European Nanoelectronics
ENI2
Infrastructure for Innovation

Raisons d'être & Objectives

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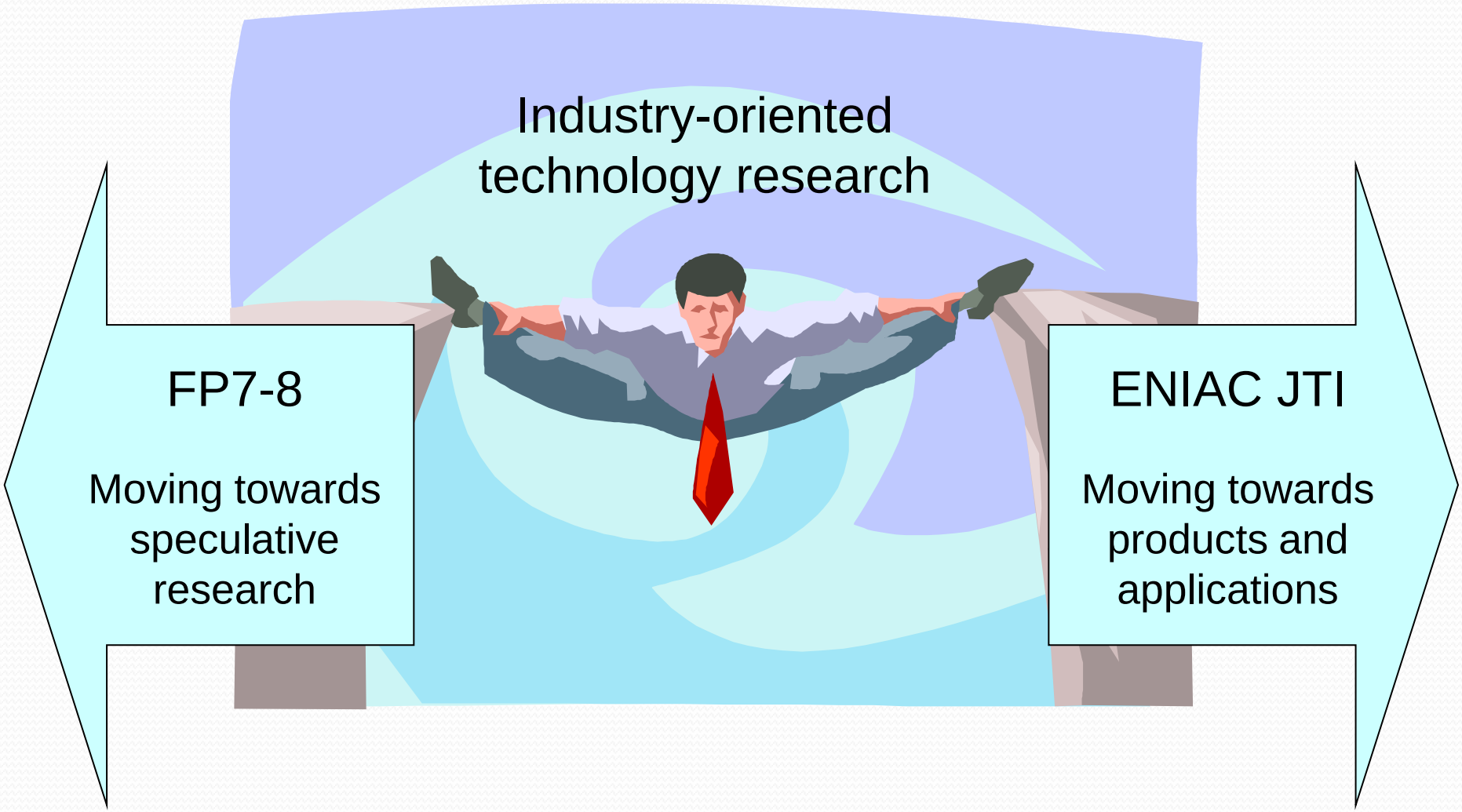
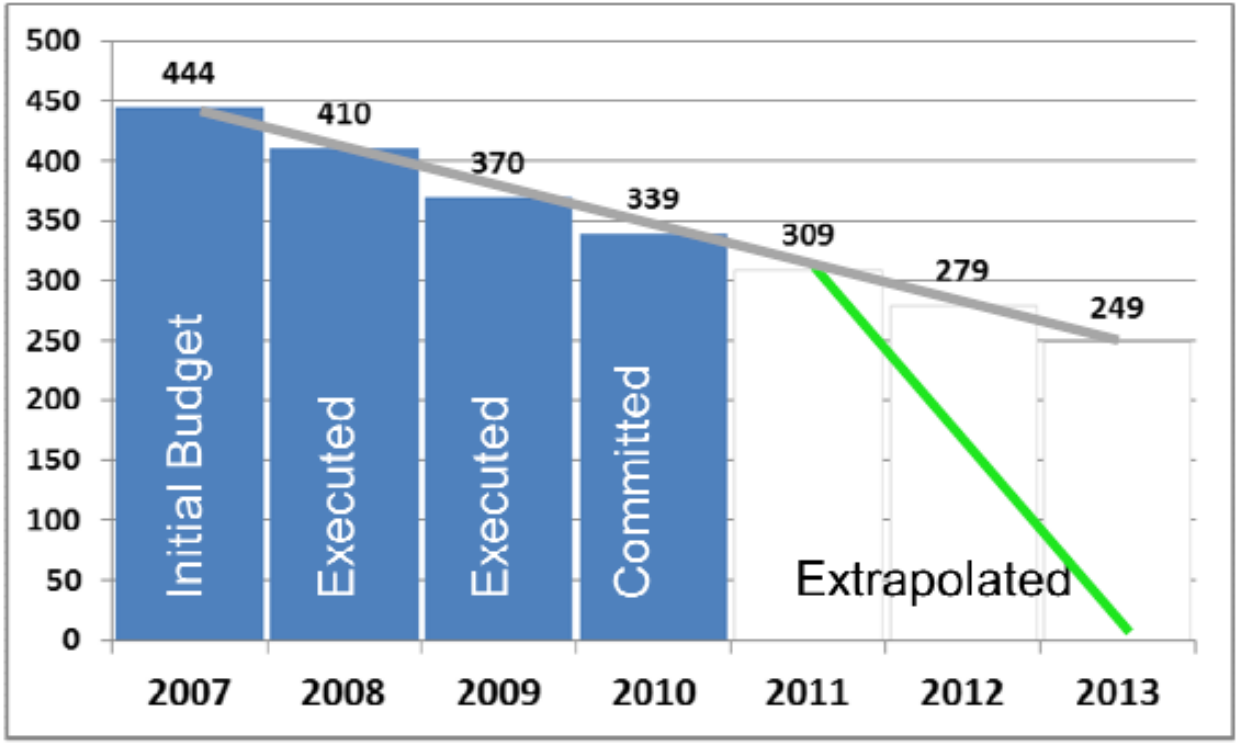
An increasing gap



Bad utilization of available funding

W ho helps ?

ENIAC JU Budget Consumption



Source: ENIAC JU

European Nanoelectronics Infrastructure for Innovation

- What?
  - ENI2 is an initiative supported by a « core group » aiming to propose new way of thinking collaborative projects to overcome the disruptive challenges to be faced by the micro/nano industry.
  - ENI2 is not a new instrument but a methodology to contribute to the implementation of the VMS and the SRA.
- Why?
  - To improve the innovation cycle by closing the gap between advanced research and industrial needs
  - To set-up a durable Multi-disciplinary Research **Infrastructure**.
  - To create wider externalities

Positioning

Universities
Institutes
Industrialists

Research → Early Development → Industrial development → Manufacturing (of products)

€ intensity

ACADEMICS

INDUSTRY ORIENTED INSTITUTES

INDUSTRIALISTS

PRODUCTIZATION

Time

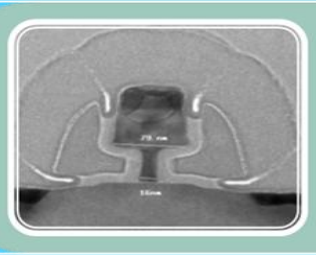
Objectives

To:

- Rationalize the R&D activities in order to maximize the efficiency of the funding allocated.
- Improve the timely selection of ideas.
- Benchmark the various technological solutions proposed and to perform an early evaluation of their cost effectiveness.
- Offer a continuity of partnership during the whole execution of a roadmap/vision.
- Insure a European scope to research in Nanoelectronics, overcoming cross-border funding problems.

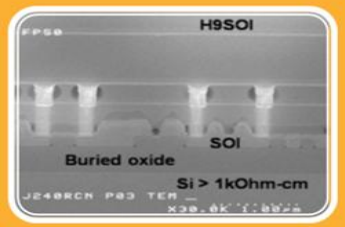
A THREE LEVEL STRUCTURE

In nanoelectronics, a successful innovative infrastructure will rely to a three R&D levels organization



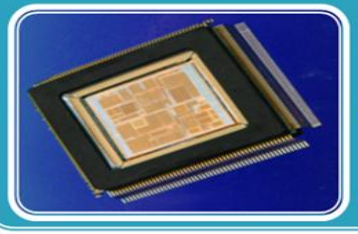
ACADEMIC LABORATORIES

- Basic understanding, test and validation of innovative architectures, materials and processes in order to identify the most promising topics for future ICT



INSTITUTES (Integration Centers)

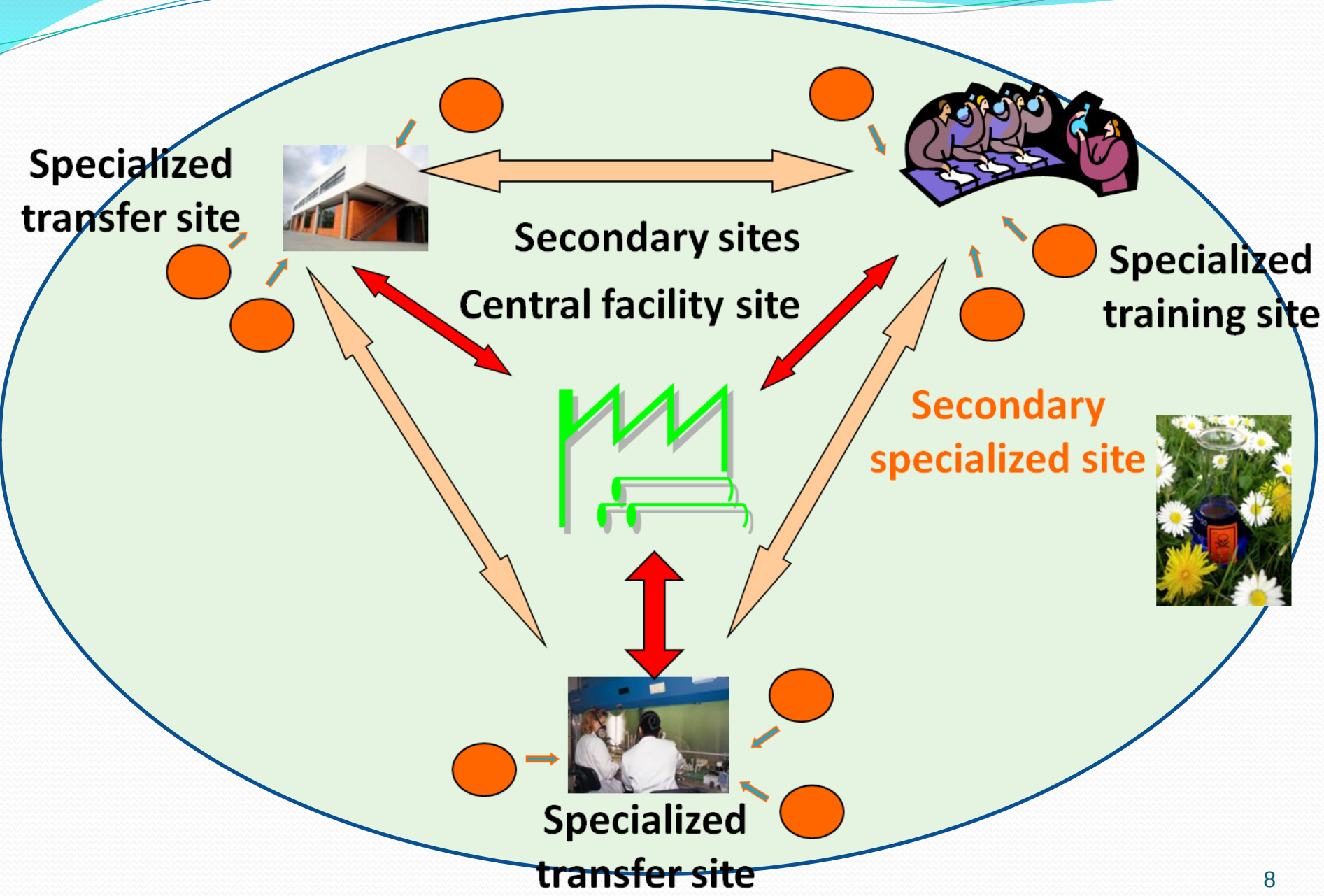
- Technology implementation and performance assessment on R&D equipments ; development of high performance Logic, Memories, Derivative, Power devices



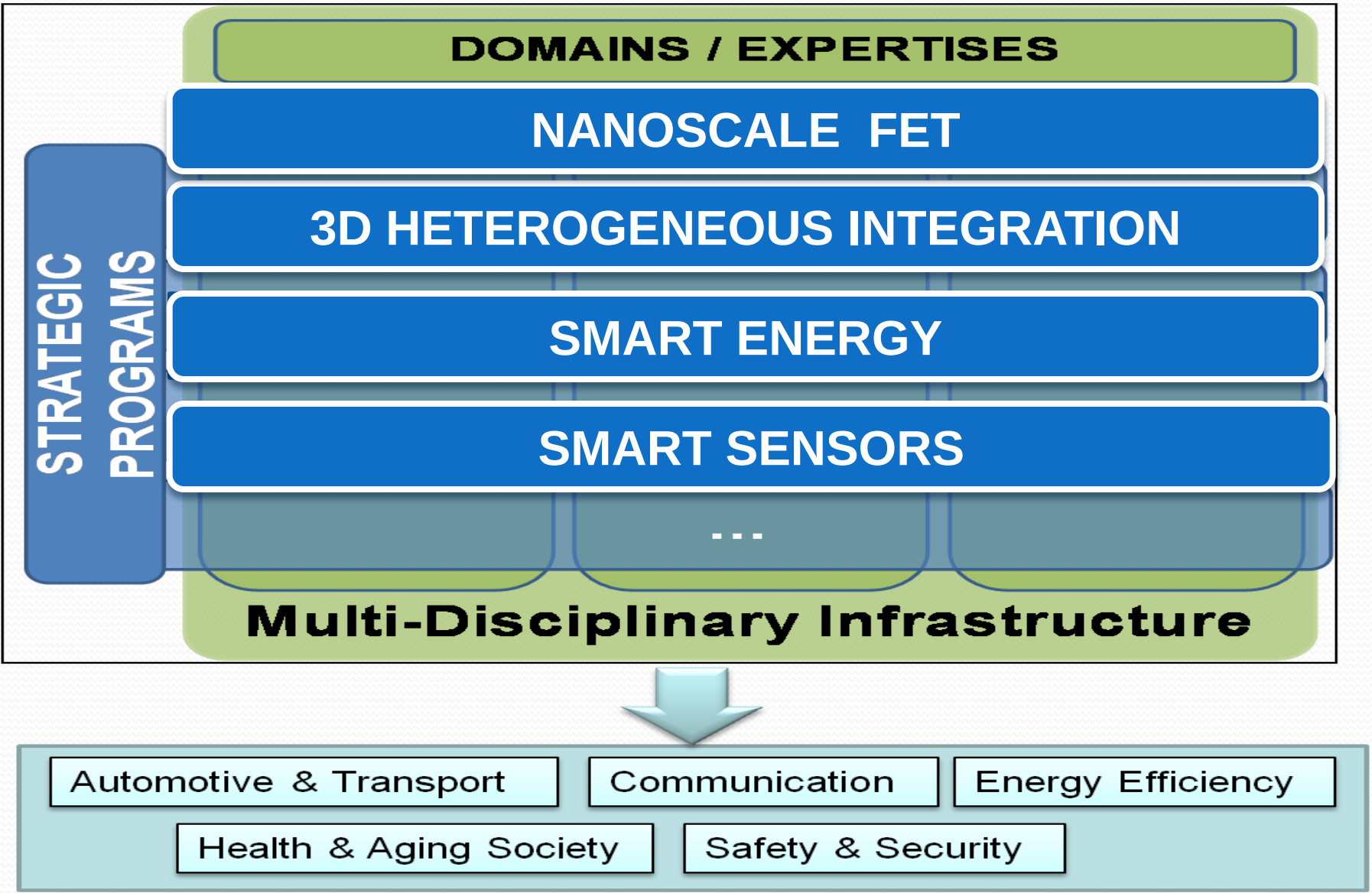
INDUSTRIALISTS

- Technology exploitation as functional product, process optimization, yield, product reliability, device and interconnect architecture and design

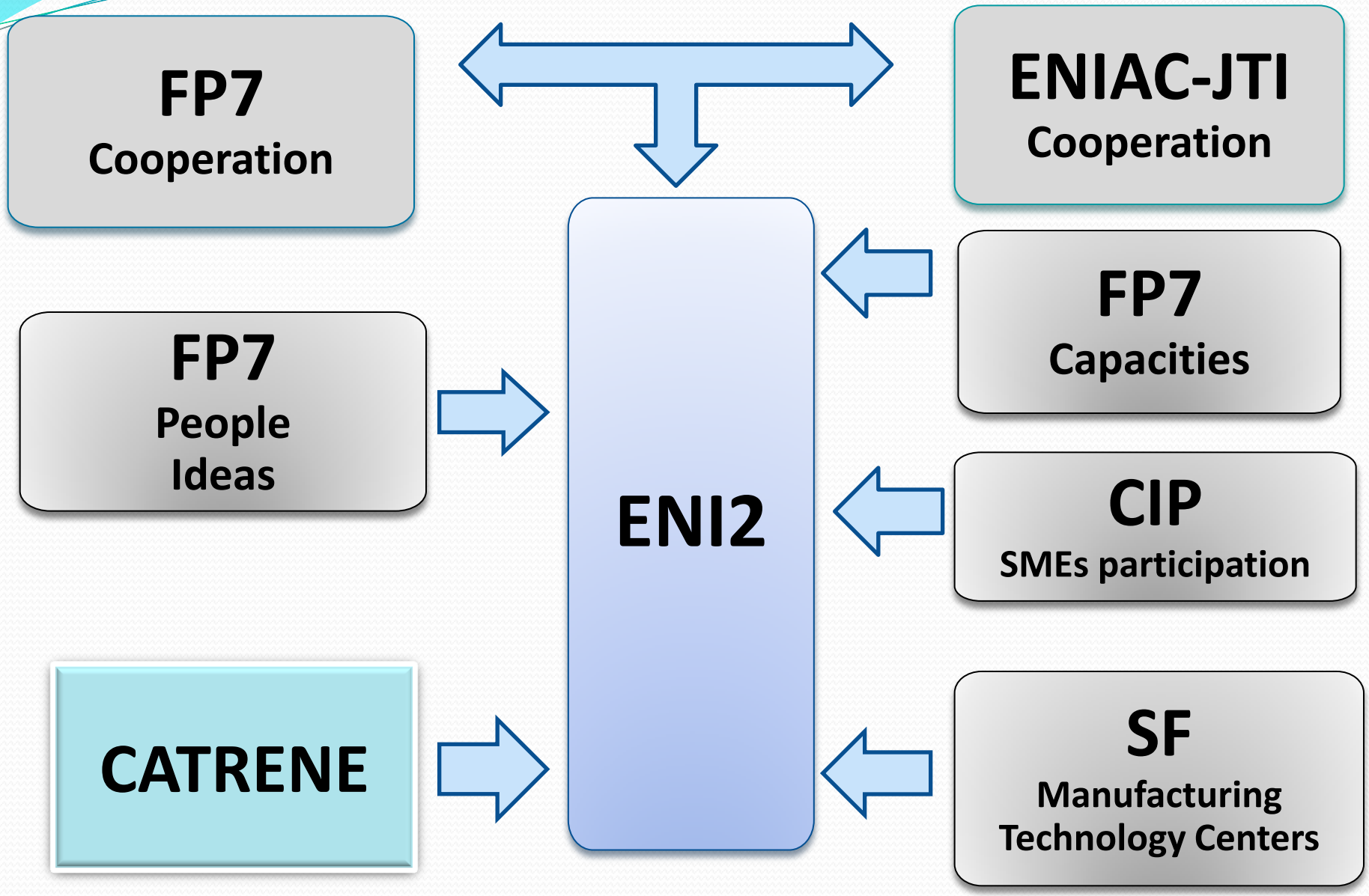
A networked open infrastructure with a formal governance



Four strategic Programs domains…..as a starting point



Synergies and Wider externalities



Action Plan

- Full support by AENEAS obtained
- Domain coordinators selected
- To apply to the strategic domains: *Mid. January*
- Kick-off meeting*:* *Feb 3*
  - Agree on the objectives and areas of collaboration.
  - Draw-up a preliminary list of contributors.
  - Propose a set of priorities and associated tentative time delivery
- Specific meetings by strategic domains organized by Domain leaders and co leaders during *Feb./March 2011*, to:
  - Formalize the contribution by research level
  - Issue a technical agenda covering the 2012-2020 period with key milestones and estimated resources.
  - Set-out a European ecosystem (cartography) by strategic domain
- To consolidate the different strategic domains *April 2011*

ENI2 proposal *April 2011*

Thank you

Back Up slides

Leading the strategic domains

For each Strategic Domain a binome (leader/co-leader) has been formed and the basis for cooperation has been discussed.

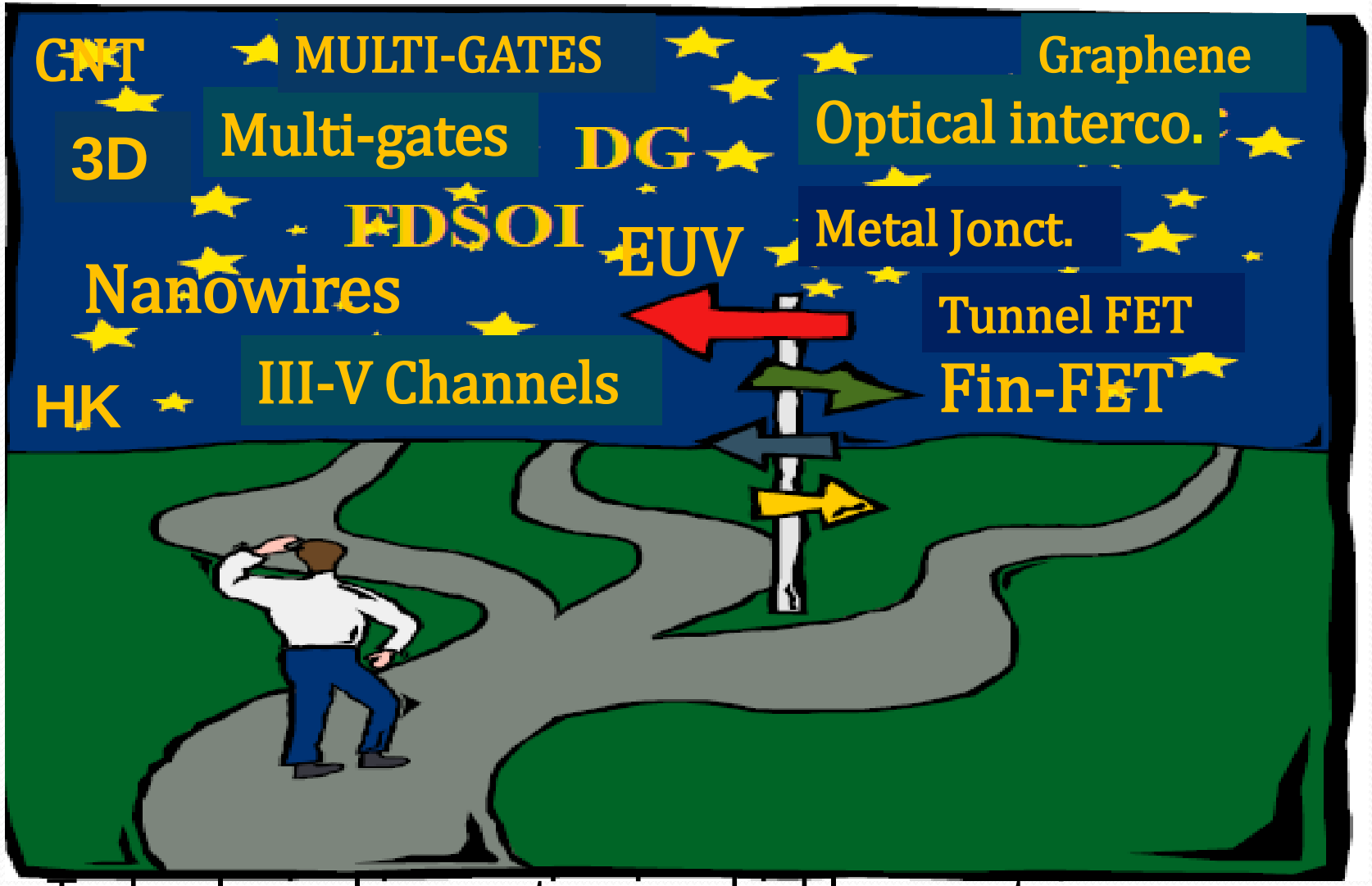
• **Nanoscale FET**:	F.Balestra	Sinano Institute
	G.Thomas	ST
• **Smart Energy** :	W. Dettmann	Infineon
	(TBN)	ST
• **3D Integration**	J.Stephan	FHG
	A.Bouffioux	NXP
• **Smart sensors**	R.Zafalon	ST
	xxxx	xxxx

Core Group

- **AVSET** Berit-Sundby **SINTEF**
- **BALESTRA** Francis **SINANO**
- **BAUSELLS** Joan* **CNM**
- **BRILLOUET** Michel **Leti**
- **CASANOVA** Gilles **ST**
- **DONOVAL** Daniel **STUBA**
- **GRÜTZMACHER** Detlev **FZ-JÜLICH**
- **MOUIS** Mireille **FMNT**
- **O'NEILL** Brendan **TYNDALL**
- **STEPHAN** Joerg **FHG**
- **ROESEMS** Gisele **EC** (observer)
- **ROUSSET** Denis **STE**
- **SCHELLENBERGER** Martin **FHG**

- **THOMAS** Dominique **ST**
- **KILCHYTSKA** Valeria **UCL Louvain_**
- **LAUWERS** Lode **IMEC**
- **LEHNER** Norbert **IFX**
- **MATHERON** Gerard **ST**
- **MORAND** Jean-Luc **ST**
- **MODH** Peter **CHALMERS**
- **ROUZAUD** Andre **Leti**
- **THOMAS** Gilles **ST**
- **THOMAS** Dominique **ST**
- **TSOUKALAS** Dimitris **DEMOKRITOS**
- **Van der ZON** Ben **TNO**
- **VANDEN BULCKE** Mathieu **UCL Louvain**
- **WHATMORE** Roger **TYNDALL**

Improve the selection of technological options



Technological innovation is a highly uncertain process.
A portofolio of options have to be supported

Expected impact

- Speed-up the innovation process
- World class infrastructures
- Structured R&D collaborative approach
- Academic-industry cooperation Europe-wide
- Reinforcing the Regional/European ecosystems
- Improving knowledge transfer between public research and industry
- Better visibility to attract other partners (including SMEs)
- Structural Funds support
- Wider externalities (Manufacturing support Education & Training- International cooperation)

Motivations

- The **excellent European scientific knowledge fails to convert into industrially exploited products.** The migration path from FUNDAMENTAL SCIENCE to APPLIED SCIENCE to TECHNOLOGY to PRODUCT and its VOLUME MANUFACTURING is somewhat broken or too long.
- Lack of European strategic objectives
- European R&D efforts are duplicated by different policies at national level and cultural diversity amplified by an artificial separation between different research horizons
- CMOS scaling down is generating explosive R&D cost and More than Moore and 3D integration are creating explosive multidisciplinary R&D complexity.

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The impact and the success of ENI2 will depend largely on well-focused joint R&D objectives, well-formalized and structured governance, effective long range planning and supportive PAs and requires changes to the Council regulations.

ENI2 positionning: ENIAC / CATRENE

SUPRANATIONALITY

INFRASTRUCTURES
STRATEGIC TECHNOLOGICAL DOMAINS
Nanoscale FET, 3D heterogeneous integration, smart power…..

APPLICATIONS
PAN EUROPEAN INTEREST
Advanced LTE, Smart power grid, smart systems, devices for electrical/hybrid cars ….

SUBSIDIARITY

INTEGRATION PROCESSES APPLICATIONS

INNOVATION PROCESSES