

Nanotechnology R&I opportunities in Horizon 2020



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Financial instrument implementing the Innovation Union (Europe 2020 flagship) initiative aimed at securing Europe's global competitiveness

Programme involving more than **~77b€** for research and innovation **Combining all research and innovation funding** currently provided through the :

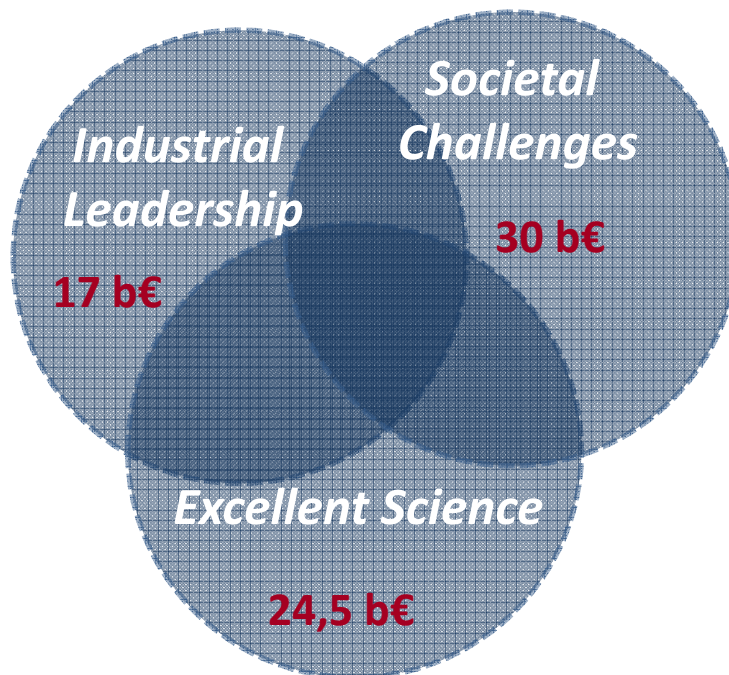
7th Framework Programmes for Research and Technological Development (FP)

Competitiveness and Innovation Framework Programme (CIP)

European Institute of Innovation and Technology (EIT)

Horizon 2020 (2014-2020) – Three mutually reinforcing priorities – ~70 b€ (FP + EIT+ CIP)

Strengthen industrial leadership in innovation. Includes major investment in key technologies, great access to capital and support for SMEs



Support EU's position as a world leader in science, with an increase in funding to the European Research Council

Reflects the priorities of the EU 2020 strategy, addressing major concerns shared by all Europeans





Horizon 2020 is different

- A strong challenge-based approach, allowing applicants to have considerable freedom to come up with innovative solutions
- Simplified list of possible types of action (e.g. research and innovation -100%; innovation actions - 70%,...)
- Less prescription, strong emphasis on expected impact
- Strategic approach, with two-year work programmes
- Broader topics
- Focus areas bring together different technologies, along entire innovation chain
- Cross-cutting issues mainstreamed (e.g. social sciences, gender, international...)

Horizon 2020 Rules



Types of action

- **RIA:** Research and innovation actions
- **IA:** Innovation actions
- **CSA:** Coordination and support actions

Minimum participation conditions

- At least three legal entities each established in a different Member State or an Associated Country for collaborative actions (and minimum one entity for CSAs)

Evaluation criteria

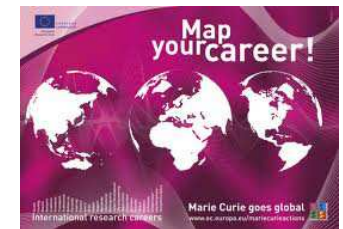
- Excellence – Impact – Quality and efficiency of the action (similar with FP7)
- Thresholds are depending on the call conditions

Time to Grant shortened

- Maximum 8 months (5 to evaluation results and 3 to Grant Agreement)
- Grant preparation rather than negotiation (proposals are evaluated "as is" and not "what could be")

HORIZON 2020- Excellent Science

1. **ERC**, provide attractive and flexible funding to enable talented and creative individual researchers and their teams to pursue the most promising avenues at the frontier of science
2. **FET**, Future and Emerging Technologies, support collaborative research across disciplines on radically new, high-risk ideas in order to accelerate the development of the most promising emerging areas of S&T
3. **Marie-Curie actions**, provide excellent and innovative research training and attractive career and knowledge-exchange opportunities through cross-border and cross-sector mobility of researchers
4. **Research Infrastructures**, develop European research infrastructure for 2020 and beyond, foster their innovation potential and human capital



HORIZON 2020 – Industrial Leadership

1. **ICT** – micro & nanoelectronics & photonics, embedded & energy & resource efficient components & systems, next generation computing, future internet, advanced interfaces and robots
2. **Nanotechnologies** – develop new materials & nanotechnologies at the cross-roads of different scientific disciplines, addressing sustainability & social dimension
3. **Advanced materials** - develop materials with new functionalities and improved performance, greater energy efficiency & lower environmental impact
4. **Biotechnology** – develop competitive, sustainable, & innovative industrial products & processes for agriculture, forestry, food, chemical, & health sectors
5. **Advanced Manufacturing and Processing** – transform today's industrial forms of production towards more knowledge intensive, sustainable, trans-sectoral manufacturing and processing technologies, resulting in more innovative products, processes and services
6. **Space** – develop and exploit space infrastructure to meet future EU policy & societal needs



Access to risk finance and Innovation in SMEs.

HORIZON 2020: Societal Challenges

1. **Health, demographic change and wellbeing**
2. **European bioeconomy challenges: food security, sustainable agriculture and forestry, marine and maritime and inland water research**
3. **Secure, clean and efficient energy**
4. **Smart, green and integrated transport**
5. **Climate action, resource efficiency and raw materials**
6. **Europe in a changing world - Inclusive, innovative and reflective societies**
7. **Secure societies – Protecting freedom and security of Europe and its citizens**



Work Programme topics

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

NMP 28 – 2014: Assessment of environmental fate of nanomaterials

Specific challenge: A potential nanomaterial risk for humans and the environment is present only when both exposure and a hazard potential of the nanomaterial exist. The challenge is to address the prediction of environmental distribution, concentration and form (speciation) of nanomaterials. It includes release and exposure studies using laboratory, field and model simulations of possible release and transformation of nanomaterials transport and fate, availability and bioaccumulation potential, to allow early assessment of potential exposure and facilitate safe product design.

Scope: The testing and modelling framework to be developed must allow prediction of the release and fate of nanomaterials over relevant whole product chains from manufacturing downstream application and use, including waste and accidents, consumer use, to end-of-life recycling or disposal and final environmental fate. The predictive framework to be developed should include basic geographical and demographic considerations for uses, and address the physico-chemical characterisation at the release sources as well as the identification of the main mechanisms and nanomaterial properties driving their transformation and fate. The framework should enable predictive mapping of zones of accumulations and exposure potential (including the final aging transformations, fates and uptake availabilities) of nanomaterials in these “environmental sinks” and hot spots.

A close collaboration with stakeholders and different industries should be envisaged, to enhance realistic modelling and testing.

Activities expected to focus on Technology Readiness Level 4.

The Commission considers that proposals requesting a contribution from the EU between EUR 6 and 10 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. No more than one proposal will be funded.

Expected impact:

- understanding and quantifying nanomaterial release from manufacturing use and end-of-life stages in relevant product value chains
- an overall validated framework that ensures the completeness and quality of information and data needed for understanding and predictive modelling of environmental transport and transformation
- understanding of the interplay of the different transformation, transport, and aging mechanisms determining environmental exposure
- enabling safer product design guidance, comprehensive laboratory and field test procedures all along the product chain, including metrology and standardisation issues for characterisation, and addressing international harmonisation and regulation

Type of action: Research & Innovation Actions

Industrial Leadership

- **Nanotechnologies**
- **Advanced Materials**
- **Biotechnology**
- **Advanced Manufacturing and Processing**

Budget: 4206 M€



Key Enabling Technologies (KETs)



Key Elements for 2014/2015 Work Programmes

- **Transfer of R&I results to industry:** enhance the industrial involvement, financial leverage, pilots and demonstrators (TRLs 4-7)
- Synergies with other funds and complementarity with national programs - **Smart Specialisation**
- **Result oriented projects** – focused on impact
- **Societal Challenges oriented:** *Personalising health care; Smart cities and communities; Low-carbon energy; Waste as a resource; Water innovation*
- **PPPs: Factories of the Future; SPIRE; Energy-efficient Buildings**
- **Cross-sectorial activities:** safety, outreach, standardization, technology transfer, business models, metrology
- **International Cooperation**

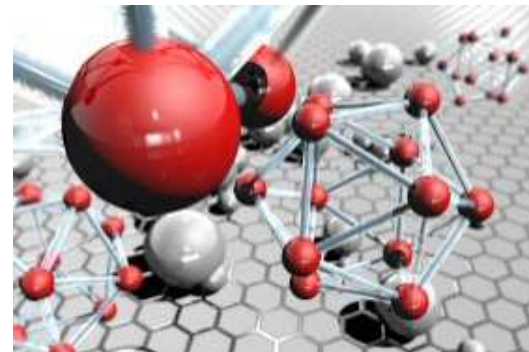
Calls for Nanotechnologies, Advanced Materials, Biotechnology and Advanced Manufacturing and Processing

- **One call for Nanotechnologies, Advanced materials and KET support actions**
- **One call for Biotechnology**
- **Three cross-cutting calls implementing Factories of the Future (FoF), Energy-efficient buildings (EeB) and Sustainable Process Industries (SPIRE)**

Call for Nanotechnologies, 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 Nanotechnologies, Advanced materials and KET support actions

Nanotechnology and Advanced Materials for more effective Healthcare

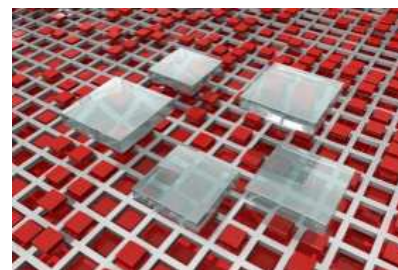
- Support **more effective therapies** in health care for important diseases.
- Required development : reach point where they can be considered **fit for purpose** in preparation of, but not including, clinical trial stages.
- **Gender** issues important : technologies and innovations should suit both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



Call for Nanotechnologies, 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 Nanotechnologies, 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 Nanotechnologies, 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)



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

Topic	TRL	Instrum
NMP 26 – 2014: Joint EU & MS activity on the next phase of research in support of regulation “NANOREG II” 6-10M€	5	RIA
Regulation of the nanomaterials market evolves parallel to technology development and societal requirements. Demonstration of integration of such technology into the design of new nanomaterials and products and their applications is a major challenge and the main objective of this joint action. This collaboration should be complemented by solid mechanisms networking state and private laboratories in nanotechnology toxicity testing and exposure control.		
NMP 27 – 2014: Coordination of EU and international efforts in safety of nanotechnology 2-3M€		CSA
The main aim is to bring together EU Member and Associated states and international efforts for risk assessment, management and governance by streamlining data acquisition, collection and management on regulatory oriented toxicology testing of nanomaterial, exposure monitoring, LCA, and disposal and treatment of waste nanomaterials		
NMP 28 – 2014: Assessment of environmental fate of nanomaterials 6-10M€	4	RIA
The testing and modelling framework to be developed must allow prediction of the release and fate of nanomaterials over relevant whole product chains from manufacturing, downstream application and use, including waste and accidents, consumer use, to end – of - life recycling or disposal and final environmental fate.		

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

Topic	TRL	Instrum
NMP 29 – 2015: Increasing the capacity to perform nano - safety assessment 4-8M€	4	RIA
Projects should enhance the understanding of the mechanisms underlying any observed adverse effects from engineered nanomaterials, and ultimately link the potential for such adverse effects to specific physical or chemical nano scale properties.		
NMP 30 – 2015: Next generation tools for risk governance of nanomaterials 6-8M€	5	RIA
Research should focus on the testing, the calibration and the further development of risk prioritisation (or banding) tools for both human and environmental risks, with emphasis on.....		

Call for Nanotechnologies, 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

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

Topic	TRL	Instrum
NMP 31 – 2014: Novel visualisation tools for enhanced nanotechnology awareness	0.5-1M€	CSA
The major efforts of the project should be dedicated to the development of content aimed at enhanced communication, outreach and balanced information on nanotechnology with youngsters, civil society organisations, the media, and the lay public as the target audience. The content should be made available using novel visualisation, which is not only characterised by a geometry but also has attributes, semantics, and possibly interaction with time. The content should be built either from existing data (e.g. from finished or on-going FP7 projects) or from new data (e.g. from modelling efforts on nano-toxicology phenomena).		
NMP 32 – 2015: Societal engagement on responsible nanotechnology	0.5-1M€	CSA
The proposed action should identify current best practices in societal engagement to establish a multi - stakeholder platform at EU and/or at national level in a number of EU Member States and Associated Countries, involving a balanced representation of researchers, Civil Society Organisations (CSOs) and Non - Governmental Organisations (NGOs), scientists in the field of Social Sciences and Humanities, industry and policy - makers to develop a shared understanding of the current and potential future (economic, social and environmental) benefits and risks of advancing nanotechnology.		
NMP 33 – 2014: The Materials "Common House"	1-2M€	CSA
Support to a monitoring system and a forum to debate developments and needs, identify gaps and opportunities, establish priorities in order to create a sound, authoritative, consensual, science-based, economy pushed, society-driven Europe-wide knowledge base of materials science and engineering. Synergy with or use of present structures and existing schemes is welcome.		
The proposal for the support action should describe the expected level of detail in the study, definitions and limitations, the parameters to be observed, and the targeted application fields.		

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

Topic	TRL	Instrum
NMP 34 – 2014: Networking and sharing of best practices in management of new advanced materials through the eco-design of products, eco-innovation, and product life cycle management 1-2M€		CSA
<p>Projects should network actors (such as enterprises, academia and research institutions) to: share knowledge and practices on eco-design, eco-innovative solutions for manufacturing processes and eco-innovative business models; provide models to decouple economic growth from resource constraints. Eco-design principles, recyclability, required materials performance and cost-effectiveness could be part of the study</p>		
NMP 35 – 2014: Business models with new supply chains for sustainable customer-driven small series production 6-8M€	6-7	IA
<p>Research activities should focus on all of the following areas: integrated business model solutions for customer-driven supply chain management; practical solutions for the ownership, control and management of the related supply chain data; novel distributed manufacturing, sourcing and design solutions linking individual "home-based" designers and manufacturers to the supply-chain promoting social inclusion and deploying skills locally available; solutions for local sourcing and supply, thus reducing the environmental footprint.</p>		
NMP 36 – 2014: Facilitating knowledge management, networking and coordination in NMP 250-500k€		CSA
<p>The coordination action should bring together the experience in the various networks to address issues of common interest including synergies with other actors, e.g. ETPs, PPPs and European Regional and Investment Funds; foresight activities; education and training needs; opportunities and strategies for international cooperation; communication and societal dialogue; synergies with Social Sciences and Humanities actors; gender issues; and widening participation.</p>		

***NanoSafety
Cluster***



<http://www.nanosafetycluster.eu/>

OECD Working Party on Nanotechnology

<http://www.oecd.org>



http://ec.europa.eu/nanotechnology/policies_en.html



http://ec.europa.eu/environment/ecoap/about-eco-innovation/index_en.htm



<http://www.cencenelec.eu/Pages/default.aspx>



Timetable

Calls	Topics	Deadline	
		Phase 1	Phase 2
Nanotechnologies, Advanced materials and KET support actions	H2020-NMP-2014-two-stage (26,28)	06/05/2014	07/10/2014
	H2020-NMP-2014-CSA (27, 31, 33, 34, 36)	06/05/2014	
	H2020-NMP-2015-CSA (32)	26/03/2015	
	H2020-NMP-2015-two-stage (29, 30)	26/03/2015	08/09/2015
Factories of Future (FoF)	H2020-FoF-2014	20/03/2014	
	H2020-FoF-2015	09/12/2014	
Sustainable Process Industry (SPIRE)	H2020-SPIRE-2014	20/03/2014	
	H2020-SPIRE-2015	09/12/2014	
Energy Efficient Buildings (EEB)	H2020-EEB-2014	20/03/2014	
	H2020-EEB-2015	09/12/2014	

Participant Portal

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



The screenshot shows the top section of the Horizon 2020 Participant Portal. It features the European Commission logo and the text "RESEARCH & INNOVATION Participant Portal". Below this is a navigation bar with links: HOME, FUNDING OPPORTUNITIES, HOW TO PARTICIPATE, EXPERTS, and SUPPORT. There are also LOGIN and REGISTER buttons. The main content area has a banner for "Horizon 2020 Funding Starting from 1/1/2014". Below the banner, it states: "On this site you can find and secure **funding** for research & innovation projects under the following EU programmes:

- **2014-2020** Horizon 2020 - research and innovation framework programme
- **2007-2013** 7th research framework programme (FP7) and Competitiveness & Innovation Programme (CIP)

Below this, there are two columns of user actions:

Non-registered users	Registered users
<ul style="list-style-type: none">• search for funding• read the H2020 Online Manual & download the legal documents• check if an organisation is already registered• contact our support services or check our FAQs	<ul style="list-style-type: none">• submit your proposal• sign the grant• manage your project throughout its lifecycle

At the bottom, there is a row of six icons representing various aspects of the portal: a network diagram, the European Union flag, a classical building, a gear with a brain, a bar chart, and a person with a headset.

GPPQ – Portuguese Framework Programme Promotion Office

www.gppq.fct.pt

- **Created** by the Ministry of S&T and Higher Education (**2007**)
- **Integrated under FCT** – Science and Technology Foundation (Ministry of Education and Science)
- **Promotion** of the Portuguese participation in FP7
- **Support, advice and assistance** to Portuguese participants
- **Coordination of the activities of the Portuguese Delegations** to FP7 Programme Committees, European Technological Platforms and Joint Technological Initiatives
- **Support the promotion of bridges, dialogue and partnerships** between Portuguese and international institutions



The screenshot shows the GPPQ website interface. At the top, there's a header with the GPPQ logo and navigation tabs for various themes: AMB, TRAN, SSH, SPACE, SEC, IDEAS, PRESS, INFRA, SME, and REG. Below this is a section titled 'Escolhe o tema aqui' with a grid of icons. The main content area is divided into three columns. The left column features a 'Catálogo de Projectos com Coordenação Portuguesa no 7º PQ' and a '7º Framework Programme - Portuguese Delegations' brochure. The middle column is titled 'GPPQ | Gabinete de Promoção do Programa Quadro de I&DT' and contains text about the office's mission and contact information. The right column is titled 'Destaque' and lists several news items, including 'O BPI já disponibiliza empréstimos ao apoio do Risk Sharing Instrument (RSI) do R&D 7º PQ', 'Conheça os tópicos indicativos para a 9ª call da iniciativa Medicamentos Inovadores (IMI)', 'Asubscrição pública sobre os Acordos de Parceria para os Fundos Estruturais e de Investimento Europeus 2014-2020', 'Lançamento do concurso ERA-NET New INDIGO no tema Energia', 'A Parceria Europeia para ensaios clínicos (EDCTP) lançou um concurso para Membros do Strategic Advisory Committee (SAC)', 'FCT publica aviso de abertura de concurso para Centros de Co-localização do EIT em Portugal', 'Aberto Concurso de 2013 do Fundo de Investigação do Carvão e do Aço (RFCAS)', 'Concurso de 2013 das Apes COST', and 'Abertura do concurso FP7-KBBE-2013-PEEDTRIALLS'.

R&D in Nanotechnology

Nanotechnology, Nanomaterials, Nanosafety, Engineered Nanoparticles, Metrology funding projects:

- **FCT projects (2000-2008) – 83 projects ~18M€**
- **FP7 projects with PT participation – 86 projects ~ 10M€ for PT participants**
- **PT involved in several ERA-NETs :**
 - **SIIN (Nanotoxicology)**
 - EuroNanomed2 (Nanomedicine)**
 - NanoSci-ERA and NanoSci-E+ Plus (Nanosciences)**
 - EuroNanomed (Nanomedicine)**
 - MNT-ERA.NET II (micro/nanotechnology)**

