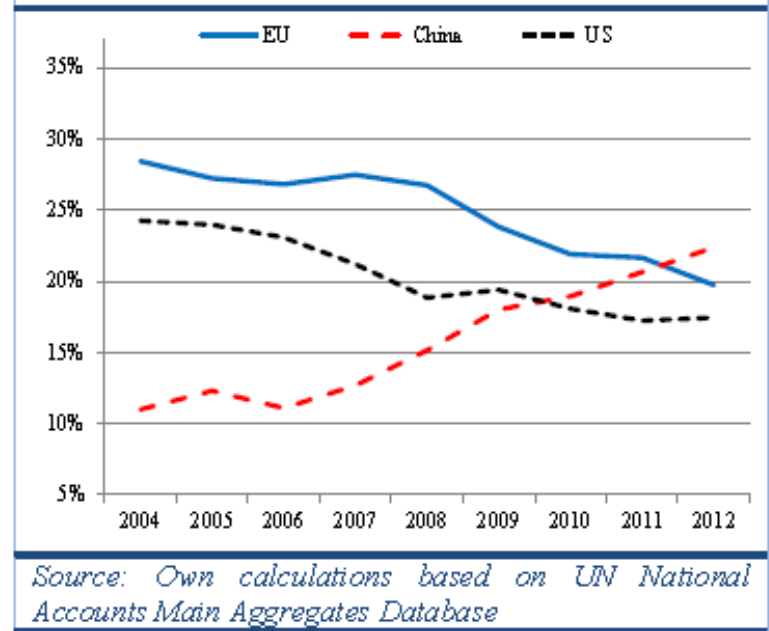
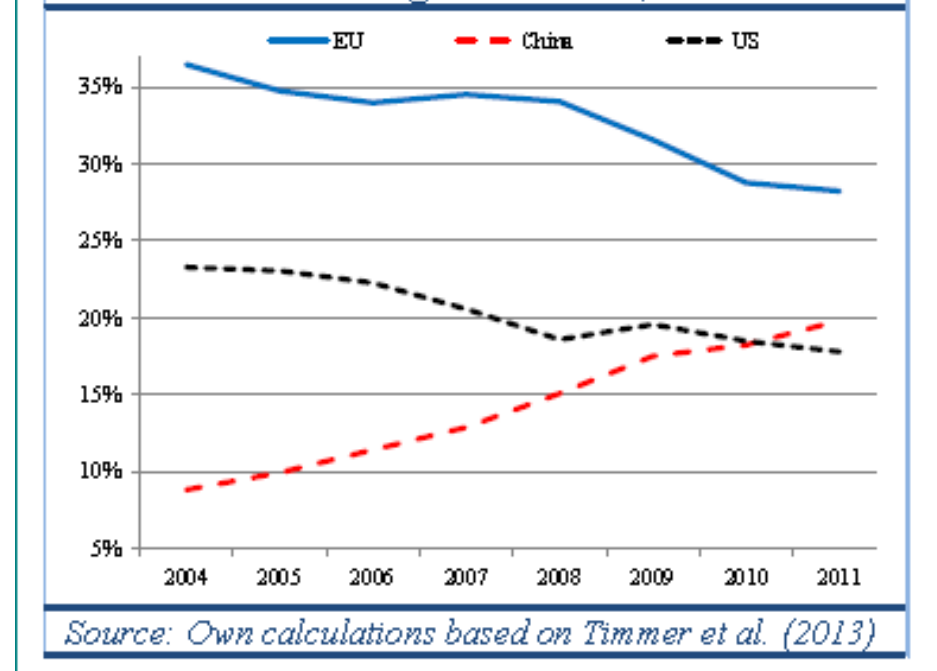


Figure 1.3b: EU, Chinese and US shares of world manufacturing value added, 2004–2011



Source: *Helping firms grow. European Competitiveness Report 2014*

Policy context: interplay of Horizon 2020 with EU agenda

- **Sustainable jobs and growth:**
Boost jobs, growth and investment
Deeper and fairer internal market with a strengthened industrial base
- **Re-industrialisation of EU:**
towards a strong industrial base
- **Digital Single Market:**
Factories of the Future, '4th industrial revolution'
– link to Digital Single Market
- **EU Energy Union:**
Energy-efficient Buildings, Materials for Energy, etc.
- **Circular economy:** boosting growth and renewing industrial capacities in a world of finite resources

LEIT – NMBP part of Horizon 2020

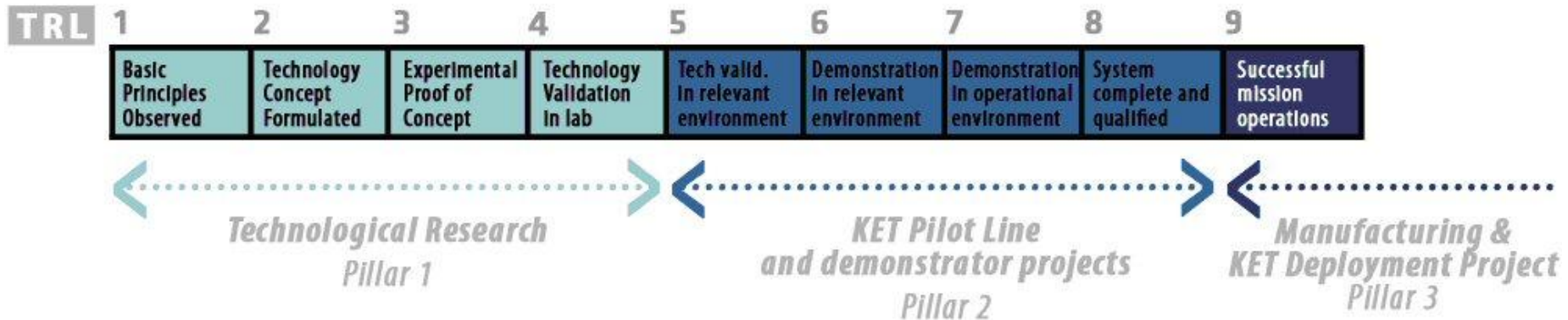
- **Guiding principles:**
 - Partnership with industry, to stimulate private investment
 - Targeting value chains
 - Demonstration and piloting
- **Support for 4 of the 6 Key Enabling Technologies (KETs)**
 - Nanotechnologies
 - Advanced Materials
 - Biotechnology
 - Advanced Manufacturing / Processing
 - Technology Readiness Levels: Bridging TRLs from 3 to 6-7, *with emphasis on expected impact (business cases)*
 - Total budget under Horizon 2020: **3.8 billion €**
- **Focus on EU Manufacturing**
in the context of '4th industrial revolution'
- **Enhanced synergies with Societal Challenges / FETs**

- **Leveraging further investment**

- **Public** – through:
 - Synergies with ESIF (European Structural and Investment Funds)
 - EMPIR (European Metrology Programme for Innovation and Research)
300M€
- **Private** – through contractual PPPs and JTIs:
 - Factories of the Future
1,150M€, leverage 5-10
 - Sustainable Process Industries (SPIRE)
900M€, leverage 5-10
 - Energy-efficient Buildings (EeB)
600M€, leverage at least 4
 - Bio-based Industries JTI (BBI), 150M€ contribution from NMBP
- European Investment Bank instruments: Loan / Equity, InnovFin
- **EFSI**: European Fund for Strategic Investments, to mobilise 315 billion € in support of innovation, infrastructure and SMEs
- Prepare ground for IPCEIs (important projects of common European interest)

Technology Readiness Levels (TRLs)

- The LEIT part of Horizon 2020 targets TRLs from 3-4 up to 7 with a centre of gravity on 5-6
- Highest TRLs for cases with a strong industrial commitment



- Beyond TRL 7: *explore paths to commercial exploitation, to deploy technologies funded under Horizon 2020*

Policy developments, to create favourable conditions

- Stimulate demand-side actions
- Better collaboration between the public/private sectors to stimulate investments
(e.g. links between Horizon 2020 and European Fund for Strategic Investments – EFSI)
- Financing (e.g. new approaches for SMEs, risk-sharing, risk-financing)
- Better regulation
- Standardisation
- New skills / training / education
- Promoting entrepreneurship (e.g. KIC on Added Value Manufacturing)
- Knowledge and risk management for products and industries
- Public procurement
- Programme evaluation of FP7 / Mid-term review of Horizon 2020

Public-Private Partnerships in Horizon 2020

Joint Technology Initiatives

- **Innovative Medicines (IMI)**
- **Clean Sky**
- **Single European Sky ATM Research (SESAR)**
- **Fuel Cells and Hydrogen (FCH)**
- **Electronic Components and Systems (ECSEL)**
- **Bio-based Industries (BBI)**
- **Shift2Rail**

Contractual PPPs

- **Factory of the Future (FoF)**
- **Energy-efficient Buildings (EeB)**
- **Sustainable Process Industry (SPIRE)**
- **Green Vehicles (EGVI)**
- **Future internet (5G)**
- **Robotics**
- **Photonics**
- **High Performance Computing**
- **Big Data**

NMBP Work Programme 2016-2017

- Draft version now available:
<https://ec.europa.eu/programmes/horizon2020/en/draft-work-programmes-2016-17>
 - LEIT Introduction, including section on *Business cases and exploitation strategies for industrialisation*
 - LEIT-NMBP part, including EeB call and main NMBP call
 - Cross-Cutting part , including PILOTS, Factories of the Future (FoF), and Sustainable Process Industries (SPIRE)
(Focus Area 'Industry 2020 in the Circular Economy')
- Publication: expected 13 October 2015
- Deadlines:
 - » NMBP two-stage: 8 Dec 2015 / 24 May 2016
 - » PILOTS (two-stage): 8 Dec 2015 / 24 May 2016
 - » EeB, FoF, SPIRE: 21 Jan 2016
 - » NMBP CSAs, ERA-NETs, NMBP-08: 21 Jan 2016

NMBP Work Programme 2016-2017

- Budgets:
 - » NMBP: 230.78M€ (incl. BIOTEC, CSAs, ERA-NETs, NMBP-08)
 - » EeB: 49M€
 - » PILOTS: 32M€
 - » FoF: 77M€ (+ 68M€ for ICT topics)
 - » SPIRE: 74M€
 - » SME Instrument (NMP + Biotech): 39.33M€
- Types of action
 - RIA: Research and innovation actions (100% funding)
 - IA: Innovation actions (70% funding for profit-making partners)
 - CSA: Coordination and support actions
 - ERA-NET Co-fund: to support public-public partnerships

SME Instrument and Fast Track to Innovation (FTI)

- **SME Instrument** - support to SMEs for innovation projects, to help them grow in Europe and beyond
 - 7% of budget of LEIT and Societal Challenges (~3B€)
 - Bottom-up topics in each area
 - Phase 1 for feasibility studies (50 000€ lump sums)
 - Phase 2 for innovation development and demonstration (indicative grant 0.5 – 2.5 M€) – independent of Phase 1
 - Phase 3 – specific services for commercialisation
 - 4 cut-offs per year for Phases 1 and 2
- **Fast Track to Innovation (FTI)** - fully-bottom-up support for close-to-market innovation activities
 - open to all types of participants (indicative grant 1-2 M€)
 - Pilot in 2015 and 2016, 200M€
 - 3 cut-offs in 2015 and in 2016

Impact in NMBP Work Programme 2016-2017

- Expected impacts as described in topic descriptions
- For most topics , impact to be underpinned by ***Business cases and exploitation strategies for industrialisation*** (outlined in LEIT Introduction)
- Should be realistic and credible
- Exploitation strategies are to be developed further during projects
- In NMBP calls, the impact criterion is always the first criterion used to resolve proposals with equal overall scores
- For IAs, the impact criterion is weighed by 1.5

Communication

- Obligatory to address and implement in proposals /projects (work package or part of package)
- Evaluated under "Impact" – section 2.2
- Applicants should demonstrate how they will promote the action and its results, by providing targeted information to multiple audiences (including the media and the public)
- Communication activities need to address the "public policy perspective"
- Type of communication activities may be freely chosen

Dissemination and Exploitation

- Evaluated under "Impact" - section 2.2
 - *Plan for dissemination and exploitation* of the project's results: admissibility condition, unless otherwise specified in the work programme
- For Research and Innovation Actions (RIA, IA) : proposals will also be judged on their business potential under "Excellence" - section 1.4
=> also for Stage 1 proposals !

Reminders

- **Timing:** prepare and submit proposals well before deadline
- Respect **page limits** (evaluators will disregard excess pages).
- Read the LEIT Introduction – esp. business cases and exploitation strategies.
- Read other relevant cross-cutting WP documents.
- Ask peers other than the authors to review your proposal.
- No negotiation phase – no room for improvements during grant preparation.
- Expected impact can be a decisive factor.

Focus Area: Industry 2020 in the Circular Economy

*“Systemic approaches to sustainably boost economic growth and renew Europe's industrial capacities in a world of finite resources”
- contributions from NMBP, ICT and Societal Challenges*



Pilot lines in Nanotechnology and Materials

- *Cross-cutting KET pilot activities building on previous research that is ready to be processed towards industrial-scale processes.*
- **PILOTS-1: Pilot lines for manufacturing of materials with customized thermal/electrical conductivity properties, IA**
- **PILOTS-2: Pilot line manufacturing of nanostructured antimicrobial surfaces using advanced nanosurface functionalization technologies, IA**



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Factories of the Future PPP

- **FOF-1: Novel hybrid approaches for additive and subtractive manufacturing machines, RIA**
- **FOF-2: Machinery and robot systems in dynamic shop floor environments using novel embedded cognitive functions, IA**
- **FOF-3: Zero-defect strategies at system level for multi-stage manufacturing in production lines, IA**
- **FOF-4: Continuous adaptation of work environments with changing levels of automation in evolving production systems, RIA**
- **FOF-5: Support for the further development of Additive Manufacturing technologies in Europe, CSA**
- **FOF-11: Digital automation, RIA + CSA (ICT)**
- **FOF-13: Photonics Laser-based production, RIA + IA (ICT)**



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Sustainable Process Industry PPP

- ***SPIRE-1: Systematic approaches for resource-efficient water management systems in process industries, IA***
- ***SPIRE-2: Plant-wide monitoring and control of data-intensive processes, RIA***
- ***SPIRE-3: Industrial technologies for the valorisation of European bio-resources into high added value process streams, IA***
- ***SPIRE-4: Industrial furnace design addressing energy efficiency in new and existing furnaces, RIA***
- ***SPIRE-5: Potential use of CO₂ / CO and non-conventional fossil natural resources in Europe as feedstock for process industry, CSA***
- ***SPIRE-6: Business models for flexible and delocalised approaches for intensified processing, CSA***



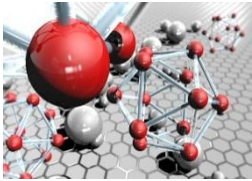
Sustainable Process Industry PPP (topics outside NMBP and Focus Area)

- **EE-17: Valorisation of waste heat in industrial systems, IA (Energy)**
- **EE-21: ERA-NET Cofund actions supporting Joint Actions towards increasing energy efficiency in industry and services, ERA-NET Cofund (Energy)**
- **LCE-25: Utilisation of captured as feedstock for the process industry, RIA (Energy)**



Energy-efficient Buildings PPP

- **EEB-1: Highly efficient insulation materials with improved properties, IA**
- **EEB-2: Performance indicators and monitoring techniques for energy-efficiency and environmental quality at building and district level, CSA**
- **EEB-3: Integration of advanced technologies for heating and cooling at building and district level, IA**
- **EEB-4: New technologies and strategies for the development of pre-fabricated elements through the reuse and recycling of construction materials and structures, RIA**
- **EE-10: Supporting accelerated and cost-effective deep renovation of buildings, IA (Energy)**



Advanced materials and Nanotechnologies for high added value products & process industries

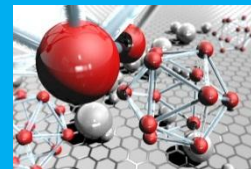
- NMBP-1: Novel hybrid materials for heterogeneous catalysis, RIA***
- NMBP-2: Advanced Materials for Power Electronics based on wide bandgap semiconductor devices technology, RIA***
- NMBP-3: Innovative and sustainable materials solutions for the substitution of critical raw materials in the electric power system, RIA***



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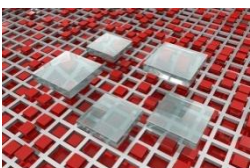
Green Vehicles PPP

- NMBP-8: Affordable weight reduction of high-volume vehicles and components taking into account the entire life cycle, RIA***



Advanced materials and Nanotechnologies for Healthcare

- ***NMBP-9: Biomaterials for diagnosis and treatment of demyelination disorders of the Central Nervous System, RIA***
- ***NMBP-10: Nanoformulation of biologicals, RIA***
- ***NMBP-11: ERA-NET on Nanomedicine, ERA-NET Cofund***



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Advanced materials and Nanotechnologies for Energy applications

- ***NMBP-17: Advanced materials solutions and architectures for high efficiency solar energy harvesting, IA***
- ***NMBP-18: Advanced materials enabling the integration of storage technologies in the electricity grid, IA***



Eco-design and new sustainable business models

NMBP-21: Manufacturing technologies supporting industry and particularly SMEs in the global competition, ERA-NET Cofund



Biotechnology

BIOTEC-1: ERA-NET Cofund on Biotechnologies, ERA-NET Cofund

BIOTEC-2: Bioconversion of non-agricultural waste into biomolecules for industrial applications, RIA

BIOTEC-3: Microbial chassis platforms with optimised metabolic pathways for industrial innovations through systems biology, RIA

BIOTEC-4: KET Biotechnology foresight identifying gaps and high-value opportunities for the EU industry, CSA



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Modelling for the development of Nanotechnologies and Advanced Materials

- **NMBP-23: Advancing the integration of Materials Modelling in Business Processes to enhance effective industrial decision making and increase competitiveness, RIA**
- **NMBP-24: Network to capitalise on strong European position in materials modelling and to allow industry to reap the benefits, CSA**



Science-based risk assessment

and management of Nanotechnologies, Materials and Biotechnologies

- **NMBP-26: Analytical techniques and tools in support of nanomaterial risk assessment, RIA**
- **NMBP-27: Promoting safe innovation through global consolidation and networking of nanosafety centres and strengthening the European industry through co-operation in nanosafety, CSA**



Innovative and responsible governance of new and converging enabling technologies

- ***NMBP-30: Facilitating knowledge management, networking and coordination in the field of formulated products, CSA***
- ***NMBP-31: Presidency events, CSA***
- ***NMBP-32: Support for National Contact Points, CSA***
- ***NMBP-33: Networking and sharing of best experiences in using regional clusters strategies with a focus on supporting innovation in the NMBP thematic area, CSA***
- ***NMBP-36: Policy support for Industry 2020 in the circular economy, CSA***



Further information and advice

Horizon 2020: http://ec.europa.eu/research/horizon2020/index_en.cfm

Participant Portal - Funding Opportunities and support services

<http://ec.europa.eu/research/participants/portal/desktop/en/home.html>

National Contact Points in your country (NMP)

http://ec.europa.eu/research/participants/portal/desktop/en/support/national_contact_points.html#c,contact=country/sbg//1/1/0&+person.last_name/desc

National Contact Points website - webinars, presentations, guidance : <http://www.nmpteam.eu/>

Research Enquiry Service:

http://ec.europa.eu/research/participants/portal/desktop/en/support/research_enquiry_service.html



**Thank you for your
attention**