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 infrastrutures***

***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

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# 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

<u>European KET Strategy</u>

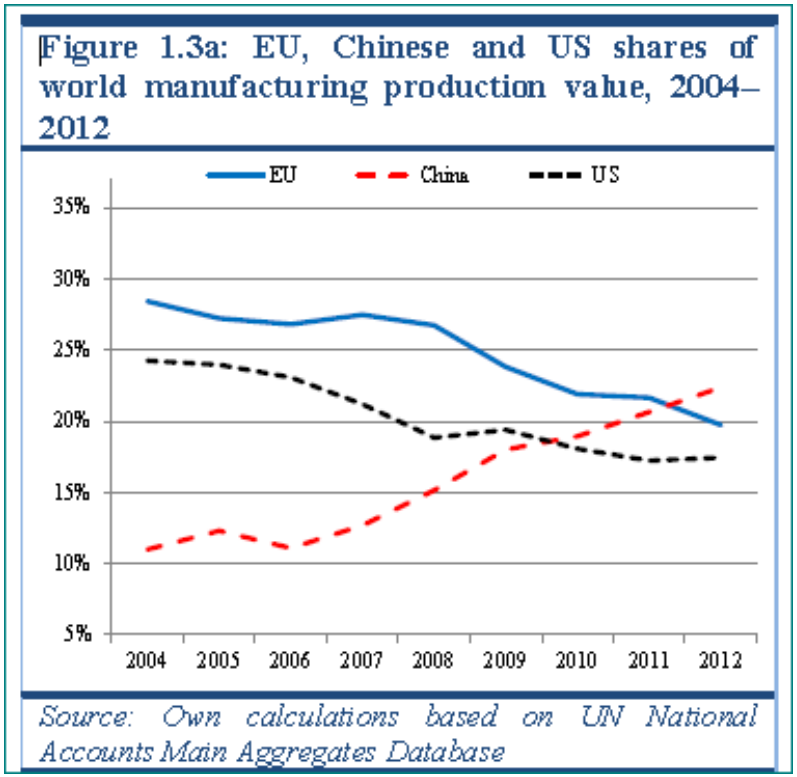
- EC Communications (2009)512 & (2012)341
- KET High-level Group
  - final report '*KETs: Time to Act*', June 2015

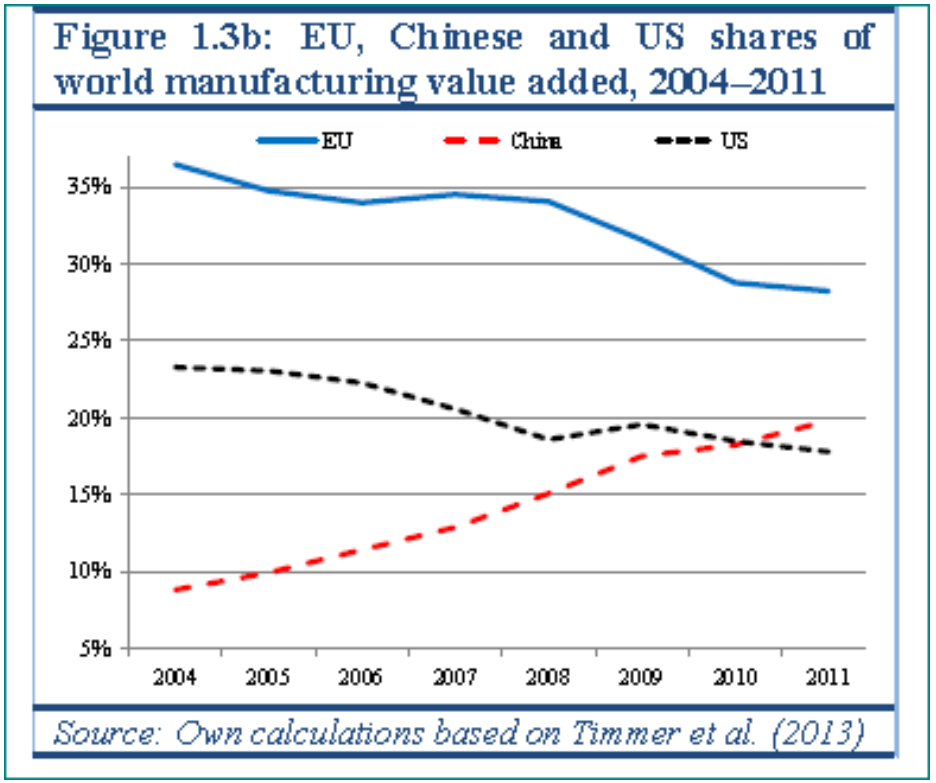
# Strategic context:
# Importance of EU Manufacturing

- **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




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 €**

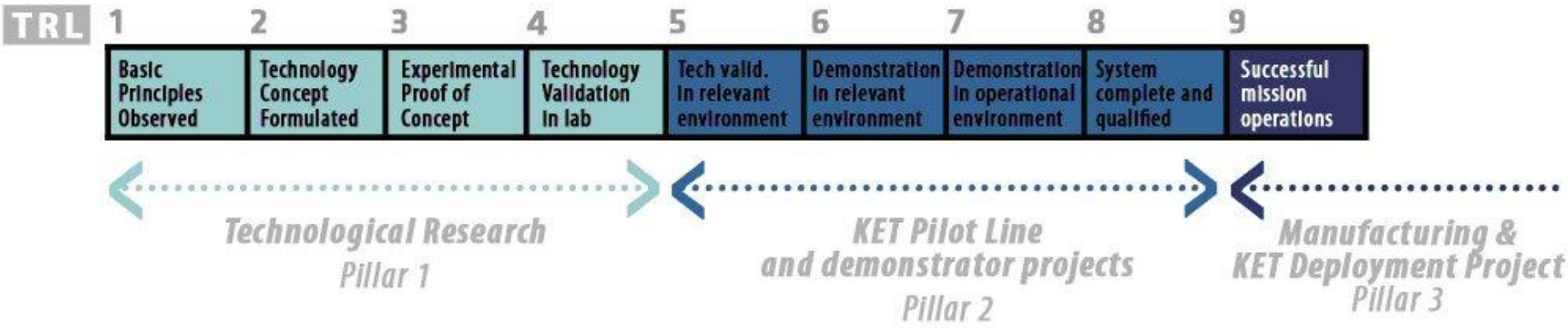
- **Focus on EU Manufacturing**
  *in the context of '4th industrial revolution'*

- **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 | Contractual PPPs |
|---|---|
| • Innovative Medicines (IMI)<br>• Clean Sky<br>• Single European Sky ATM Research (SESAR)<br>• Fuel Cells and Hydrogen (FCH)<br>• Electronic Components and Systems (ECSEL)<br>• Bio-based Industries (BBI)<br>• Shift2Rail | • Factory of the Future (FoF)<br>• Energy-efficient Buildings (EeB)<br>• Sustainable Process Industry (SPIRE)<br>• Green Vehicles (EGVI)<br>• Future internet (5G)<br>• Robotics<br>• Photonics<br>• High Performance Computing<br>• 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

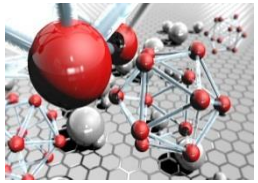
- ***SPIRE-1: Systematic approaches for resource-efficient water management systems in process industries, IA***
- ***SPIRE-2: Plant-wide monitoring and control of data-intensive processes, RIA***
- ***SPIRE-3: Industrial technologies for the valorisation of European bio-resources into high added value process streams, IA***
- ***SPIRE-4: Industrial furnace design addressing energy efficiency in new and existing furnaces, RIA***
- ***SPIRE-5: Potential use of $CO_2$ / 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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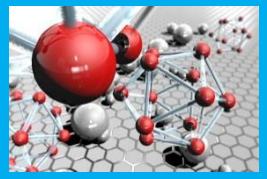
## Green Vehicles PPP

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





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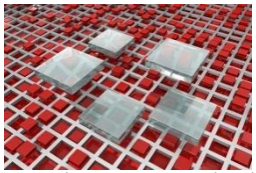
## Advanced materials and Nanotechnologies for Healthcare

- ***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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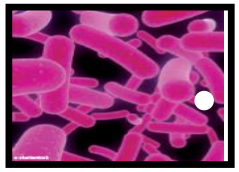
## Advanced materials and Nanotechnologies for Energy applications

- ***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***



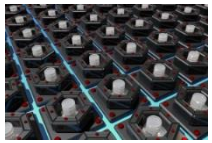
## Biotechnology

***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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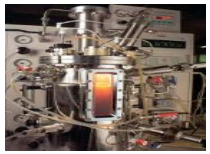
## Modelling for the development of Nanotechnologies and Advanced Materials

- ***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***

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## 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

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