European Commission

HORIZON 2020

The New EU Framework Programme for Research and Innovation

2014-2020

Nicolas SEGEBARTH

DG RTD, Nanosciences and Nanotechnologies

HORIZON 2020

Outline

- What is Horizon 2020? Institutional framework
- A retrospective look at FP7
- What is new in Horizon 2020?
  - ✓ The 3 pillars
  - ✓ The Industrial Leadership pillar and the NMPB work programme
  - ✓ Simplification, partnerships and (int.) participation

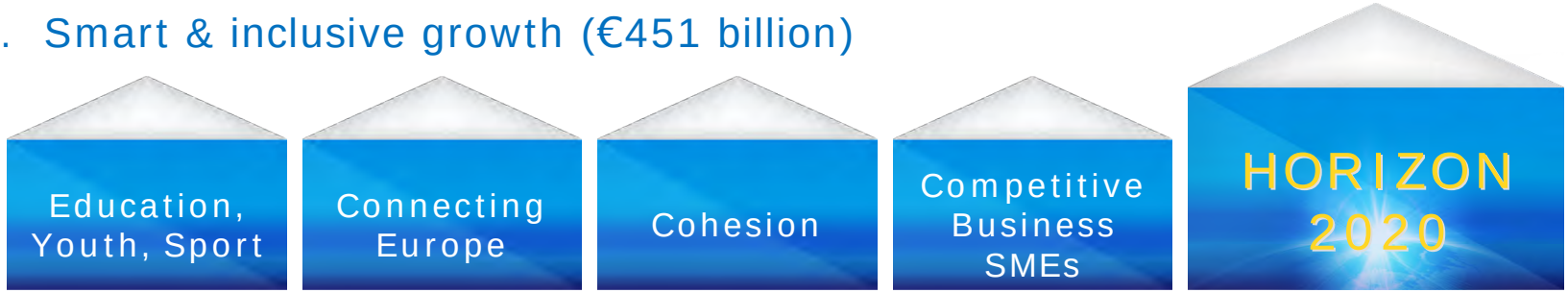
European Union & European Commission

EU Member States delegate to the Union *exclusive*, *shared* or *supplementary and coordination* competencies

Key challenge: stabilise the financial and economic system while taking measures to create economic opportunities

The Multiannual Financial Framework 2014-2020
(Adopted by European Parliament on Nov 20)

1. Smart & inclusive growth (€451 billion)



2. Sustainable growth, natural resources (€373 billion)
3. Security and citizenship (€16 billion)
4. Global Europe (€58 billion)
5. Administration (€61.6 billion)

TOTAL €960 billion

HORIZON 2020

European Commission

European Commission - DG for Research and Innovation (DG RTD)

DG RTD Mission:

➢To develop and implement the European research and innovation policy (Europe 2020 and the Innovation Union).

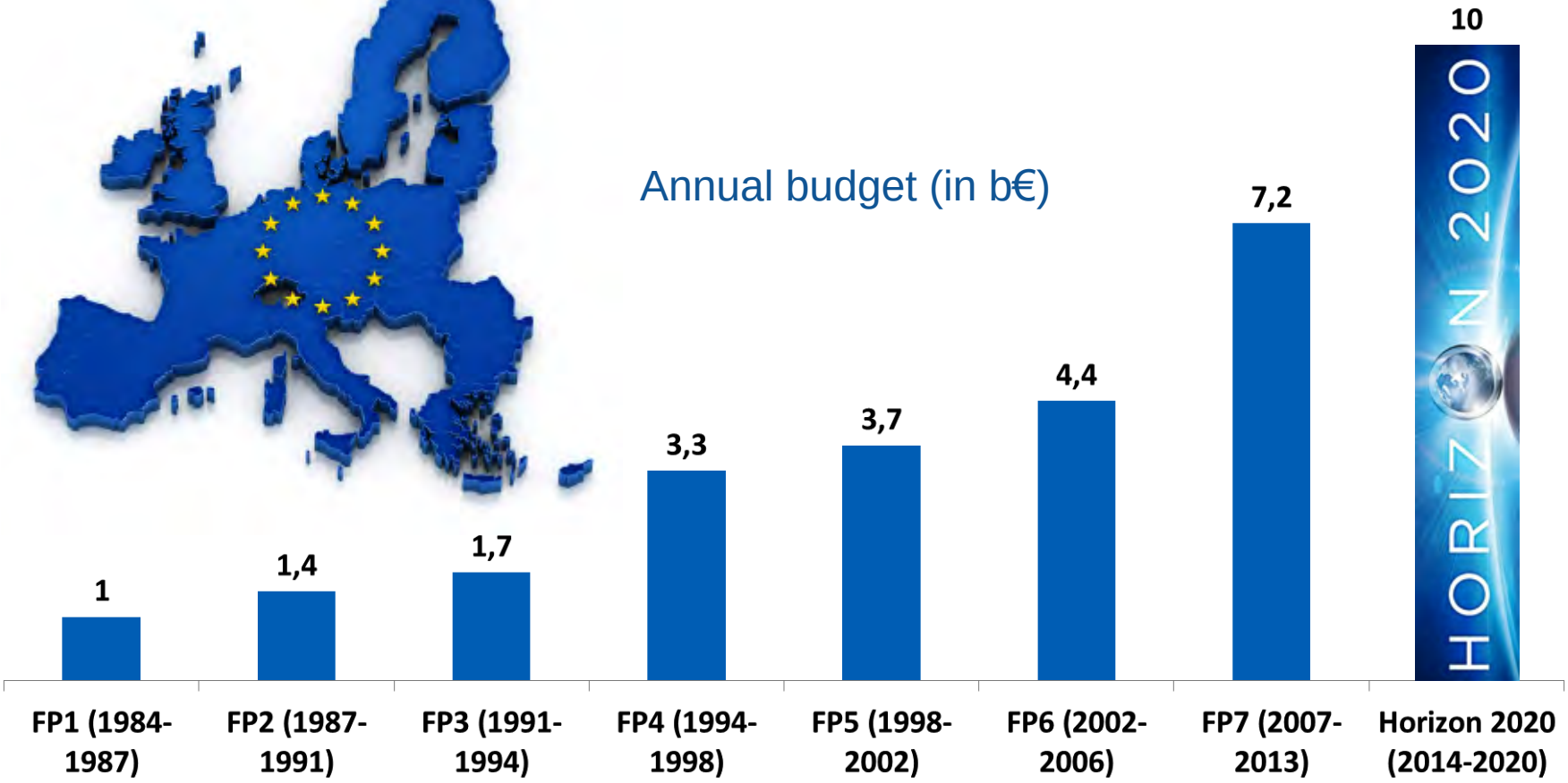
DG RTD supports research and innovation through the:

- ➢ European Framework Programmes (FP7, H2020),
- ➢ Coordination and support of national and regional research and innovation programmes,
- ➢ Construction of the European Research Area for the free circulation of researchers and of knowledge
- ➢ Support European organisations and researchers in their cooperation at international level.

EU research programmes represent 3-5% of total European research !

30 years of EU funded R&I

Annual budget (in b€)



European Commission

What is Horizon 2020?

- The new European Union programme for research and innovation for 2014-2020
- An budget of €77 billion [$104 billion]; 20 per cent higher in real terms than FP7
- A core part of Europe 2020, Innovation Union & European Research Area:

– Strengthening the EU's global position in research, innovation and technology

– Responding to the economic crisis to invest in jobs and growth

– Addressing people's concerns about their livelihoods, safety and environment

First, let's look back: Nanotechnology in FP7

- Nanotechnology in NMP programme: ~ € 1.5 billion
  - Research directed towards the Grand Challenges: sustainable development, health, energy, environmental remediation, transport, …
  - Enabling R&D and cross-cutting issues (safety, ethics, metrology & standardisation)

- NT ~ 5-10% of global FP7 budget (€50.4 billion)

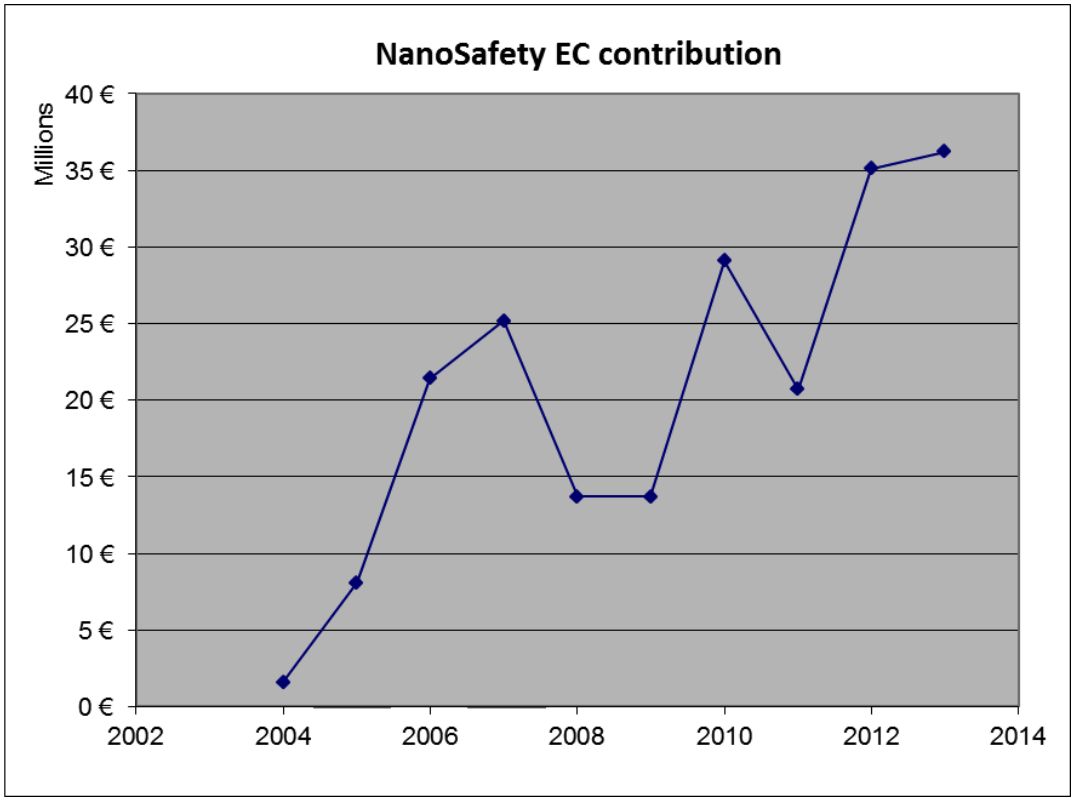
FP7 funding of Nanoscience-Nanotechnologies 2007-2011

Prog./Themes	Proj.No	Funding/€mil.
ERC	**296**	**514.5**
Health	18	74.0
Energy	19	55.0
Environment	3	10.5
KBBE	13	39.5
NMP	**238**	**896.0**
JOINT	32	112.0
ICT	**102**	**316.0**
SECURITY	4	10.2
Aeronautics	5	44.0
SPACE	9	24.3
SST	3	7.0
SME	35	41.6
Science in Society	14	15.0
ERA-Nets	4	10.5
Infrastructure	16	60.0
Marie-Curie:	**560**	**295.0**
Regions:	19	28.7
INCO:	10	6.3
Total:	**1400**	**2560.0**

Nanosafety research in FPs

- First nanosafety projects in FP5 (1998-2002)
- Regular budget increase, now levelled off at ~30M€
- FP7: 48 funded nanosafety projects, representing a total EU investment of 177 M€ (corresponding to total projects costs of 262M€).
- ~5% NMP budget, ~10% Nano@NMP
- In addition to FP, Member States annual funding efforts about 70 M€

  → European (EU + EU MS) nanosafety funding about 100 M€ annually.



NB: These figures do not include safety research in application-oriented projects nor nanomedicine

Risk Assessment
& Management

A good framework for NMs?

A science-based, world-class, regulatory framework

COM(2008)366
COM(2012) 572

Regulatory aspects of nanomaterials

EP Resolution
2008/2208 (INI)

REACH / CLP

Hazard
X
Exposure

Risk Characterisation

Implementation

Validation, Adaptation or Development of test methods, guidance, standards "Regulatory Research"

Nano specificity

nanomaterials differentiation
Identity: Chemical? Physical? Biological?

Mechanisms of interactions with living organisms
- metrics and dose-response issues

Fate & behaviour through the Life Cycle

Exposure models

Detection tools

Categorisation, read across

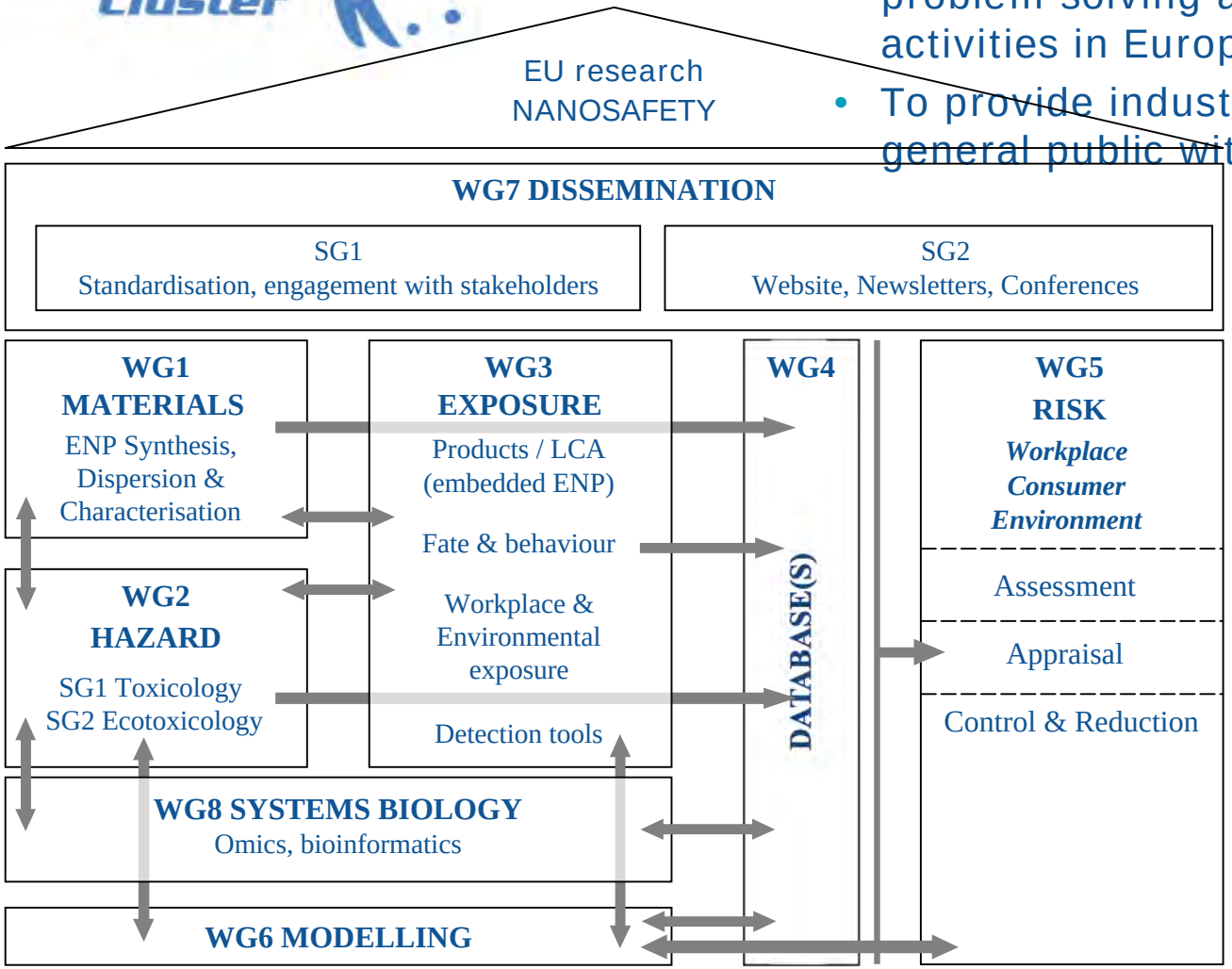
Downstream Regulations
Cosmetics, Biocides, Novel Foods, Worker protection, Environmental law, etc

Definition of Nanomaterials
2011/696/EU

Robust, cost-effective and fast validated methodologies

Projects clustering

- Finding synergies & complementarities
- To avoid duplicating work and improve efficiency
- To provide a forum for discussion, problem solving and planning R&D activities in Europe
- To provide industrial stakeholders and the general public with appropriate knowledge



European Commission

Back to H2020 - What's new?

- An integrated programme coupling research to innovation support from research to retail, bringing together three separate programmes/initiatives, more emphasis on innovation. More strategic two-year Work Programmes
- Major simplification - for all companies, universities, institutes in all EU countries and beyond
- Challenge based - tackling major challenges facing EU society, e.g. health, clean energy and transport
- Less prescriptive topics - strong emphasis on expected impact
- New forms of funding aimed at innovation - pre-commercial procurement, inducement prizes, dedicated loan and equity instruments

Three priorities

Priority 1. Excellent Science

(€ 24.4 billion, 2014-2020)

European Research Council (ERC) Frontier research by the best individual teams	13.09
Future and Emerging Technologies Unconventional and pioneering science Collaborative research to open new fields of innovation	2.70
Marie Sklodowska-Curie actions (MSCA) Opportunities for training and career development	6.16
Research infrastructures (including e-infrastructure) Ensuring access to world-class facilities	2.49

European Research Council

Starting Grants
starters (2-7 years after PhD)
up to € 2.0 Mio for 5 years

Consolidator Grants
consolidators (7-12 years after PhD) up to € 2.75 Mio for 5 years

Advanced Grants
track-record of significant research achievements in the last 10 years
up to € 3.5 Mio for 5 years

Proof-of-Concept
bridging gap between research - earliest stage of marketable innovation
up to €150,000 for ERC grant holders for 18 months

Synergy Grants
2 – 4 Principal Investigators
up to € 15.0 Mio for 6 years

Marie Sklodowska-Curie actions (MSCA)

- Innovative Training Networks (ITN)
  - Doctoral and initial training of researchers proposed by international networks of organisations from public and private sectors
- Individual Fellowships (IF)
  - Individual fellowships for most promising experienced researchers to develop their skills through international or inter-sector mobility
- R&I Staff Exchange (RISE)
  - International and inter-sector cooperation through the exchange of research and innovation staff
- COFUND
  - Co-funding of regional, national and international programmes

Priority 3. Societal Challenges

(€ 29.7 billion, 2014-2020)

Health, demographic change and wellbeing	7.47
Food security, sustainable agriculture, marine and maritime research & the Bioeconomy	3.85
*Secure, clean and efficient energy **	5.93
Smart, green and integrated transport	6.34
Climate action, resource efficiency and raw materials	3.08
Inclusive and reflective societies	1.31
Secure societies	1.69
Science with and for society	*0.46*
Spreading excellence and widening participation	*0.82*

* Additional funding for nuclear safety and security from the Euratom Treaty activities (2014-2018)

Priority 2. Industrial Leadership

(€ 17 billion, 2014-2020)

Leadership in enabling and industrial technologies (LEITs) (ICT, nanotechnologies, adv. Materials, adv. Manufacturing, biotechnology, space)	13.56 (NMPB: € 4.37 bn)
Access to risk finance Leveraging private finance and venture capital for research and innovation	2.84
Innovation in SMEs Fostering all forms of innovation in all types of SMEs	0.62*

* Complemented by expected 20% of budget of societal challenges + LEITs and 'Access to risk finance' with strong SME focus

Leadership in enabling and industrial technologies

- Key Enabling Technologies (KETs) and support to industry, to recover from economic crisis
- Emphasis on R&D and innovation with strong industrial dimension and with contributions to solving societal challenges
- 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*

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

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 in LEIT

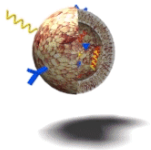
- Technology development and validation, aiming at industrial deployment of Key Enabling Technologies (KETs)
- Strategic research agendas, roadmaps and value chains (applications in several sectors)
- Industrial engagement / leverage
- Pilot lines and demonstrators
- Cross-cutting KETs (combinations of KETs), 30% of KET budget
- Enabling applications in societal challenges

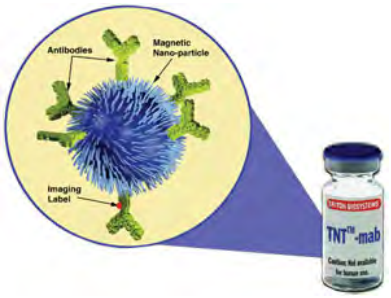
H2020 – LEIT/KETs:
From R&D to close-to-market activities

- Use of Technology Readiness Levels (TRLs from 3-4 to 8)
- Two funding rates
  - ✓ 100% funding: TRLs 3-6
  - ✓ 70% funding: TRLs 5-8 *
- Cross-cutting KETs (combinations of KETs)
- Seamless coverage provided by FETs/ERC – LEIT – Societal Challenges
- Ground prepared in FP7 (first pilots and demonstrators, innovation activities)

* Non-profit participants can claim 100% funding)

Example - combining several KETs for advanced products





Societal Challenge

Health

New nanotechnology-based diagnostics

New target drug delivery and release

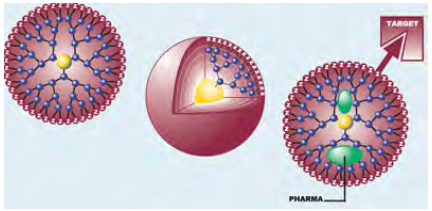
Regenerative medecine

Nanomedicine

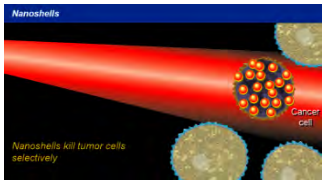
Advanced materials

Microelectronics

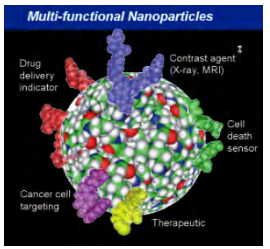
Nanotechnologies



Photonics



Biotechnologies



HORIZON 2020

European Commission

NMPB Work Programme 2014-15

Nanotechnologies, Advanced Materials, Biotechnology and Advanced manufacturing and production technologies

- Pre-publication (Nov 26) - official publication: Dec 11

http://ec.europa.eu/research/horizon2020/index_en.cfm?pg=h2020-documents

- Safety of nanotechnology-based applications and support to the development of regulation:

✓ NMP 26-2014: Joint EU & MS activity on the next phase of research in support of regulation "NanoReg II"

✓ NMP 27-2014: Coordination of EU and international efforts in the safety of nanotechnology

✓ NMP 28-2014: Assessment of environmental fate of nanomaterials

✓ NMP 29-2015: Increasing the capacity to perform nano-safety assessment

✓ NMP 30-2015: Next generation tools for risk governance of nanomaterials

✓ **+ systematic integration of safety issues in product-oriented R&D&I**

H2020 - Types of Actions and Modalities

EC Calls for Proposals ; PPP or P2P Partnering ; Joint Calls with other countries/ international organisations

- ... requiring at least three legal entities from different EU Member States
  - ✓ Research and Innovation Actions
  - ✓ Marie-Skłodowska-Curie Actions – research training*, staff exchanges
  - ✓ Co-fund – ERANET, Public Procurement Actions
- ... requiring at least one legal entity
  - ✓ European Research Council grants
  - ✓ MSCA – Individual Fellowships (European or Global)
  - ✓ SME instrument
  - ✓ Coordination & Support Actions

Partnerships with Industry and Member States

- **€22 billion Innovation Investment Package of which ~€8 billion from H2020**

  5 Joint Technology Initiatives (with industry - Article 187)

  ✓E.g. Innovative Medicines Initiative, Fuels Cells and Hydrogen

  4 Joint Programmes (with Member States - Article 185)

  ✓ e.g. European and Developing Countries Clinical Trials Partnership (EDCTP), European Metrology Programme

- **Contractual PPPs (full H2020 support)**

Set out objectives, commitments and outputs, implement through WP based on industrial roadmaps

✓ e.g. Factories of the Future, Energy-efficient Buildings, …

- **ERA-NETs**

Supporting public-public partnerships between research funders, including JPIs (e.g. JPND), Joint calls for proposals

Simplification: Rules for Participation

1. A single set of rules:

- ✓ Adapted for the whole research and innovation cycle
- ✓ Covering all research programmes and funding bodies
- ✓ Aligned to the Financial Regulation, coherent with other new EU Programmes

2. One project – one funding rate

- ✓ Maximum of 100% of the total eligible costs (except for innovation actions, where a 70% maximum will apply for profit making entities)
- ✓ Indirect eligible costs: a flat rate of 25% of direct eligible costs

3. Simple evaluation criteria

- ✓ Excellence – Impact – Implementation (Excellence only, for the ERC)

4. New forms of funding aimed at innovation

- ✓ pre-commercial procurement, inducement prizes, dedicated loan and equity instruments

5. International participation

- ✓ facilitated but better protecting EU interests

Simplification: Rules for Participation

6. Simpler rules for grants

- ✓ broader acceptance of participants accounting practices for direct costs, flat rate for indirect costs, no time-sheets for personnel working full time on a project, possibility of output-based grants

7. Fewer, better targeted controls and audits

- ✓ Lowest possible level of requirements for submission of audit certificates without undermining sound financial management
- ✓ Audit strategy focused on risk and fraud prevention

8. Improved rules on intellectual property

- ✓ Balance between legal security and flexibility
- ✓ Tailor-made IPR provisions for new forms of funding
- ✓ A new emphasis on open access to research publications

Beyond the Rules: further simplified provisions in the Grant Agreement and implementing procedures to facilitate access to Horizon 2020 (e.g. common IT platform), time-to-grant of 8 months

Strong participation by SMEs

- Integrated approach - around 20% of the total budget for societal challenges and LEITs to go to SMEs
- Simplification of particular benefit to SMEs (e.g. single entry point)
- A new SME instrument will be used across all societal challenges as well as for the LEITs
- A dedicated activity for research-intensive SMEs in 'Innovation in SMEs'
- 'Access to risk finance' will have a strong SME focus (debt and equity facility)

International Cooperation

- Crucial to address many Horizon 2020 objectives
- Principle of general openness: the programme will be the most open funding programme in the world
- Open to the association of acceding countries, candidate countries and potential candidates and selected international partner countries
- Targeted actions to be implemented taking a strategic approach to international cooperation
- Cooperation with the United States is highest priority

Benefits of Participation in transnational collaborative R&D projects

- Sharing complementary knowledge & experience
- Economies of scale & expanded scope
- Increased research quality
- Efficiency, speed and impact gains
- Joining existing/ creating new networks & contacts
- + many unintended indirect benefits …
  - New research avenues
  - Exchange possibilities
  - Cross-disciplinary/ cross-border fertilization
  - …

Participation of U.S. Organisations

Eligibility for participation

- Any legal entity regardless of place of establishment subject to work programme conditions

Eligibility for funding U.S. entities in collaborative projects

- Not automatic except if …

✓ Provided for in the Work Programme (e.g. Health) or

✓ Deemed essential for the action/ project or

✓ Provided for in a relevant bilateral S&T agreement or any other relevant arrangement

Participation of U.S. Organisations

- Program-level cooperation:
  - With government departments and agencies (e.g. NSF, NIH, DOE, etc.)
  - Joint call (follow RfP with joint evaluation and selection procedures to be agreed upon)
  - Coordinated/synchronized calls (no specific legal provisions in RfP)
  - International Consortia, shared research agenda and coordination mechanisms

Thank you for your attention!

Find out more:
www.ec.europa/research/horizon2020

HORIZON 2020