

# NCP Info Day 13 May 2011, Brussels

## Factories of the Future & Next ICT Calls

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# Factories of the Future (FoF): Context

- What:
  - Part of the Recovery Plan
  - To help manufacturing, in particular SMEs, across a broad range of sectors be competitive after the Crisis is over
- How:
  - Industry-driven R&D projects
  - 4 annual co-ordinated calls until 2013 between the two relevant FP7 Themes, ICT and NMP
- Who:
  - R&D stakeholders of European Technology Platforms ARTEMIS, ENIAC, EPOSS, EUROP, NESSI, PHOTONICS21, MANUFUTURE
  - Technology providers & industrial users (large & SME), academic researchers
- Total FP7 budget (2010-2013):
  - 245 M€ (ICT) + 400 M€ (NMP)

# State of the Industry & Expected Impact

- Europe's manufacturing
  - More than 25 sectors, 21 % of GDP (= € 6.5 trillion), 30+ million jobs
  - Crisis has reduced Europe's production capacity
  - Export champions (but at risk) in machinery, automobiles, wind turbines, ...
  - Largest global market share in automation & factory equipment
  - Under threat from low wage economies (eg mass-produced goods)
  - Chance to compete through high added-value products (eg quality, services, customisation, clean & energy efficient processes)
- FoF ICT: Technology leaders to gain market share
  - Automation/industrial robotics & laser technology solutions for factory environments
  - Product/production design tools (eg software for modelling, simulation, visualisation)
  - Software for enterprise/supply-chain management
- FoF ICT: European industrial end users to
  - Integrate latest technology into their production environments
  - Build on new competencies (knowledge, organisation, skills, business models)
  - Use technologies that enable energy-efficient and "waste-less" production

# Recovery Plan Objectives: Industrial Competitiveness

## Supply side

Technology/manufacturing equipment suppliers to gain market share:

- Automation/industrial robotics & laser technology solutions for factory environments
- Product/production design tools (eg software for modelling, simulation, visualisation)
- Enterprise/supply-chain management tools

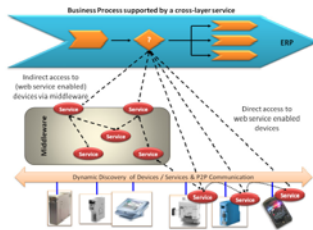


## Demand side

European industrial end users:

- To integrate latest technology into their production environments
- To develop new competencies (knowledge, organisation, skills, business models)
- To use technologies that enable energy-efficient and “waste-less” production

# Factories of the Future ICT Vision

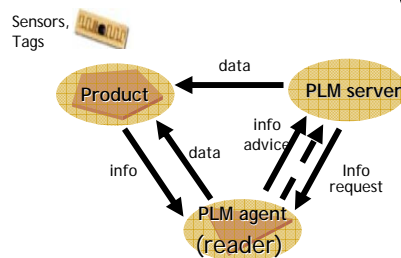


## Smart Factories:

- Goal:  
More automation, better control & optimisation of factory processes
- Means:  
Software, lasers & intelligent devices embedded in machines & factory infrastructure

### Factory productivity

- Less waste
- Less energy use
- Faster time-to-market
- Better quality



## Virtual Factories:

- Goal:  
To manage supply chains; to create value by integrating products & services
- Means:  
Software to holistically interconnect & manage distributed factory assets; new business models & value propositions

### Supply-chain productivity

- High-value products
- Keep jobs in Europe
- Process transparency
- IPR security
- Lower CO<sub>2</sub> footprint



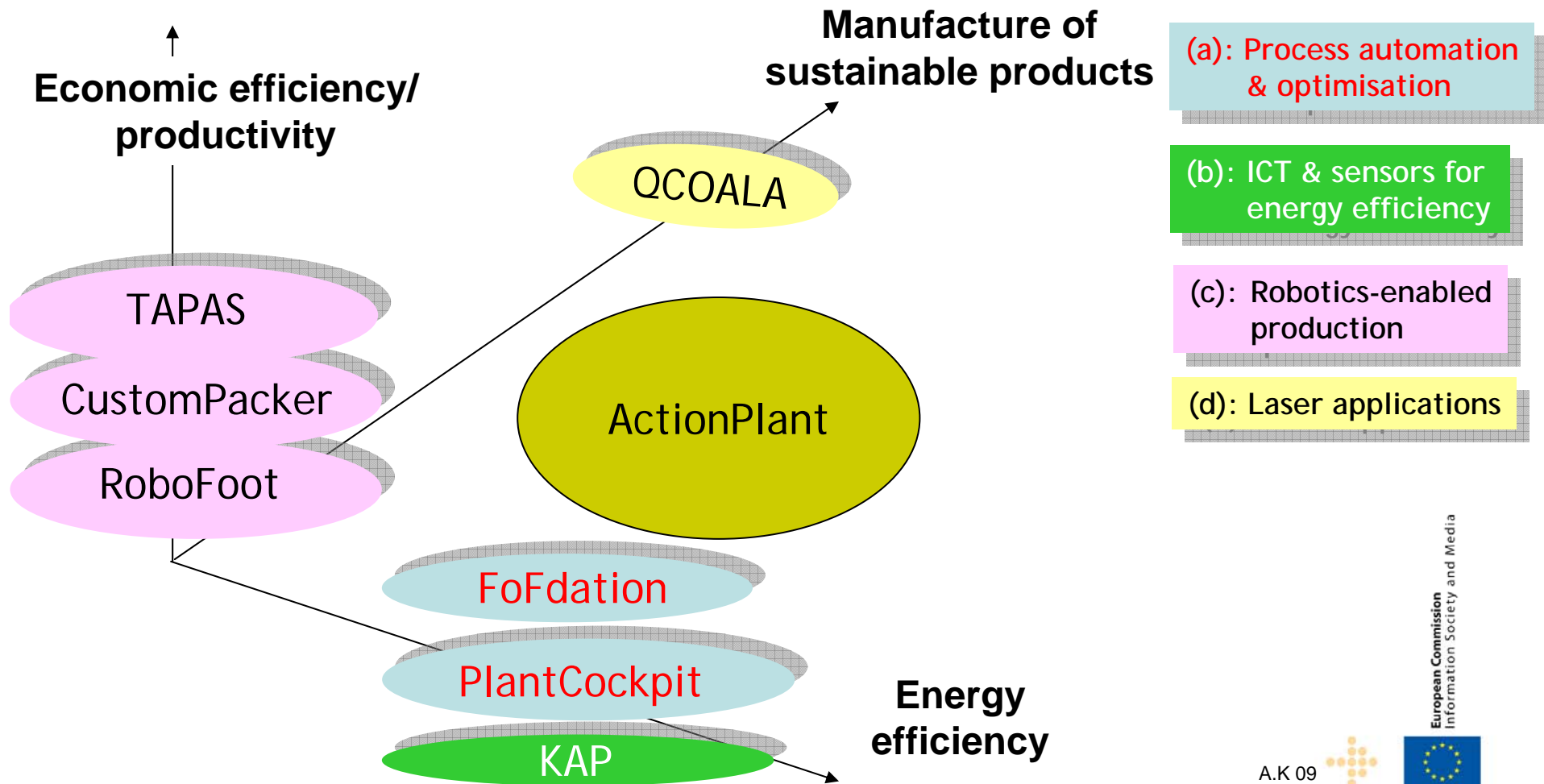
## Digital Factories:

- Goal:  
To "see" the product before it is produced
- Means:  
Software for the digital representation & test of products & processes prior to their manufacture & use

### Design productivity

- Reduce design errors
- Better & efficient products
- Less waste + rework
- Faster time-to-market

# 2009 FoF ICT Call on "Smart Factories": Successful Proposals



# 2010 FoF ICT Call - Virtual Factories

## Work Programme coverage

	a	b	c	d	Target outcomes Main theme
ADVENTURE	X				Factory process optimisation
BIVEE	X				Business innovation
COMVANTAGE (IP)				X	Product-centric collaboration
EPES			X		Dynamic composition of services
Extreme Factories	X				Industrial SME innovation
GloNet	X			X	Cloud-based networks of SMEs
IMAGINE (IP)	X	X	X	X	Integrated management of networked manufacturing
MSE (IP)	X	X	X	X	Distributed, autonomous, interoperable innovation ecosystems of manufacturing assets
PREMANUS			X		Re-manufacturing
VENIS	X			X	Large enterprise/SME interoperability



# 2010 FoF ICT Call - Digital Factories

## Work Programme coverage

Objective FoF-ICT-2011.7.4	Retained Proposals	Issues covered	Issues not covered
a) Comprehensive engineering platforms (IP, STREP)	RLW Navigator I-Conik (IP) amePLM LinkkME (IP) Vistra	All	
b) Simulation & virtual prototyping tools for product/process design (IP, STREP)	Simposium (IP) Terrific FFD	All	
c) Holistic modelling & simulation of full complex Products / processes (IP, STREP, CSA)	Simposium (IP)	Digital evaluation & simulation of material properties - from micro- to macro-scale	Digital modeling and simulation of product & process behaviour





## Results of first FoF ICT+NMP Calls

	July 2009	July 2010
• Success rate:	26%	19%
	(25 funded of 98)	(36 funded of 193)
• Share by Org. Type:		
- Higher Education:	23%	24%
- Private for Profit:	54%	50%
- Research Org.:	22%	24%
• Share of funding of SMEs:	31%	29%
• Countries of funded partners:	25	26

# Factories of the Future 2011 Call

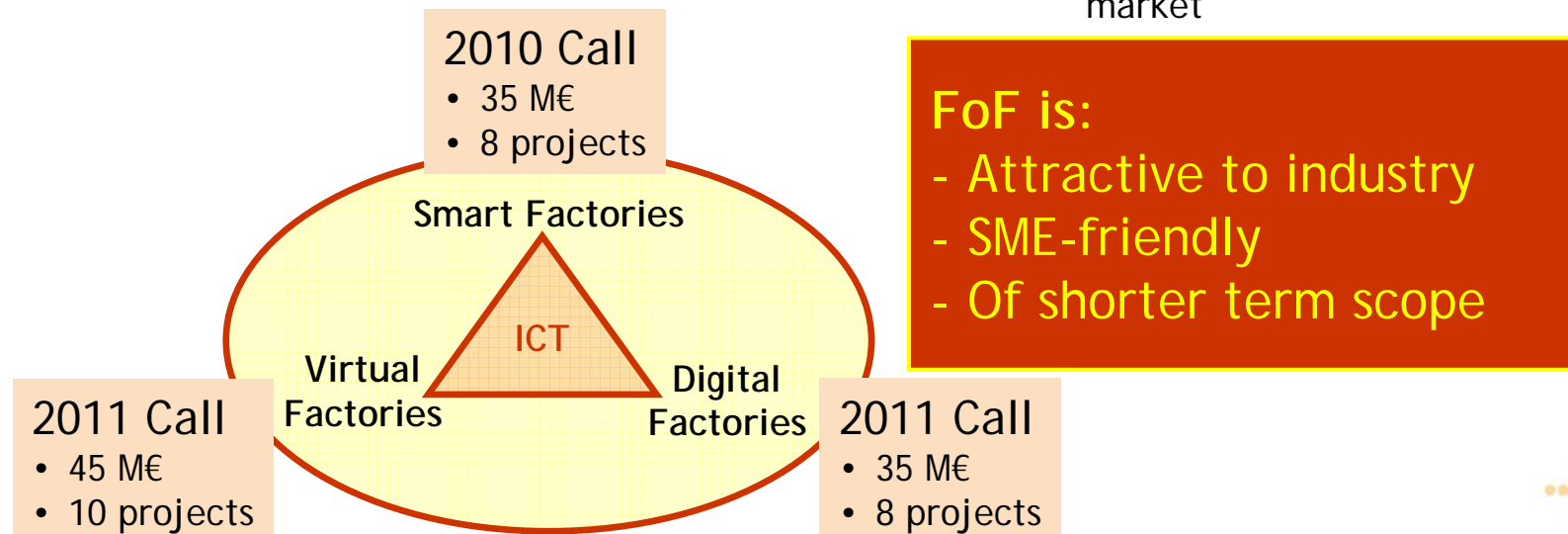
## Expected impact & conclusions

### “Virtual Factories”

- Higher management efficiency of networked & sustainable business operations.
- ICT tools enabling the participation of SMEs in virtual factory environments.
- New business models & innovation scenarios for a low-carbon economy.

### “Digital Factories”

- Reinforced European leadership in knowledge-driven platforms & tools for product development & manufacturing
- Scaling and higher accuracy of digital design tools & simulation techniques
- Accelerated product design & manufacturing, with a considerably shorter time-to-production & time-to-market



# Factories of the Future Multi-Annual Roadmap 2010-2013

## Sub-Domains:

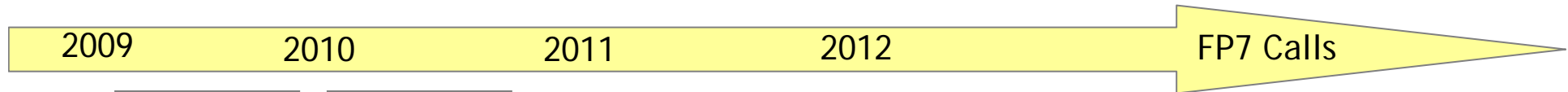
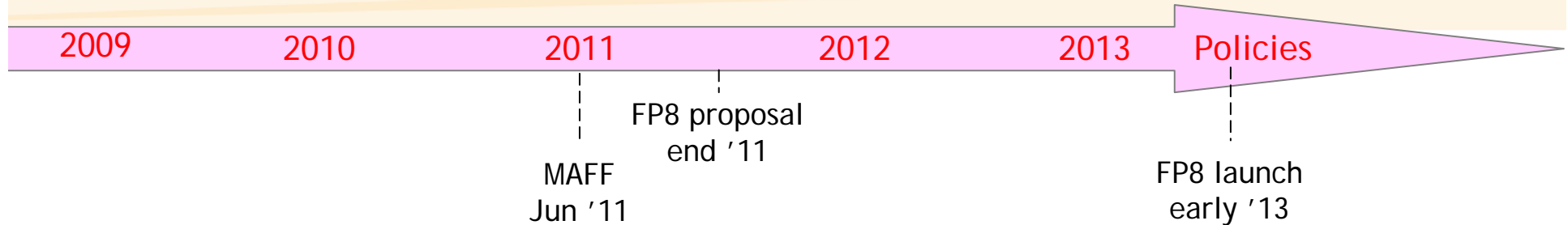
1. Sustainable Manufacturing
2. ICT-enabled intelligent manufacturing
3. High-performance manufacturing
4. Exploiting new materials through manufacturing



[http://ec.europa.eu/research/industrial\\_technologies/pdf/ppp-factories-of-the-future-strategic-multiannual-roadmap-info-day\\_en.pdf](http://ec.europa.eu/research/industrial_technologies/pdf/ppp-factories-of-the-future-strategic-multiannual-roadmap-info-day_en.pdf)



# Factories of the Future Beyond 2013?



**Virtual Factories**  
(45 M€)

**Digital Factories**  
(35 M€)

9 July - 2 Dec 2010

**FoF Call**  
70 M€

**Total ICT  
245 M€**

**Smart Factories**  
July '09 - Nov. '09

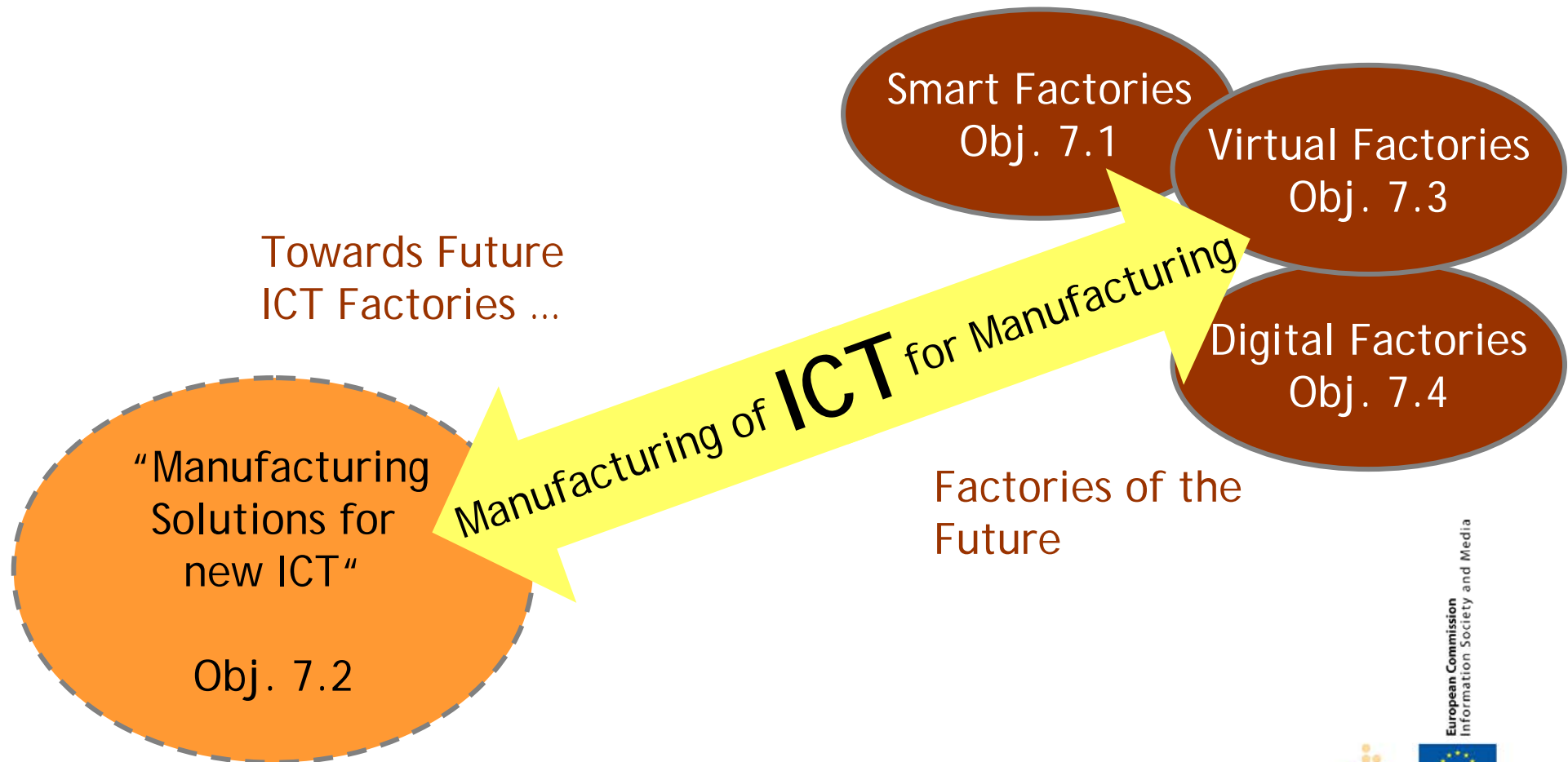
**Smart Factories**  
Obj. 7.1  
(40 M€)

**Manuf. solutions for new ICT products**  
Obj. 7.2  
(20 M€)

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Jul - Dec 2011

# The double role of ICT



# Objective 7.1: Smart Factories

## Energy-aware, agile manufacturing & customisation

### Where do we stand?

- EU:  
Global leader in automation, industrial robotics & laser systems
- Key industry players:  
ABB, Siemens, Festo, Schneider Electric, Acciona, Bosch, KUKA, COMAU, Trumpf, ...
- EU position:  
Increasingly threatened by Japan, USA, Korea, China
- Lack of standardisation

### What do we want to achieve & why?

- Maintain & extend Europe's 30% market share: «Factories» as products
- Strong, export-oriented sector needs to maintain competitiveness
- Tackle resource use efficiency of manufacturing (especially reduce 25% share of energy consumption)
- Open new markets for innovative ICT devices & automation systems



# Objective 7.1: Smart Factories

## Energy-aware, agile manufacturing & customisation

### Target outcomes

- a) Demonstration, benchmarking of process automation & control
  - For discrete, continuous or batch industries
  - Key features: flexibility, autonomy, robustness, energy transparency
  - Demonstration in real industrial environments
- b) Large-scale validation of advanced industrial robotics systems
  - User-friendly interaction with & tasking of intelligent cooperative robotic systems
  - Large-scale applicability to flexible, small batch & craft manufacturing
- c) Applications based on factory-wide networks of intelligent sensors, new metrology tools & methods
  - Real-time management of manufacturing information (incl. planning, scheduling, dispatching)
- d) Lasers & laser systems for manufacturing & materials processing
  - High-brilliance diode lasers/laser arrays
  - New wavelengths & online adaptation of beam properties

**Call FoF/2011**

**40 M€**

**IPs/STREPs**

# Objective 7.2

## Manufacturing solutions for new ICT products

### Target outcomes

- Primarily roll-to roll wet deposition, but also other processes, e.g.
  - Evaporation, hot-embossing, laser processing, other low-temperature processes
- Tackle main roadblocks, e.g.
  - Patterning processes, resolution, registration accuracy, process stability, multilayer lamination, encapsulation, automation, in-line quality control, architectures to cut production costs
- Standardisation issues as appropriate
- Industry-driven, strong quality control, testing & validation elements



**Call FoF/2011**

**20 M€**

**IPs**





Thank you

**FoF on the web:**

[http://ec.europa.eu/research/industrial\\_technologies/lists/factories-of-the-future\\_en.html](http://ec.europa.eu/research/industrial_technologies/lists/factories-of-the-future_en.html)

**PPP Information Event in Brussels, 9 July 2010**

**FoF Contacts:**

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