HORIZON 2020

LE PROGRAMME DE RECHERCHE ET D'INNOVATION DE L'UNION EUROPÉENNE

# Technologies Futures et Emergentes

## Future Emerging Technologies

# FET

dans

# Horizon 2020

Martine Garnier-Rizet ANR/IMMI-CNRS

# Technologies Futures et Emergentes

- Eléments statistiques du 7ème PCRD
- FET dans H2020
- Le programme de travail FET
- Modalités de soumission
- Evaluation
- Calendrier et budget

# Le programme FET ?

- Un programme initié il y a 24 ans
- Géré par la DG-CONNECT
- Historiquement la partie « amont » du programme TIC traditionnel :

***Pathfinding Europe's technological future***

- Quelques mots-clés: *nursery of novel and emerging scientific ideas*, *high-risk*, *with potential significant societal or industrial impact*, *multidisciplinary, interdisciplinary*


The sower, Vincent van Gogh

# STATISTIQUES DU 7ÈME PCRD

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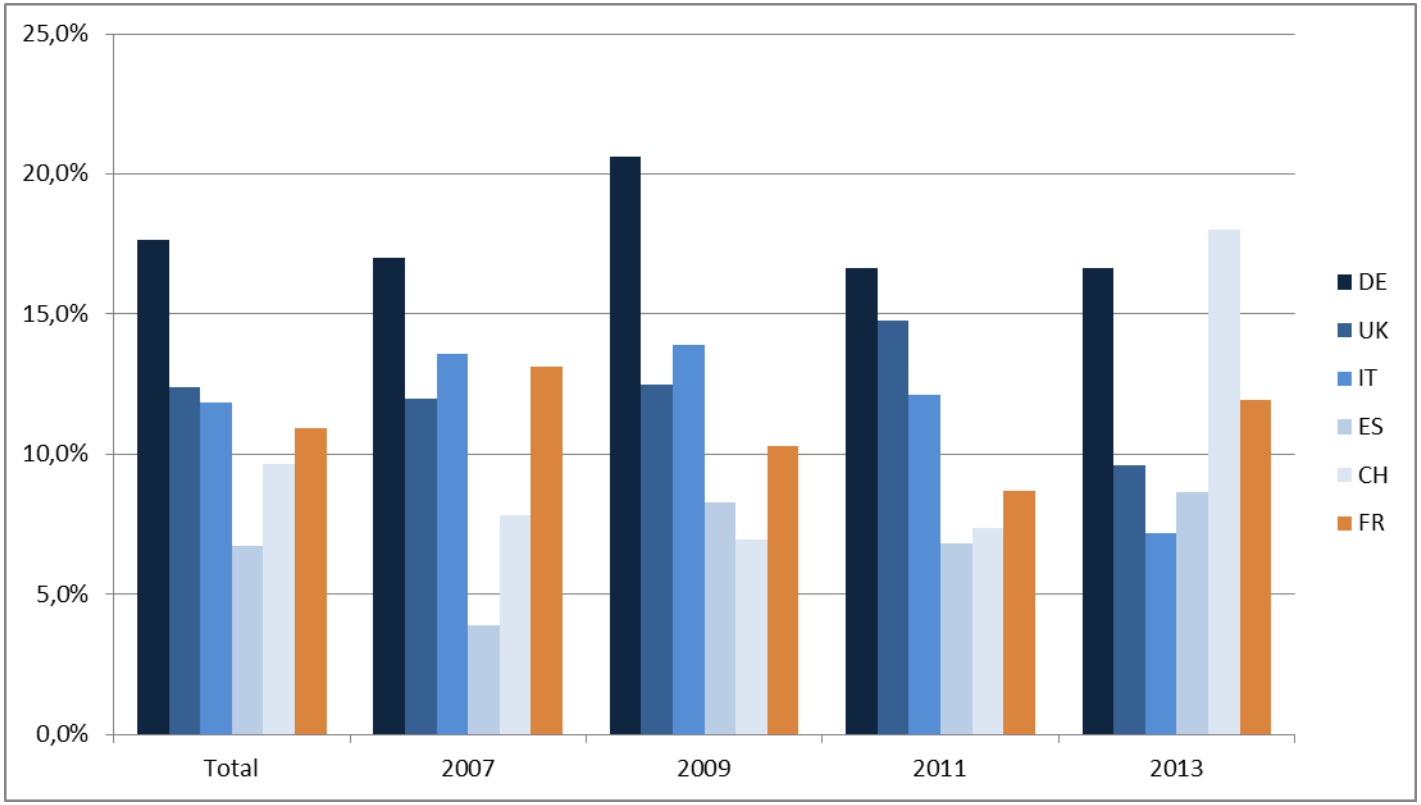
RÉPUBLIQUE FRANÇAISE
MINISTÈRE
DE L'ENSEIGNEMENT SUPÉRIEUR
ET DE LA RECHERCHE

# Les principaux pays bénéficiaires

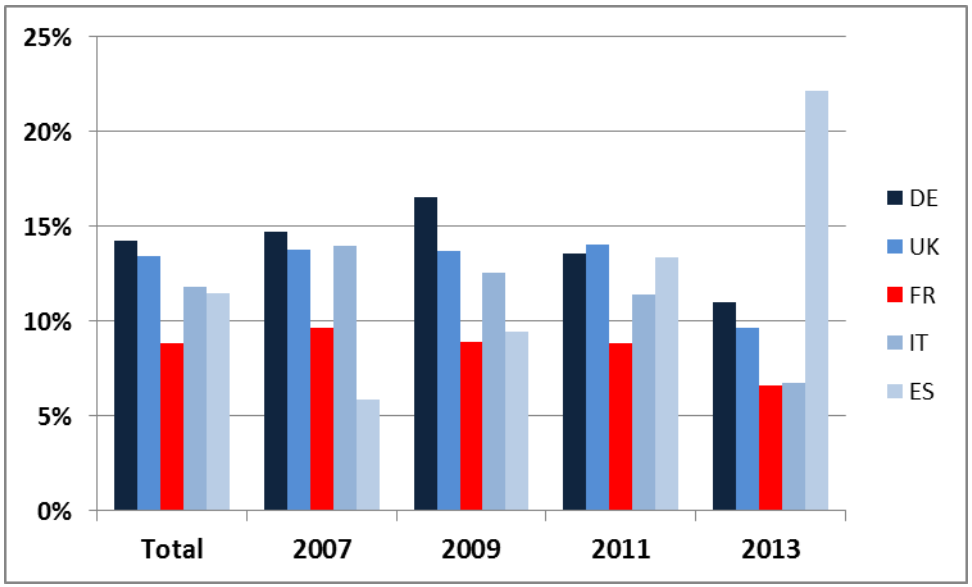
FR 4ème bénéficiaire du programme derrière DE, UK, IT
Retour FR global de 10,9% (vs. contribution UE de 17%)
Tendance forte à la baisse: 13,1% en 2007; 10,3% en 2009; 8,7% en 2011




*Source: projets signés 06/13 et propositions retenues en cours de négociation*

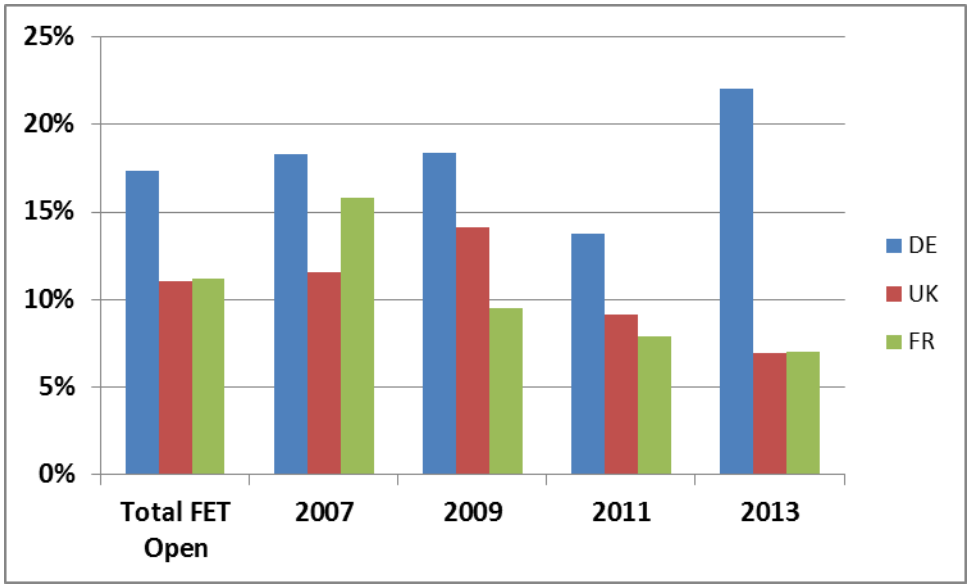
# Les principaux pays participants

- Un déficit de participation française par rapport aux autres pays… semblable à celui rencontré sur les autres appels du 7ème PCRDT



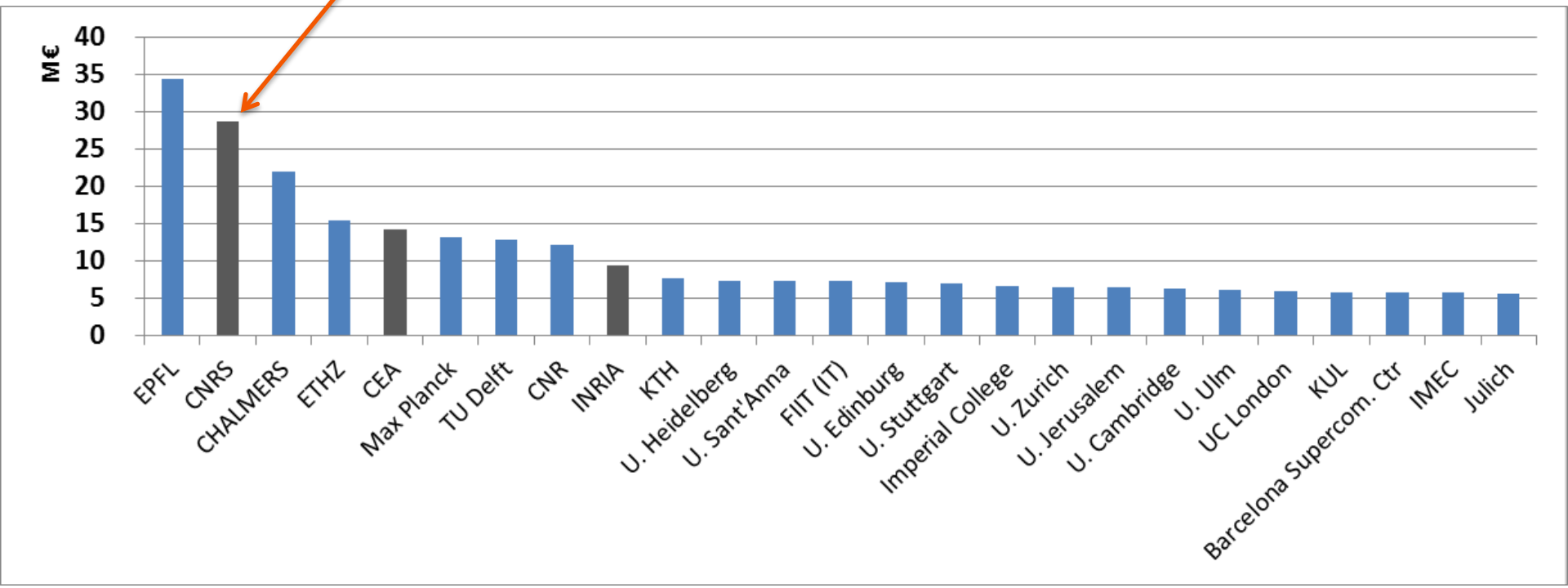

FR 5ème participant
FR a demandé 8,8% des contributions totales
Soit 60% seulement des demandes DE

# Une évolution de la participation FR sur FET Open

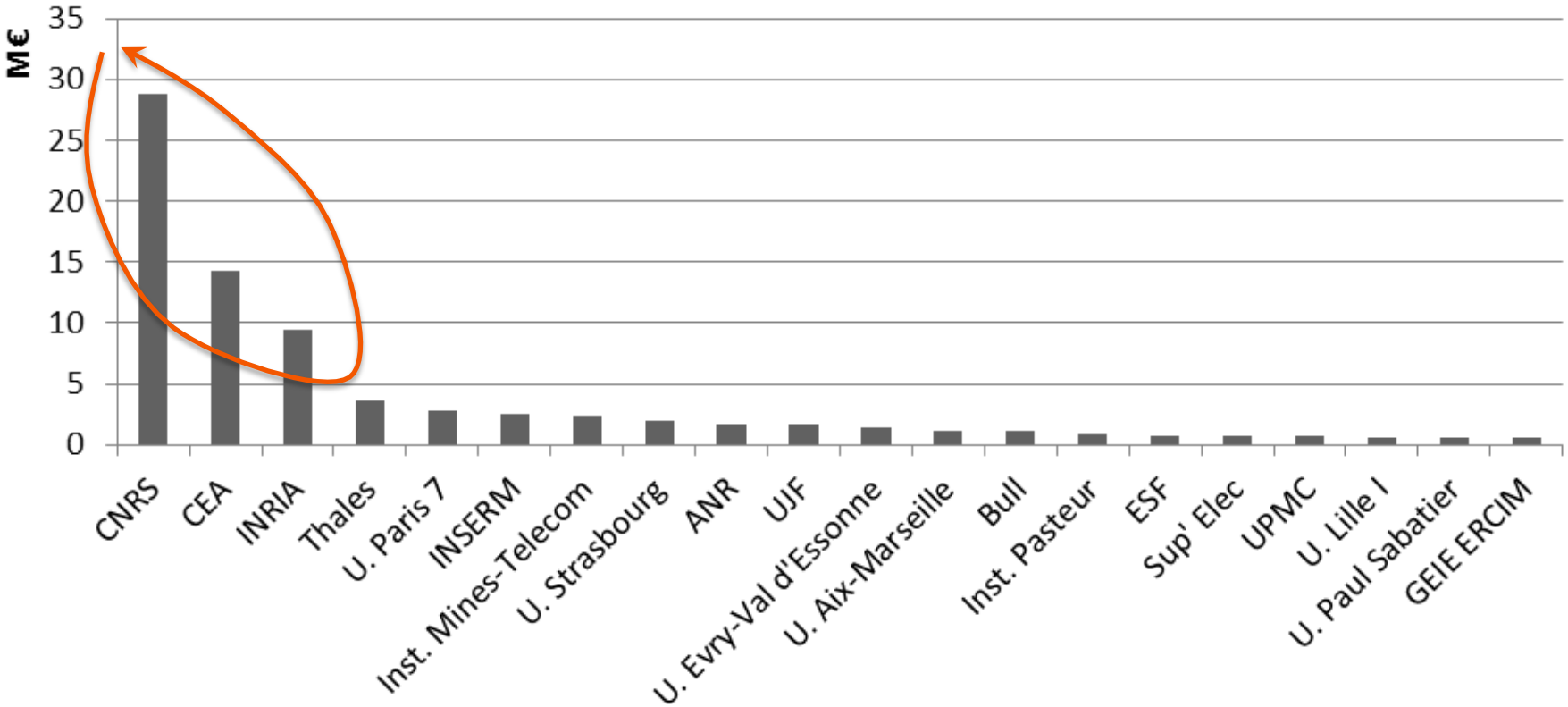



FR 3ème bénéficiaire sur FET Open…
Mais avec une forte tendance à la baisse

# Principaux organismes bénéficiaires (UE)



# Principaux organismes bénéficiaires (FR)



# LE PROGRAMME FET DANS HORIZON 2020

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Un programme unique où sont réunis trois programmes et initiatives jusqu'à présent séparés.

2014-2020

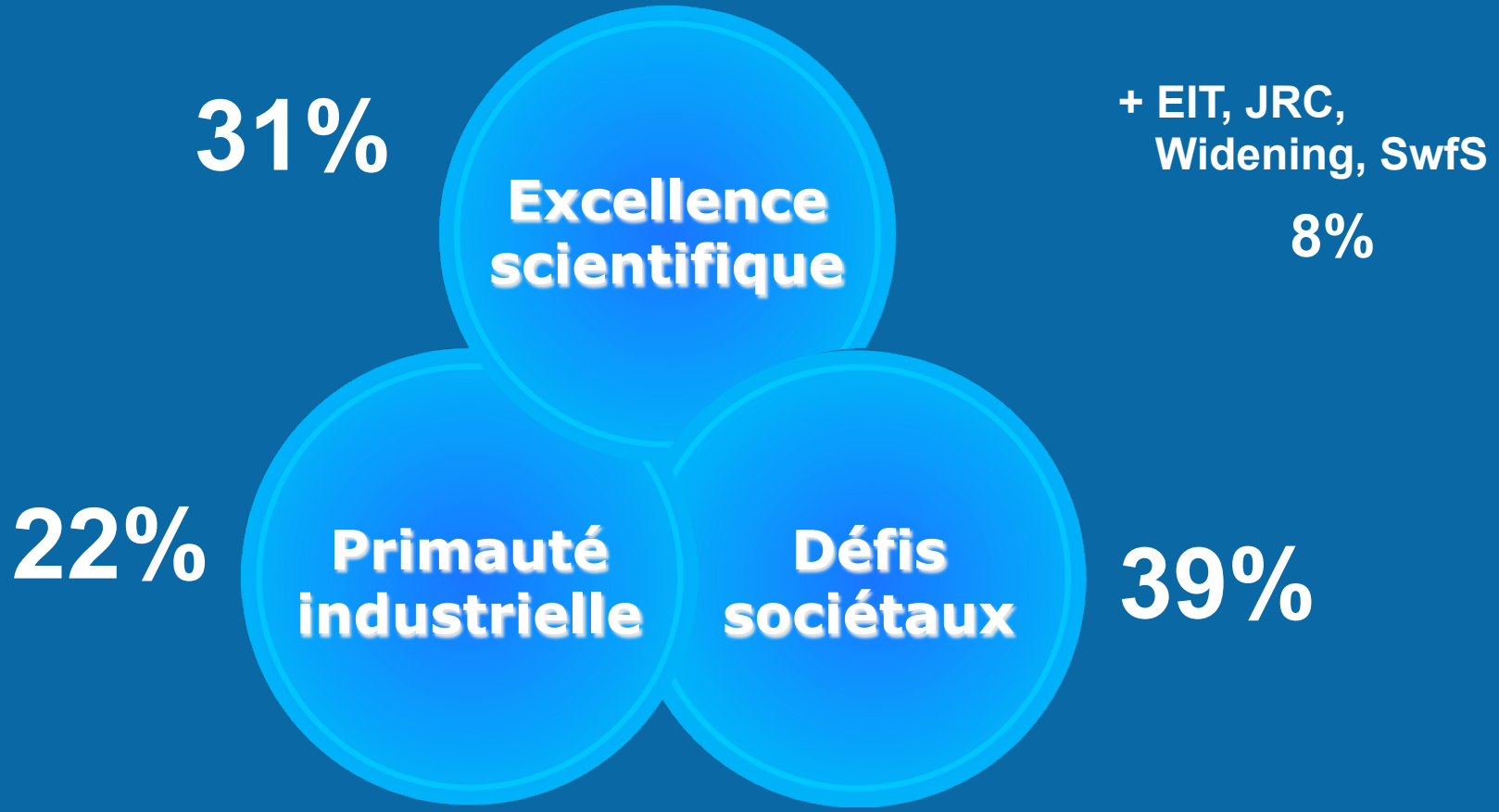

2007-2013

SEVENTH FRAMEWORK PROGRAMME

cip competitiveness and innovation framework programme 2007-2013

eit European Institute of Innovation & Technology

# Trois priorités/piliers

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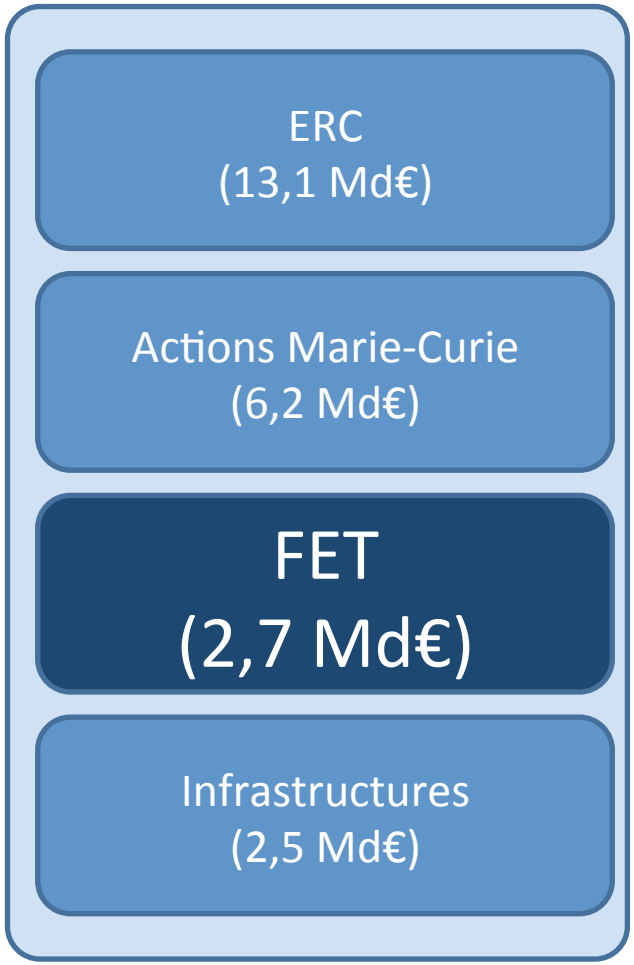
European Commission
MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE
RÉPUBLIQUE FRANÇAISE

# H2020 : Le pilier Excellence

Excellence scientifique

**24,4 Md€**



# FET in Horizon 2020

"**Future and emerging technologies** shall support collaborative research in order to extend Europe's capacity for advanced and paradigm-changing innovation. It shall foster scientific collaboration across disciplines on radically new, high-risk ideas and accelerate development of the most promising emerging areas of science and technology as well as the Union wide structuring of the corresponding scientific communities."

**COMMISSION PROPOSAL ON ESTABLISHING HORIZON 2020 - THE FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION (2014-2020)**

# FET's missions

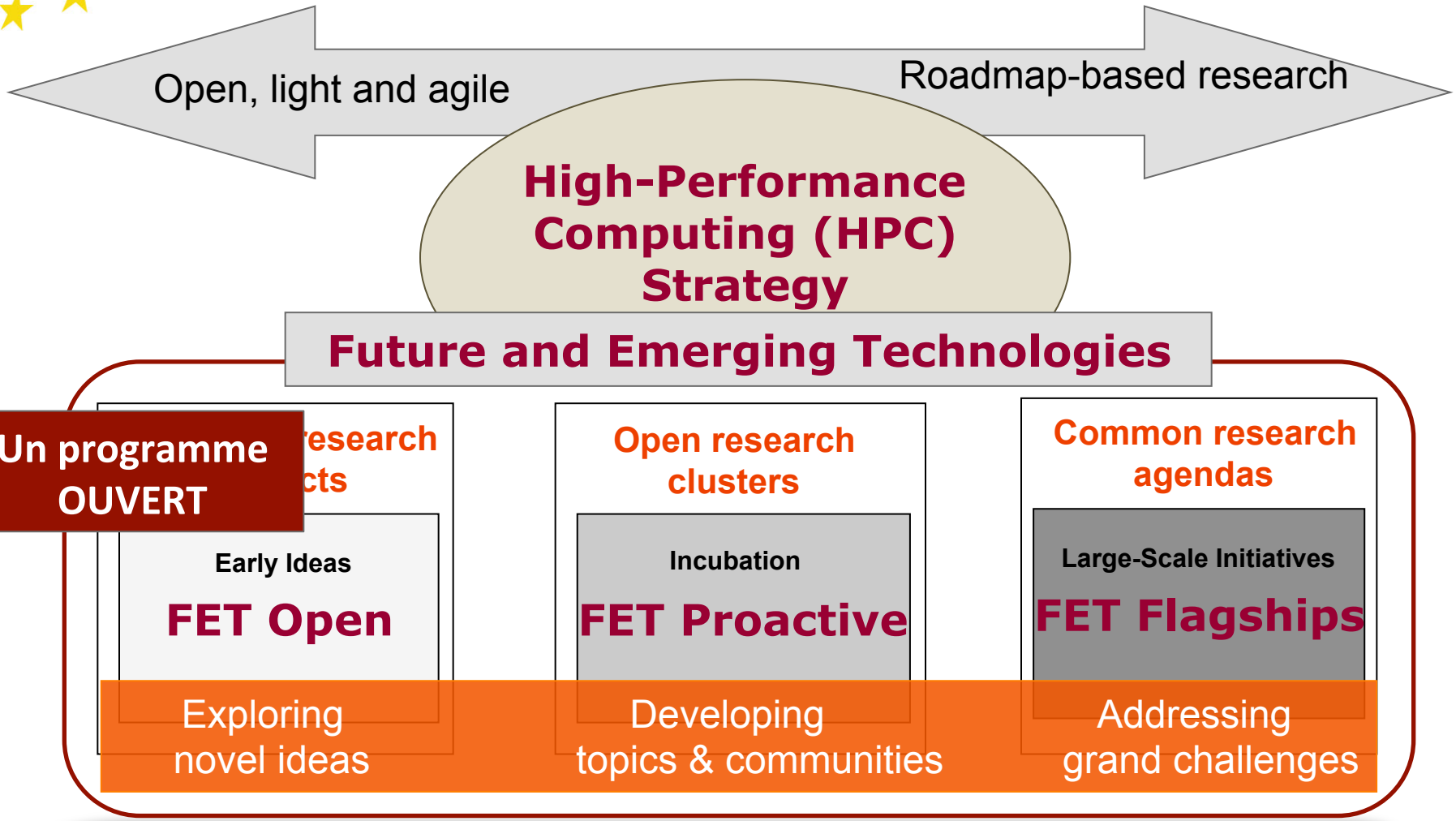
To uncover radically new technology areas that will renew the basis for future European competitiveness and growth and will make a difference for society in the decades to come.

To grasp European leadership in research and innovation on the most promising such future and emerging technologies early on.

To turn Europe into the best environment for responsible and dynamic multi-disciplinary collaborations on such future and emerging technologies.

To kick-start European research and innovation eco-systems around such future and emerging technologies, as seeds of future industrial leadership and the tackling of grand societal challenges.

# Le programme FET



# Le projet de programme de travail 2014-2015

- Adopté le 12 novembre par les Etats Membres
- Mise en ligne sur le site Horizon2020

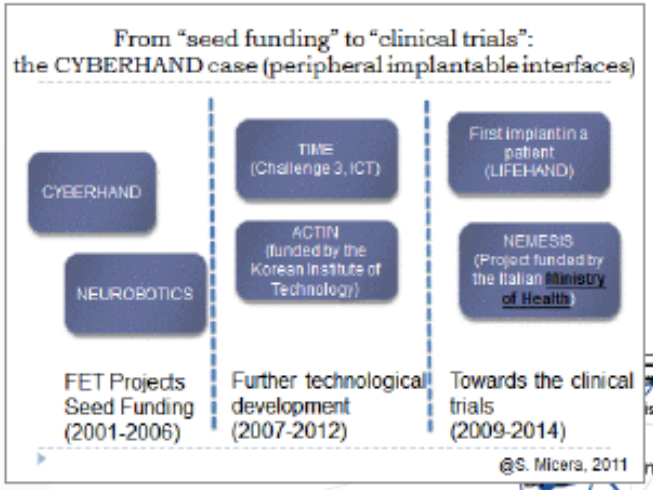
http://www.horizon2020.gouv.fr/

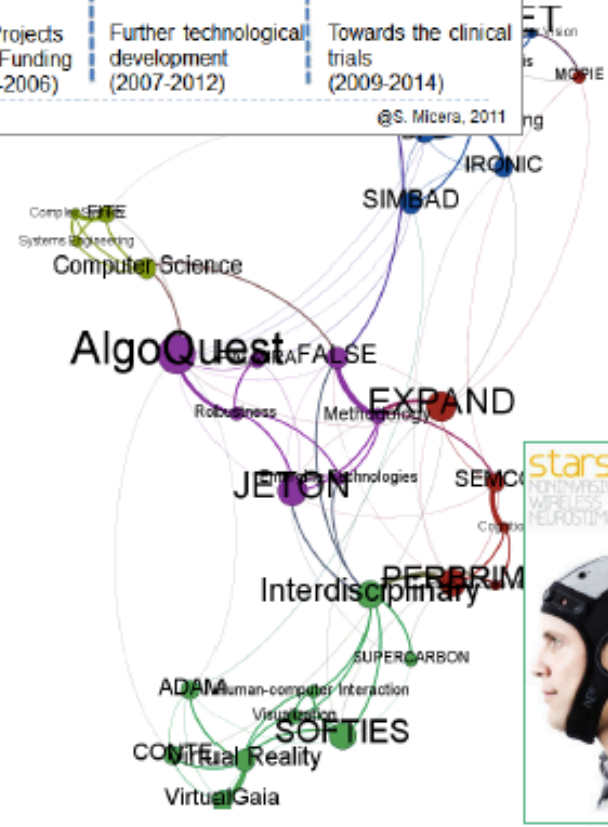
- Présenté lors de la Journée nationale d'information FET

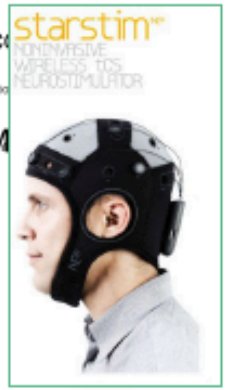
le mercredi 4 décembre à 14h au MESR

# FET Open

- + Popular FET-hallmark scheme
- + Numerous success stories
- + Attracts new disciplines and actors, including many young ones and SMEs
- + A source of new directions and early signals
- + Largely academic, with some high-tech industry and SME participation
- + Highly competitive!



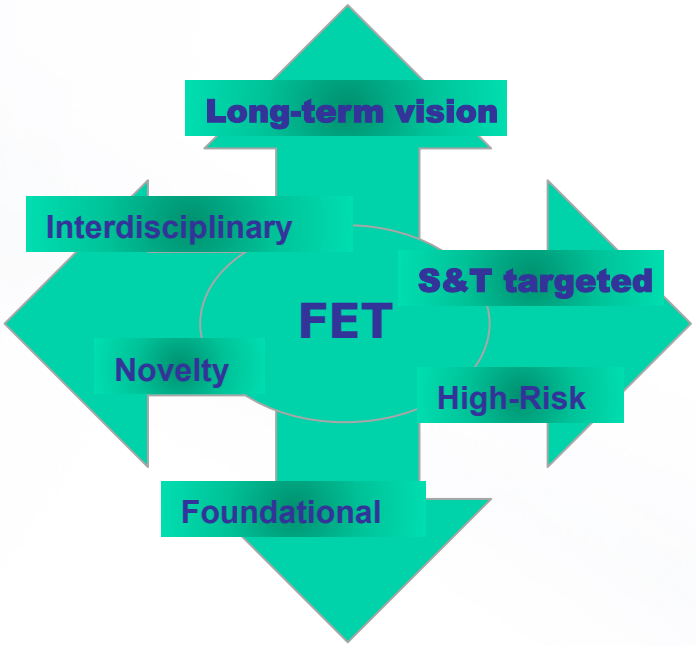
# FET Open: fostering novel ideas

'Open is open': all technologies, no other topical scope limitation.

40% of the FET budget in H2020 (>1B€ as of September 2013).

FET gatekeepers define the kind of research that FET is looking for.

- *Overall goal – contribute to innovation by:*
  - Encouraging the application of existing scientific knowledge to solve technological problems
  - Facilitating new scientific research to fill today's gaps in technology
  - Supporting the development of expertise in new technological areas within the EU



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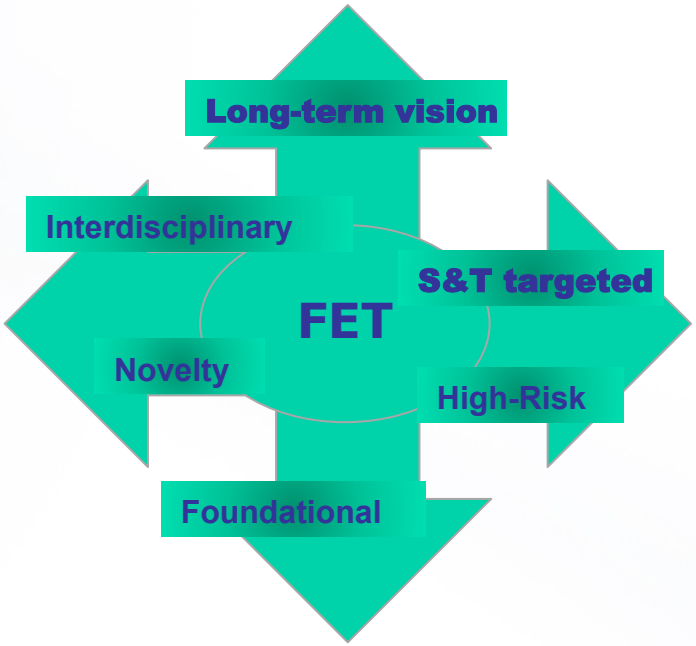
FET gatekeepers define the kind of research that FET is looking for.

- *An end-to-end fast and light sheme*
  - 15 pages proposal
  - 1 step submission, 1 step evaluation
  - 3 evaluation criteria

Instruments

  - Research and Innovation Actions
  - Cordination and support Activities



# FET Proactive - nurturing emerging themes and communities

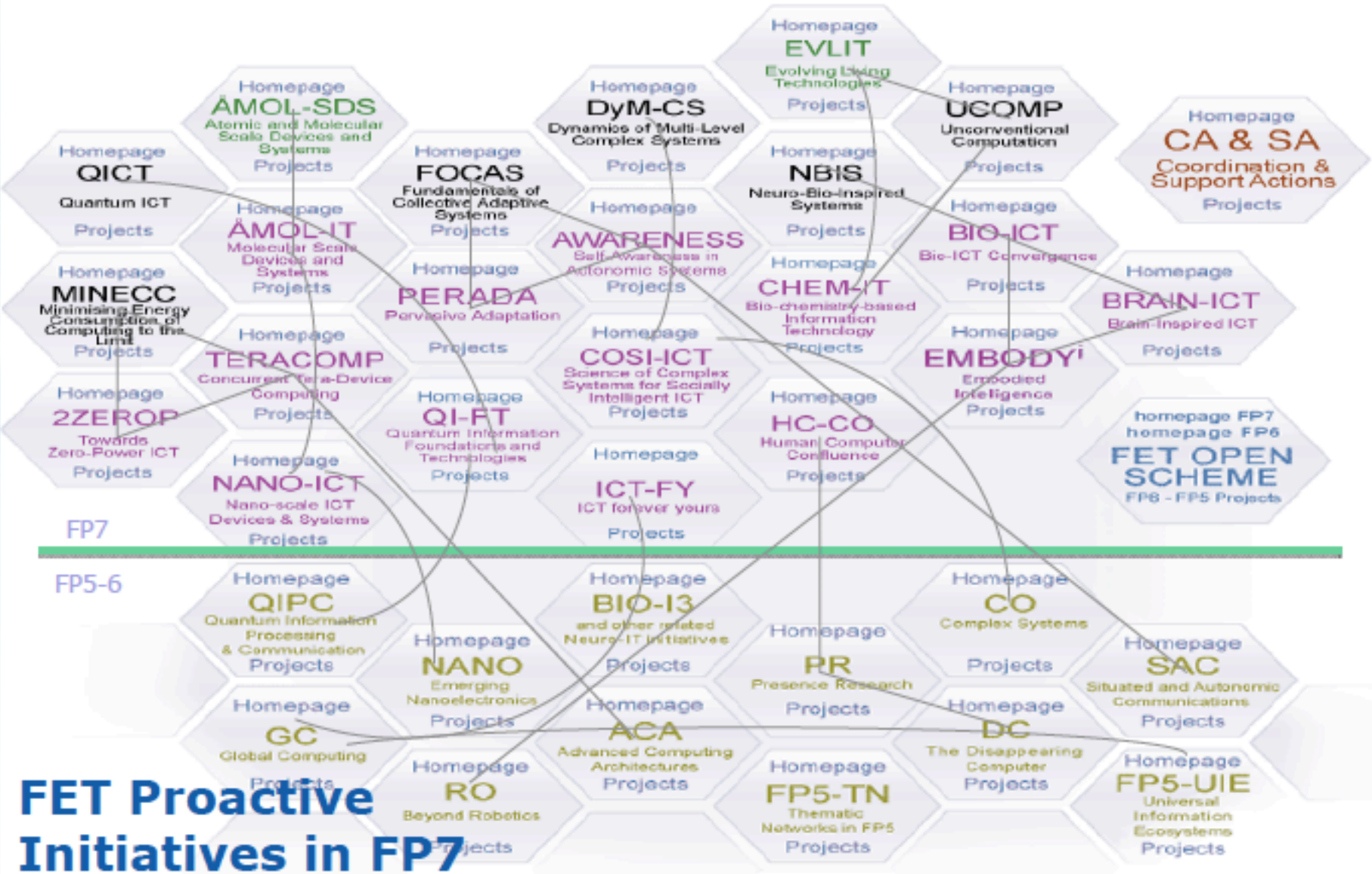
A set of thematic initiatives on promising emerging research themes.

Building up a European pool of knowledge and new interdisciplinary communities.

Joint exploration or consolidation of promising future technologies.

Topics defined bottom-up (FET Observatory):

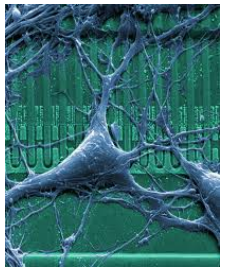
- FET-Open portfolio analysis
- Consultations
- Participatory engagement with industry and society
- Coordination and support actions




# FET Proactive Initiatives in FP7

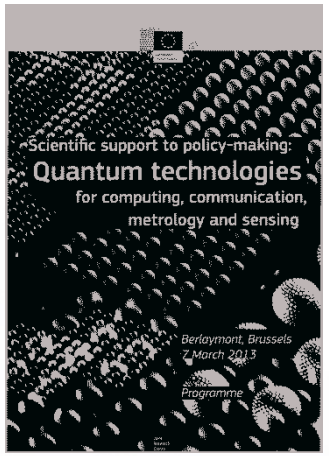
# FET Proactive

- Balance between continuity and new directions
  - It can take time to mature an avenue
- Creation of communities
  - for instance in, Bio-ICT, quantum technologies, Neuro-IT, complex systems
- Successful transfers
  - for instance in quantum cryptography, cognition, nano-tech, robotics, bio-ICT



ETP 4 HPC

SECOQC



# FET Proactives

*Three topics are selected for funding in WP2014-15:*

- **Global Systems Science (GSS)**
- **Knowing, doing and being: cognition beyond problem solving**
- **Quantum Simulation**

***Complemented by a special action:***

**Towards exascale high-performance computing, as part of the High Performance Computing Public-Private Partnership (ETP4HPC)**

# High Performance Computing PPP

- The EC Communication "**High-Performance Computing: Europe's place in a global race**", adopted 15 Feb 2012, describes an ambitious strategy for HPC, combining three elements:

FET

a) Computer Science: towards exascale High Performance Computing;

RI

b) providing access to the best supercomputing facilities and services for both industry and academia;

FET +RI

c) achieving excellence in HPC applications;

Complemented with training, education and skills development in HPC

# FET Proactive (except HPC) – Thematic call

Collaborative research

A set of thematic initiatives on promising emerging research themes.

- Fixed deadline calls
- 15 page proposals
- 1 step submission, 1 stage evaluation
- 3 evaluation criteria

Instrument

- Research and Innovation Actions

# FET evaluation

- FET-Open & FET-Pro-active (except HPC)

  Specific evaluation procedure

- FET-Flagship

  Specific evaluation procedure

# Critères d'évaluation – Actions de Recherche et d'Innovation

First stage

- ***S/T quality*** weight 60%, threshold 4/5
  - Clarity of targeted breakthrough and its relevance towards a long-term vision.
  - Novelty and foundational character.
  - Specific contribution to progress in science and technology.
  - Quality and effectiveness of the S/T methodology and workplan.

*If successful*

Second stage

- ***Impact*** weight 20%, threshold 3,5/5
  - Appropriateness of measures envisaged towards getting a transformational impact of the results on science, technology and/or society.
  - Appropriateness of measures envisaged for the dissemination and/or use of project results.
- ***Implementation*** weight 20%, threshold 3/5
  - Quality of management.
  - Quality of the participants and of the consortium as a whole.
  - Appropriate allocation and justification of resources (person-months, equipment, budget).

# Critères d'évaluation – Actions de Coordination

- ***Excellence*** weight 40%, threshold 3/5
- ***Impact*** weight 40%, threshold 3/5
- ***Implementation*** weight 20%, threshold 3/5

# FET Flagships

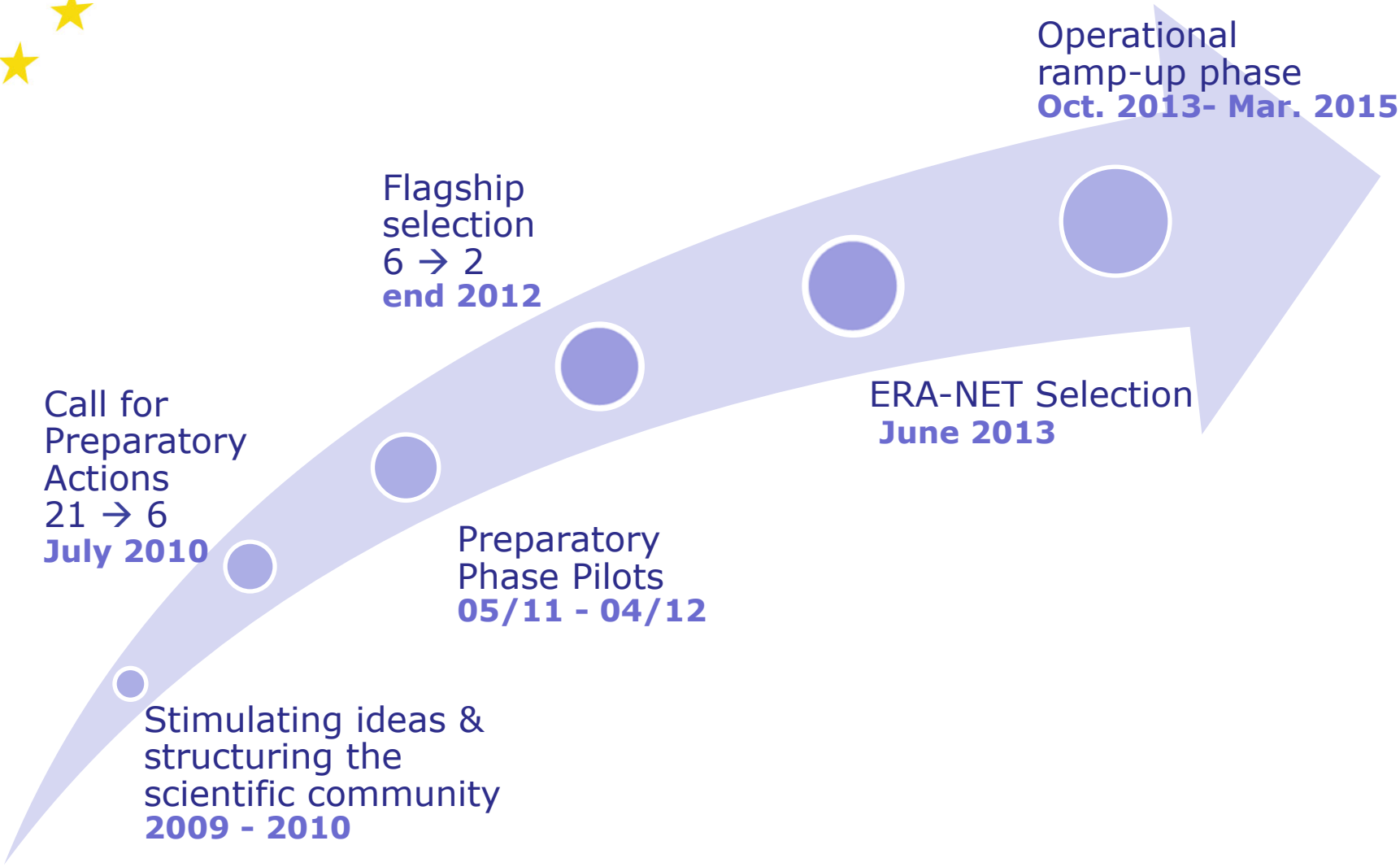
***FET Flagships are ambitious, large-scale, long-term, science-driven, goal-oriented, roadmap-based research initiatives, which are expected to:***

- **provide a strong S&T basis for future technological innovation and substantial benefits for society**
- **help overcome fragmentation and increase the impact of European research and innovation efforts**

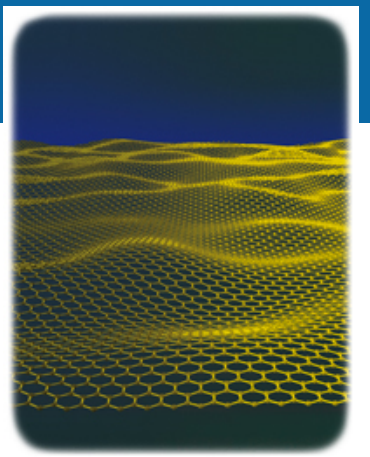
***and which will require:***

- **cooperation among a range of scientific communities/disciplines, with industries and with the involvement of representatives from the civil society**
- **a long-term commitment of all key stakeholders sharing a common scientific vision and under a strong leadership**
- **a joint effort of EU and national programmes to provide a large financial support (~ 100 M€/year) over a long period (~10 years)**

# Le processus de sélection des FET Flagships



# FET Flagship: Graphene



***Graphene, is a 2D material , a single layer of carbon atoms, stronger than diamond, yet lightweight and flexible*** *and an exceptional electricity conductor.*

*The Graphene Flagship will bring graphene, and related 2D materials,* ***from academic labs to industry, manufacturing and society.***

***Artistic impression of a corrugated graphene sheet***
***Credit: Jannik Meyer***

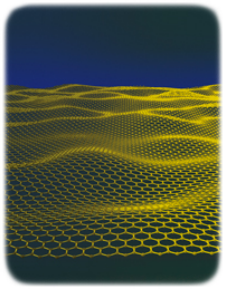
*Examples of products:*

- ✓ **electronic paper**
- ✓ **bendable smartphones**
- ✓ **enhanced solar cells and batteries**
- ✓ **lighter and more energy efficient airplanes**

*On the longer term, graphene is expected to give rise to new computers and revolutionary medical applications such as artificial retinas.*

***Nokia Morph concept - Credit: Nokia Research Center***

# Graphene - Appel ouvert

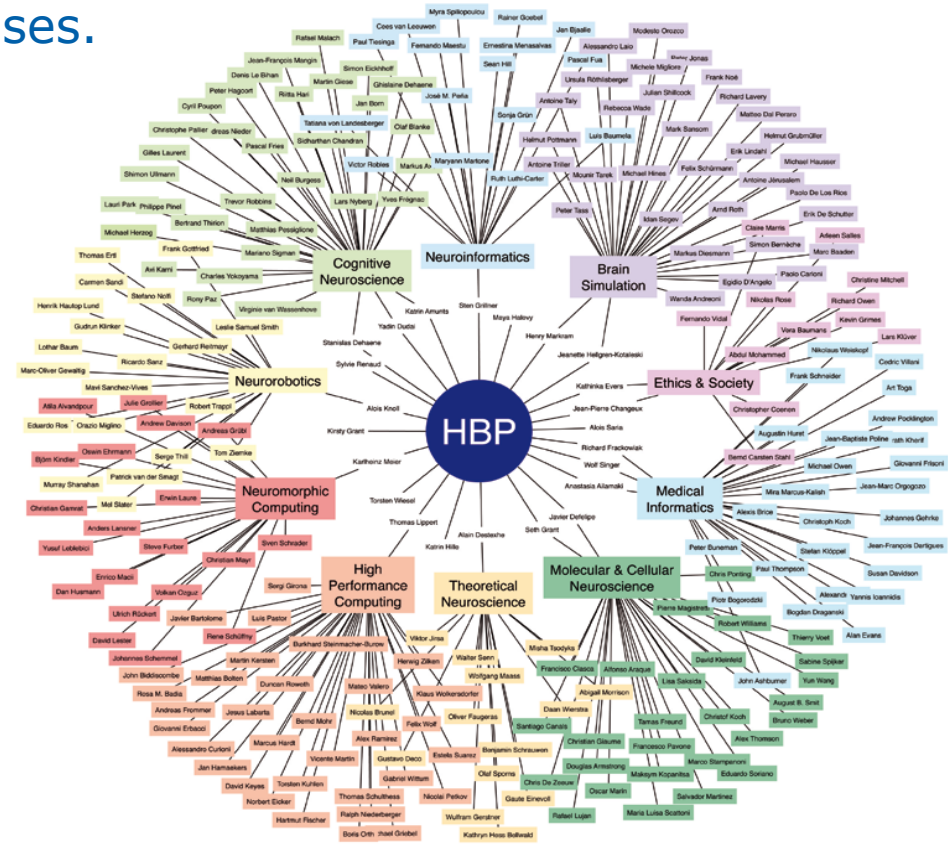


- total de 9 M€ (~20% de l'IP-CSA) sera distribué au travers d'appels compétitifs
- Seules les équipes d'entités non partenaires au consortium sont éligibles (indépendamment de leur part dans le projet initial)! Celles-ci deviendront ensuite membre de plein droit au GA
- 20 à 30 équipes seront sélectionnées
- 12 sujets sont identifiés:
  - *A- Materials, B- Health & environment, C- Fundamental science, D- High-frequency electronics, E- Optoelectronics, F- Spintronics, G- Sensors, H- Flexible electronics, I- Energy applications, J- Nanocomposites, K- Production*
- Chaque sujet bénéficiera d'environ 700 k€ (2 projets attendus...au maximum), sur la base des taux FP7
- Les projets peuvent être monopartenaires
- L'évaluation sera menée par des experts indépendants sur la base des critères CE traditionnels
- Publication attendue pour le 25 novembre 2013
- Clôture vers le 3 février 2014
- Résultats pour juin 2014 au plus tard

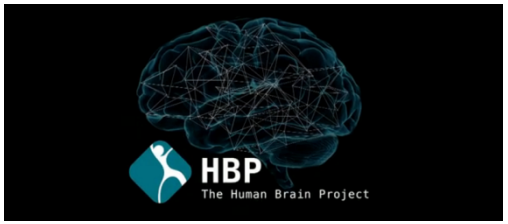
HBP will create the wold's largest experimental facility for developing the most detailed models of the brain (from genes to mind), for studying how the human brain works and ultimately for simulating and developing personalised treatment of brain diseases.

*This research lays the scientific and **technical foundation for medical progress**: identifying new drug targets and treatment, in response to the urgent need to combat brain diseases and their associated costs to society.*

*HBP will also produce brain-inspired **'neuromorphic' computing** systems that could drastically reduce power-consumption for super-computers and enhance robots.*



# HBP – Appel ouvert




- ~9 M€
- Lancement le 1 octobre 2013
- Clôture le 6 novembre 2013
- Résultats en février 2014
- Contenu

1. *Human and mouse neural channelomics and receptomics* (937 k€)
2. *Genotype to phenotype mapping of the mouse brain* (937 k€)
3. *Identifying, gathering and organizing multimodal human and nonhuman neuroscience data* (937 k€)
4. *Cognitive architectures* (750 k€)
5. *Novel methods for rule-based clustering of medical data* (937 k€)
6. *Neural configurations for neuromorphic computing systems* (581 k€)
7. *Virtual robotic environments, agents, sensory & motor systems* (2,5 M€)
8. *Theory of multiscale circuits* (768 k€)

# L'ERANET FLAG-ERA

- Objectif: coordonner les actions des agences nationales ou régionales en lien avec les Flagships
- Activités
  - Etablir un inventaire des actions
  - Analyser la couverture (redondances ou manques éventuels)
  - Potentiellement lancer des appels conjoints

# Budget prévisionnel

- WP 2014 – 2015 – Budget global de 453 M€
  - FET Open: 80 M€/an
  - FET Proactive
    - GSS: 10 M€ en 2014
    - Knowing, doing, being: 15 M€ en 2014
    - Quantum simulation: 8 M€ en 2014, 2 M€ en 2015
    - HPC: 97,4 M€ en 2014
  - Flagships:
    - HBP, 89 M€ en 2015
    - Graphene, 89 M€ en 2015

# Calendrier

- Adoption du WP le 12 novembre
- Lancement des appels : 11 décembre
- Clôture 2014
  - FET-OPEN : 30/09/2014
  - FET-PROACTIVE : 01/04/2014 mais FETHPC : 25/11/2014

# PCN – Technologies Futures et Emergentes (FET)

Frédéric Laurent, représentant Comité de programme, MESR

Fabienne Ragache, experte Comité de programme, DGCIS

Coordination – Martine Garnier-Rizet

Martine Knibiehler, mission interdisciplinarité

Subbarao Bassava

Muriel Maurice, Chargé de projets Europe et ANR

Nicolas Lecompte, chargé d'affaires Europe

Catherine Gilles-Pascaud, chargée de mission

Nacer Boubenna, chargé de mission pôle relations européennes

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## Journée nationale d'information FET
## Mercredi 4 décembre, 14h-17h30
## MESR

## Calendrier des journées en région

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