



EUROPEAN
COMMISSION

Community Research

Building the Europe of Knowledge

**Overview of the 7th Framework Programme
on Research & Technology 2007 - 2013**

Theme 4 “NMP”

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« Nanosciences and Nanotechnologies, materials and new production technologies »

Directorate G – Industrial Technologies

Università degli Studi di Milano – 22 Novembre 2006



SP1 - Cooperation

9 Themes

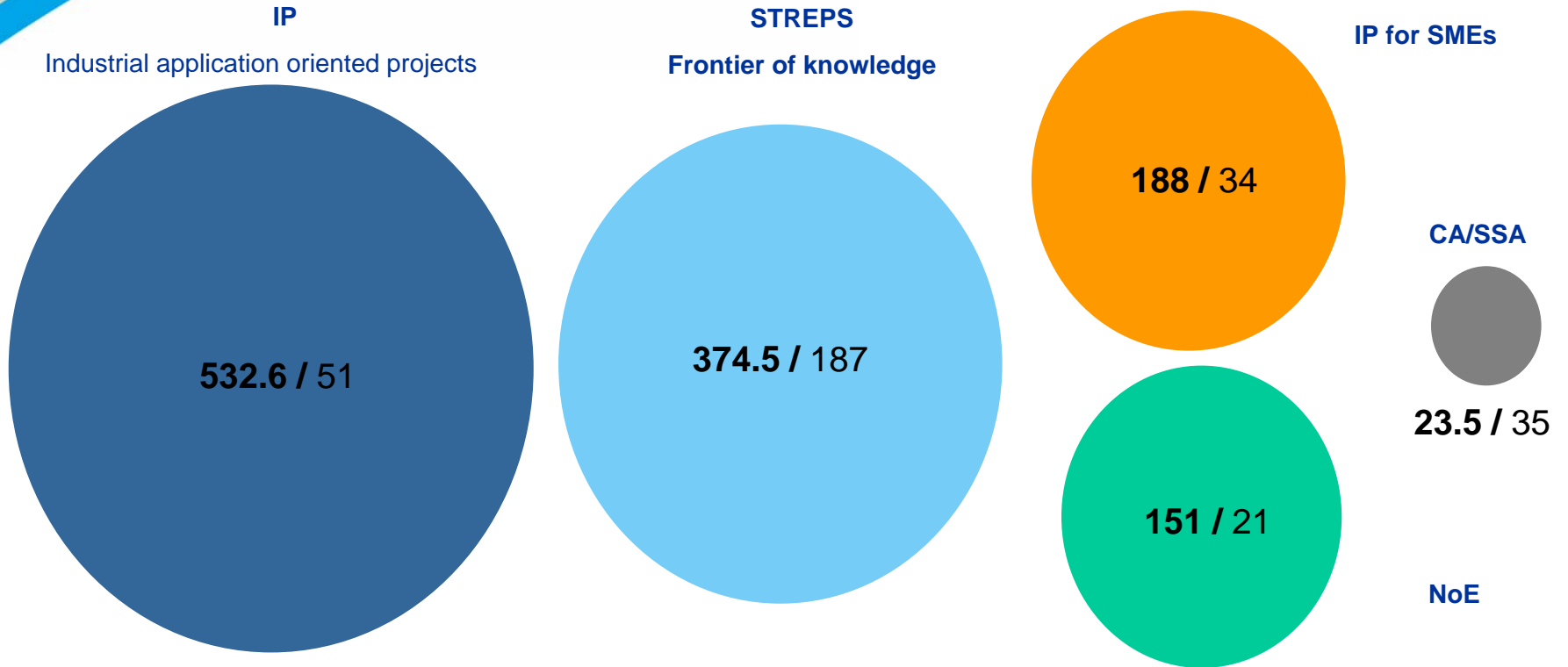
1. **Health**
 2. **Food, agriculture and biotechnology**
 3. **Information and communication technologies**
 4. **Nanosciences, nanotechnologies, materials and new production technologies**
 5. **Energy**
 6. **Environment (including climate change)**
 7. **Transport (including aeronautics)**
 8. **Socio-economic sciences and the humanities**
 9. **Security and space**
- + *Euratom: Fusion energy research, nuclear fission and radiation protection*

Nanosciences, nanotechnologies, materials and new production technologies

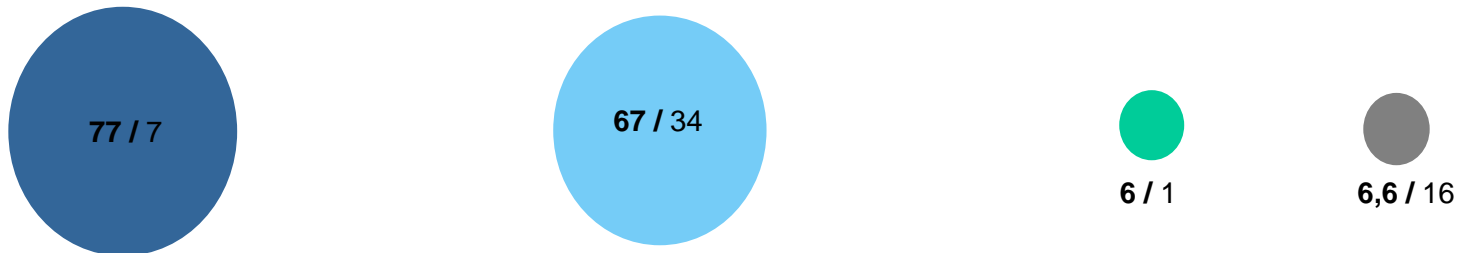
FP7 Total Budget 2007-2013:	50 521 million €
- SP Cooperation:	32292 million €
- Theme 4 budget:	3 467 million €

FP 6 - Total EC funding

EC funding, €mio / N. of projects **1 426 / 386**



Additional calls (11%) : IST-1 & 2, NSF, Steel, etc. 157 / 58



FP6 NMP projects-Sectors and technologies

Financement CE, €millions / Nombre de projets per area

Green: IP- SMEs Bold: big size

Size-dependent phen.

Self-organisation & assembly
Standardisation for nanos

Mol & bio molecular mechanisms & engines

Molecular motors

Interfaces bio / non-bio & applications

Nature as model

Nanotubes

NANO: 320 / 109

Nanostructures surfaces

3-D nano / no-carbon

Handling-control instrumentation

Devices, techniques

Nanoparticles in the living world

Nano drug delivery

Impact on health & environment

Ethical, legal, social aspects

Nano-photonic/electronic devices

Bio-sensors - diagnostics and health care

Roadmaps for Nanotechnologies

Syst./instrum/equipment – diagnosis/surgery

Tissue engineering, bio-mimetic, bio-hybrid

Sensors, actuators – health, safety, security

Industrial bio-technol., Environmental technol.

Nanos for security systems

INTEGR

250 / 41

Components for transport

Chemicals – eco-efficient processes

Safe, efficient construction

New construction products & proc.

Factory of the future through N-M-P

Knowl-based communities in prod. techn.

Knowl-based techn. in traditional Industries

(Machine tools, hydraulics, pigments, materials, stones, metals, textiles, plastics, wood, non-destructive testing)

Concepts for global delivery

Mapping and foresight

PROD: 437 / 97

Radical changes in the “basic” materials indus.

Waste mangt. Hazard reduction in plant & storage

Knowl-based, sust. proc., eco-innovation

Public awareness, sust. consumption

Safety, environmental technol.

Fast & Flexible manufacturing Enterprise

Multi-funct mat – factory of the future

Biomaterials for implants

Multi-funct technical textiles

Understanding materials phen.

Modelling and design

Interfacial phen. in materials

New tools for adv. mat.

New processing pathways

MAT: 390 / 120

Production of nanoparticles

Intelligent bio-materials

Tribology – surface engineering

Nanostructures porous materials

Ceramic thin films

New materials by design

High-perfo mat - macro-scale applic.

Bio-inspired, org/inorganic hybrid mat.

Solid-state ionics

Computational materials

Mapping & foresight activities

Clean **STEEL**
production

20 / 1

Nanosciences, nanotechnologies, materials and new production technologies

Overall objective : improve the competitiveness of EU industry (including SMEs) and ensure its transformation through:

- the effective **transition** from a resource-based to **knowledge-based industry**
- generation of **new breakthrough**, applicable, knowledge
- strengthening **EU leadership** in nano, materials and production technologies
- emphasis on **integrating** different technologies and disciplines across many sectors

... same messages as in FP 6

Importance of **Technology Platforms** to help establish common research priorities and targets

Towards the NMP work programme 2007

Nov 2006: final phase - InterService Consultation & Progr. Committee

FP6 project portfolio,
studies and
Roadmaps

Research Strategic
Agenda of the ETPs

Other consultative
bodies

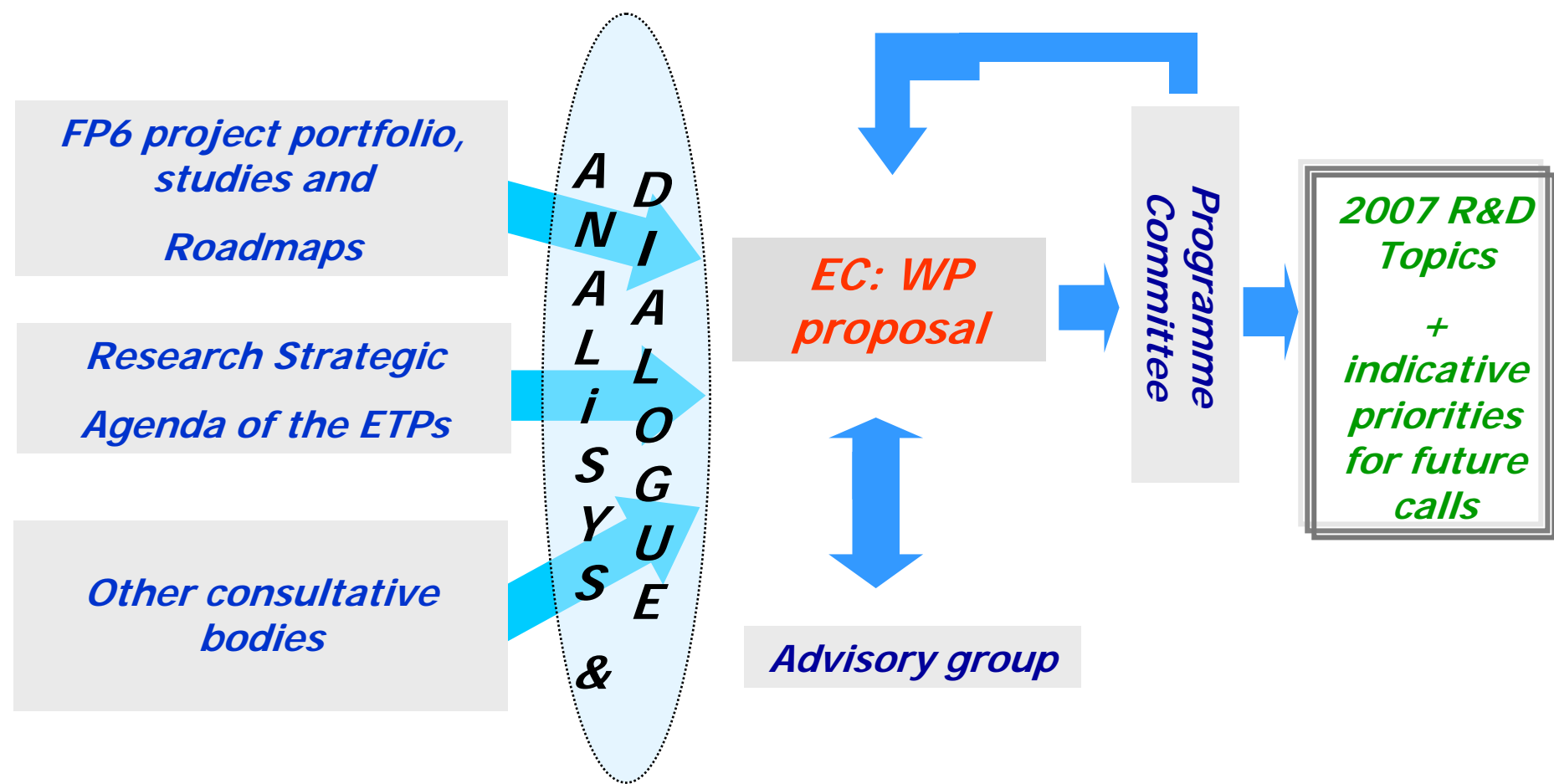
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EC: WP
proposal

Programme
Committee

2007 R&D
Topics
+
indicative
priorities
for future
calls

Advisory group



Nanosciences, nanotechnologies, materials and new production technologies

Four activities:

- 1. Nanosciences and nanotechnologies**
- 2. Materials**
- 3. New production**
- 4. Integration of technologies for industrial applications**

...very good continuity with « NMP » activities in FP 6 !!



EUROPEAN
COMMISSION

Community Research

SP1 - Cooperation – Implementation

Collaborative research

(Collaborative projects; Networks of Excellence; Coordination/support actions)

International cooperation

Coordination of non-Community research programmes

(ERA-NET; ERA-NET+; Article 169)

Joint Technology Initiatives (Article 171)

2007 NMP WP: overview (16 Nov 2006)

	Large scale projects		Small and medium Scale projects	SSA	CA	ERA Net	ERA Net Plus
	Général	SME					
NANO (15)	3		3	6	2		1
MATERIAUX (12)	4	1	6		1		
PRODUCTION (10)	4	2	4				
INTEGRATION (7)	4	2				1	
44 topics in TOTAL	15	5	13	6	3	1	1

1. Nanosciences - Nanotechnologies

Objectives: Toward a new generation of sustainable products and services by (a) **generating new knowledge** by studying new phenomena at the nano scale; (b) **promoting innovation** by developing nanotechnologies

Pluridisciplinary: integration and convergence of **several disciplines and technologies**, various sectoral applications, and along all steps of added value generation.

Impact to society: consequences on **health, security, growth and the environment**. Importance of **public acceptance**.

1. Nanosciences - Nanotechnologies

4.1.1 Nanosciences and converging sciences

Development of new knowledge at the nano scale to open new horizons, in collaboration with other scientific fields (bio, physics, chemistry, math, environmental, social, engineering, etc.)

4.1.2 Nanotechnologies and converging technologies

Promote industrial innovation towards new products, services, components, devices, systems and manufacturing processes through an inter-disciplinary approach.

4.1.3 Impacts on Health and the Environment

Support the scientific assessment of potential health and environmental risks associated with nanotechnology-based materials and products at the earliest possible stage.

4.1.1 Nanosciences and converging sciences (5 topics)

4.1.1-1 Nano-scale mechanisms of bio/non-bio interactions – Small/Med

4.1.1-2 Self assembling and self organisation – Small/Med

4.1.1-3 Support to ICPC researchers in nanotechnology and creation of a free and open electronic archive of nanosciences and nanotechnologies scientific and technical publications - SSA

4.1.1-4 Development of methodology, collection and elaboration of scientific-technical and socio-economic data and studies on nanosciences and nanotechnologies, including risk assessment, and establishment of an observatory - SSA

4.1.1-5 ERANET Plus in nanosciences – ERANet+

4.1.2 Nanotechnologies and converging technologies (5 topics)

4.1.2-1 Pilot lines to study, develop and up-scale nanotechnology-based processes from laboratory - Large

4.1.2-2 Equipment and methods for nanotechnology - Large

4.1.2-3 Analysis of the ethical, regulatory, social and economic environment of nanomedicine - SSA

4.1.2-4 Coordination in nano-metrology - CA

4.1.2-5 Examining capacity building in nanobiotechnology - SSA

4.1.3 Impact on environment and health (5 topics)

4.1.3-1 Specific, easy-to-use portable devices for measurement and analysis - Large

4.1.3-2 Impact of engineered nanoparticles on health and environment – Small/Med

4.1.3-3 Critical review on the data and studies on the potential impact on environment and health of nanoparticles - SSA

4.1.3-4 Creation of a critical and commented database on the impact of nanoparticles - SSA

4.1.3-5 Coordination in studying the environmental and health impact of nanoparticles and nanotechnology based materials and products - CA

2. Materials

Objectives: develop new knowledge-based **multifunctional** surfaces and materials with tailored properties and predictable performance, for new products and processes targeting a **wide range of applications**

Pluri-disciplinary: **utilise the potential of nanotechnologies** and integrate the possibilities of every scientific domain or discipline.

Criticality: knowledge-based materials are becoming **the first stage in increasing the value of products** and their performance, rather than simple production steps.

2. Materials

4.2.1 Mastering nano-scale complexity in materials.

Tailor at the nano scale novel material systems with radically new properties based on improved understanding of materials nanostructure.

4.2.2 Knowledge-based smart materials with tailored properties.

Design novel knowledge-based smart materials releasing their potential for enhanced and innovative applications.

4.2.3 Novel biomaterials and bio-inspired materials.

Achieve radical innovations in state-of-the-art biomaterials and design high-performing bio-inspired materials learning from natural processes.

4.2.4 Advances in chemical technologies and materials processing.

Radically improve materials by increasing knowledge in materials chemistry and chemical processes, in particular at the nano-scale and in a sustainable manner.

4.2.5 Using engineering to develop high-performance knowledge-based materials.

Use advanced engineering to design materials systems for specific high-demanding applications, incorporating micro-structural information.

4.2.1 Mastering nano-scale complexity in materials (3 topics)

4.2.1-1 Nano-structured polymer-matrix composites - Large

4.2.1.2 Nano-structured coatings and thin films – Small/Med

4.2.1-3 Characterisation of nano-structured materials - CA

4.2.2 Knowledge-based smart materials with tailored properties (3 topics)

4.2.2-1 Organic materials for electronics and photonics - Large

4.2.2-2 Nano-structured materials with tailored magnetic properties – Small/Med

4.2.2-3 Advanced material architectures for energy conversion – Small/Med

4.2.3 Novel biomaterials and bioinspired materials (1 topics)

4.2.3-1 Highly porous bioactive scaffolds favouring angiogenesis for tissue engineering - Large

4.2.4 Advances in chemical technologies and materials processing (3 topics)

4.2.4-1 Flexible efficient processing for polymers – SMEs projects

4.2.4-2 Nano-structured catalysts with tailor-made functional surfaces – Small/Med

4.2.4-3 Renewable materials for functional packaging applications – Small/Med

4.2.5 Using engineering to develop high performance knowledge based materials (2 topics)

4.2.5-1 Novel materials tailored for extreme conditions and environments - Large

4.2.5-2 Modelling of micro-structural evolution under work conditions and in materials processing – Small/Med

3. New Production

Objectives: create the appropriate conditions for continuous innovation at every level of a **sustainable production system and develop generic production assets** (technologies, organisation, facilities, human resources.)

Pluri-disciplinary: utilise the potential of nanotechnologies and new materials, integrate the possibilities of every scientific domain and discipline along the entire **life-cycle of products**, for a large spectrum of sectors and of industrial applications.

Criticality: the industrial transformation from a resource-intensive to a knowledge-based, high added-value industrial environment is essential for Europe. Towards « Factories made in Europe ».

3. New Production

4.3.1 Development and validation of new industrial models and strategies

Development of concepts for knowledge-based factories as products, continuously adaptable to the changing requirements of the global market.

4.3.2 Adaptive production systems

Develop agile production systems, anticipating small-series oriented adaptable and flexible production, using a holistic approach.

4.3.3 Networked production

Develop the tools and methods for cooperative networked production operations of high added value, aiming at a global production capability.

4.3.4 Rapid transfer and integration of new technologies into the design and operations of manufacturing processes

Develop knowledge-based engineering capacities drawing on in-depth understanding of the behaviour of machines, processes and systems.

4.3.5 Exploitation of the convergence of technologies

Stimulate the creation of new industries by facilitating the design, engineering and manufacturing of the next generation of high-added value products.

4.3.1 Development and validation of new ind models and strategies (3 topics)

- 4.3.1-1 Beyond Lean Manufacturing: New industrial models for product and process life cycle - Large
- 4.3.1-2 New added-value user-centered products and product services – SMEs
- 4.3.1-3 Integrated risk management in (plants, ind. parks,) industrial systems (and networks) - Large

4.3.2 Adaptive production systems (2 topics)

- 4.3.2-1 Rapidly configurable machines and production systems – Small/Med
- 4.3.2-2 Process intensification in chemicals production – Small/Med

4.3.3 Networked production (1 topic)

- 4.3.3-1 Innovative custom-driven product-service design in a global environment – Small/Med

4.3.4 Rapid transfer and integration of NT into design and operation (2 topics)

- 4.3.4-1 Rapid manufacturing concepts for small series industrial production – SMEs
- 4.3.4-2 Innovative pathways in Synthesis – improving efficiency by smart synthesis, design and reduction of the number of reaction steps – Small/Med

4.3.5 Exploitation of the convergence of technologies (2 sujets)

- 4.3.5-1 Processes and equipment for high quality industrial production of 3-dimensional nano-surfaces - Large
- 4.3.5-2 Production technologies and equipment for micro-manufacturing - Large

4. Integration of technologies for industrial applications

Objectives: Towards new applications and novel, step-change technological solutions responding to **major industrial challenges**, including those identified within the ETPs.

- **Transforming traditional industry**

Knowledge, productivity and added value facing the low-cost global competition

- **Fostering scale-intensive and specialised suppliers industry**

Adoption and integration of new technologies improving global EU leadership

- **Promoting science-based industry**

Integration of most of the advanced high technologies related to nano, materials and production activities, in order to establish a high added value EU industry

- **Towards a sustainable supply industry**

Innovation in products and productivity, especially for sectors with large environmental footprint

2007 Topics - Integration

- 4.4-1 Advanced Wood-Based Composites and their Production (Large)
- 4.4-2 Application of New Materials Including Bio-Based Fibres in High-Added Value Textile Products (SME)
- 4.4.-3 Multifunctional materials for future vehicles (Large)
- 4.4.-4 Substantial innovation in the European medical industry: development of nanotechnology-based smart multi-tasking targeted agents for joint diagnosis and therapy ("theranostics") (Large)
- 4.4.-5 Resource Efficient and Clean Buildings (Large)
- 4.4.-6 Innovative added-value construction product-services (Large)
- 4.4-7 ERA –Net on Construction (ERA-NET)

NMP WP – Main features

- ✓ Strategic use of **funding schemes** (*one funding scheme per topic*)
- ✓ **Calls** by funding scheme
- ✓ **Budget** allocation by call (not by Activity/Area) – Max size
- ✓ **Two stage submission** for all projects except CSA
- ✓ Continuation of the **SME dedicated activities**
- ✓ One evaluation panel per topic

NMP WP – main features (cont.)

... about the types of calls...

- **Main calls for 2007** organised by type of scheme (3 calls for collaborative projects; 1 for CA/SAs; 1 call for EraNet Plus)
→ 22 December 2006
- **Joint calls** addressing cross-cutting topics and implemented jointly with other Themes (not foreseen for the first year)
- **Coordinated calls** allowing concurrent calls with other Themes on topics/initiatives with complementary objectives, including third countries

... about the two-stage procedure

- For Collaborative projects and NoEs
- First stage on the content and expected impact (20 pages)
- First stage single evaluation criterion: S&T Quality and Impact

NMP WP – main issues (cont.)

International cooperation

- **Industrialised countries + ST agreements:** ‘coordinated calls’ to address objectives of mutual interest
- **IMS:** promotion of IMS regions participation + ad hoc activities
- **International dialogue for responsible and safe development of nanotechnology:** definition of a ‘code of conduct’
- Coordination/exchange of research data

ERANET/ERANET +

- Coordination of programmes and joint activities at national/regional (international) level

NMP WP – main features (cont.)

About the use of funding schemes...

- **Collaborative projects:** 'small-medium'-scale actions knowledge-driven and 'larger'-scale actions integrating different components from research... to education - (SME dedicated projects)
- **Networks of excellence:** promote durable integration of key competences to support research activities in strategic areas
- **Coordination and supporting actions:** coordination and networking, studies, info/com, etc. as well as ERA-NET and specific international cooperation activities.

Maximum funding rates

- **Research and technological activities – 50% of eligible costs except that for:**
 - SMEs – 75%
 - Public bodies – 75%
 - Secondary and higher education establishments – 75%
 - Research organisations (non-profit) – 75%
- **Demonstration activities – 50% of eligible costs**
- **Other activities – 100% of eligible costs**
- **Frontier research actions – 100%**
- **Coordination and support actions – 100%**
- **Training and career development of researchers actions – 100%**
- **Flat rate for overheads**

- Evaluation criteria specified in the Specific Programmes and detailed in the Work Programmes: reduced from 5 or 6 to 3 (**S&T quality, Impact, Implementation**). 'Impact': ref. to expected impacts listed in the work programmes

 - 1st Stage: two criteria and thresholds
 - **S&T quality: 4 / 5**
 - **Impact: 3 / 5**
- Seuil total: 8 / 10**
- 2nd Stage: three criteria and thresholds
 - **S&T quality: 4 / 5**
 - **Impact: 3 / 5**
 - **Implementation: 3 / 5**

Seuil total: 12 / 15

2007 Call planning

Publication expected: 22 Décembre 2006

Collaborative projects – 1st stage:

- 1) Closing: 2 Mai
- 2) Remote evaluation: 25/5 – 9/6

Collaborative projects – 2nd stage:

- 1) Closing: 13 Septembre
- 2) Evaluation Small/Med scale project: 1-6/10
- 3) Evaluation Large projects & PME: 22-27/10

Single stage projects (CSAs):

- 1) Closing: 5 Juin
- 2) Evaluation 25-30/6

Indicative budget - NMP first call

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	Large scale projects	265
	Small Medium scale projects	150
	SCA	15
	SMEs	75
	ERANet+	8
TOTAL		543



Information

- **EU research:**
<http://europa.eu.int/comm/research>
- **Seventh Framework Programme and SPs:**
http://europa.eu.int/comm/research/future/index_en.cfm
- **Information on research programmes and projects:**
<http://www.cordis.lu>
- **NMP Industrial Research Magazine**
http://europa.eu.int/comm/research/industrial_technologies/lists/magazine_en.html/
- **Nanotechnologies:**
<http://www.cordis.lu/nanotechnologies>
- **RTD info magazine:**
<http://europa.eu.int/comm/research/rtdinfo>

