HORIZON 2020
Key Enabling Technologies for European Growth
Towards the First Calls for Proposals

Industrial Technologies
DG Research & Innovation
European Commission
Europe 2020 Strategy

Three priorities:

**Smart growth**: Development of an economy based on knowledge and innovation

**Sustainable growth**: Promotion of an economy that is preserving resources, more ecological and more competitive

**Inclusive growth**: Promotion of an economy with high employment and high social and territorial cohesion

Three priorities → five main targets:

- 75% of the 20-64 year-olds to be employed
- 3% of the EU’s GDP for R&D
- Attainment of the 20-20-20 climate protection targets
- School drop-out rates below 10%, 40% of the 30-34 with 3rd level ed.
- 20 million fewer people in poverty

For implementation **seven Flagship Initiatives**:

- Innovation Union
- Youth on the move
- Digital Agenda for Europe
- Resource efficient Europe
- Industrial policy for the globalisation era
- An agenda for new skills and jobs
- European platform against poverty
Innovation Union

1. Strengthening the knowledge base and reducing fragmentation
   - Promoting excellence in education and skills development
   - Delivering the European Research Area (ERA)
   - Focusing EU funding instruments on Innovation Union priorities
   - Promoting the European Institute of Innovation and Technology (EIT)

2. Getting good ideas to the market
   - Enhancing access to finance for innovative companies
   - Creating a single innovation market
   - Promoting openness and capitalising on Europe's creative potential

3. Maximising social and territorial cohesion
   - Spreading the benefits of innovation across the Union
   - Increasing social benefits

4. Pooling forces to achieve breakthroughs

5. Leveraging EU policies externally
Political Architecture: Covering the Full Innovation Chain

- Fundamental Research
- Applied Research
- Technical Development/Innovation
- Market Uptake

"The Valley of Death"
Deficient support lowers Competitiveness

NEED FOR IMPROVEMENT

very successfully covered by EU funding
Horizon 2020

- A strong challenge-based approach, allowing applicants to have considerable freedom to come up with innovative solutions
- Emphasis on innovation
- 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)
How about synergies with Horizon2020?

**Upstream**
- ESI Funds
  - R&I Infrastructures and Equipment (IP1)
  - ESFRI
  - Skills
  - Business Advisory services

**Horizon 2020**
- Frontier research (ERC, FET)
- Excellent R&I
- Demonstration
- Pilots

**Downstream**
- KETs
- Business Innovation (IP1+3)
- PPPs
- prizes
- procurement

**“Stairway to Excellence”**
- National/Region
- alR&I systems

**“Research Excellence”**
- SME instrument, "Fast track"
- KICs

**“Innovation Excellence”**
- Hopefully also excellence,
Three priorities

- Excellent science
- Industrial leadership
- Societal challenges
**Horizon 2020**

Total indicative budget: 70 Bio. €*

**Excellent science**

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

**Industrial leadership**

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

**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

**Indicative Budget:**

- **Excellent science:** 24.4 Bio. €*
- **Industrial leadership:** 17.0 Bio. €*
- **Societal challenges:** 29.7 Bio. €*

* 2014-20, actual budget (tentative)

Includes EIT, JRC, "widening", "science with and for society", not shown above
Future and Emerging Technologies (FET) – Objectives

Foster scientific collaboration across disciplines on visionary, high-risk ideas – uncover radically new technology areas

Science-driven and revolutionary research

Interdisciplinary and collaborative

Pathfinding Europe’s technological future + bootstrapping new R&I eco-systems

Complementary to activities in other parts of Horizon 2020 – exploiting synergies
FET – activities

Three complementary schemes

bottom-up ↔ top-down

open, visionary, interdisciplinary 
multi-disciplinary

Early ideas

FET open

FET Proactive

Large-scale initiatives

40% of the FET budget

Exploring novel ideas

Developing topics & communities

Addressing grand challenges

Excellent Science
Leadership in enabling and industrial technologies (LEIT)

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

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
General Policy Issues in LEIT

- Exploitation and business plans
- Industrial-size projects to look at additional funding/financing sources
- Contributions to solving societal challenges and to focus areas
- Open to International Cooperation
Industrial Leadership

- Key Enabling Technologies (KETs) and support to industry, to recover from economic crisis

- Emphasis on R&D and innovation with strong industrial dimension

- Activities primarily developed through relevant industrial roadmaps (ETPs, PPPs)

- Involvement of industrial participants and SMEs to maximise expected impact => key aspect of proposal evaluation

- Funded projects will be outcome oriented, developing key technology building blocks and bringing them closer to the market
Mastering and industrial deployment of Key Enabling Technologies (KETs)

What are KETs?

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

European KET Strategy:
- KET High-level Group

- Nanotechnologies
- Advanced Materials
- Micro- and nano-electronics
- Photonics
- Biotechnology
- Advanced Manufacturing
The issues regarding KETs

- Europe has strong position in science and in patenting activity
- EU actors are at top of patent ranking in each KET

From Lab to Industry to Market
Main priorities for KETs in LEIT

- Technology development and validation, aiming at industrial deployment of Key Enabling Technologies (KETs)
- Strategic research agendas, roadmaps and value chains (applications in several sectors)
- Industrial engagement / leverage
- Pilots and demonstrators
- Cross-cutting KETs (combinations of KETs), 30% of KET budget
- Enabling applications in societal challenges
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 – 8; centre at TRLs 5-7
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 5-8
  (Non-profit participants can claim 100% funding)
- Cross-cutting KETs (combinations of KETs)
- Seamless coverage provided by FETs/ERC – LEIT – Societal Challenges
- Ground prepared in FP7 (pilots & demonstrators, innovation activities)
## PPPs in Horizon 2020

<table>
<thead>
<tr>
<th>Joint Technology Initiatives</th>
<th>Contractual PPPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Innovative Medicines (IMI)</td>
<td>• Factory of the Future (FoF)</td>
</tr>
<tr>
<td>• Clean Sky</td>
<td>• Energy-efficient Buildings (EeB)</td>
</tr>
<tr>
<td>• Single European Sky ATM Research (SESAR)</td>
<td>• Green Vehicles (EGVI)</td>
</tr>
<tr>
<td>• Fuel Cells and Hydrogen (FCH)</td>
<td>• Future internet (5G)</td>
</tr>
<tr>
<td>• Electronic Components and Systems (ECSEL - old ARTEMIS + ENIAC)</td>
<td>New:</td>
</tr>
<tr>
<td>New:</td>
<td>• Sustainable Process Industry (SPIRE)</td>
</tr>
<tr>
<td>• Bio-based Industries (BBI)</td>
<td>• Robotics</td>
</tr>
<tr>
<td></td>
<td>• Photonics</td>
</tr>
<tr>
<td></td>
<td>• High Performance Computing</td>
</tr>
</tbody>
</table>
Rationale of the FoF PPP

• Manufacturing Jobs

• Advanced manufacturing is a complex R&D-intensive activity,

• Technological capabilities and supply chains
Rationale of the EeB PPP

- The construction sector is the largest EU single activity

- The sector is highly fragmented

- Buildings and climate

- Very low replacement rate of the existing stock.
Rationale of the EGVI PPP

- EU automotive industry is a key sector,

- The quick introduction of new green vehicles

- Technological complexity, initial low market acceptance
Rationale of the SPIRE PPP

- EU process industries is very important

- Eight EU industrial sectors are covered (chemical, steel, cement, ceramics, minerals, non-ferrous metals, industrial water and process engineering).

- They are struggling with competitiveness at global level
Contractual arrangement

- **Main roles in a contractual PPP**
  - Private sector
  - Implementation via Commission WPs

- **Content of the document:**
  - Scope and Specific Objectives,
  - Activities, investment and outputs,
  - Governance and openess,
Where have CIP programmes gone?

- **Intelligent Energy Europe**
  - Challenge 3 (efficient energy)

- **ICT Policy Support Programme**
  - Leadership in Emerging and Industrial Technologies

- **Entrepreneurship and Innovation Programme**
  - Eco-innovation
  - Innovation
  - Competitiveness

- **Horizon 2020**
  - Challenge 5 (climate change & resource efficiency)
  - Access to risk finance, Innovation in SMEs

- **COSME**
TOPICS
Work Programme topics

Structure reflects the challenge based approach

3 key features:

• **Specific Challenge**
  - sets context, problem to be addressed, why intervention is necessary

• **Scope**
  - delineates the problem, specifies the focus and the boundaries of the potential action BUT without overly describing specific approaches

• **Expected Impact**
  - describe the key elements of what is expected to be achieved in relation to the specific challenge
Calls in first WP of H2020 for Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing

Publication: 11 December 2013

Deadlines (2014 topics):
FoF, EeB, SPIRE calls: 20/03/2014 (single stage)
NMP call, nano pilot lines / CSAs: 06/05/2014 (single stage)
NMP call, other topics: 06/05/2014 (1st stage) / 07/10/2014 (2nd stage)
Biotechnology call: 12/03/2014 (1st stage) / 26/06/2014 (2nd stage)
SME Instrument: Phase 1 18/06, 24/09, 17/12/2014;
                Phase 2 09/10, 17/12/2014

Always check legal documents
Call for Nanotechnology, Advanced Materials and KET support actions

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
Call for Nanotechnology, Advanced Materials and KET support actions

Nanotechnology and Advanced Materials for 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.
Call for Nanotechnology, Advanced Materials and KET support actions

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**
Call for Nanotechnology, Advanced Materials and KET support actions

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.
Call for Nanotechnology, Advanced Materials and KET support actions

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)
Call for Nanotechnology, Advanced Materials and KET support actions

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 Biotechnologies

Cutting-edge biotechnologies as future innovation drivers

- **Synthetic biology**: potential to influence or even transform large areas of our economy and society.
- **Bioinformatics** critical to realise full value of biotechnology
- Appropriate measures to facilitate effective transfer and implementation into new applications.
Call for Biotechnologies

*Biotechnology-based industrial processes driving competitiveness and sustainability*

- Addresses technology driven R&D targeting industrial bottlenecks.
- Aim: maintain EU leadership in industrial biotechnology
Call for Biotechnologies

Innovative and competitive platform technologies

- Furthering technological development of metagenomics technologies in terms of increased accuracy and costs reduction to expand their potential
Call for Factories of the Future (FoF)

- **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
Call for Energy-efficient Buildings (EeB)

- 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 & CO² 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)

- 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.
Contribution to Focus Area WASTE: A resource to recycle, reuse and recover raw Materials (Societal Challenge 5)

- **Eco-innovative solutions** and resource-efficient products, processes and services

- **Industrial symbiosis**: turning waste from one industry into useful feedstock for another one.
Contribution to Green Vehicles

Contribution to specific initiative on Green Vehicles (Societal Challenge 4)

- Improved battery technologies for Fully Electric Vehicles (FEV)
- Roadmap of the European Green Vehicle Initiative (EGVI)
- Building on results from projects of the FP7 GCI PPP
- Next generation of batteries should be made: developed, tested, produced in Europe
Fast track to Innovation topic

- Proposals for innovation linked to any technological field – bottom-up
- Continuously open call
- 3 cut-off dates per year, first cut-off in 2015
- Time to Grant: < 6 months
- < 5 legal entities per action – max EU contribution € 3 Moi
- Impact, Implementation, excellence
- Impact higher weighting (time sensitivity, international competitive situation)
III. List of All Topics

Legend:

RIA: Research and Innovation Actions (100% funding)

IA: Innovation Actions (70% funding)

SME: SME Instrument (70% funding)

CSA: Coordination and Support Actions
Bridging the gap between nanotechnology research and markets

<table>
<thead>
<tr>
<th>Topic code</th>
<th>Topic title</th>
<th>Type of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMP 1 - 2014</td>
<td>Open access pilot lines for cost-effective nanocomposites</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 2 - 2015</td>
<td>Integration of novel nano materials into existing production lines</td>
<td>IA</td>
</tr>
<tr>
<td>NMP 3 - 2015</td>
<td>Manufacturing and control of nanoporous materials</td>
<td>IA</td>
</tr>
<tr>
<td>NMP 4 - 2014</td>
<td>High-definition printing of multifunctional materials</td>
<td>IA</td>
</tr>
<tr>
<td>NMP 5 - 2014</td>
<td>Industrial-scale production of nanomaterials for printing applications</td>
<td>IA</td>
</tr>
<tr>
<td>NMP 6 - 2015</td>
<td>Novel nanomatrices and nanocapsules</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 7 - 2015</td>
<td>Additive manufacturing for table-top nanofactories</td>
<td>RIA</td>
</tr>
</tbody>
</table>
**Call for Nanotechnology, Advanced Materials and KET support actions**

**Nanotechnology and Advanced Materials for more effective Healthcare**

<table>
<thead>
<tr>
<th>Topic code</th>
<th>Topic title</th>
<th>Type of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMP 8 - 2014</td>
<td>Scale-up of nanopharmaceuticals production</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 9 - 2014</td>
<td>Networking of SMEs in the nano-biomedical sector</td>
<td>CSA (max 1)</td>
</tr>
<tr>
<td>NMP 10 - 2014</td>
<td>Biomaterials for the treatment of Diabetes Mellitus</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 11 - 2015</td>
<td>Nanomedicine therapy for cancer</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 12 - 2015</td>
<td>Biomaterials for treatment and prevention of Alzheimer's disease</td>
<td>RIA</td>
</tr>
</tbody>
</table>
Call for Nanotechnology, Advanced Materials and KET support

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

<table>
<thead>
<tr>
<th>Topic code</th>
<th>Topic title</th>
<th>Type of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMP 13 - 2014</td>
<td>Storage of energy produced by decentralised sources</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 15 - 2015</td>
<td>Materials innovations for optimisation of cooling in power plants</td>
<td>IA</td>
</tr>
<tr>
<td>NMP 16 - 2015</td>
<td>Extended in-service service of advanced functional materials in energy technologies (capture, conversion, storage and/or transmission of energy)</td>
<td>IA</td>
</tr>
<tr>
<td>NMP 17 - 2014</td>
<td>Post-lithium ion batteries for electric automotive applications</td>
<td>RIA</td>
</tr>
</tbody>
</table>

* Contribution to specific initiative on Green Vehicles
Call for Nanotechnology, Advanced Materials and KET support

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

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

* 3 separate phases / 70% funding for phase I in form of lump sum of 50,000 €
Call for Nanotechnology, Advanced Materials and KET support

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

<table>
<thead>
<tr>
<th>Topic code</th>
<th>Topic title</th>
<th>Type of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>NMP 26 - 2014</td>
<td>Joint EU &amp; MS activity on the next phase of research in support of regulation “NANOREG II”</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 27 – 2014</td>
<td>Coordination of EU and international efforts in safety of nanotechnology</td>
<td>CSA</td>
</tr>
<tr>
<td>NMP 28 – 2014</td>
<td>Assessment of environmental fate of nanomaterials</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 29 – 2015</td>
<td>Increasing the capacity to perform nano-safety assessment</td>
<td>RIA</td>
</tr>
<tr>
<td>NMP 30 – 2015</td>
<td>Next generation tools for risk governance of nanomaterials</td>
<td>RIA</td>
</tr>
</tbody>
</table>
Call for Nanotechnology, Advanced Materials and KET support

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

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

**Cutting-edge biotechnologies as future innovation drivers**

<table>
<thead>
<tr>
<th>Topic code</th>
<th>Topic title</th>
<th>Project type</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOTEC 1 - 2014</td>
<td><strong>Synthetic biology – design of organisms for new products and processes</strong></td>
<td>RIA</td>
</tr>
<tr>
<td>BIOTEC 2 - 2015</td>
<td><strong>New bioinformatics approaches in service of biotechnology</strong></td>
<td>RIA</td>
</tr>
</tbody>
</table>
Call for Biotechnologies

**Biotechnology-based industrial processes driving competitiveness and sustainability**

<table>
<thead>
<tr>
<th>Topic code</th>
<th>Topic title</th>
<th>Type of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOTEC 3 - 2014</td>
<td>Widening industrial application of enzymatic processes</td>
<td>IA</td>
</tr>
<tr>
<td>BIOTEC 4 - 2014</td>
<td>Downstream processes unlocking biotechnological transformations</td>
<td>IA</td>
</tr>
<tr>
<td>BIOTEC 5 - 2014/2015</td>
<td>SME boosting biotechnology-based industrial processes driving competitiveness and sustainability</td>
<td>SME</td>
</tr>
</tbody>
</table>
Call for Biotechnologies

Innovative and competitive platform technologies

<table>
<thead>
<tr>
<th>Topic code</th>
<th>Topic title</th>
<th>Type of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOTEC 6 - 2015</td>
<td>Metagenomics as innovation driver</td>
<td>RIA</td>
</tr>
</tbody>
</table>
## Call for Factories of the Future (FoF)

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

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

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

<table>
<thead>
<tr>
<th>Topic code</th>
<th>Topic title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTI - 1</td>
<td><strong>Fast Track to Innovation</strong></td>
</tr>
</tbody>
</table>
Find out more on Horizon 2020: http://www.ec.europa.eu/research/horizon2020

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

Thank you for your attention