

# EC Programmes in Micro & nanoelectronics

## **A way to a bright future?**

EU 2020, KET, FP 8, ENIAC JTI

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## Outline presentation

### 2010 – 2020: A new momentum for Nanoelectronics in Europe ?!

- ☐ What is going-on at the higher policy level in the Commission?
- ☐ Something on 8th framework
- ☐ Today: call 8
- ☐ The immediate future: WP 2013
- ☐ To conclude



## From 10 year Lisbon Strategy ... to EUROPE 2020

- **UPDATE VISION TO POST-CRISIS WORLD**
- **IMPROVE DELIVERY**

### ***EUROPE 2020: A EU strategy for smart, sustainable and inclusive growth***

- **Smart Growth:** knowledge and innovation economy
- **Sustainable growth:** greener and competitive economy
- **Inclusive growth:** high employment, knowledge people and social and territorial cohesion



**5 EU Targets** – translated into national ones

**7 Flagship initiatives** – EU & national action

**COMMUNICATION FROM THE COMMISSION COM(2010) 2020**

<http://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf>



# Europe 2020: 5 EU Headline Targets

(translated in national and regional ones)

## By 2020:

- **75 % (now 69) employment rate** (% of population aged 20-64 years)
- **3% (now 1,8) Investment in R&D** (% of EU's GDP)
- **"20/20/20" climate/energy targets met** (incl. 30% emissions reduction if conditions are right)
- **< 10% (now 15) early school leavers** & min. 40% (now 31) hold **tertiary degree**
- 20 million **less people (now 80)** should be **at risk of poverty**



# Europe 2020

3 priorities, 7 flagship initiatives

Communication COM(2010)2020 of 3.3.2010

**A strategy for smart, sustainable and inclusive growth**

- **Innovation Union**

- Youth on the move

- **A Digital Agenda for Europe**

- Resource efficient Europe

- **An industrial policy for the globalisation era**

- An Agenda for new skills and jobs

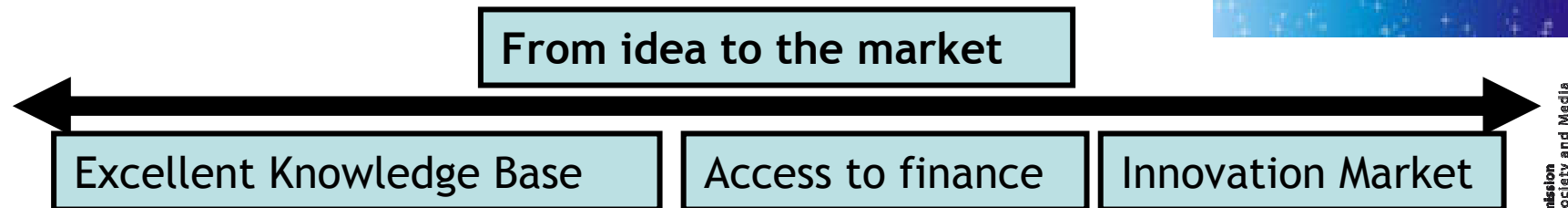
- European Platform against Poverty

<http://ec.europa.eu/eu2020>

# TOWARDS AN INNOVATION UNION

Communication  
COM(2010)546 of 6.10.2010

- Innovation Union will **advance scientific boundaries**, increase European **competitiveness** and help solve **societal challenges** such as climate change, energy and food security, health and an ageing population.
- Around 16,000 participants from research organisations, universities and industry, including about 3,000 SMEs, will receive funding. It is expected to create more than 165.000 jobs.



*European innovation partnerships & international cooperation*

***“EIP”’s are an umbrella to guide all activities  
using all financial instruments***

# The Innovation Union: targets

- Completing the European Research Area *(already by 2014)*
  - *joint programming with Member States and regions ...*
- Improving framework conditions for business to innovate
  - *single EU Patent, access to capital, setting of interoperable standards, making full use of public procurement, prototype manufacturing, ...*
- Strengthen partnerships in knowledge triangle between **education, business, research and innovation** and between knowledge clusters
  - *people, institutions, infrastructures, regions, ...*

Launching EIP's: 'European Innovation Partnerships' where all EU instruments to support innovation should work together

- ***structural funds**, rural development funds, **R&D framework programme**, **CIP ... EIB** ... and streamline administrative procedures ...*





# A Digital Agenda for Europe

Every European Digital !

Communication  
COM(2010)245 of 19.05.2010

**A vibrant digital  
single market**

**Fast and ultra  
fast internet  
access**

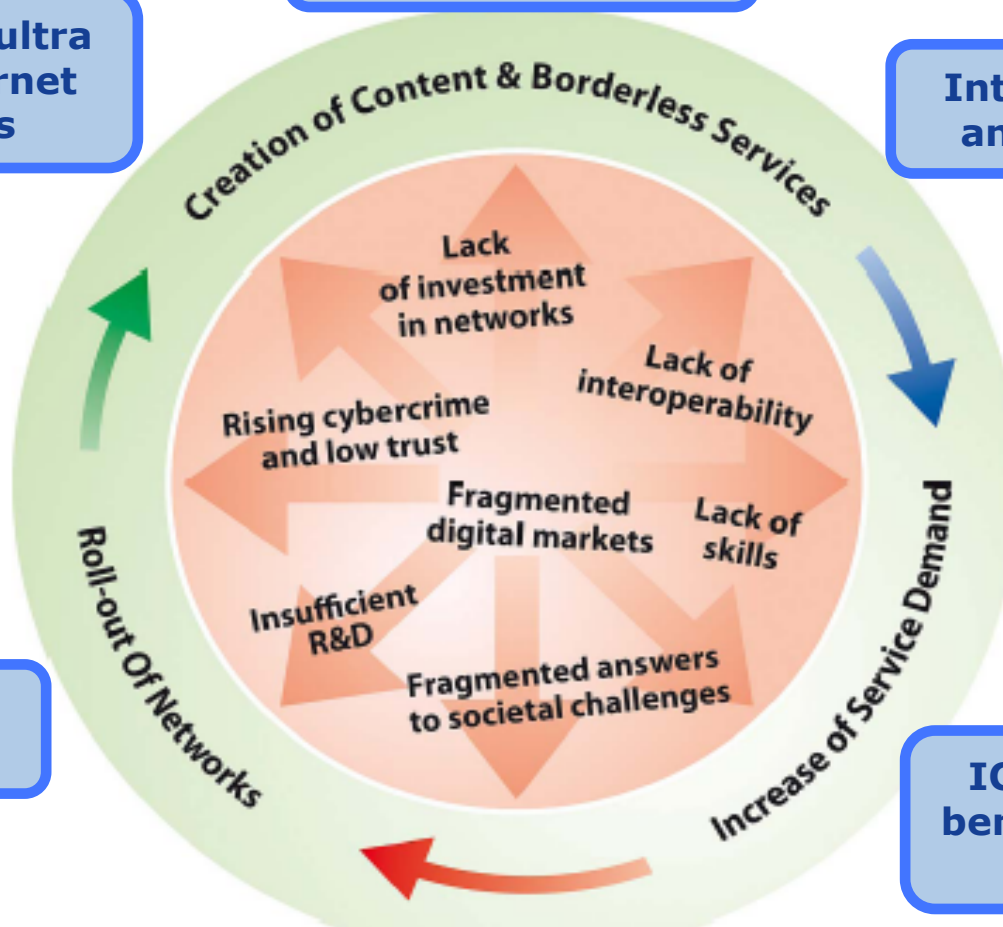
**Interoperability  
and standards**

**Trust and  
security**

**Enhancing  
digital literacy,  
skills and  
inclusion**

**Research and  
innovation**

**ICT-enabled  
benefits for EU  
society**



[http://ec.europa.eu/information\\_society/digital-agenda](http://ec.europa.eu/information_society/digital-agenda)



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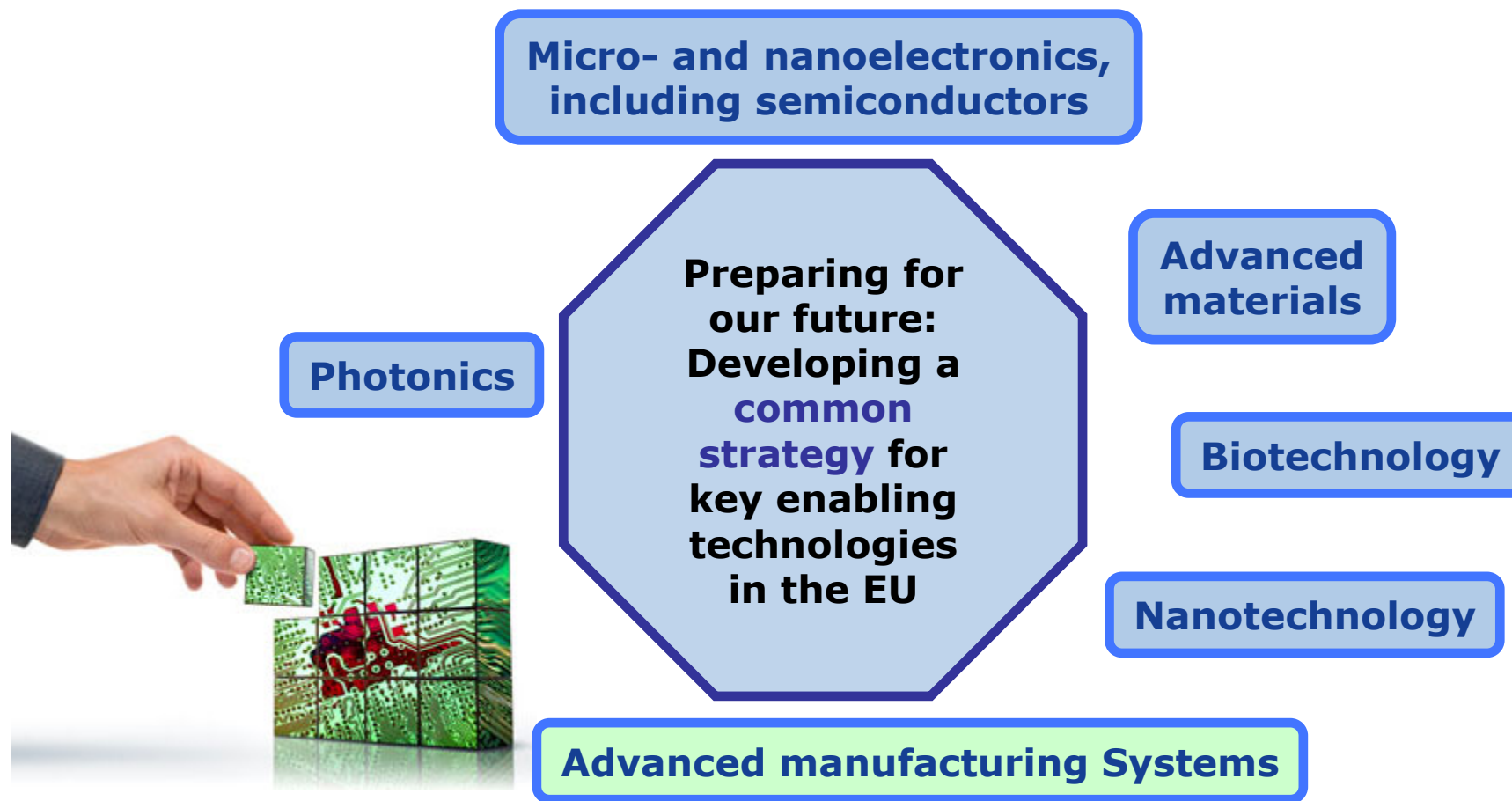




# R&D&I is part of Industrial Policy

Key Enabling Technologies

Communication COM(2009)512 of 30.9.2009



[http://ec.europa.eu/enterprise/sectors/ict/key\\_technologies](http://ec.europa.eu/enterprise/sectors/ict/key_technologies)

# Identified Key Enabling Technologies (KET)

Communication COM(2009)512 of 30.9.2009

## Importance of KETs

- **Driving** our competitiveness, our innovation potential and **knowledge-based economy** delivering new goods and services
- **Modernization of the industrial and research base**
- Creating regional knowledge **eco-systems** incl. clusters of **SMEs**.

## Defining KETs

- **Knowledge intensive**
- **R&D intensive**
- **Capital intensive**
- **(Multi-)Skill intensive**
- **Enable innovation,**
- **Multipliers**
- **Systemic relevance**

**Nanotech, Micro- and Nanoelectronics, Photonics, Advanced Materials, Biotech**

### High Level Group (25#):

- **industries**, incl. **SMEs**,
- **research community**
- **member states**
- **EIB**

### Make policy recommendations using existing instruments

existing state aid rules, improve access to finance

### Make policy recommendation for EU2020, flagships and FP 8

Shared long term vision  
and  
A sense of partnership

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[http://ec.europa.eu/enterprise/sectors/ict/key\\_technologies](http://ec.europa.eu/enterprise/sectors/ict/key_technologies)



# 2011 is key for future EU financing MAFF 2014+, FP8, CIP II !!!!

## Basis for proposed objectives and structure FP8 & CIP II

- Policy framework
  - EU2020, DAE, Innovation Union, Budget Review
- Lessons learned
  - Interim evaluations: ICT in FP6, in FP7, JTIs-AAL, general FP7, CIP
  - Impact analyses: ICT in FP5, ICT in FP6
- Position papers
  - Member States
  - Stakeholder positions: industry, academia, ISTAG, ETPs ...
- Public consultation on Green Paper on R&D&I
- Reflections conducted with MSs and stakeholders
  - SE and ES presidencies, Lund declaration ...

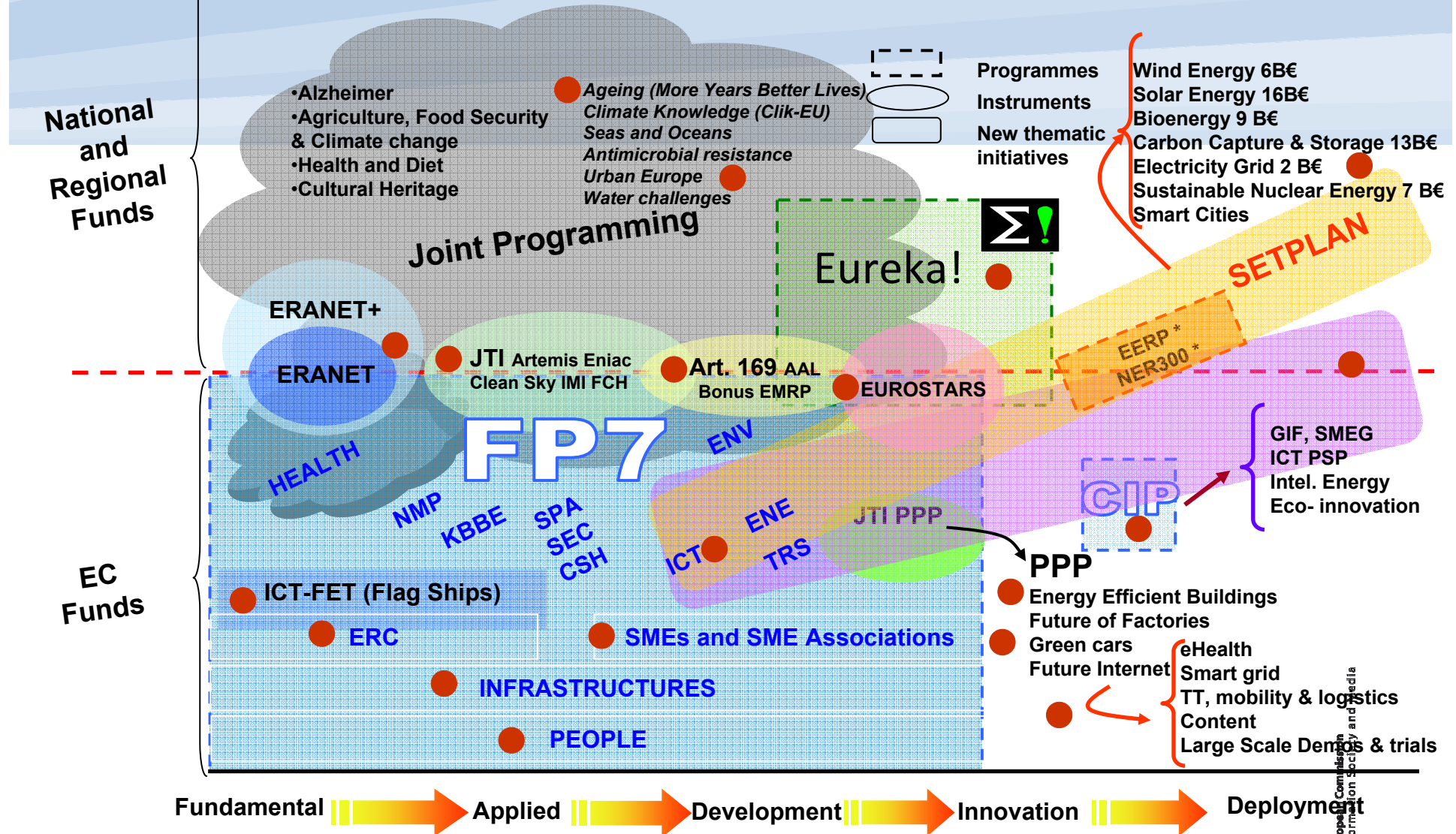


## Three key messages

- More clarity of goals and strategy, Higher impact on competitiveness / society and more EU added value
- Simplification
  - Procedures but also of programmes/instruments
  - To attract wider constituency, smaller entities
- Work across silos
  - research-innovation-policy priorities
  - between themes and disciplines
  - EU-MSs, public-private



# The EU's research and innovation landscape



Simplification: We also had good intentions in FP7, FP6, FP5!



## Some first and preliminary thinking on FP 8

Towards a Common R&I framework in the next MAFF  
“3 sets of challenges, 4 type of activities, (funding schemes)”

**Draft**

	<b>Focussed, Roadmap based</b>	<b>Flexible, Open, agile</b>	<b>Infrast and skills</b>	<b>Testing, piloting</b>
<b>Societal challenges</b> e.g. EIPs		Light WP Any time	e.g. Living labs	CIP Pilots
<b>Industrial leadership</b> e.g. PPPs		Small size SMEs specific	e.g. Clean rooms, Innovation clusters	CIP Pilots
<b>Excellence in science</b>	e.g. FET flagships	e.g. FET open ERC	E-Infrastruct .	



## 2011: Preparing FP 8 & CIP II & EIT (summary)

- **Multi-Annual Financial Framework (MAFF) 2014+.**
- RTD + Innovation: FP 8+ CIP II ?
- **FP8:**
  - « Competitiveness » (*Leadership in Key Technologies*),
  - « Societal Challenges » (*Mission orientation of research*) and
  - « Science for Science »
- Keep developing the **European Research Area**, and more international coop.
- Keep Long term (ERC) and global cutting edge frontier research (FET)
- **Simplification:** Simpler structure, simpler procedures, easier access for SMEs
- **Externalisation** (leverage private investments in PPPs - next generation JTI)

**2011-2012**  
**R&D&I is high on the political Agenda**






## What happens next?

- **February**      **Green Paper**
- 4/2      European Council devoted to research & innovation
- **Feb-May**      **Consultation based on Green Paper**
- 10/6      Consultation ‘wrap-up’ event in Brussels
- June      Proposal for next MFF
- December      Proposal (s) for FP8/CIP-II





## FP7-CIP/ICT Budget Profile: 70% increase in period 2011-13



M€	2007	2008	2009	2010	2011	2012	2013	TOTAL
PF7 ICT	1.189	1.217	1.227	1.241	1.382	1.582	1.760	9.597
CIP	58	52	105	113	120	135	149	732

### Financial support

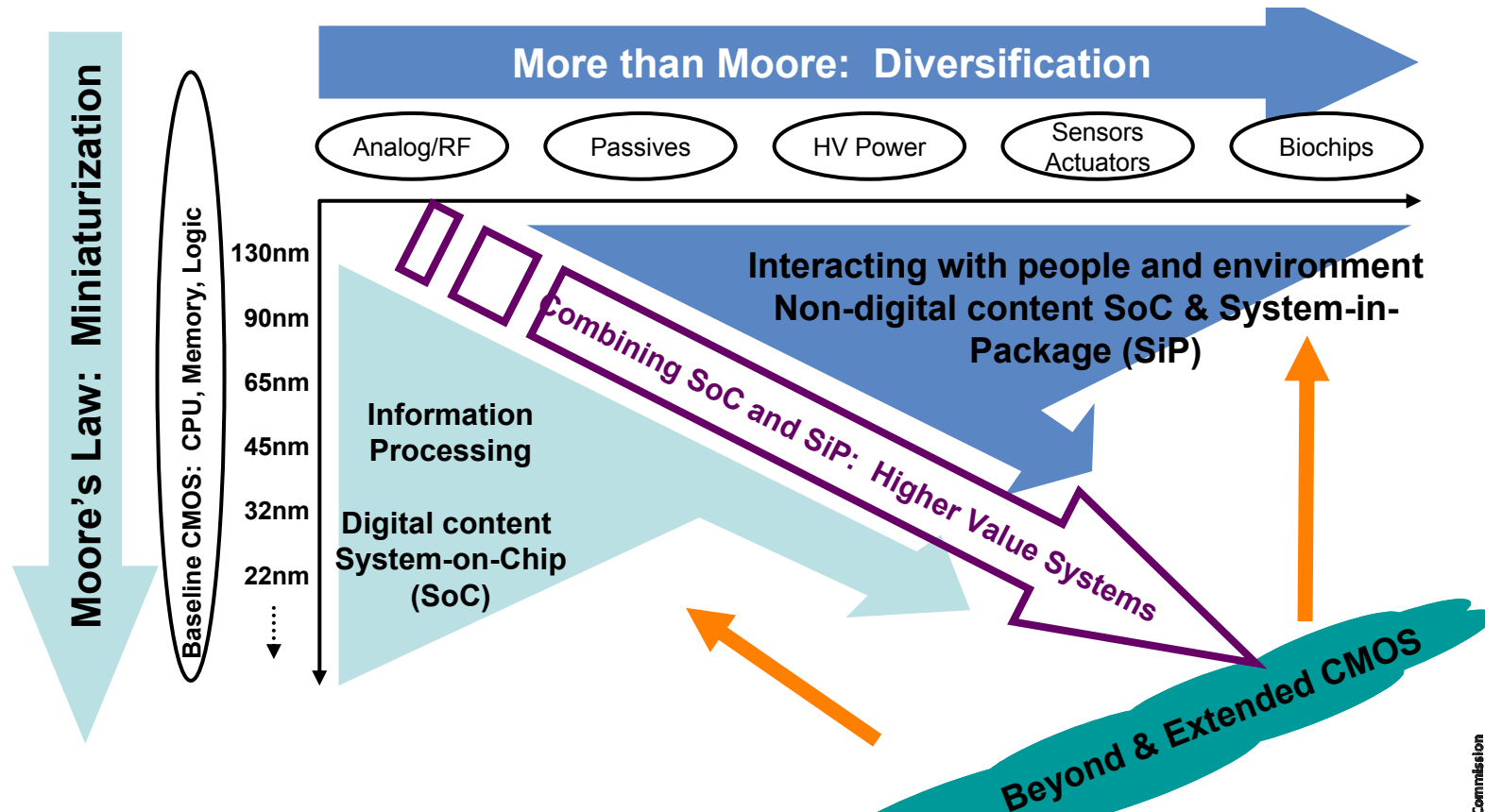
- **FP7:** master & shape research & development
- **CIP:** ensure wider uptake & better use of research
- + Regional and Structural Funds,...

# European vision of the More Moore and More than Moore domains

## Nanoelectronics

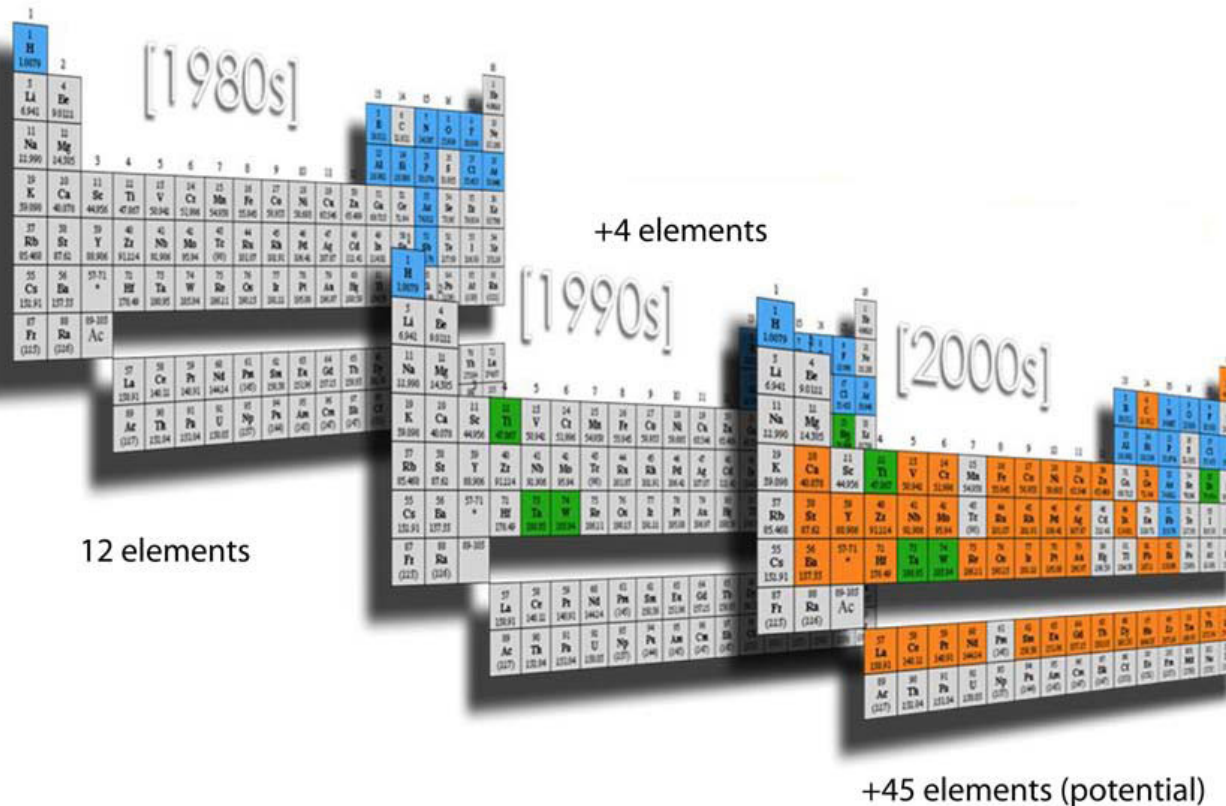
"Small, smaller, smarter"

- Advanced components in advanced systems enabling pervasive applications -



**Beyond & Extended CMOS** technologies need to meet the criteria of **integratability and systemability and manufacturability**

# ICTs require raw materials:



The dynamics of two decades of computer chip technology development and their mineral and element impacts.

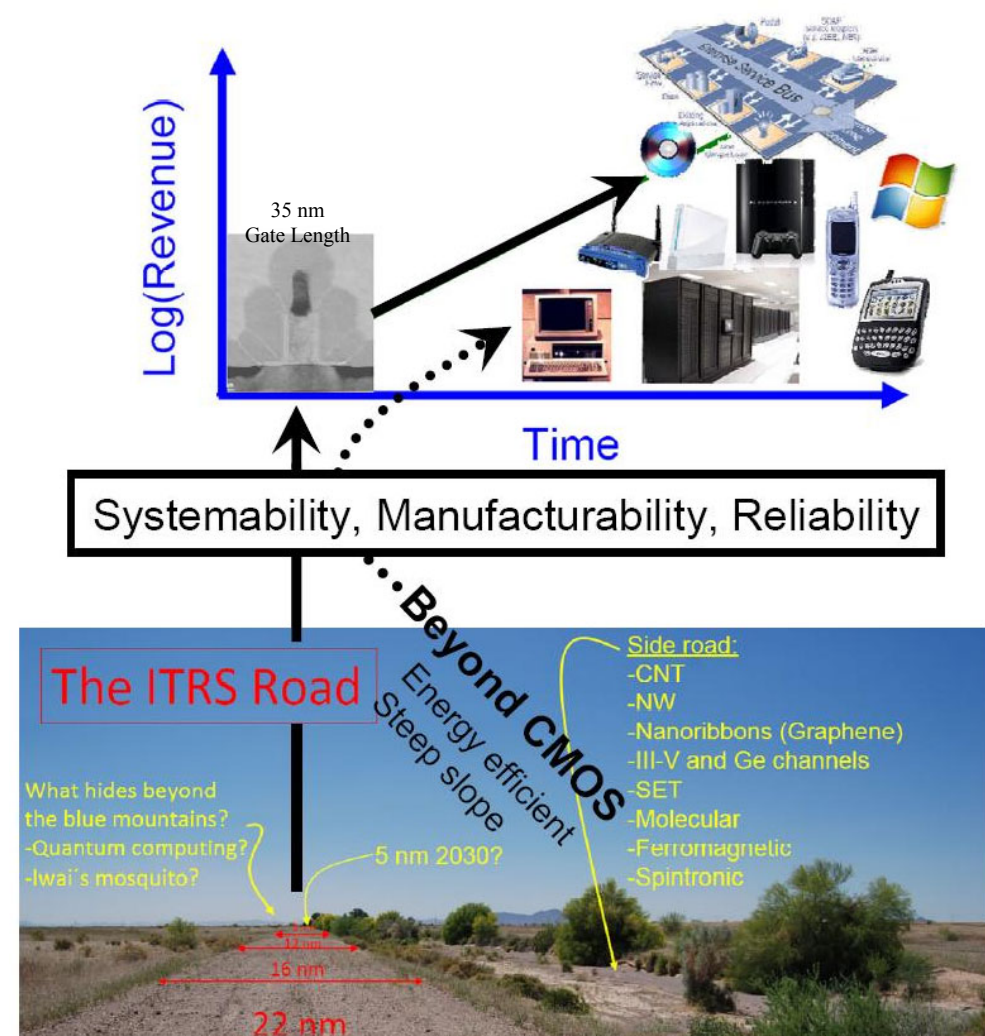
In the 1980s, computer chips were made with a palette of **twelve** minerals or their elemental components. A decade later, **sixteen** elements were employed. Today, as many as **sixty** different minerals (or their constituent elements) are used in fabricating the high-speed, high-capacity integrated circuits that are crucial to this technology.

Source: CT IC

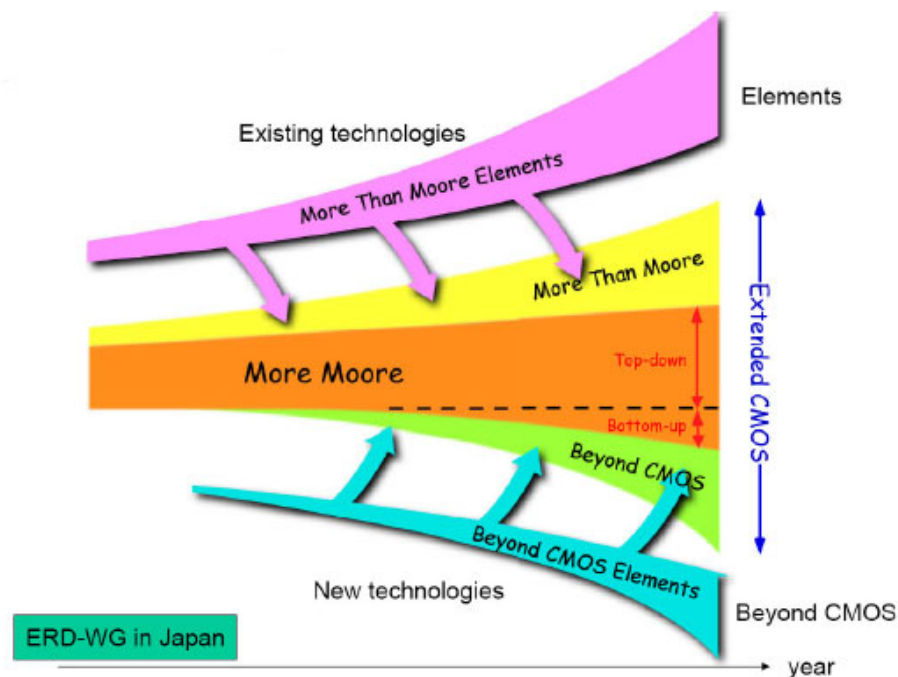


# Advanced Nanoelectronics Technology: WP 2011-2012

- To stimulate **interaction of system and technology**
- To address **energy efficiency** needs
- Nanoelectronics products as **system enablers and solution providers** for global challenges as aging society, global warming, growing population or sustainable manufacturing.
- To prepare for **“beyond” traditional shrinking** (ITRS roadmap)



# Advanced Nanoelectronics Technology



ITRS-ERD vision of the role of Beyond CMOS and More than Moore elements to form future extended CMOS platforms.

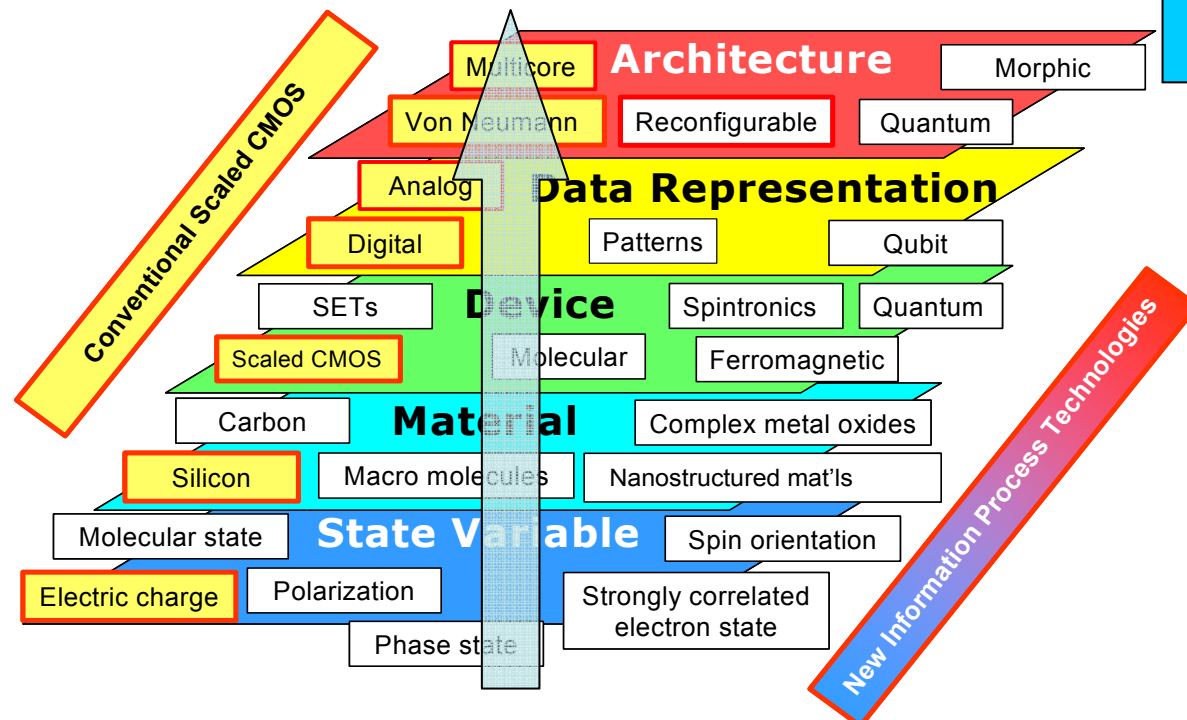
- **Beyond CMOS and advanced More than Moore as an extended-CMOS vision.** No disconnection from the advanced silicon CMOS in order to keep impact of its results on the applications and markets.
- Needs of **hybridizing silicon** with molecular switches, ferromagnetic logic, spin devices and sensors in order to *enable heterogeneous and morphic system architectures*.
- **Integrate-ability** of novel technology with CMOS and their **reliability** become key factors.

# Work Programme 2011-12

## General concepts

### Transversal Research Projects

### Multi-disciplinary cooperation



-System-technology interaction  
-Nanofabrication  
-Energy efficiency  
-Next switch  
-Universal memory  
-3D integration  
-Novel architectures

- Advanced component technology + advanced system design
- Beyond CMOS , Extended CMOS

For systems 2020 and beyond

**Systemability, integratability, manufacturability**

## ICT Work Programme 2011-12

### *Nanoelectronics: proof of concept and prototype demonstration*

#### Objective 3.1: Very Advanced Nanoelectronics Components

- Beyond CMOS technology
- Circuit-technology solutions
- Nano-manufacturing and Joint Equipment Assessment
- Coordination and Support Actions

Call 8 (July 2011 - Jan 2012)

**60M€**

#### Objective 3.2: Smart components and smart systems integration

- Smart components
- Smart (miniaturized) systems
- Micro-Nano Bio Systems (MNBS)
- Coordination and Support Actions

Call 7 (MNBS - call 8 (39M€))

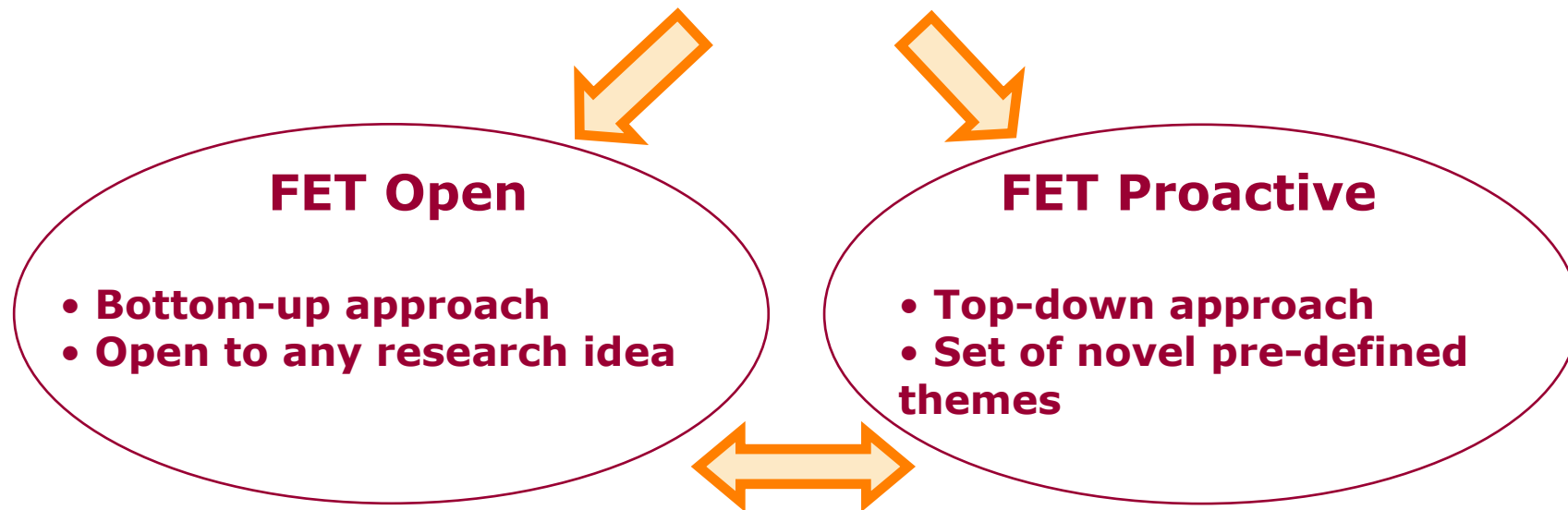
**41M€**





Future & Emerging Technologies - FET: **idea and proof of principle**  
*Supporting high-risk transformative research in ICT*

Two complementary funding schemes



**Nano-electronics** related topics with EU funding **~ 30M€/year:**  
Molecular-scale systems, Tera-scale computing, Quantum-ICT,  
Bio-Chemistry-based and towards zero power ICT



**ICT Proposers' Day 2011**  
**19 - 20 May, Budapest**  
**Networking for European ICT R&D**



- Aim of the event:  
to prepare for Calls 8 and 9 (together >1 billion €)
  - by networking and partnerships building
  - by first-hand information from >100 EC officials
- Structure:
  - thematic sessions with presentations of
  - information stands & meeting points
- Registration:  
free of charge, open from January 2011



<http://ec.europa.eu/ictproposersday>



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## The immediate future - WP 2013

- ☐ Preparing - bridging towards FP 8
- ☐ Large initiatives, holistic approach + FET
- ☐ ENI2 (MS + EC)
- ☐ ENIAC & FP -a common strategy ?
- ☐ European presence at global level: international cooperation
- ☐ EUROPRACTICE, Equipment assessment, .....

**Still money left !!!!!**



# Summary.

- **Transition Barosso I to Barosso II**
  - 2010: Renewed cooperative spirit towards EU 2020, renewed emphasis on R&D&I as a basis for **smart, sustainable and inclusive** growth.
  - Think larger, smarter and be competitive.
- **Multi-Annual Financial Framework 2014+, new FP 8, CIP II,...**
  - 2011-2012 is key : New opportunities for improvements and for holistic integrated views to face global and grand challenges
- **KETs initiative** including nanoelectronics **is a major input to this processes**
- **Participate in Call 8 !!!**

*« Time is ready. Let us profit from these exciting times and take action  
---- together ----- »*

!!!! Take part in the consultation processes !!!!  
!!!! 2011 is a year of change, **you can influence the future** !!!!

# THANK YOU

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Information Society and Media:

[http://ec.europa.eu/information\\_society](http://ec.europa.eu/information_society)

[http://cordis.europa.eu/fp7/ict/nanoelectronics/mission\\_en.html](http://cordis.europa.eu/fp7/ict/nanoelectronics/mission_en.html)

European research on the web:

<http://cordis.europa.eu>

<http://www.eniac.eu>



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### *3.1 Very advanced nanoelectronic components: design, engineering, technology and manufacturability*

#### Summary

➤ **Call 8**

- Open: 26 July 2011
- Close: 17 January 2012 (at 17:00 Brussels local time)

➤ **Funding schemes:**

- a) Beyond CMOS technology: **STREPs**
- b) Circuit-technology solutions: **STREPs and at least 1 IP**
- c) Nano-manufacturing and joint equipment assessment: **STREPs and at least 1 IP**
- d) Support measures: **CSAs**

➤ **Indicative budget distribution - 60 M€:**

- IP/STREP 55 M€
- CSA 5 M€

