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Evolutions towards an European Strategy for Nanotechnology

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Nanosciences and Nanotechnologies

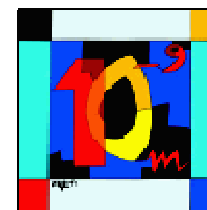
DG Research, European Commission

Please provide your comments to:

rtd-nano-strategy@cec.eu.int

Disclaimer: Note that these slides are not legally binding and do not represent any commitment on behalf of the European Commission
Please refer to official documents

NANOTECHNOLOGIES AND NANO-SCIENCES, KNOWLEDGE-BASED MULTIFUNCTIONAL MATERIALS
AND NEW PRODUCTION PROCESSES AND DEVICES



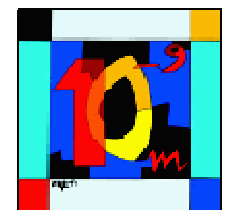


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Outline

- | **Why is nanotechnology important?**
- | **Worldwide R&D activities in nanotechnology**
- | **Towards a European Strategy**
- | **Response to the Proposed Strategy**
- | **FP7 and Technological Platforms**
- | **Future Steps**





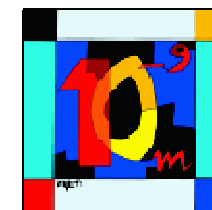
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A large, stylized question mark with a grey halftone texture, positioned behind the main text.

Why is nanotechnology
important?

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AND NEW PRODUCTION PROCESSES AND DEVICES





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Nanotechnology has an extraordinary potential

Medicine
and
Health

Information
Technology

Energy
Production
/ Storage

Materials
Science

Food, Water
and the
Environment

Instruments

Drug
delivery

GMR Hard
Disk

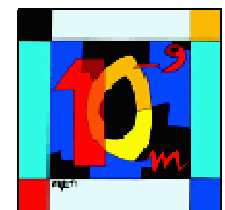
Hydrogen
Fuel Cells

Lightweight
and strong

Remediation
methods

Tunneling
microscopy

- **to serve citizens and satisfy their needs**
- **to support industrial competitiveness and sustainable development**





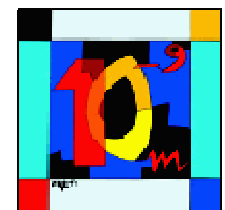
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Meeting Millennium Development Goals

- | **Applications of nanotechnology can help:**
 - | **Water treatment and remediation**
 - | **Energy production, storage and conversion**
 - | **Disease diagnosis and screening**
 - | **Drug delivery systems**
 - | **Health monitoring**
 - | **Air pollution and remediation**
 - | **Food processing and storage**
 - | **Vector and pest detection and control**
 - | **Agricultural productivity enhancement**

**Taken from “Innovation: applying knowledge in development”
UN Millennium Project Report**



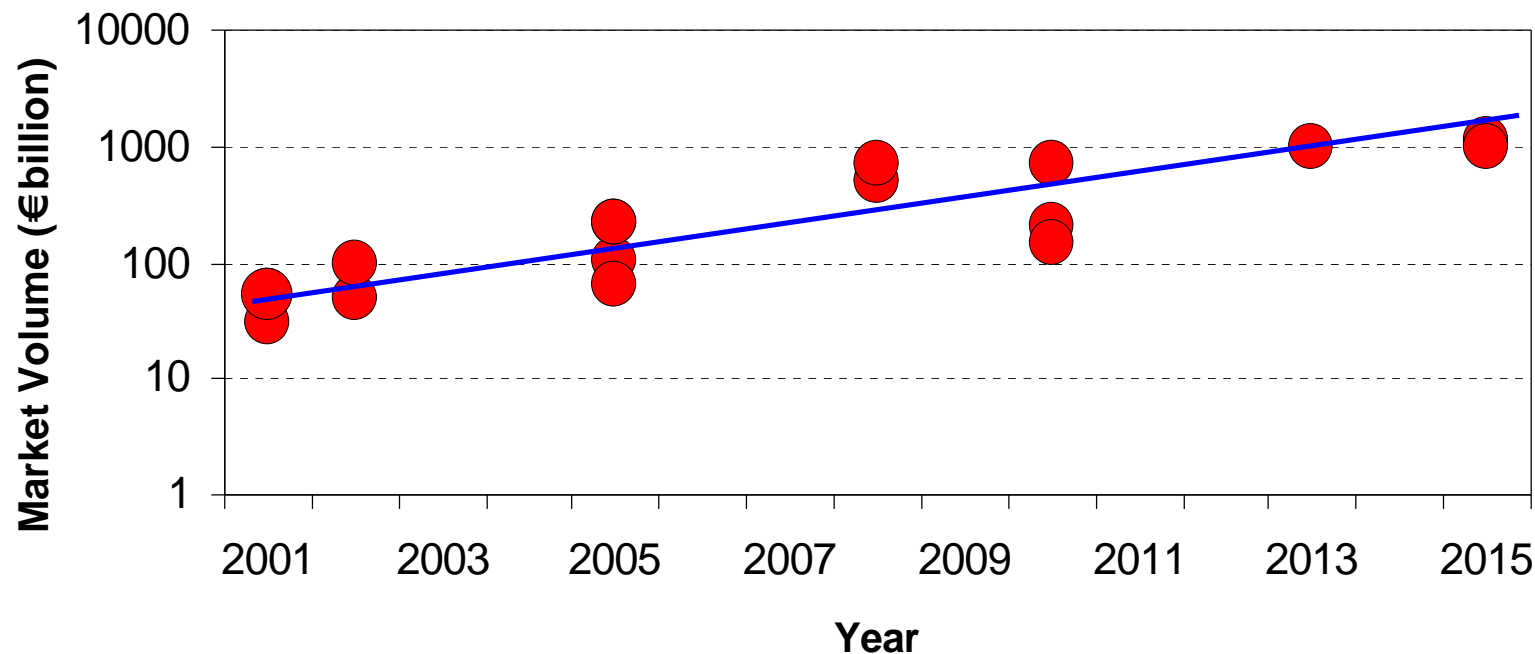


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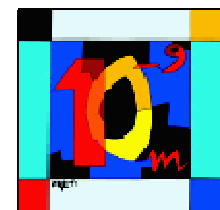
Why is nanotechnology important for industry?

- Analysts estimate that the market for products based on nanotechnology could rise to hundreds of billion by 2010 and exceed one trillion after



Source: Various

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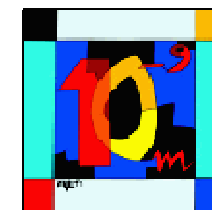


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Worldwide Activities in Nanotechnology R&D

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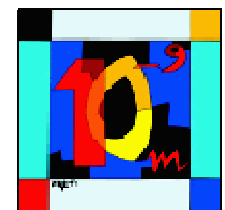


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European Activities in Nanotechnology R&D

- | **Several countries started national nanotechnology between the mid-1980's and mid-1990's**
- | **Overall investment of around 200 million € in 1997 has risen to around 1000 million € in 2003**
- | **Levels of public investment vary considerably between 0.05 and 5.6 € per citizen in 2003**
- | **Transnational projects in the EU's 4th (~30M€/year) and 5th (~45M€/year) Framework Programmes**
- | **Nanotechnology identified as a main priority area in the 6th Framework Programme (~250M€/year)**



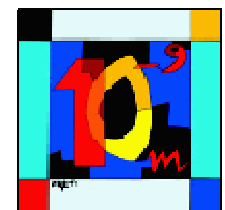


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Worldwide Activities in Nanotechnology R&D

- | **USA's National Nanotechnology Initiative (NNI) launched in 2000 and public investment increased from \$220 to \$750 million in 2003.**
- | **21st Century Nanotechnology Budget signed in 2003 and budget for 2005 set for \$1000 million**
- | **Japan identified nanotechnology as a priority with \$800 million in 2003 and set to rise by 20% in 2004**
- | **South Korea and China have nanotechnology programme with \$100-200 million each year**
- | ***Many* other countries active in nanotechnology**



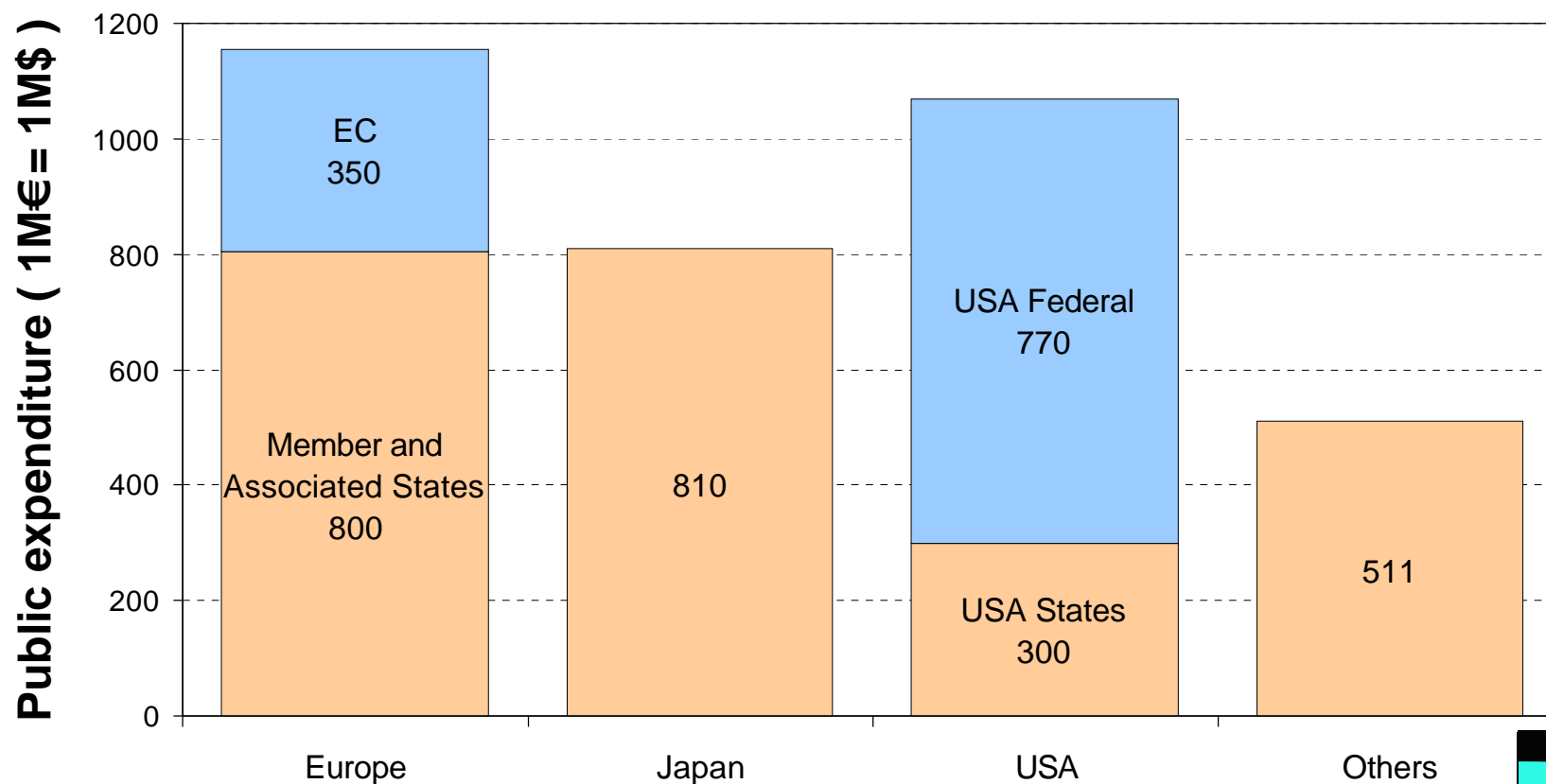


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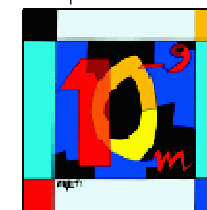
Worldwide Activities in Nanotechnology R&D

Absolute public expenditure during 2003 (1€ = 1\$)



Source: European Commission (2003)

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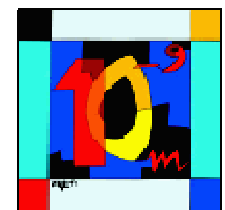


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Where do we stand in Europe?

- | **Enjoys a strong position in terms of producing knowledge in nanotechnology (e.g. publications)**
- | **Weaker in transforming this knowledge into products and services (e.g. patents, start-ups)**
- | **Europe already has a commercial deficit for high-tech products of around €23 billion per year**
- | **Few “centres of excellence” on the scale of those being developed in other regions e.g. the USA**
- | **Lower level of private R&D funding from industry. Estimated that Europe industry invests \$0.7B compared to \$1.7B in USA and \$1.4B in Japan**



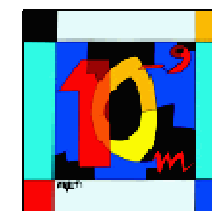


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Towards a European Strategy for Nanotechnology

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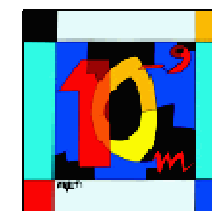
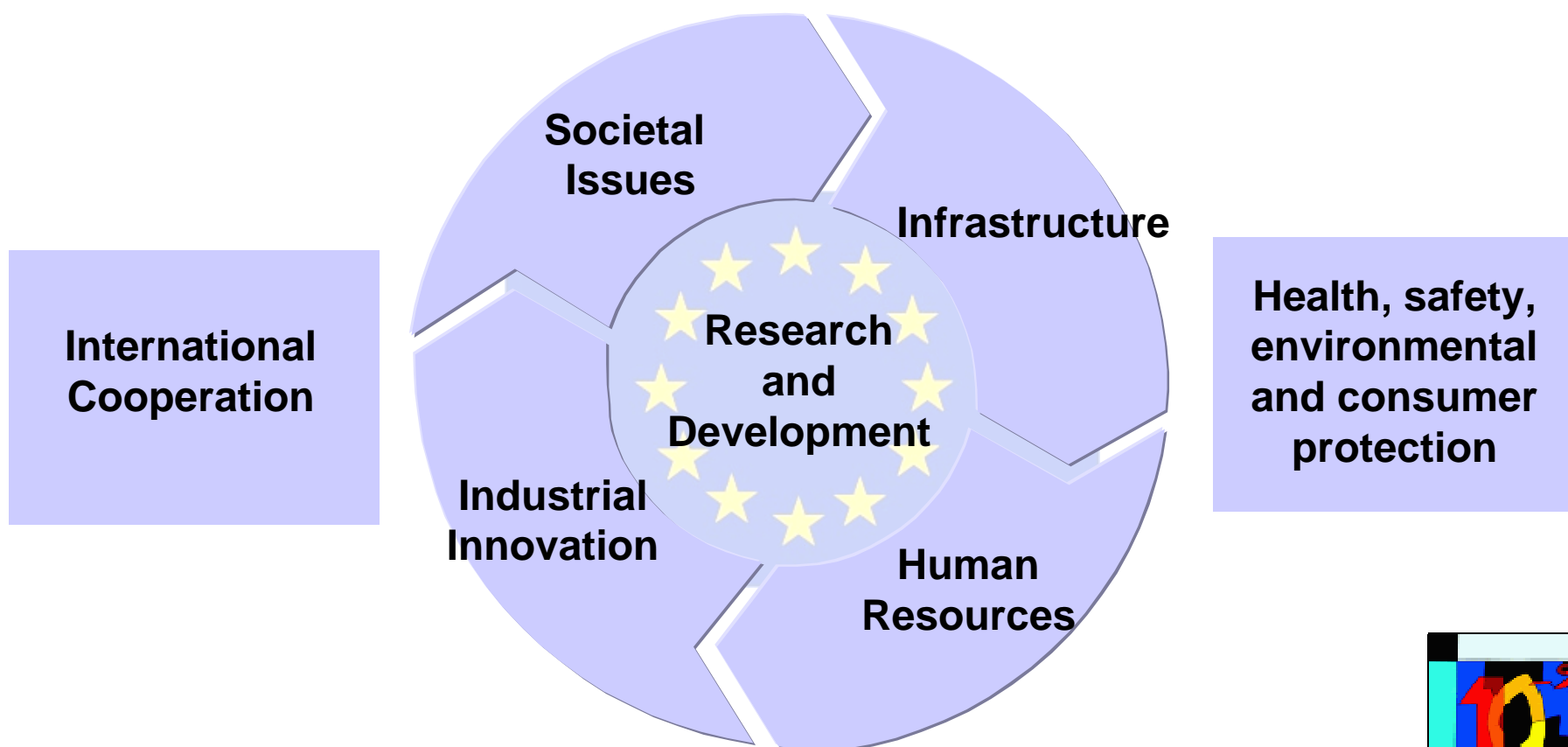


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The European approach is integrated and responsible

Communication by the European Commission:
“Towards a European Strategy for Nanotechnology” COM(2004)338



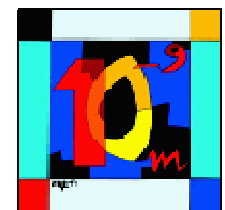


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R&D: Building the Momentum

- | ***European public investment in nanotechnology R&D should increase by a factor of 3 by 2010***
- | ***Reinforce the next FP for added-value via critical mass, transnational collaboration and competition***
- | ***Effective coordination of national and regional programmes***



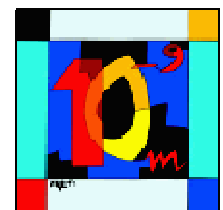


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Infrastructure: European “Poles of Excellence”

- | ***Europe needs a coherent system of infrastructure for R&D in nanotechnology***
- | ***Measures needed to maximise the added-value of existing infrastructure, in particular, to help SMEs***
- | ***Existing infrastructure should be examined and mapped to identify most urgent needs***
- | ***Where needed, dedicated Europe nanotechnology infrastructure with critical mass should be built***



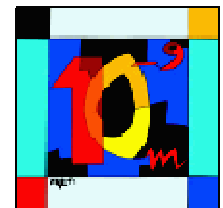


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Investing in Human Resources

- | ***Identify the educational needs of nanotechnology and provide examples of best practice***
- | ***Encourage the definition and implementation of new courses and curricula for nanotechnology***
- | ***Promote the integration of complementary skills into research training e.g. entrepreneurship***



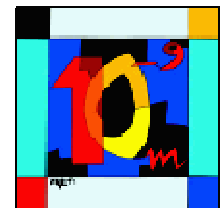


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Industrial Innovation: Knowledge to Technology

- | ***Promote conditions that encourage investment in nanotechnology R&D by industry, banks and venture capitals***
- | ***Encourages closer cooperation between patent offices towards a more efficient patenting system***
- | ***Invites Member States to review existing regulation and consider specificities of nanotechnology***
- | ***Boost and coordinate actions in metrology, standards and norms***



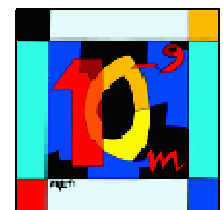


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Integrating the Societal Dimension

- | ***Due attention should be paid to the integrating societal aspects into nanotechnology R&D***
- | ***Europe should pursue an open and proactive approach to governance in nanotechnology R&D***
- | ***A dialogue with EU citizens and consumers should be encouraged to promote informed judgement***
- | ***The responsible and transparent development of nanotechnology is essential for public confidence***



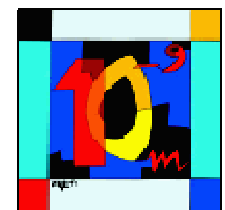


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Public Health, Safety, Environmental and Consumer Protection

- | ***Identification of safety concerns (both real and perceived) and action at the earliest stage***
- | ***Toxicological and ecotoxicological data and evaluation of human/environmental exposure***
- | ***Adjustment, if necessary, of risk assessment procedures for issues of nanotechnology***
- | ***Integration of risk assessment at all stages of the life cycle of the technology***



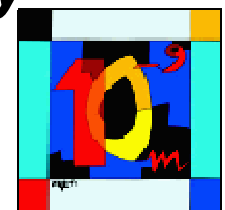


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A Further Step: International Cooperation

- | ***Encourage international debate on issues such as public health, safety, environment, consumer protection, risk assessment, metrology, norms***
- | ***Provide access to knowledge to economically less developed countries to contribute towards the prevention of any “knowledge apartheid”***
- | ***Promote the monitoring and sharing of information related to the scientific, technological, economical and social development of nanotechnology***
- | ***Define an international “code of good conduct” for the responsible development of nanotechnology***





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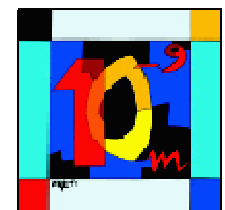
Political Response to the Proposed Strategy

- | **Discussed in the European Council and conclusions adopted on 24 September 2004:**

The proposed integrated and responsible strategy has been welcomed



- | **Positive opinion issued by the Economic and Social Committee on 15 November 2004**



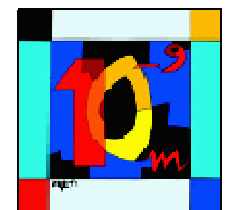


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Public Response to the Proposed Strategy

- | **Open consultation launched at the end of July and closed 15th October**
- | **Report can be downloaded from (www.nanoforum.org)**
- | **Over 750 responses from 41 countries with support for more EU-level action**



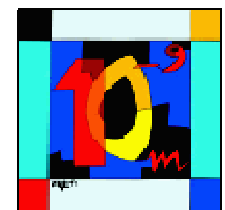


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NEXT STEPS

- Action Plan in Nanotechnology. In preparation as a Commission Communication, to be adopted in April by the European Commission and discussed in the June meeting of the Council of the European Union
- Preparing the next Framework Programme (FP7): The Commission proposal for the Council's and Parliament's decision (co-decision) is foreseen to be adopted and published in April





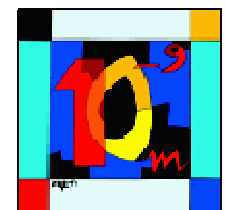
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A new way of industrial engagement: the Technology Platforms

- | **Bringing the main public and private stakeholders to address major technological challenges**
- | **Key concepts are:**
 - | **Development of a shared long-term vision (e.g. “Vision 2020”);**
 - | **Creation of a coherent, dynamic strategy to achieve this vision: The Strategic Research Agenda;**
 - | **Leading role of industry but should include stakeholders (research, financial, users and civil society)**

<http://www.cordis.lu/technology-platforms/>



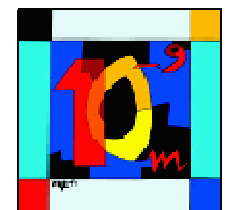


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A Further Step: Specific International Co-operation

- | The E. Commission seeks **international debate** on nanotechnology-related issues such as public health, safety, environment, consumer protection, risk assessment, metrology, norms;
- | The EU R&D programme is open to the World; Europe even funds research teams in Third Countries;
- | Europe promotes the **monitoring and sharing at international level of information** related to the scientific, technological, economical & social development of nanotechnology;
- | Europe strives for an **international "code of conduct"** for the responsible development of nanotechnology **and to avoid a "nano-divide"**.





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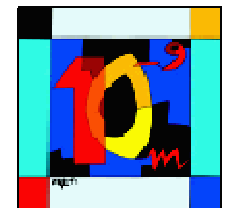
International dialogue

24th June 2004 Alexandria, VA (USA)

Experts from 25 countries in private capacity, by invitation of NSF (USA) to discuss benefits and risks of nanotechnology to human health and safety and to the environment, socio-economic and ethical implications, consideration of nanotechnology in developing countries;

- concluded to establish a small preparatory group that should explore mechanisms/institutional framework, principles for international dialogue, actions and timing, that are acceptable to all regions; that should explore, in particular, for a joint declaration and its adoption, and a set of actions at int'l level.

Composition: 3 regions: North & South America, Europe & Africa, Asia & Oceania (each party should bear its cost).





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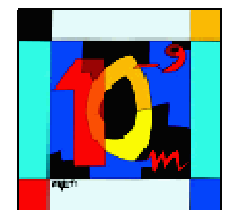
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Activities organised in Brussels

A meeting with Member States on international dialogue on responsible research in nanotechnology has been held in Brussels, on 3rd December 2004

The topic has also been discussed with the Research working party of the Council of the European Union

NEXT STEP: to convene in Brussels the preparatory meeting agreed upon in Alexandria (VA, USA), possibly in May





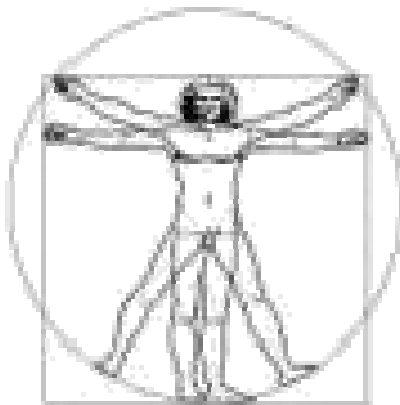
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The idea to explore: a high-level declaration on “responsible nanotech” and a set of actions

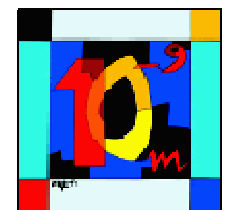
Commitment of political value to be taken at top-level. Parties of the declaration;

- must engage themselves to **develop and use nanotechnology** in a responsible manner;



- must attribute public funds, devoted to civil R&D, only to projects that **respect human dignity and integrity**, and that **do not harm** health and/or the environment.

- Industry will be invited to adhere.

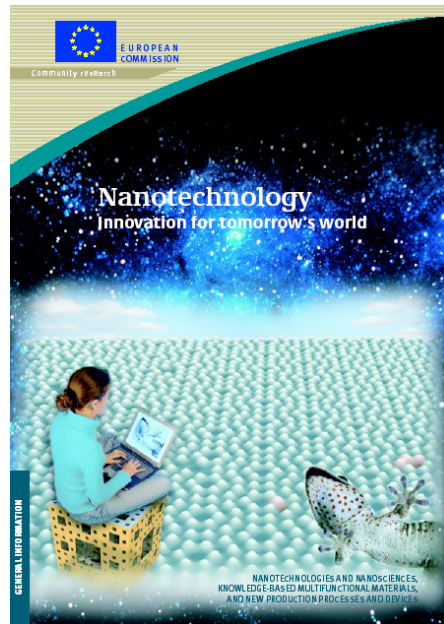




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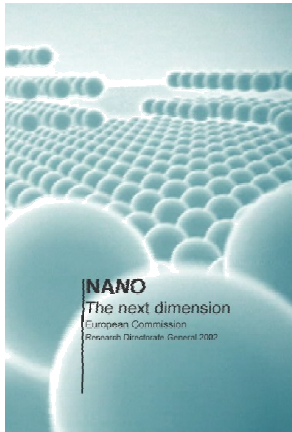
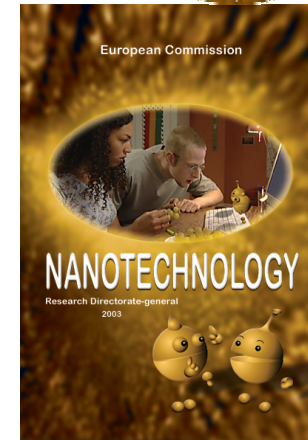
Informative material is available, e.g.



Brochure:
"Nanotechnology: Innovation for tomorrow's world" soon in 23 languages



Film (for younger people):
"Nanotechnology" in 20 languages

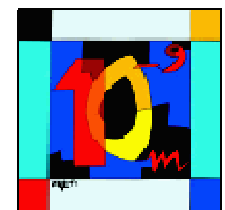


Film:
"Nano: The next dimension"

All can be seen or obtained via

www.cordis.lu/nanotechnology/src/pressroom.htm

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Thank you for your attention!

Full text of the Communication and information on nanotechnology in Europe can be downloaded from:

<http://www.cordis.lu/nanotechnology>

Please provide your comments:

rtd-nano-strategy@cec.eu.int

Other nanotechnology information also from:

