

**ECOC 2011**  
**Geneva, 19 September 2011**

# **Optical Communications in the EU: State of play and Perspectives**

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European Commission  
Information Society and Media



# Overview

- **Policy: Digital Agenda for Europe**
- **Research and Innovation**
  - **Challenges and research priorities**
  - **Funding opportunities in FP7**
  - **Research and innovation perspectives in Horizon2020**
- **Conclusions**



# "EVERY EUROPEAN DIGITAL"

## The Digital Agenda for Europe ... and broadband networks

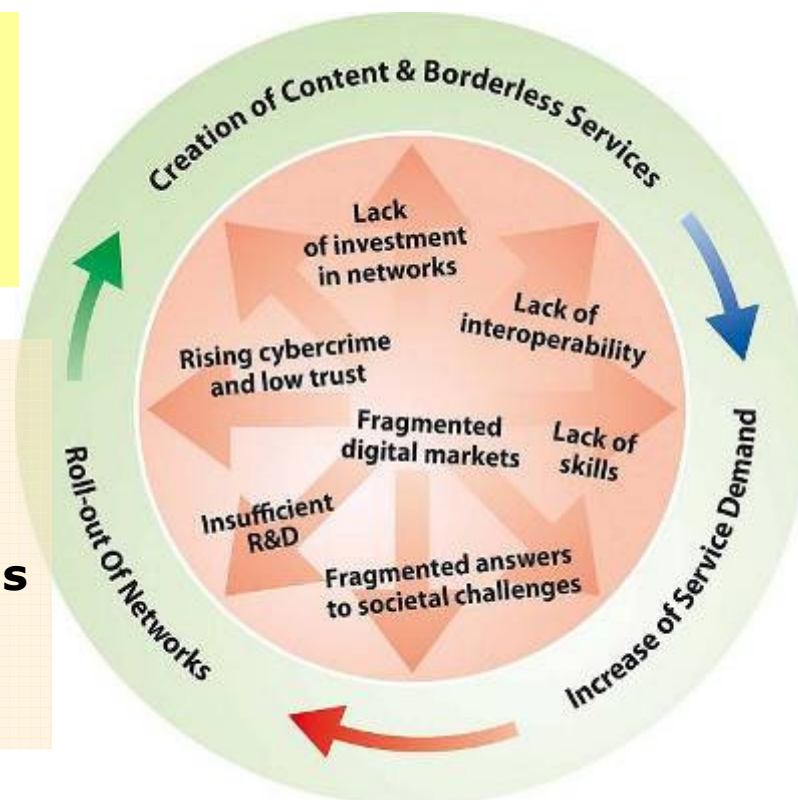
### Digital Agenda for Europe (DAE)

COM(2010)245 final/2 of 19 MAY 2010

→ To create a virtuous cycle in which ICT stimulates the EU economy

### EU Targets for Broadband Deployment:

- by 2013: basic broadband to all Europeans
- by 2020:
  - internet speeds  $\geq 30$  Mbps for all Europeans
  - internet connections  $\geq 100$  Mbps for  $>50\%$  of EU households



**2014-2020: EU Fund of 9 B€ proposed for broadband deployment under "Connecting Europe Facility"**



# Overview

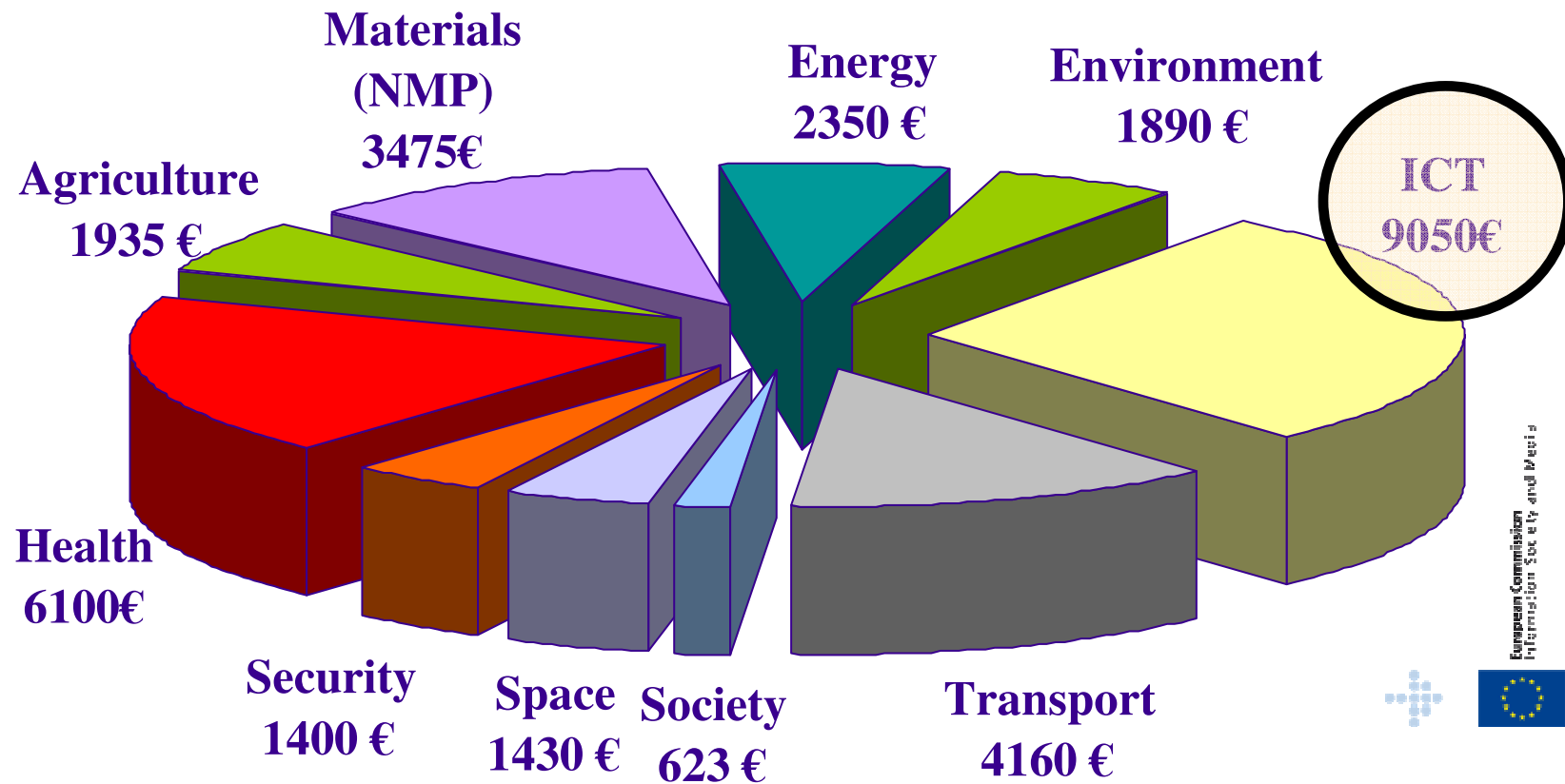
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# Optical Communications Research in the EU

**EU's 7th Research Framework Programme: 2007-2013**  
**Budget for 10 thematic areas : 32,4 B€**

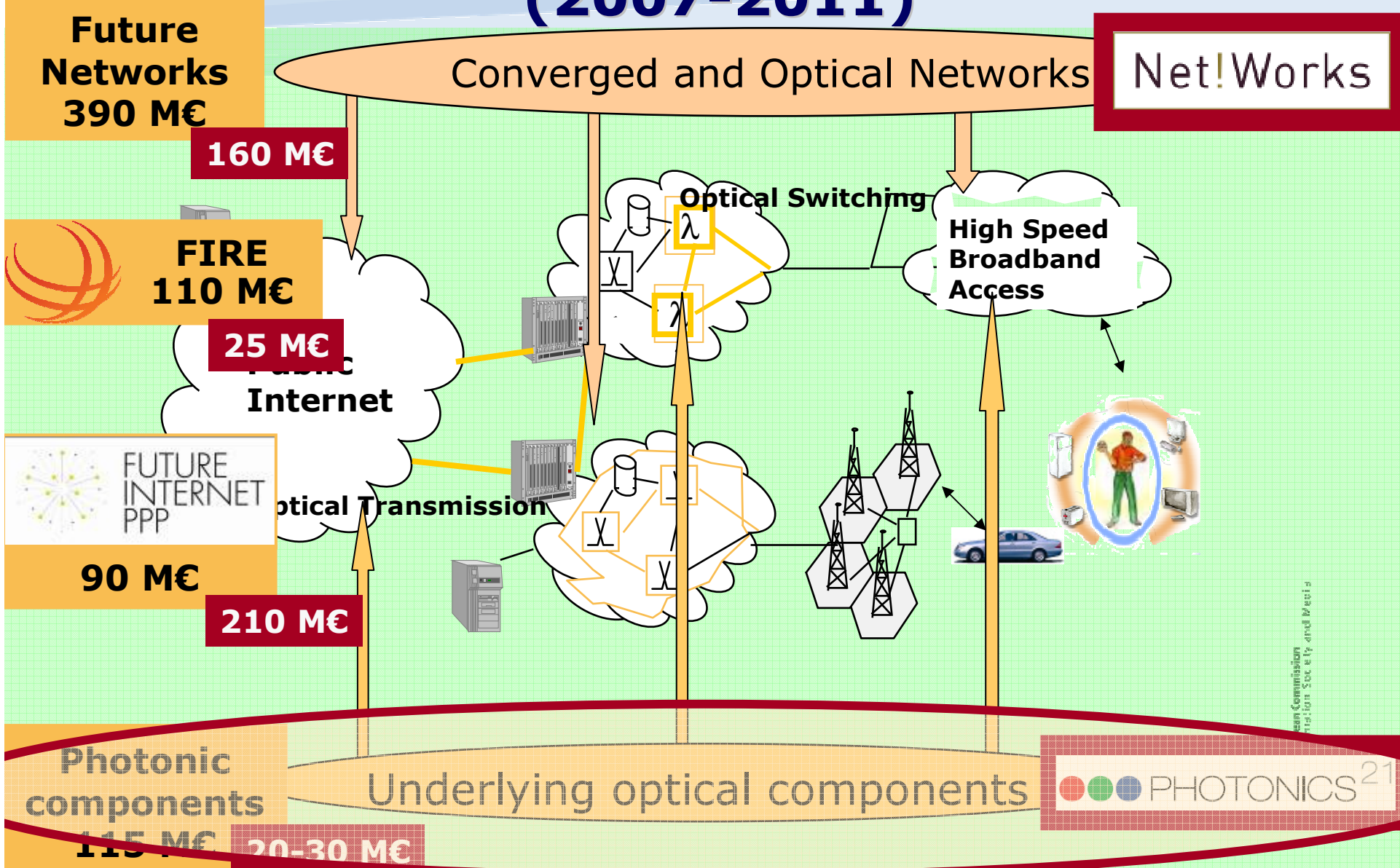


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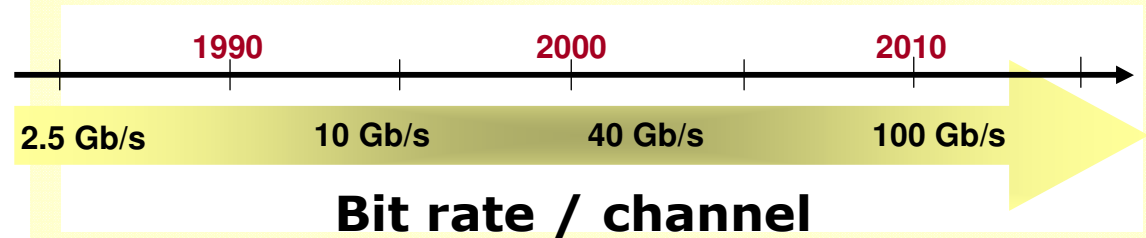
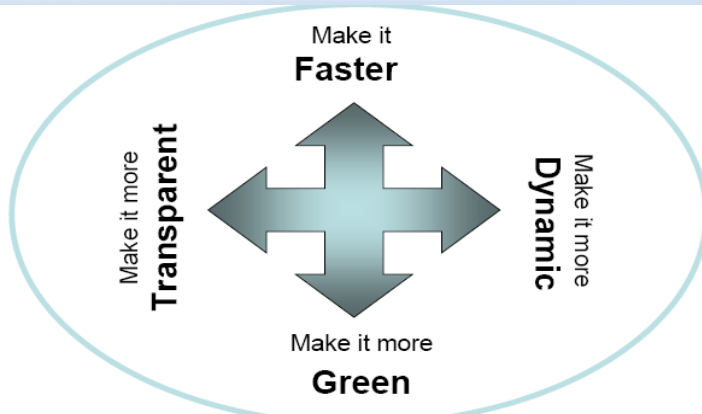


# EU's FP7 research in broadband networks: an overview (2007-2011)



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# Optical Communications Challenges & Research priorities



- increase transmission capacity:

→ modulation formats, fibre design, multiple modes

- sustainable *last-mile* optical solutions

- short range optical interconnects

- components: lasers, modulators, detectors, switches

- integration and packaging

**Disruptive approaches:**

→ Components for quantum communication, plasmonics, ...



Quantum Repeaters for Long Distance Free-Based Quantum Communication

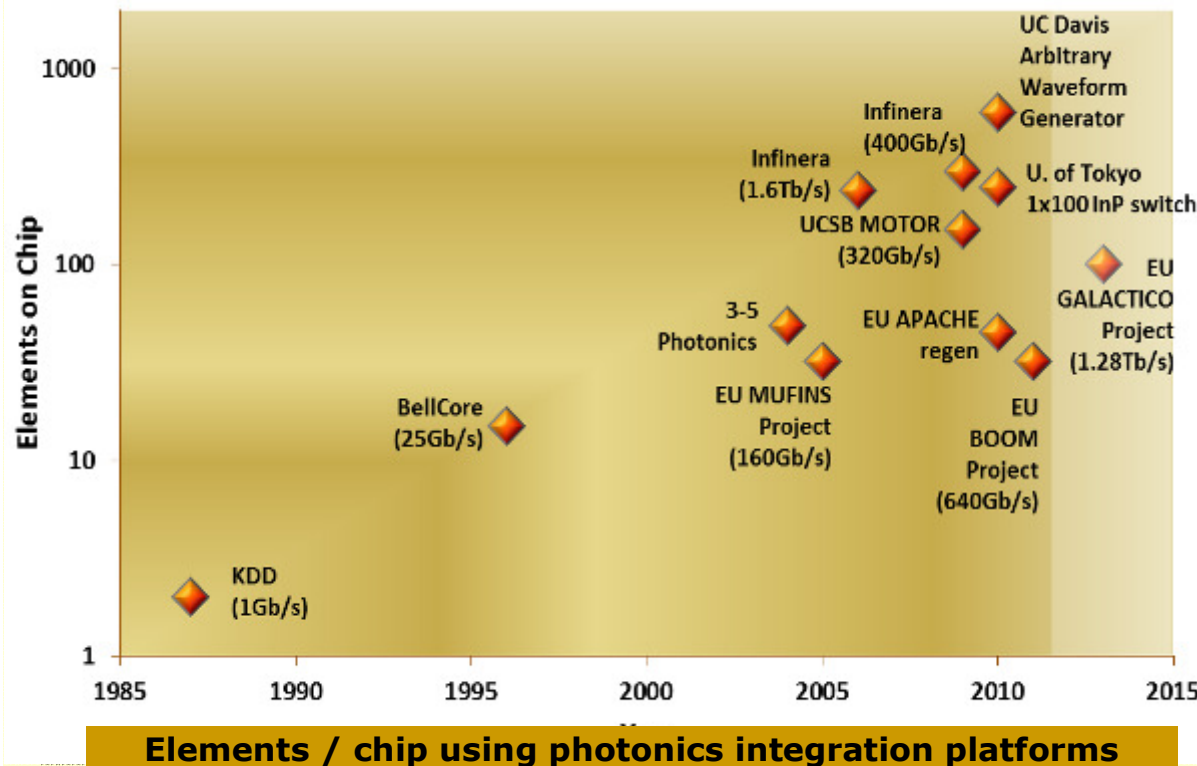
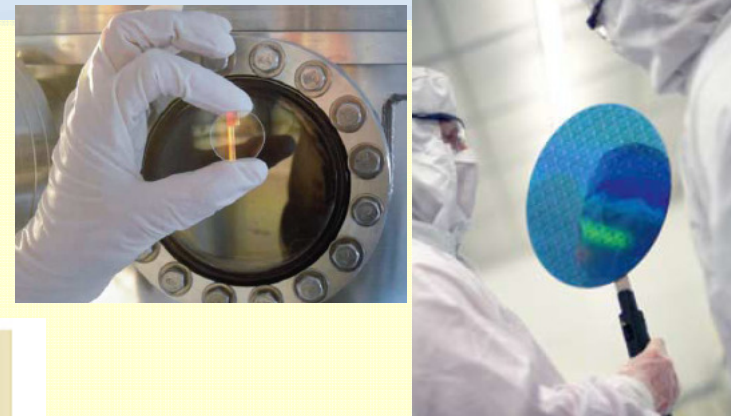


# Optical Communications Photonic Integrated Circuits and Nanophotonics

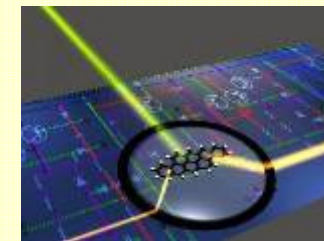
**Cost is a key factor → PICs**

- Apply PICs in larger scale devices
- Packaging and automation

Courtesy H. Avramopoulos / NTUA



## Nanophotonics



*An artist view of a photonic circuit with molecular building blocks (Credit: Robert Lettow)*

- Quantum optics
- All optical routing
- Nano-PICs
- ...

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# FP7 ICT call 8 - Objective 3.5a

## Core photonic technologies

*Call 8, closes 17 Jan 2012*

**79 M€**

→ Advance R&D in core photonic technologies. Focus is on:

### ■ Optical data communications

i. **Communication networks:** more transparent, dynamic, energy efficient and faster

- **Core networks:** transport at 100 Gb/s per channel, scalable towards 100 Tb/s systems;
- **Access networks:** enabling 1-10 Gb/s per client over more than 100 km

ii. **Optical interconnects:**

- Cost and energy effective technology for Tb/s optical links in short range communication

**Radio over fibre techniques**

■ Photonics integration platforms for cost-effective, volume manufacturing of a large variety of complex "PICs"

→ **Actions should be driven by user-requirements**



# FP7 ICT – other funding opportunities

## ICT Call 8 and FI PPP call 2012

**ICT Call 8, closes 17 Jan 2012**

### ■ Objective 1.1 Future Networks

b) High capacity end-to-end infrastructure technologies

**160 M€**

– **Ubiquitous fast broadband access**

– **Ultra high capacity all-optical networks**

*Note: system perspective for photonic components and sub-systems undertaken in Objective 3.5*

### ■ Objective 1.6 Future Internet Research and Experimentation

b) Federation of FIRE prototype facilities; c) Experimentation

**25 M€**



**Future Internet PPP call 2012  
closes 24 Oct 2012**

**80 M€**

■ **Objective 1.8: Use case scenarios and early trials**

■ **Objective 1.9: Capacity Building and Infrastructure support**

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# Horizon 2020

## The EU Framework Programme for Research and Innovation: 2014-2020

**EC proposal: 80 B€**

### Architecture

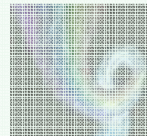
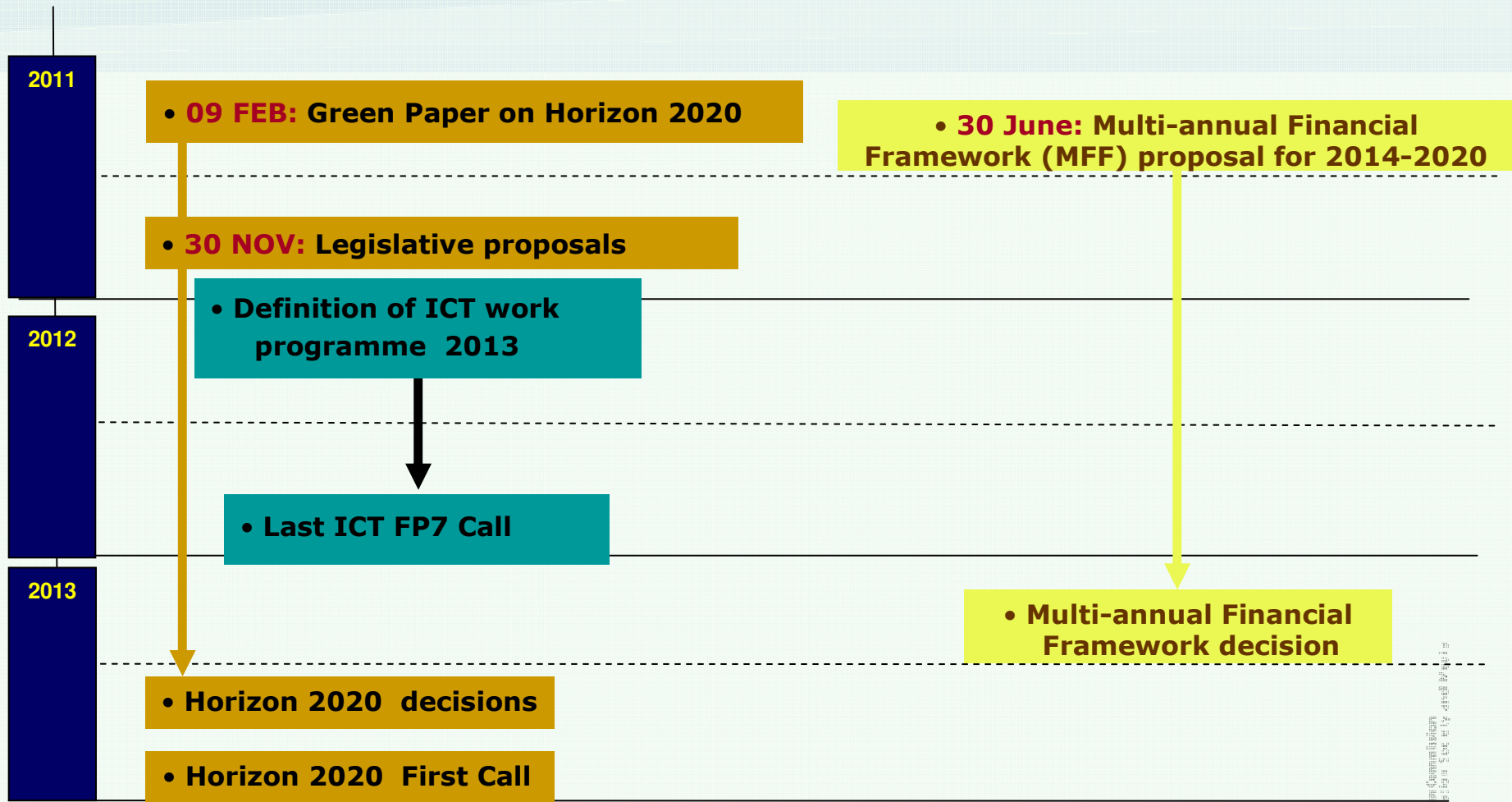
- Societal challenges
- Industrial Leadership and Competitive Frameworks
- Science Base



**Horizon 2020**

[http://ec.europa.eu/research/horizon2020/index\\_en.cfm](http://ec.europa.eu/research/horizon2020/index_en.cfm)

# Timeline for EU Decision Making



# In Conclusion

## ■ New Research priorities for last year of FP7 ICT (2013)

- Photonics 21 and Net!works Technology Platforms



## ■ Horizon 2020 and Photonics

- New R&D Challenges
- Public Private Partnership: objectives, governance, ...

## ■ Address the deficit in Scientists and Engineers!

## ■ Promote Photonics: Media & the Public!



# Further Information

## → ICT Calls

<http://ec.europa.eu/research/participants/portal/page/cooperation#ict>

→ Future Internet PPP: <http://www.fi-ppp.eu/>

## → Future Networks:

<http://cordis.europa.eu/fp7/ict/future-networks/>

→ FIRE: <http://cordis.europa.eu/fp7/ict/fire/>

→ Photonics: <http://cordis.europa.eu/photonics/>

→ Preproposal Submissions in Photonics:

[INFISO-PHOTONICS@ec.europa.eu](mailto:INFISO-PHOTONICS@ec.europa.eu)



PHOTONICS 21  
Net!Works

→ Photonics 21: [www.photonics21.org/](http://www.photonics21.org/)

→ Net!works: <http://www.networks-etp.eu/>

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