EUROPEAN COMMISSION / Research & Innovation / 7th Framework Programme

Overview of the EC EHS research plans and perspective

FP7 and future research needs
Most recent calls for proposals and those anticipated

European Commission
Directorate-General for Research and Innovation
Georgios Katalagarianakis

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Basis of EU Research Programmes

- *Objective "Lisbon":* **to become the most dynamic and most competitive knowledge-based economy**
- *Objective "Göteborg":* **sustainable development (environment, health, economy, employment)**
- *European Research Area (ERA):* **Integrating, reinforcing, structuring and stimulating investment in Research & Development – 3% of GDP**

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7th Framework Programme 2007-2013

Building the Europe of Knowledge

Theme 4 :

Nanoscience & tech, Materials, Production

Improve the competitiveness of European Industry

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FP7 – 4 Specific Programmes

Cooperation – Collaborative research

Ideas – Frontier Research

People – Marie Curie Actions

Capacities – Research Capacity

+

JRC non-nuclear research

***Euratom* direct actions – JRC nuclear research**

***Euratom* indirect actions – nuclear fusion and fission research**

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FP7 'Cooperation' ten priority Themes

1. Health	6 100
2. Food, agriculture and fisheries, and biotechnology	1 935
3. Information and communication technologies	9 050
4. Nanotechnologies, materials and production	3 475
5. Energy	2 350
6. Environment	1 890
7. Transport (incl. aeronautics)	4 160
8. Socio-economic research	623
9. Space	1 430
10. Security	1 400
Total (million Euro)	32 413

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EU Strategy Europe 2020: 3 interlinked priorities

1.) Smart growth: **developing an economy based on knowledge and innovation**

2.) Sustainable growth: **promoting a more efficient, greener and more competitive economy**

3.) Inclusive growth: **fostering a high-employment economy delivering social and territorial cohesion**

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Innovation Union

A cornerstone of Europe 2020 strategy

- **Adresses three issues:**
- Globalisation **of knowledge production and innovation capacities**
- **Impact of the** crisis **on public and private finance, survival of innovative SMEs**
- Major challenges **to address with reduced means**

- **à** *Innovation emergency!*

Key measures of Innovation Union

- Getting good ideas to market
- Access to finance
- Single innovation market
- Openness and creative potential

European Innovation Partnerships

- Key issues
  - **Major** societal challenges **require** joint responses **across policies and across EU**
  - **Numerous** sub-critical, uncoordinated initiatives:
    - between EU / Member States / Regions
    - R&D / Market-side actions (public procurement, standards, regulation)

- European Innovation Partnerships **are:**
  - Frameworks bringing together main actors and actions
    - At EU and national levels
    - From research to market
    - Around common objectives and targets

Common Strategic Framework for future EU Research and Innovation Funding

- **Towards a coherent set of instruments along the whole innovation chain starting from basic research, including:**
  - Framework Programme for Research (FP),
  - Competitiveness and Innovation Framework Programme (CIP)
  - European Institute of Innovation and Technology (EIT)

- **Green paper published:**
- **Public consultation launched:**
- **http://ec.europa.eu/research/csfri/index_en.cfm**

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EC Integrated Strategy and Action Plan for Nanotechnology, 2004-2009:

- Research
- Infrastructures
- Human Resources
- Industrial Innovation
- Societal Issues
  - Ø Outreach, Ethics, Code of Conduct
- Safety & Regulation
- International Cooperation
  - Ø in Research, Safety, Governance etc

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The current state of Nano*
- some priority issues for the future

- Significant investment in nano science topics during FP6 and first half of FP7;
  - Ø Good science base and research capacity across member states;
  - Ø Many research results in the labs resulting from the first wave of projects, but mainly long term, needing further support for development;

- Nanotechnology has to start to deliver on the promise of great societal and economic benefits – we need flagship industrial applications to lead the way;

- At the same time, Societal, Governance and Health, Safety and Environment issues are more important than ever;

- Supporting technologies (e.g. instrumentation, modelling & simulation, design) still represent a bottleneck.

* Nanosciences and Nanotechnologies: An action plan for Europe 2005-2009. Second Implementation Report 2007-2009-29.10.2009-COM(2009)607 final {SEC(2009)1468}

* EAG position paper; Ad-hoc industrial advisory group

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Nano - The Challenges for the EU - To be addressed by a new Roadmap

- **"Smart, Sustainable Growth"**
  - Ø Private investment and industrial uptake
  - Ø Must address current challenges in energy, environment and health
- **Ensure high levels of safety**
  - Ø Research into effects on human health and environment, life-cycle assessment, test methods /equipment
  - Ø Further review & effective implementation of regulation
- **Consolidate Public Trust**
  - Ø Information, dialogue

Involvement of Technology Platform NANOFUTURES

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FP6 - NMP NanoSafety PROJECTS

- **ON SAFETY OF NANOPARTICLES:**
  - **CELLNANOTOX**: Cellular Interaction and Toxicology with Engineered Nanoparticles
  - **DIPNA**: Development of an Integrated Platform for Nanoparticle Analysis to verify their possible toxicity and eco-toxicity
  - **NANOINTERACT**: Development of a platform and toolkit for understanding interactions between nanoparticles and the living world
  - **NANOSH**: Inflammatory and genotoxic effects of engineered nanomaterials
  - **NANOCAP**: Nanotechnology Capacity Building NGOs (FP6-SOCIETY)
  - **IMPART**: Improving the understanding of the impact of nanoparticles on human health and the environment
  - **PARTICLE-RISK**: Risk Assessment of Exposure to Particles (FP6-NEST)
  - **NANOTOX**: Investigative support for the elucidation of the toxicological impact of nanoparticles on human health and the environment
- **SAFETY OF PROCESSES**
  - **NANOSAFE2**: Safe production and use of nanomaterials
  - **SAPHIR**: Controlled Production Of High Tech Multifunctional Products And Their Recycling
- **STANDARDISATION AND METROLOGY:**
  - **NANO-STRAND**: Standardization related to Research and Development for Nanotechnologies
  - **NANOTRANSPORT**: The Behaviour of Aerosols Released to Ambient Air from Nanoparticles Manufacturing - A Pre-normative Study

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Impact on Health and the Environment FP7-NMP, 1st year, 2007, Projects launched in 2008-2009

NMP-2007-1.3-1 **Large RTD Projects**	**Specific, easy-to-use portable devices for measurement and analysis** **NANODEVICE**: Novel Concepts, Methods, and Technologies for the Production of Portable, Easy-to-Use Devices for the Measurement and Analysis of Airborne Engineered Nanoparticles in Workplace Air
NMP-2007-1.3-2 **Small RTD projects**	**Risk assessment of engineered nanoparticles on health and the environment** **NANOMMUNE**: Comprehensive assessment of hazardous effects of engineered nanomaterials on the immune system **NANORETOX:** The Reactivity and Toxicity of Engineered Nanoparticles: Risks to the Environment and Human Health **NEURONANO**: Do nanoparticles induce neurodegenerative diseases? Understanding the origin of reactive oxidative species and protein aggregation and mis-folding phenomena in the presence of nanoparticles
NMP-2007-1.3-3 **Coordination**	**Scientific review on the data and studies on the potential impact on health, safety and the environment of engineered nanoparticles** **ENRHES**: Engineered Nanoparticles: Review of Health and Environmental Safety
NMP-2007-1.3-4 **Coordination**	**Creation of a critical and commented database on the health, safety and environmental impact of nanoparticles** **NHECD**
NMP-2007-1.3-5 **Coordination**	**Coordination in studying the environmental, safety and health impact of engineered nanoparticles and nanotechnology based materials and products** **NANOIMPACTNET**: The European Network on the Health and Environmental Impact of Nanomaterials
HEALTH-2007-1.3-4 **Small RTD projects**	**Alternative testing strategies for the assessment of the toxicological profile of nanoparticles used in medical diagnostics** **NANOTEST**: Development of methodology for alternative testing strategies for the assessment of the toxicological profile of nanoparticles used in medical diagnostics

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Impact on Health and the Environment
FP7-NMP: Topics addressed in 2008
Projects launched in 2009

NMP-2008-1.3-1 **Large RTD Projects**	**Validation, adaptation and/or development of risk assessment methodology for engineered nano-particles** No proposals selected
NMP-2008-1.3-2 **Small RTD projects**	**Impact of engineered nanoparticles on health and the environment** **ENNSATOX**: Engineered Nanoparticle Impact on Aquatic Environments: Structure, Activity and Toxicology **ENPRA**: Risk Assessment Of Engineered Nanoparticles **HINAMOX**: Health Impact of Engineered Metal and Metal Oxide Nanoparticles: Response, Bioimaging and Distribution at Cellular and Body Level **INLIVETOX**: Intestinal, Liver and Endothelial Nanoparticle Toxicity Development and evaluation of a novel tool for high-throughput data generation **NEPHH**: Nanomaterials Related Environmental Pollution And Health Hazards Throughout Their Life Cycle

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Impact on Health and the Environment
FP7-NMP: Topics addressed in 2009
Projects launched in 2010

NMP-2009-1.3-1 ENV.2009.3.1.3.2 **Small RTD projects**	**Activities towards the development of appropriate solutions for the use, recycling and/or final treatment of nanotechnology-based products (Joint call with Theme 6: 'Environment - Climate Change')** **NANOPOLYTOX**: Toxicological impact of nanomaterials derived from processing, weathering and recycling of polymer nanocomposites used in various industrial applications **NANOHOUSE**: Life Cycle of Nanoparticle-based Products used in House Coating **NanoFATE**: Nanoparticle Fate Assessment and Toxicity in the Environment **NanoSustain**: Development of sustainable solutions for nanotechnology-based products based on hazard characterization and LCA
NMP-2009-1.3-2 **Coordination**	**Exposure scenaria to nanoparticles** **NANEX**: Development of Exposure Scenarios, for Manufactured Nanomaterials
KBBE-2009-2-4-1 **Small RTD projects**	**Analytical tools for characterisation of nano-particles in the food Matrix** **NanoLyse:** Nanoparticles in food: analytical methods for detection and characterisation

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Impact on Health and the Environment
FP7-NMP: Topics addressed in 2010
Projects to be launched in 2011

NMP-2010-1.3-1 **Large RTD projects**	**Reference methods for managing the risk of engineered nanoparticles** **MARINA**: Managing Risks of Nanoparticles **NANOVALID**: Development of reference methods for hazard identification, risk assessment and LCA of engineered nanomaterials
NMP-2010-1.3-2 **Small RTD projects** **Coordinated call with USA**	**Modelling toxicity behaviour of engineered nanoparticles** **ModNanoTox:** Modelling nanoparticle toxicity: principles, methods, novel approaches **NanoTransKinetics**: Modelling the basis and kinetics of nanoparticle cellular interaction and transport
NMP.2010.4-0-7 **Coordination**	**ERA-NET on nanotechnologies, including nanotoxicology** **SIINN**: Safe Implementation of Innovative Nanoscience and Nanotechnology
INFRA-2010-1.1.31 **Infrastructures**	**Research Infrastructures for processing, analysis and characterisation (physico-chemical properties, health and environmental impact) of engineered nanomaterials, nanoparticles and nanostructures** **QNano:** A pan-European infrastructure for quality in nanomaterials safety testing

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EU RTD investment in nanosafety research

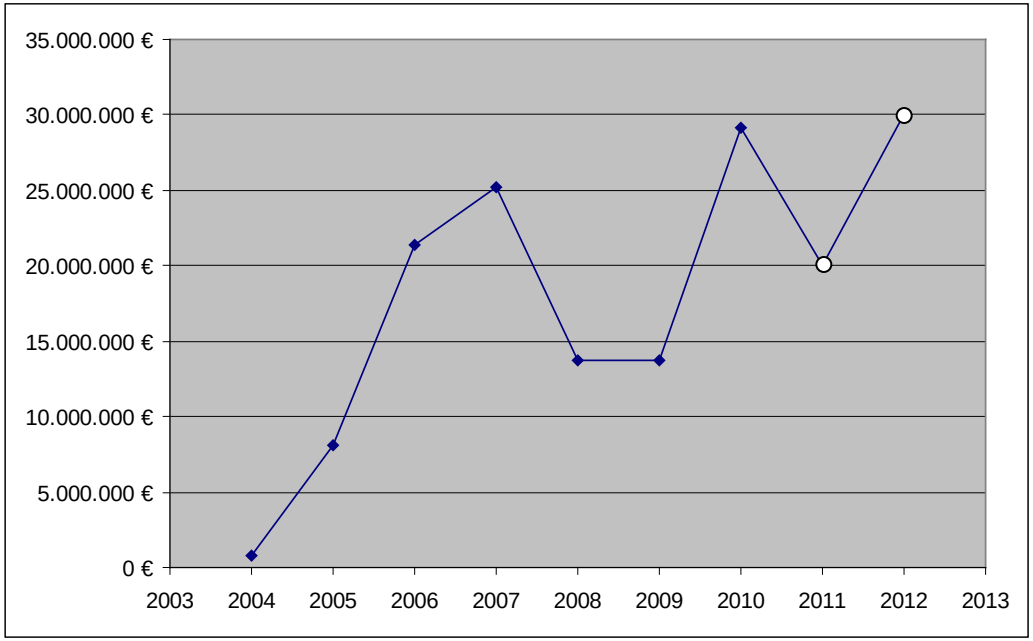
FP 6:

- **About 30 M (12 projects completed)**

FP 7:

- **FP7, 2007: € 25 M**
- **FP7, 2008: € 14 M**
- **FP7, 2009: € 14 M**
- **FP7, 2010: € 29 M**
- **FP7, 2011: € 20M (estimated)**

FP 7 Total: € 102 M EU funding



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The NMP Nanosafety Cluster

- **An initiative to maximise the synergies between projects addressing all aspects of nanosafety including toxicology, ecotoxicology, exposure assessment, mechanisms of interaction, risk assessment, LCA and standardisation.**
- **A projects and scientists forum**
- **About 30 EU and national projects**
- **Open to voluntary participation**
- **A projects compendium published; 2011 version available**
- **Integrating in the** Technology Platform NanoFutures

2011 NMP Call Topics

NMP Call 5 , Work Programme 2011 – Call is Closed

NANOTECHNOLOGIES HUMAN SAFETY & ENVIRONMENT

Projects for SMEs

- **New methods for measuring, detection and identification of nanoparticles in products and/or the environment**

Projects up to € 4M EU funding

- **Worker protection and exposure risk management strategies for nanomaterial production, use and disposal**

Support action

- **Intelligent testing strategies for nanomaterials impact and exposure – towards regulation and clustering of materials**

NMP CALL 6 (2012) WILL BE PUBLISHED on CORDIS END of JULY 2011

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Nano-Risk Management System elements

Materials and hazards

- Develop material characterisation methods
- Develop and validate methods to evaluate toxicity / ecotoxicity

Exposure and Monitoring

- Instruments for assessing exposure to nanomaterials in air and water (number, surface area, mass)
- Monitoring accidental hazards

Risk understanding / risk evaluation

- Acceptable / unacceptable risks, Costs / Benefits Analysis
- Exposure limits, control measures
- Impact evaluation over entire Life Cycle

Risk Communication

- Dialog and transparency
- Risk perception

Risk mitigation

- Proactive risk management
- Safe processes and safe handling

- Exploit synergies of strategic programmes that enable risk-focussed research
- Enhance safety management infrastructure and capacities
- Methods and data management for Materials, Toxicity testing, and Exposure measurements

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Information on Nanotechnology in EC

Commission Nanotechnologies homepage

http://cordis.europa.eu/nanotechnology/

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