



HORIZON 2020

Leadership in Enabling and Industrial Technologies

Nanotechnologies, Advanced Materials, Advanced Manufacturing and Processing

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Horizon 2020

Total indicative budget: 77.0 billion €*

Excellent science

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

Indicative Budget:
24.4 billion €*

Industrial leadership

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

Indicative Budget:
17.0 billion €*

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:
29.7 billion €*

* 2014-20, actual budget (not 2011 prices)

– includes 5.9 billion € for "widening participation", "science with and for society", JRC and EIT, in addition to three priorities above

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)

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

**This
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

Industrial Leadership

- Key Enabling Technologies (KETs) and Partnership with 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

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

European KET Strategy:

- **EC Communications**
(2009)512 & (2012)341
- **KET High-level Group**

The issues in KET development

- Europe has strong position in science and in patenting activity
- EU actors are at top of patent ranking in each KET
- But there is a gap between the technology base and the manufacturing base
- We need to add demonstrators, competitive manufacturing and product development to the technologies

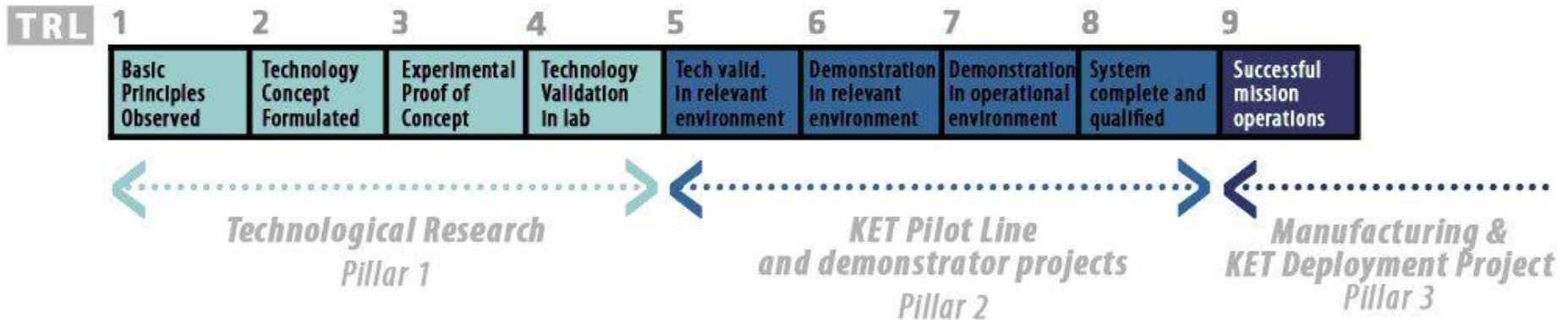
From Lab to Industry to Market

Main priorities for KETs

- 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 and manufacturing), 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 – 7; centre at TRLs 5-6

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)

General Policy Issues in LEIT

- Exploitation and business plans
(exploitable results and credible path to innovation)
- Industrial-size projects to look at additional
funding/financing sources
- SME involvement – not only SME Instrument
- Contributions to solving societal challenges
and to focus areas
- Open to International Cooperation
- Engagement with Social Sciences and Humanities
- Responsible approach to Research and Innovation

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

* Actual figure for the budget after the Council/EP/COM negotiations of July 2013; to be confirmed

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)

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

Between 80 and 100 billion € ESIF money could be made available for innovation, bolstering over 100 smart specialisation strategies

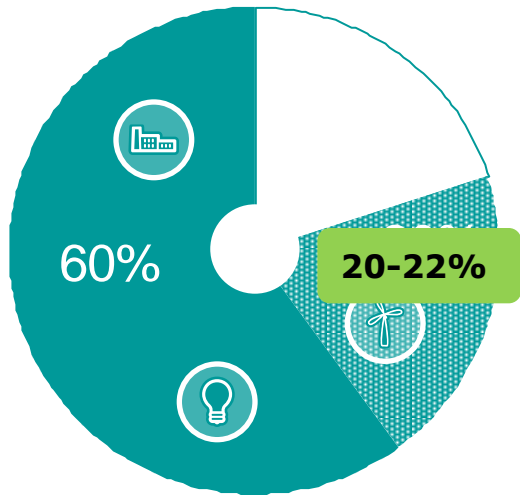
Thematic concentration of

 **Research and Innovation**

 **Energy efficiency and renewable energy**

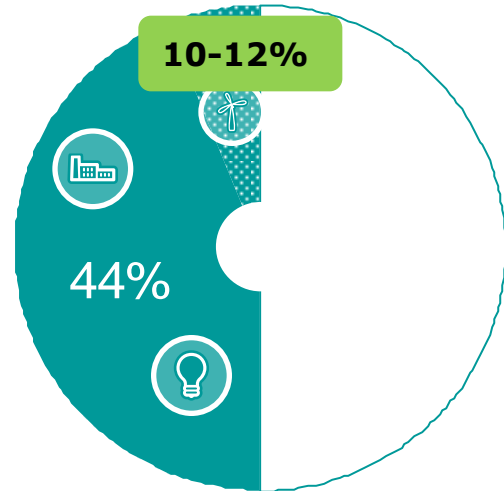
 **SMEs competitiveness**

+ ICT access and use



Developed regions and transition regions

Transition regions: 60 % concentration (incl. 15%-20% for energy/renewables)



Less developed regions

Flexibility (different regions present different needs)
Special arrangements for the previously convergence regions

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/>

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)

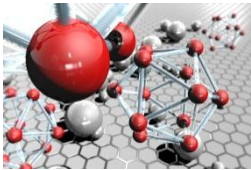
Biotechnology call: **12/03/2014** (1st stage) / **26/06/2014** (2nd stage)

SME Instrument: Phase 1 **18/06, 24/09, 17/12/2014;**

Phase 2 **09/10, 17/12/2014**

This presentation is based
on the published WP
Always check legal
documents

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

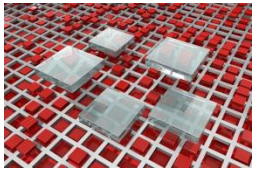
Call for Nanotechnology, Advanced Materials and Production



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 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**

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.

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)

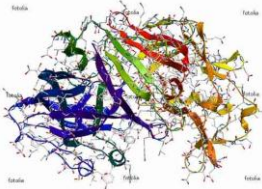
Call for Nanotechnology, Advanced Materials and Production



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 Biotechnology *

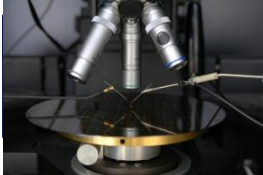


Cutting-edge biotechnologies as future innovation drivers

Biotechnology-based industrial processes

- **Synthetic biology:** potential to influence or event transform large areas of our economy and society.
- Effective translation to new applications, to maintain **EU leadership in industrial biotechnology**
- Innovative and competitive platform technologies

** a large part of the biotechnology R&D+I agenda will be implemented by the JTI Bio-based Industries*



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 & 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 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.



Find out more about Horizon 2020:

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

Participant Portal:

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

Work Programmes (and other legal and reference documents):

http://ec.europa.eu/research/participants/portal/desktop/en/funding/reference_docs.html#h2020-work-programmes-2014-15

Thank you for your attention