HORIZON 2020

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

Technologies Futures et Emergentes

Future Emerging Technologies

FET

dans

Horizon 2020

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Technologies Futures et Emergentes

- Eléments statistiques – FET dans le 7ème PCRDT
- H2020 - Que devient FET ?
- Le programme de travail FET 2014-2015
  - Appels FET Open, FET Proactive, FET HPC, FET Flagships
  - Modalités de soumission, évaluation
- FET 2014-2015 - En résumé

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

FET DANS LE 7ÈME PCRDT

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

PCRDT: la problématique française

- La France est le 3ème bénéficiaire du 7ème PCRDT et ses résultats se dégradent (13% sur le 6ème PCRDT, 11,5% à présent)

- Pour **chaque €** abondé par la France au budget du PCRDT (via le budget de l'UE), **seul 0,7 €** bénéficie aux équipes françaises.

- En comparaison, pour chaque € abondé par la Suisse au budget du PCRDT, 3€ bénéficient aux équipes suisses.

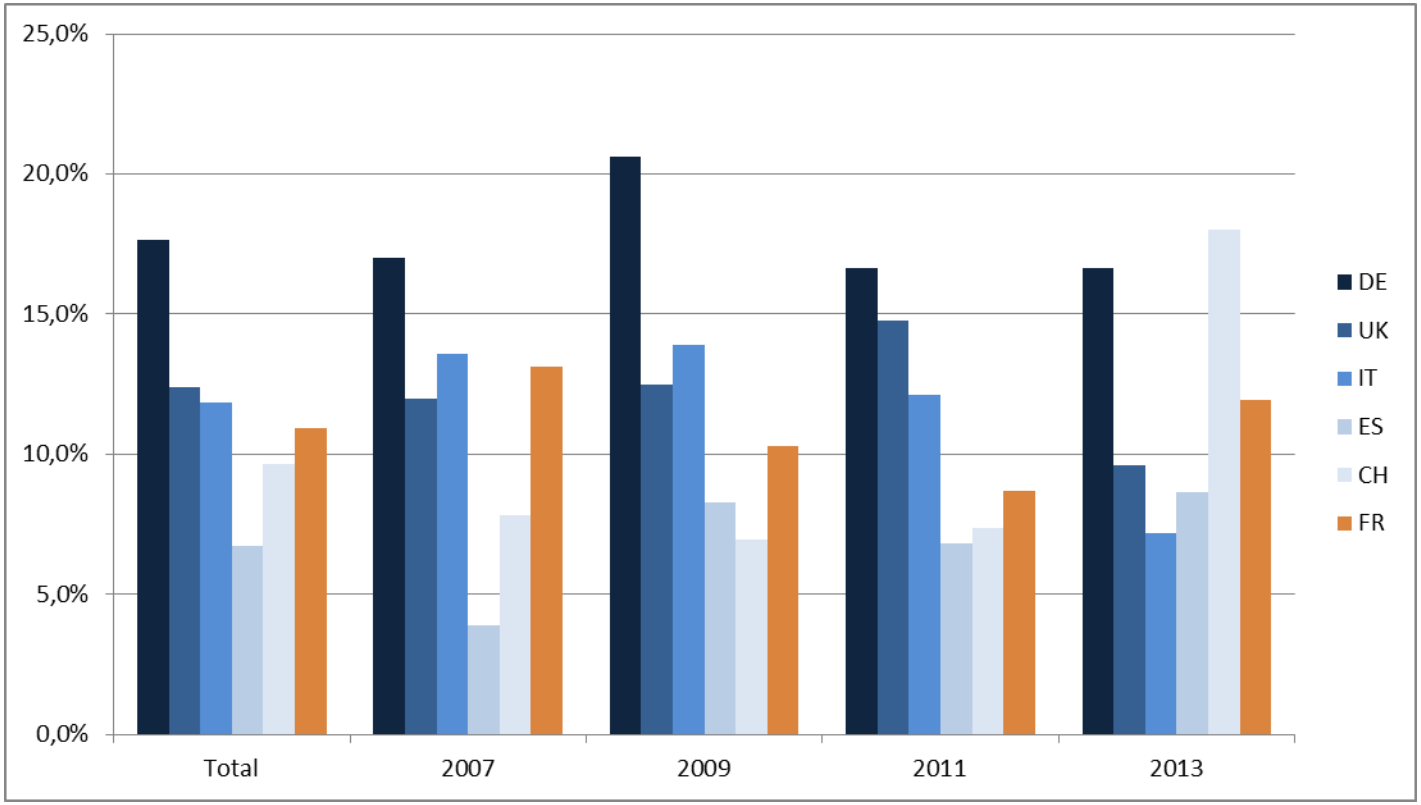
- En consolidé sur le PCRDT, la France perd **~ 600 M€/an** de crédits RDI au bénéfice de ses partenaires (mais aussi compétiteurs) européens.

- …à comparer aux ressources annuelles de l'ANR, du FUI…

Nécessité de remobiliser les équipes nationales !

FET - Les principaux pays bénéficiaires

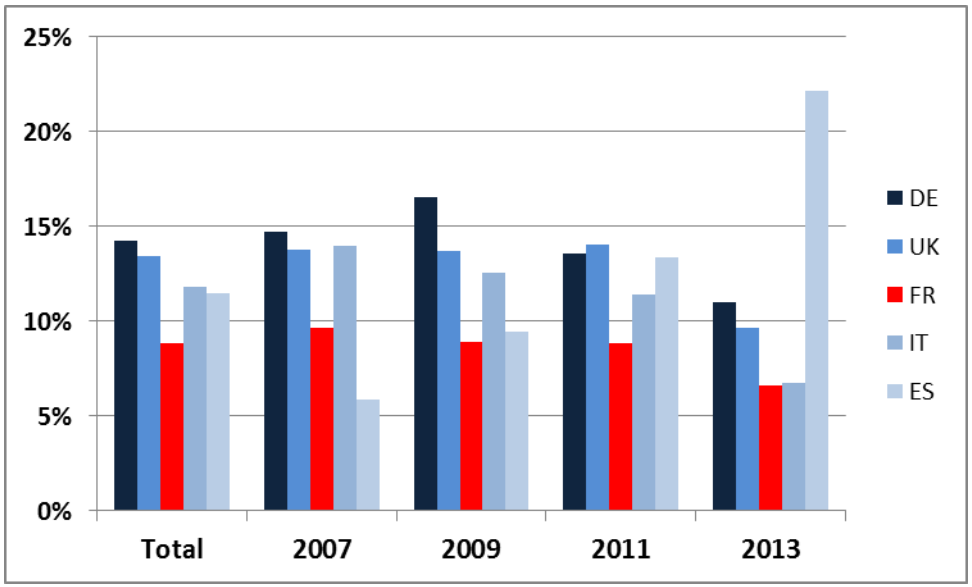
FR 4ème bénéficiaire du programme derrière DE, UK, IT
Retour FR global de 10,9% (vs. contribution UE de 17%)
Tendance forte à la baisse: 13,1% en 2007; 10,3% en 2009; 8,7% en 2011



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

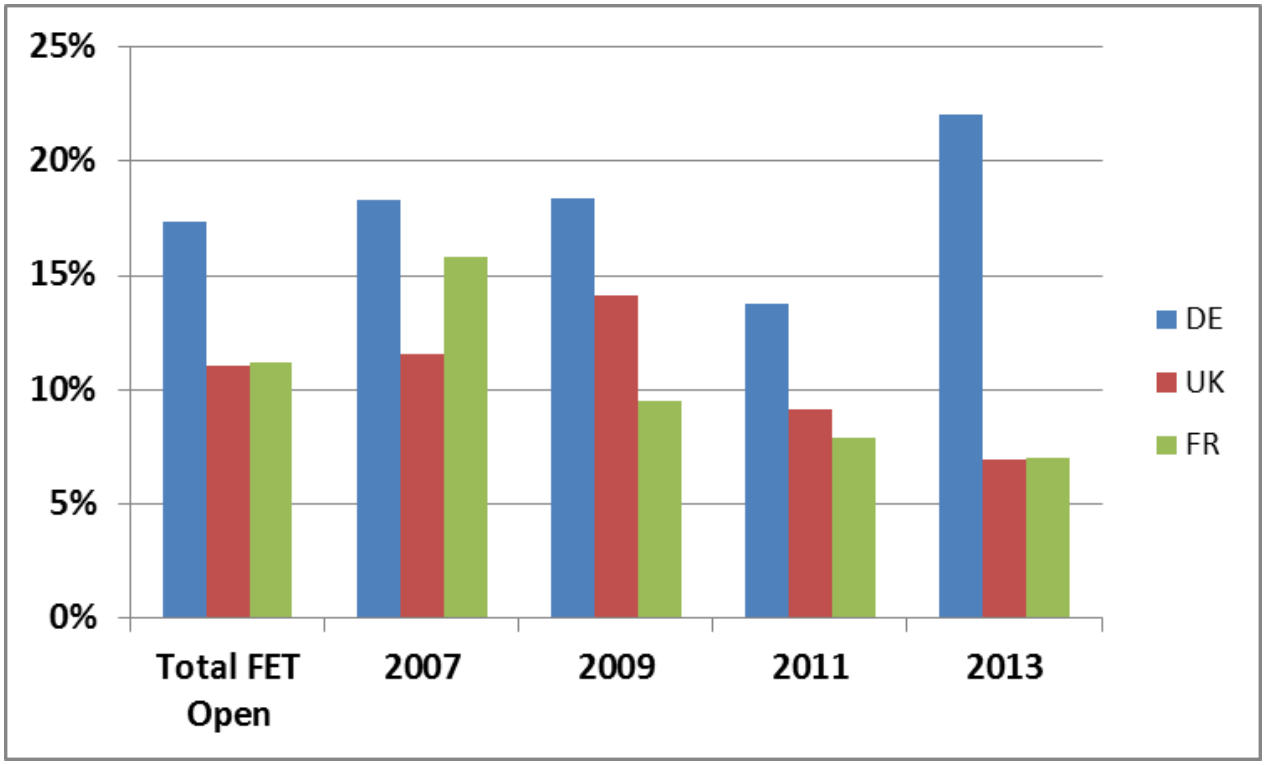
FET - Les principaux pays participants

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



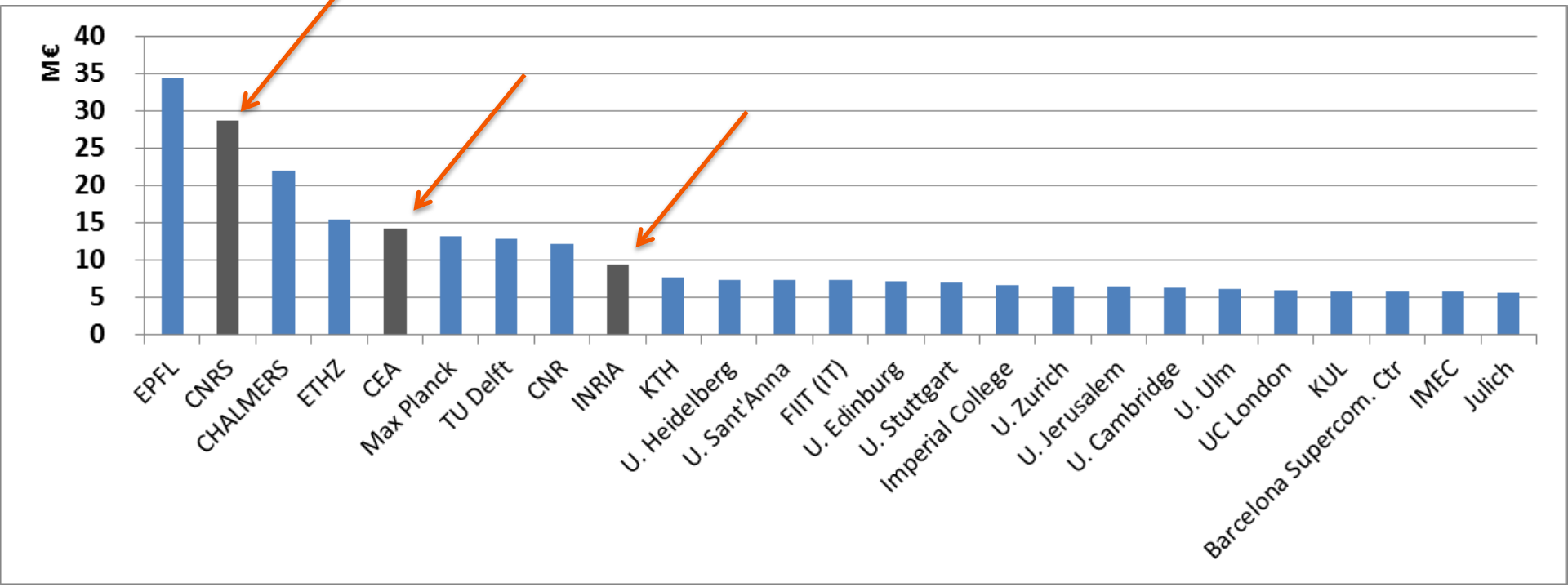
FR 5ème participant
FR a demandé 8,8% des contributions totales
Soit 60% seulement des demandes DE

Evolution de la participation FR sur FET Open



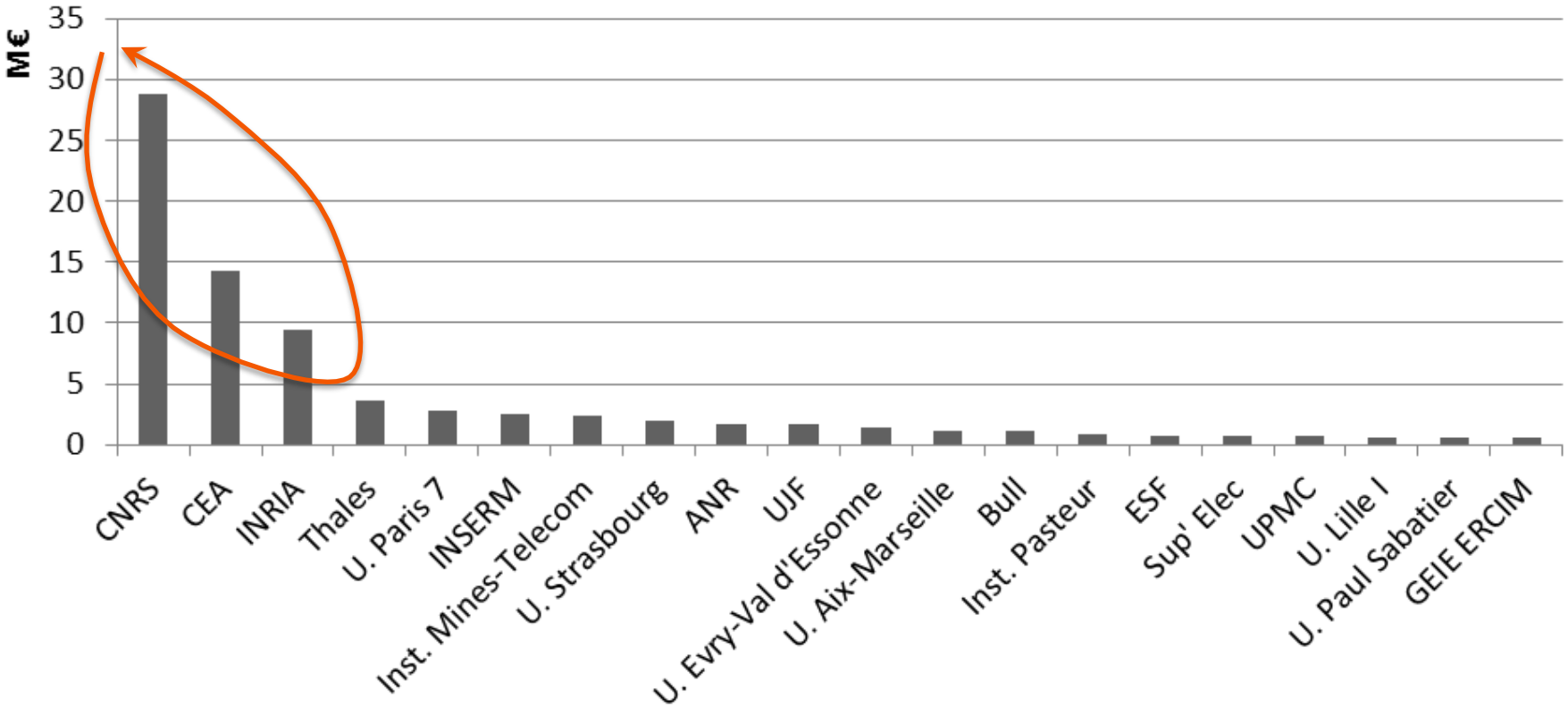
FR 3ème bénéficiaire sur FET Open…
Mais avec une forte tendance à la baisse

Principaux organismes bénéficiaires (UE)



Principaux organismes bénéficiaires (FR)

Une forte concentration...



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QUE DEVIENT 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

PROJETS INDIVIDUELS

FEDER R&D innovation

CIR + CICE

Aide BPI innovation

JEI

IDEE — RECHERCHE FONDAMENTALE — RECHERCHE INDUSTRIELLE — MARCHE

HORIZON 2020

PIA N° 2

Plan d'action ANR 2014

PROJETS COLLABORATIFS

FUI Pôles compétitivité

EUREKA FIL DE L EAU

EUREKA CLUSTER

EUROSTARS

ECSEL

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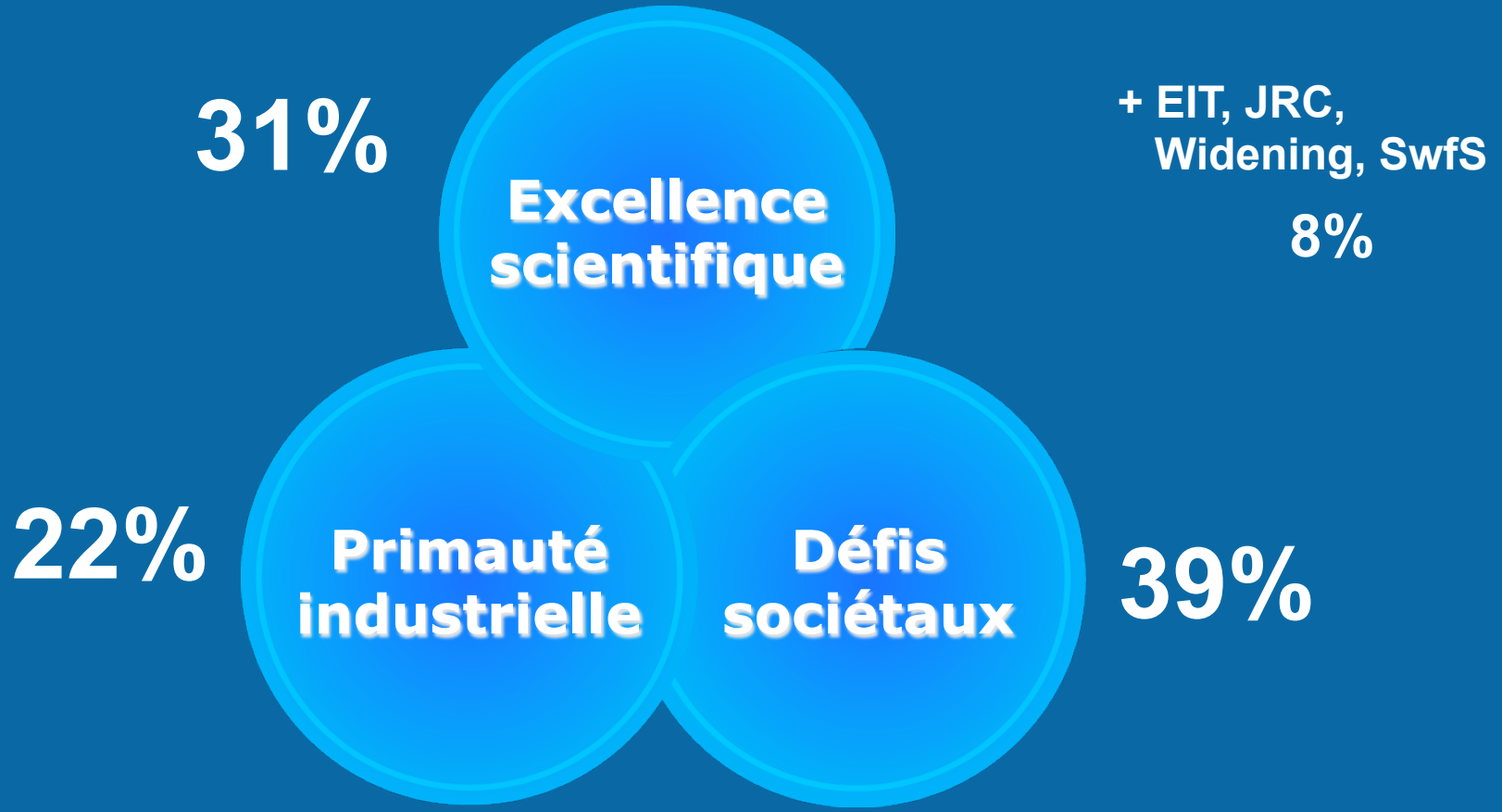
Trois priorités/piliers



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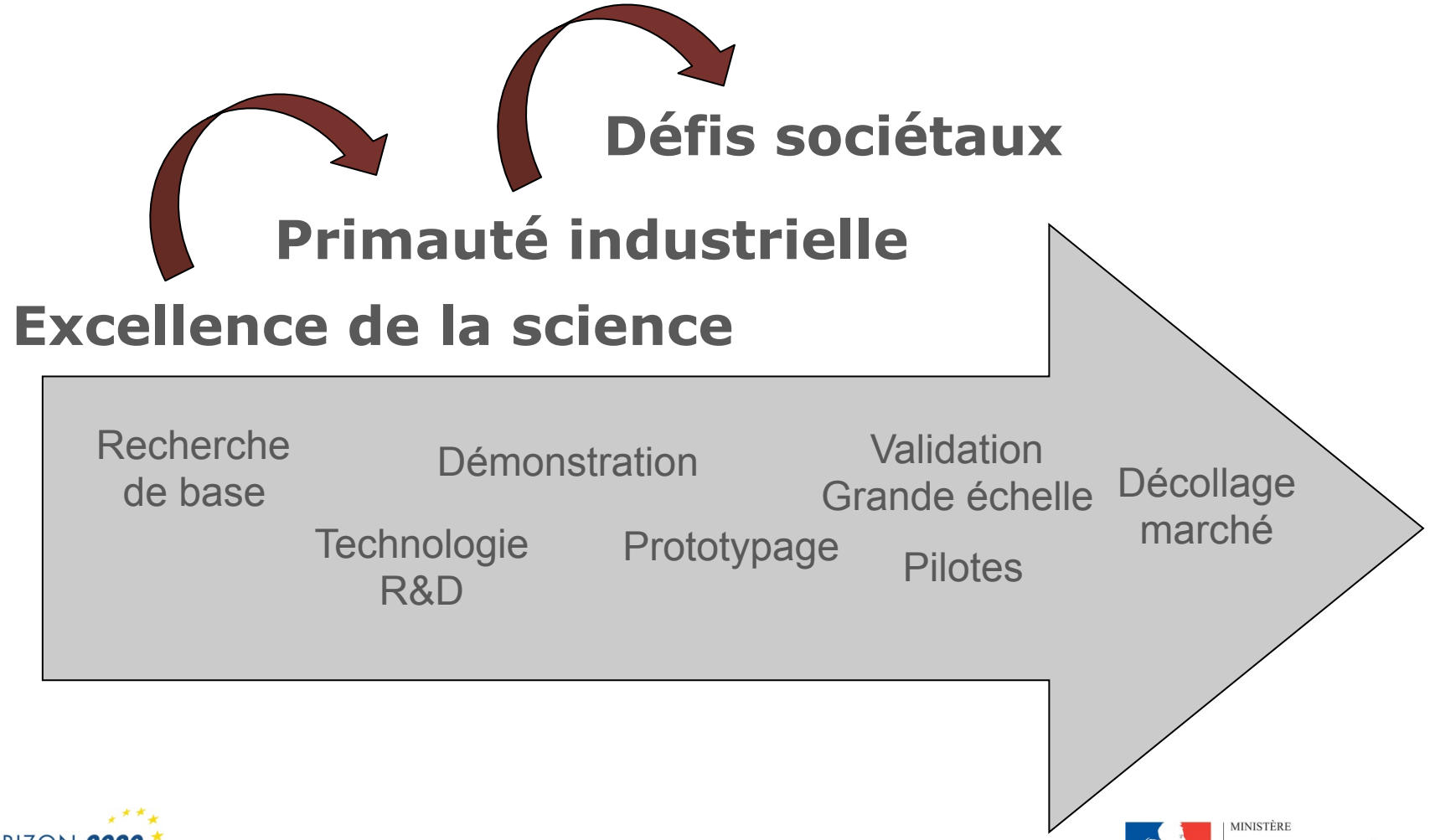
European Commission
MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR ET DE LA RECHERCHE
RÉPUBLIQUE FRANÇAISE

H2020 Couvre la chaîne entière de l'innovation et sa nouvelle structure offre des opportunités



Plusieures modifications importantes

Financements simplifiés

Un seul programme

De nouveaux instruments

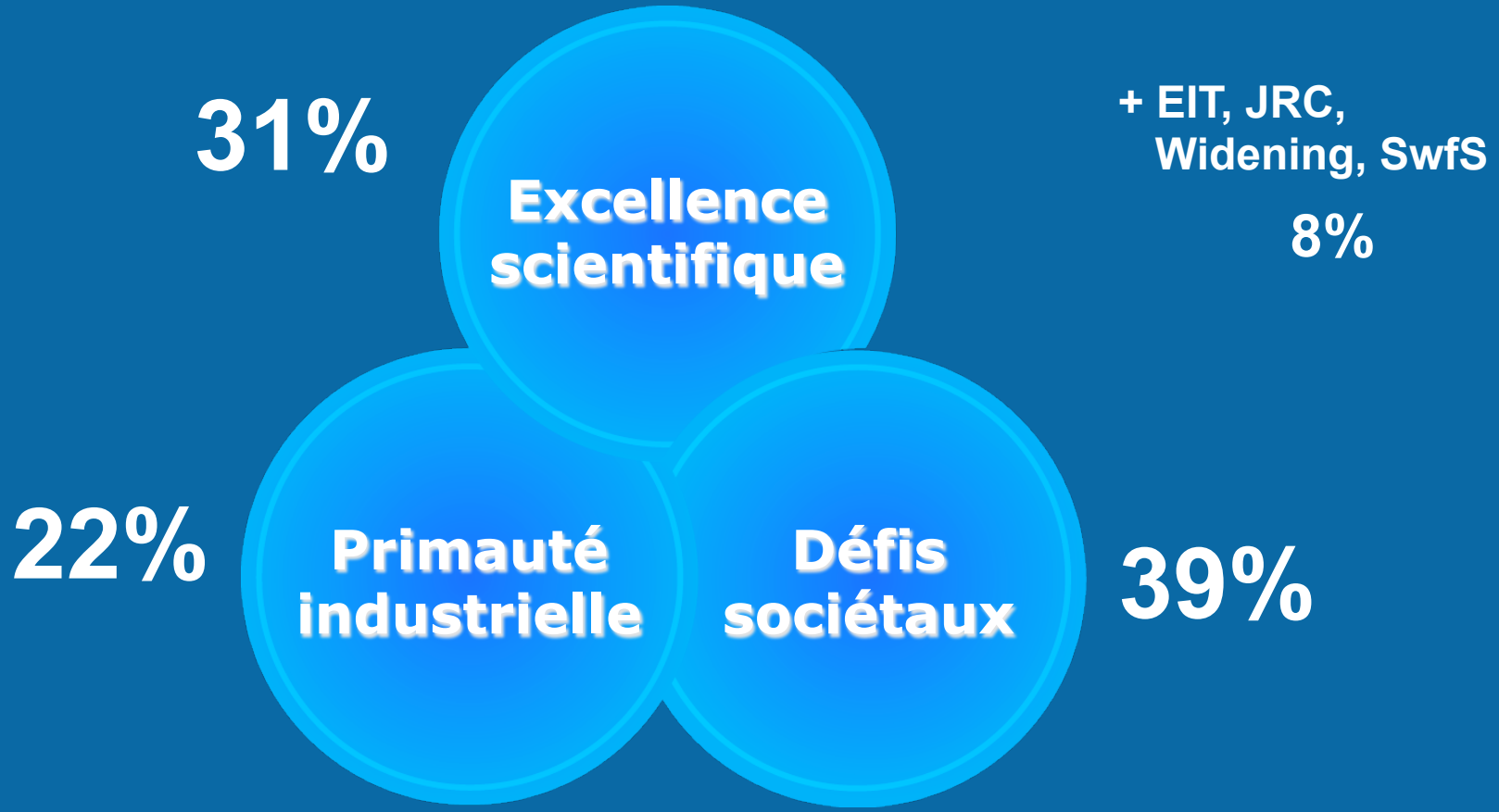
Moins d'administration

Plus de liberté dans projets

Plus de rapidité

Plus d'impact

Trois priorités/piliers



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European Commission

H2020 : Le pilier Excellence

Excellence scientifique

24,4 Md€

- ERC (13,1 Md€)
- Actions Marie-Curie (6,2 Md€)
- **FET (2,7 Md€)**
- Infrastructures (2,5 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.

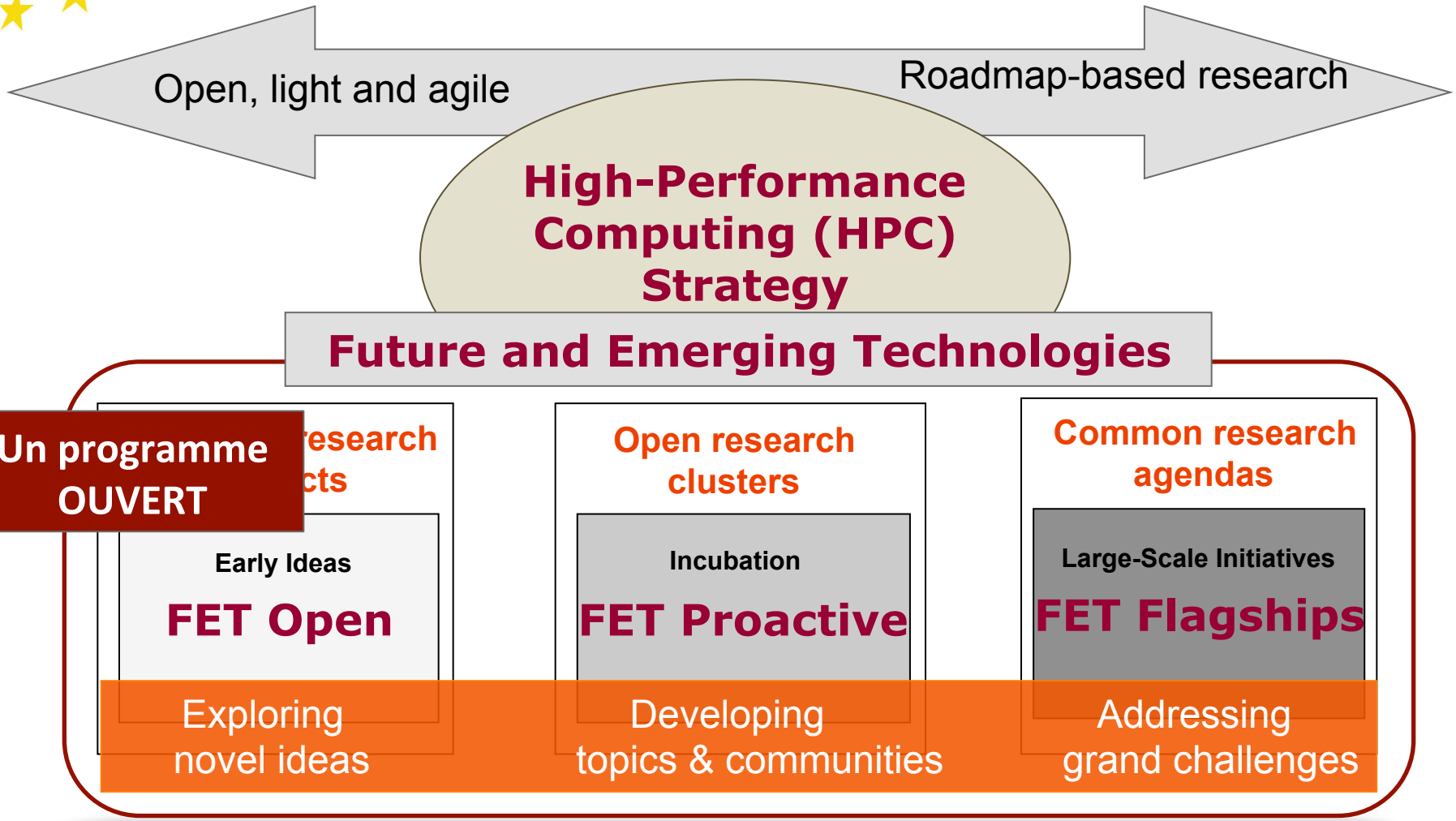
To kick-start European research and innovation eco-systems around such future and emerging technologies, as seeds of future industrial leadership and the tackling of grand societal challenges.

From FP7 to H2020

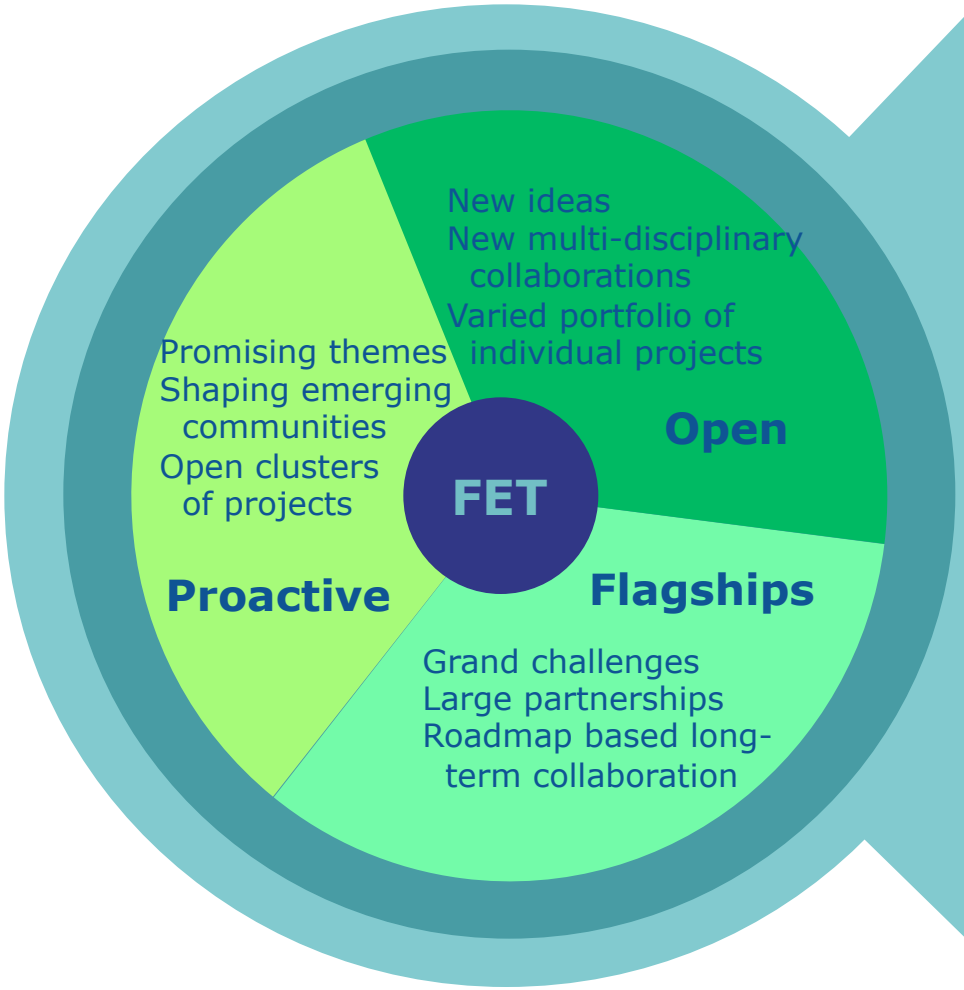
A new level of ambition

- ***New mandate, going beyond ICT***
  - **Pathfinding Europe's technological future**
  - **Bootstrapping new R&I eco-systems**
- ***New large-scale partnering initiatives complementing small and medium scale activities***
  - **FET Flagships**
  - **High-Performance Computing (PPP)**
- ***A new actor in the S&T funding landscape***
- ***A much larger intervention budget***

Le programme FET



FET cross-cutting issues



New synergies and collaborations
- New interdisciplinary synergies linking sciences, technologies and the humanities
- Attracting new high-potential actors, e.g., high-tech SMEs and young researchers
- Programme synergies at European level
- International (global) cooperation

Promoting new approaches and tools for doing science
- Exploring creative R&I methodologies
- Future generation computing to enable advanced simulation, data capture,…
- Digital Science and e-infrastructures

Innovation
- European leadership for FETs
- Encouraging new ideas and actors
- Kick-starting new innovation eco-systems (small and large) around new technologies
- Delivery of new technology options and baselines to industry and spin-offs
- Digital science, open data for wider and faster transfer, spin-off and education

Responsible research and innovation
- Social Sciences and Humanities are relevant
- Promoting societal debate and exchange
- FET Advisory Board and FET Observatory to capture views and needs widely
- Open access, open data policies
- Ethics of methods as well as of results

LE PROGRAMME DE TRAVAIL FET 2014-2015

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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 au MESR

et en régions en décembre et janvier

- Lancé par la CE le 11 décembre

Le programme de travail 2014-2015

- FET-Open – fostering novel ideas
- FET-Proactive - nurturing emerging themes and communities
- FET-Proactive - High-Performance Computing
- FET Flagships - tackling grand interdisciplinary science and technology challenges

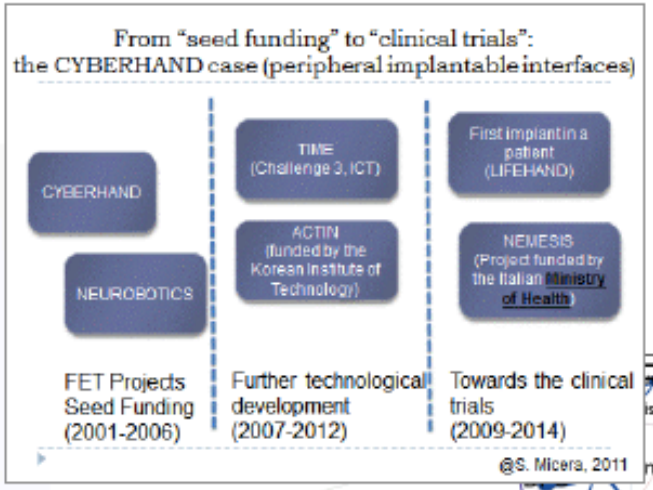
Appel à projets (*comment lire le WP?*)

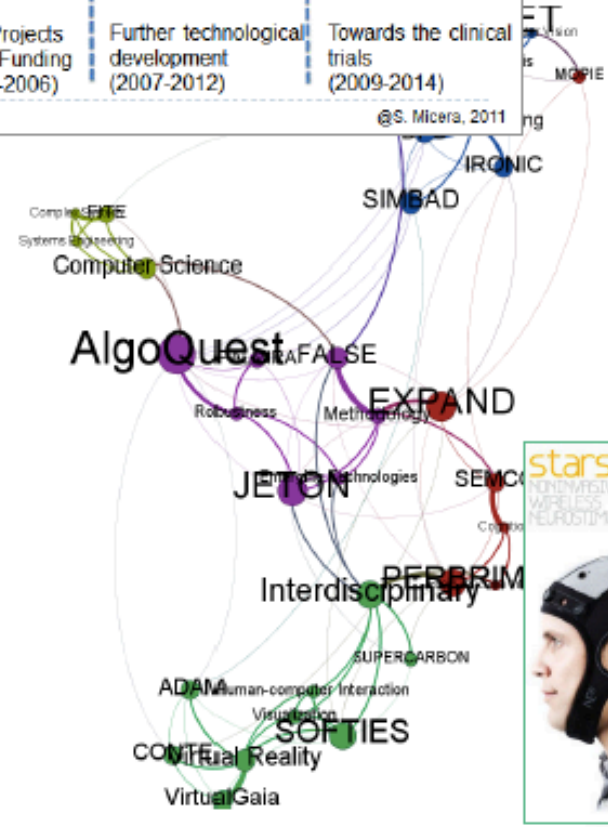
- Le contexte justifiant chaque appel
- Pour chaque appel sont décrits dans le détail

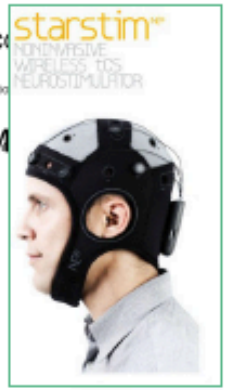
  - ***"specific challenge"*** : le défi spécifique auquel l'appel s'adresse
  - ***"scope"*** : le champ d'application du projet qui y répondrait
  - ***"expected impact"***: l'impact du projet sur/dans le contexte du défi
  - le type d'instrument (***"action"***) à mettre en oeuvre
  - le ***budget*** qui lui est réservé...
  - les ***conditions spécifiques,*** d'éligibilité, de type de partenaires, des modalités d'évaluation (1 ou 2 étapes), les dates de clôture...

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!







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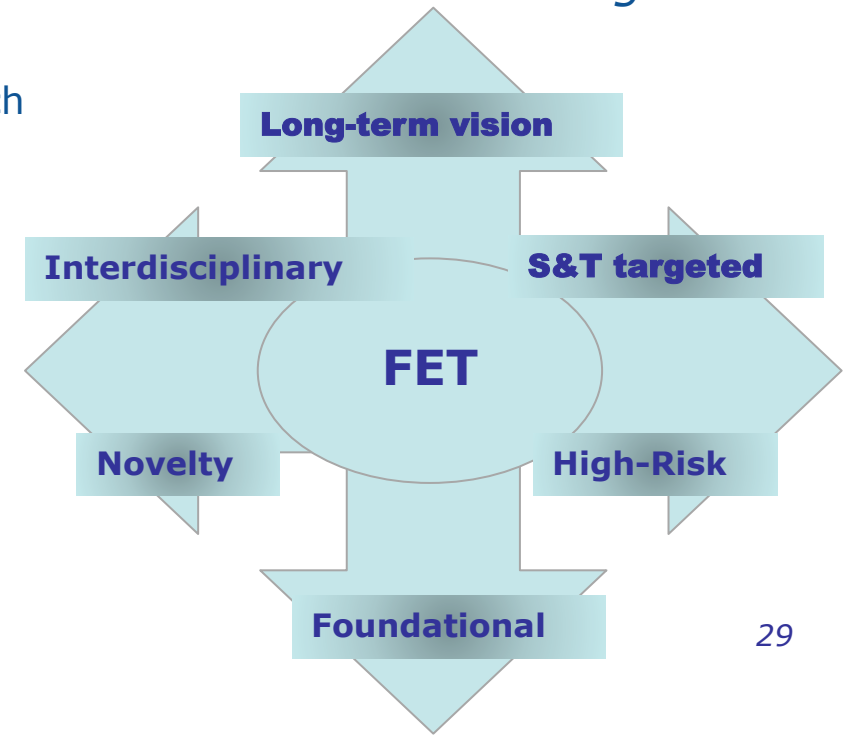
Call FET-Open : novel ideas for radically new technologies

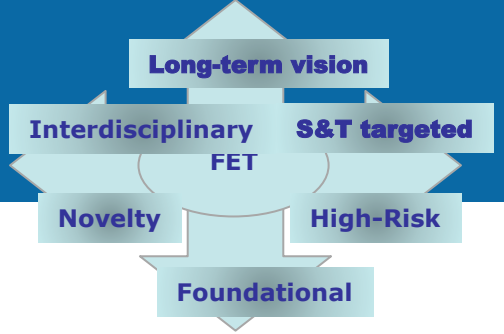
- **'Open is open'**
- All technologies, no thematic restriction
- *FET gatekeepers define the kind of research that FET is looking for*
- Scope defined by the 6 gatekeepers
- Bottom-up, but targeted - not blue sky research
- Collaborative research

- *Total budget: 160M€ in 2014-15*

- *Instrument*
- Research and Innovation Action - 154M€
- Coordination and Support actions (CSA) – 6M€



FET Gatekeepers



***Long-term vision**: a new, original or radical long-term vision of technology-enabled possibilities going far beyond the state of the art*

***Breakthrough S&T target**: scientifically ambitious and technologically concrete breakthroughs plausibly attainable within the life-time of the project.*

***Foundational**: the breakthroughs must be foundational in the sense that they can establish a basis for a new line of technology not currently anticipated.*

***Novelty**: new ideas and concepts, rather than the application or incremental refinement of existing ones.*

***High-risk**: the potential of a new technological direction depends on a whole range of factors that cannot be apprehended from a single disciplinary viewpoint.*

- This inherent high-risk has to be countered by a strongly interdisciplinary research approach, where needed expanding well beyond the strictly technological realm.

***Interdisciplinary**: the proposed collaborations must go beyond current mainstream collaboration configurations in joint S&T research, and must aim to advance different scientific and technological disciplines together and in synergy towards a breakthrough.*

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FETOPEN 1: FET-Open research projects

Specific challenge

Supporting a large set of early stage, high risk visionary science and technology collaborative research projects *is necessary for the successful exploration of new foundations for radically new future technologies. Nurturing fragile ideas requires an agile, risk-friendly and highly interdisciplinary research approach, expanding well beyond the strictly technological disciplines. Recognising and stimulating the driving role of new high-potential actors in research and innovation, such as women, young researchers and high-tech SMEs, is also important for nurturing the scientific and industrial leaders of the future.*

Project size: 2 to 4M€

- **1 step submission and evaluation of a 16 pages proposal**
- **Proposals are not anonymous**

Budget: 154M€

Deadlines	30/09/2014	31/03/2015	29/09/2015
Budget	77 M€	38,5 M€	38,5M€

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FETOPEN 2: Coordination and Support Activities 2014

Specific challenge: The challenge is to make Europe the best place in the world for collaborative research on future and emerging technologies that will renew the basis for future European competitiveness and growth, and that will make a difference for society in the decades to come.

Scope: Proposals shall address one of the following topics:

***FET Observatory**: identifying new opportunities and directions for FET research*

***FET Communication**: communicating on FET projects and activities*

***FET Exchange**: structuring an emerging FET-relevant topic and communities*

***FET Conference**: supporting the organisation of the third FET Conference*

***FET Prizes**: identifying suitable areas for prizes and competitions in FET*

***FET Impact**: Assessing the impacts of the FET programme*

Project size: 0,3 to 0,5M€ per topic, up to 1M€ for FET Conference

Budget & deadline:

- 3M€ -> Deadline: 30/9/2014

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FETOPEN 3 : Coordination and Support Activities 2015

Specific challenge: The challenge is to make Europe the best place in the world for collaborative research on future and emerging technologies that will renew the basis for future European competitiveness and growth, and that will make a difference for society in the decades to come.

Scope: Proposals shall address one of the following topics:

***FET Exchange**: structuring an emerging FET-relevant topic and communities*

***FET Take-Up**: actions for stimulating take-up of FET research results towards impact and innovation*

Project size: 0,3 to 0,5M€ per topic

Budget & Deadline:

- 1,5M€ -> Deadline: 31/3/2015
- 1,5M€ -> Deadline: 29/9/2015

Le programme de travail 2014-2015

- FET-Open – fostering novel ideas
- FET-Proactive - nurturing emerging themes and communities
- FET-Proactive - High-Performance Computing
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FET Proactive - nurturing emerging themes and communities

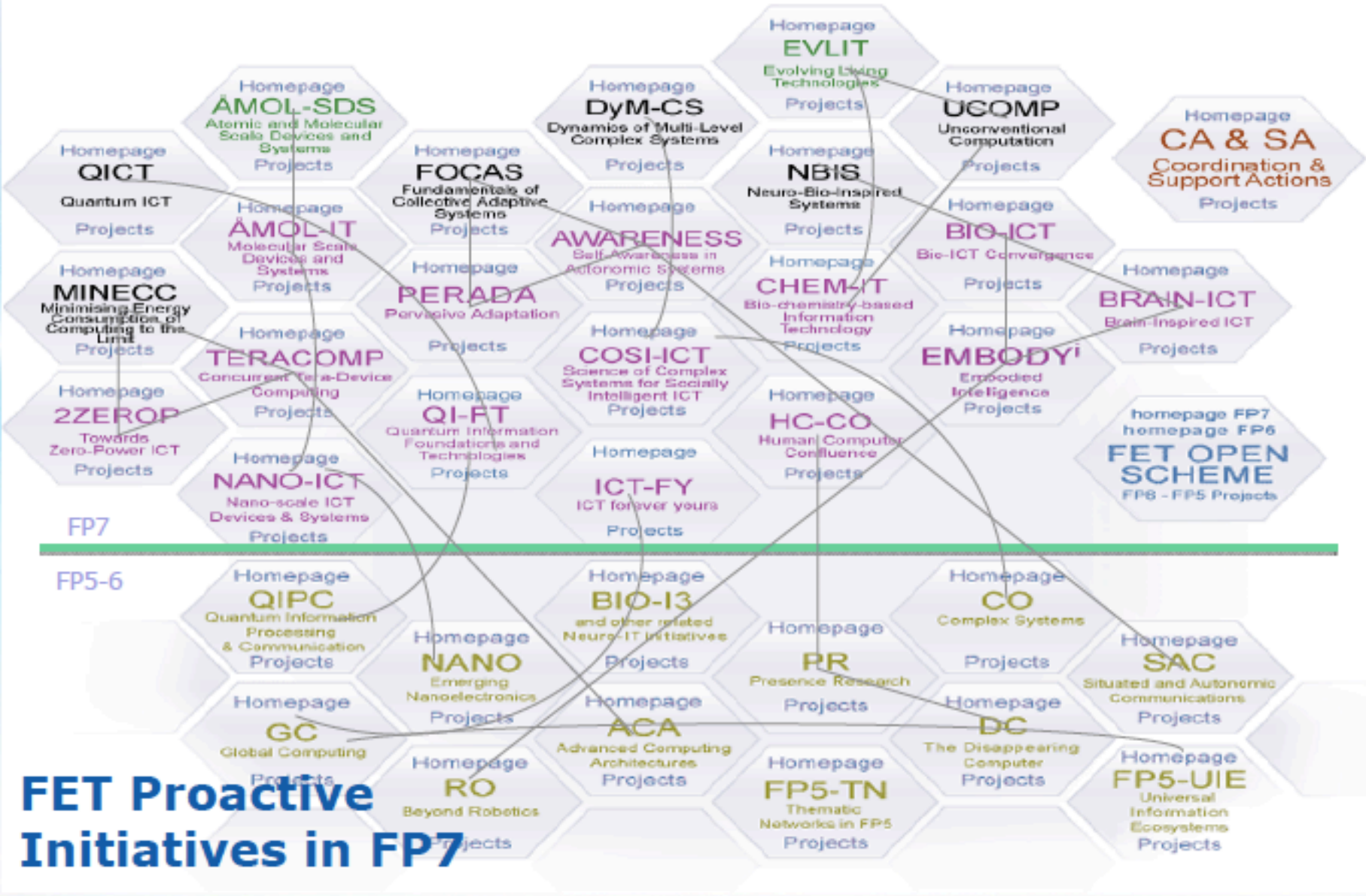
A set of thematic initiatives on promising emerging research themes.

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

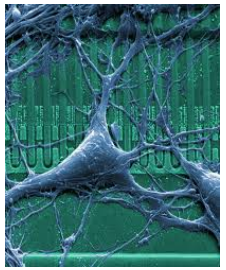


FET Proactive Initiatives in FP7

EUROPEAN COMMISSION
HORIZON 2020
INNOVATION UNION

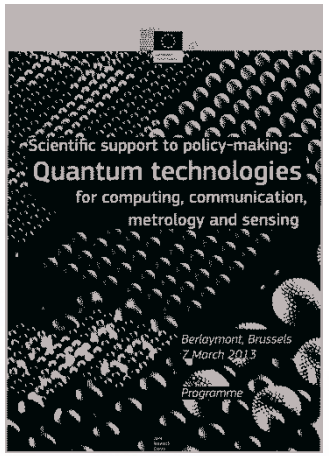
FET Proactive

- 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 - emerging themes and communities

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)**

Total budget: 35M€ in WP 2014-15

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FETPROACT 1 : Global Systems Science (GSS) - 2014

Specific challenge: ***The ambition is to improve the way scientific knowledge can help inform and evaluate policy and societal responses to global challenges*** *like climate change, global financial crises, global pandemics, and growth of cities – urbanisation and migration patterns. These challenges entangle actions across different sectors of policy and society and must be addressed by radically novel ideas and thinking for producing, delivering, and embedding scientific evidence into the policy and societal processes.*

GSS will put to full use the abundance of data on social, economic, financial, technological, and ecological systems available today. GSS emphasises systems thinking and the need to integrate/link data, models, and policies across all policy sectors with all societal actors. GSS will build on results from, among others, Complex Systems Science, Network Science, Mathematics of Big Data, the life sciences, social sciences and humanities, behavioural sciences, statistics, econophysics, etc.

Project size: 2 to 3M€

Budget & Deadline: 10M€ -> Deadline: 1/4/2014

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FETPROACT 2 : Knowing, doing, being: cognition beyond problem solving - 2014

Specific challenge: ***This initiative addresses the interdisciplinary fundamentals of knowing, thinking, doing and being, in close synergy with foundational research on future artificial cognitive systems, robots, smart artefacts and large scale cyber-physical systems.*** *It aims at renewing ties between the different disciplines studying knowledge (especially beyond the 'declarative' and static action oriented kind of knowledge), cognition (e.g., perception, understanding, learning, action) and related issues (e.g., embodiment, thinking, development, insight, knowledge as a social construct, identity, responsibility, culture…) from various perspectives (e.g., physical, biological, neuronal, behavioural, social, epistemological, ecological). The aim is to enable new synergies with engineering disciplines on smart and self-organising materials, embedded systems, robotics, hybrid systems or smart infrastructures and cities to take artificial cognitive systems beyond the level of dull task execution or repetitive problem solving.*

Project size: 2 to 4M€

Budget & Deadline: 15M€ -> Deadline: 1/4/2014

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FETPROACT 3 : Quantum simulation - 2014

Specific challenge: Devices that exploit quantum phenomena such as superposition and entanglement have the potential to enable radically new technologies. Several promising directions are now well known, for instance in quantum computation and simulation, quantum communication, quantum metrology and sensing. However, overcoming basic scientific challenges as well as bridging from the scientific results to concrete engineering technologies has proved difficult. This objective challenges the research community to develop solutions using quantum technologies that will ultimately address real world problem, with a potential for disruptive change.

Scope: ***Proposals shall address research and development for quantum simulation to address a class of problems that is beyond the reach of classical computing, and that can contribute to answering questions in fundamental or applied sciences, e.g. in quantum materials science or the life sciences.***

Project size: 2 to 4M€

Budget & Deadline: 10M€ -> Deadline: 1/4/2014

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One step submission and evaluation

Part A: Administrative part of the proposal

Part B : Scientific part of the proposal

- **16 pages – core proposal**
  - Cover page (1 page)
  - Section 1: S&T Excellence
  - Section 2: Impact
  - Section 3: Implementation
- **Additional information**
  - Operational capacity
    - E.g. legal entity, CV, subcontract, third party
  - Ethics section

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

- ***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.
- ***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

Le programme de travail 2014-2015

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- FET Flagships - tackling grand interdisciplinary science and technology challenges

High Performance Computing

European Commission

Key EU developments in 2012-2013

- *Communication from the EC: "High-Performance Computing: Europe's place in a global race" (2012)*
  - **Council Conclusions on High-Performance Computing (Competitiveness Council – 2013)**

- *Establishment of the European Technology Platform on High-Performance Computing (ETP4HPC - 2013)*
  - **ETP4HPC - Strategic Research Agenda**
  - **Public-Private Partnership with ETP4HPC***

www.etp4hpc.eu

*expected Dec-2013

Competitiveness Council 29/30 May 2013

Conclusions on HPC Communication

- HPC is an important asset for the EU's innovation capacity of strategic importance to the EU's industrial and scientific capabilities as well as its citizens:
  - developing innovative industrial products and services,
  - increasing competitiveness,
  - addressing societal and scientific grand challenges more effectively.
- Europe has the technology, knowledge and human skills to develop capabilities covering the whole technological spectrum of the next HPC generation (exascale computing)
- Importance of developing state-of-the-art HPC technologies, systems, software, applications and services in Europe
- All relevant actors, public and private, need to work in partnership
- Invites the EC to elaborate its plans for HPC to support academic and industrial research and innovation under H2020

HPC in FET: Critical technologies

European Commission

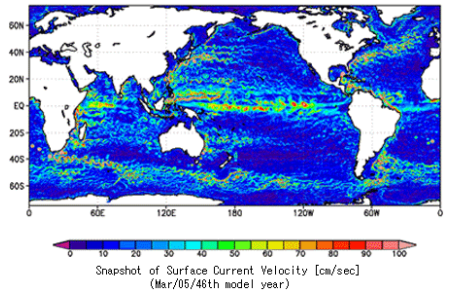
Addressing Societal Challenges

Health, demographic change and well-being

(Personalised medicine, pharma/bio-medical simulations, Virtual Physiological Human, Human Brain Project)

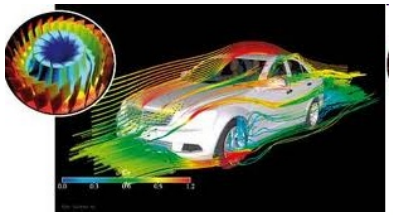
Climate action, resource efficiency and raw materials

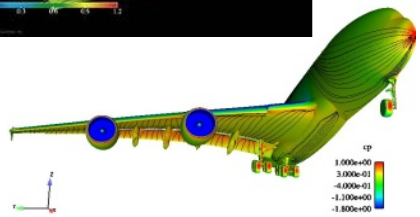
(Simulators for Climate & Earth Sciences, Gas&Oil)



Smart, green and integrated transport Engineering

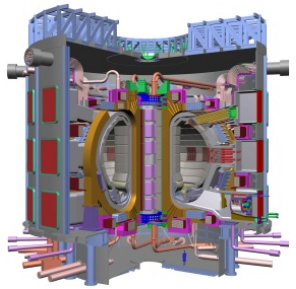
(performance, sustainability, energy efficiency)





Secure, clean and efficient energy

(Fusion, nuclear plant simulations)

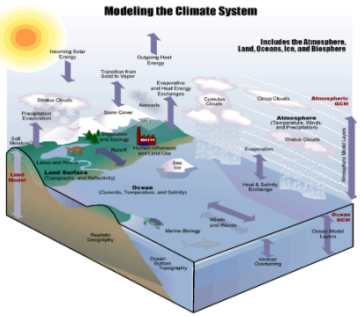


Food security, sustainable agriculture, marine research and the bio-economy

(simulation of sustainability factors (e.g. weather forecast, stock
plagues and diseases control, etc))

Inclusive, innovative and secure societies

(Smart Cities, multivariable decision/analytics support)



An integrated HPC approach in H2020

- HPC strategy combining three elements:

(a) Computer Science: towards **exascale** HPC; *A special FET initiative focussing on the next generations of exascale computing as a key horizontal enabler for advanced modelling, simulation and big-data applications* [HPC in FET]

(b) achieving excellence in HPC **applications**; *Centres of Excellence for scientific/industrial HPC applications in (new) domains that are most important for Europe* [e-infrastructures]

(c) providing **access** to the best supercomputing facilities and services for both industry and academia; *PRACE - world-class HPC infrastructure for the best research* [e-infrastructures]

- complemented with training, education and skills development in HPC

HPC- Exascale Challenges in FET

- **Energy**: Extrapolation of current power consumption (e.g. Top system Tianhe-2) would need ~1 GW for sustained exaflops: breakthroughs and advances in circuits, architecture and software are needed to achieve the ~20 MW exaflop computing
- **Memory and I/O**: Handling of memory, latency and locality at all levels, from processor, to network and storage
- **Programmability and algorithms**: Programmers face the challenge of handling billions of computing threads. Only very few applications using HPC really take advantage of current petaflop system.
- **Resilience:** Innovative ideas are needed to cope with a very unstable and complex environment of millions of cores with frequent fault rates
- **Co-design**: Technology development must be associated to users requirements to get the right systems to satisfy the needs of applications.

  - engaging a European-wide effort to develop technology to build exascale systems within ~10 years

FET-HPC in WP 2014-15

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FETHPC 1: HPC core Technologies, Programming Environments and Algorithms for Extreme Parallelism and Extreme Data Applications - 2014

Specific challenge: Addressing the exascale challenges to achieve, by 2020, the full range of technological capabilities for **exascale-class HPC systems** *which are balanced at all levels and validated with significant application drivers*

Scope :

- **a. Core technologies and architectures** *(e.g. processors, memory, interconnect and storage) and their optimal integration into HPC systems, platforms and prototypes*
- **b. Programming methodologies, environments languages and tools**: *new programming models for extreme parallelism and extreme data applications*
- **c. APIs and system software** *for future extreme scale systems*
- **d. New mathematical and algorithmic approaches** *(e.g. ultra-scalable algorithms for extreme scale systems with quantifiable performance for existing or visionary applications)*

Project size : 2 to 4M€, up to 8M€ for topic a)

Budget & Deadline : 93,4M€ -> Deadline: 25/11/2014

- with a minimum of 60% to be allocated to research under part a) of the scope

FET-HPC in WP 2014-15

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FETHPC 2: HPC Ecosystem Development - 2014

Specific challenge: To develop a sustainable European HPC Ecosystem

Scope:

- **Coordination of the HPC strategy** : coordination of the activities of stakeholders such as ETP4HPC, PRACE, application owners and users (including emerging HPC applications), the European exascale computing research community, the open source HPC community, etc.
- **Excellence in High Performance Computing Systems** : boost European research excellence on the key challenges towards the next generations of high-performance computing systems; cutting across all levels – hardware, architectures, programming, applications; ensure a durable integration of the relevant European research teams; self-sustainability of the research integration on the longer-term

Budget & Deadline: 4M€ -> Deadline: 25/11/2014

Le programme de travail 2014-2015

- FET-Open – fostering novel ideas
- FET-Proactive - nurturing emerging themes and communities
- FET-Proactive - High-Performance Computing
- FET Flagships - tackling grand interdisciplinary science and technology challenges

FET Flagships – salient features

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

- provide strong scientific, technological and IPR basis for establishing areas of European leadership and bringing 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)

Graphene & Human Brain Project selected

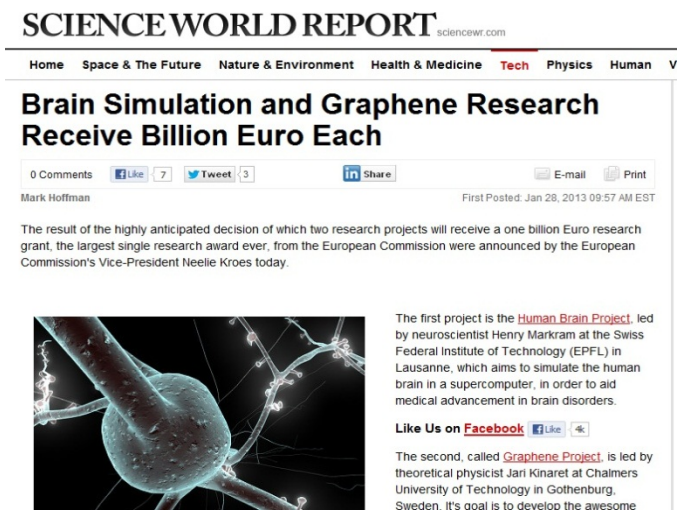
Stimulating ideas & structuring the scientific community
2009 - 2010

Call for Preparatory Actions
21 → 6
July 2010

Preparatory Phase Pilots
05/2011 - 04/2012

Flagship selection
6 → 2
end 2012

FP7 ramp-up phase
10/2013- 03/2016



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Brain Simulation and Graphene Research Receive Billion Euro Each

0 Comments | Like 7 | Tweet 3 | Share | E-mail | Print

Mark Hoffman — First Posted: Jan 28, 2013 09:57 AM EST

The result of the highly anticipated decision of which two research projects will receive a one billion Euro research grant, the largest single research award ever, from the European Commission were announced by the European Commission's Vice-President Neelie Kroes today.

The first project is the Human Brain Project, led by neuroscientist Henry Markram at the Swiss Federal Institute of Technology (EPFL) in Lausanne, which aims to simulate the human brain in a supercomputer, in order to aid medical advancement in brain disorders.

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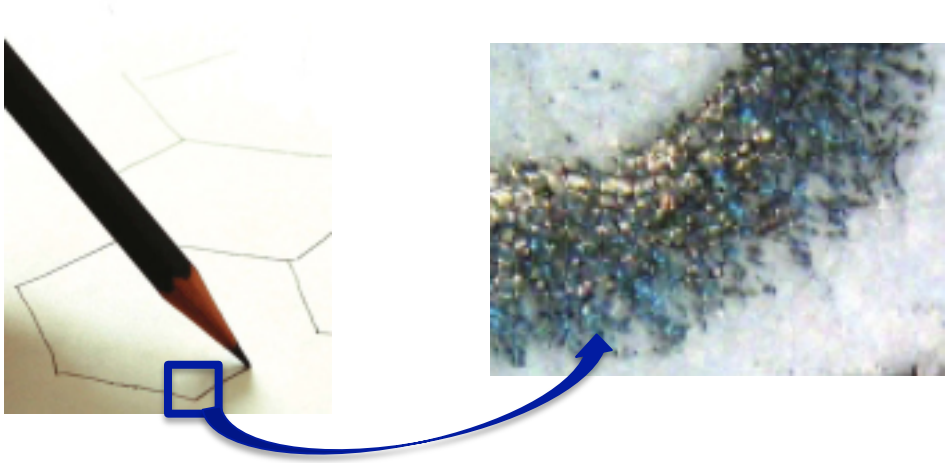
The second, called Graphene Project, is led by theoretical physicist Jari Kinaret at Chalmers University of Technology in Gothenburg, Sweden. It's goal is to develop the awesome

GRAPHENE FLAGSHIP

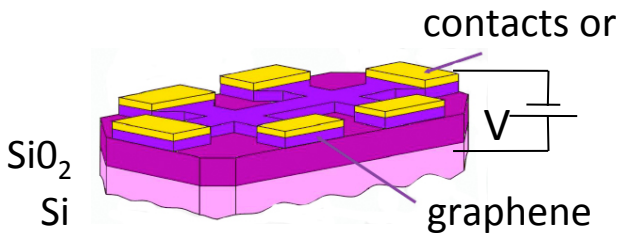
Le futur est dans une trace de crayon noir



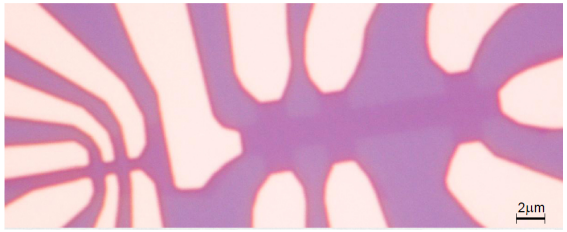
Source A.Loiseau, 4/12/2013, MESR

Un matériau aux superlatifs

Un conducteur électrique surdoué

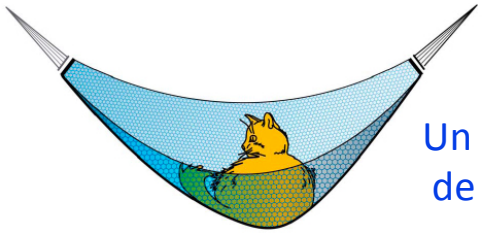


Dispositif de mesure de conductivité



- Les électrons s'y déplacent de façon très particulière car leur énergie est reliée linéairement à leur impulsion
- Leur mobilité est superélevée

Une membrane super résistante super flexible et superfine.....



Un hamac en graphène de $1m^2$ pèserait 0.77 mg

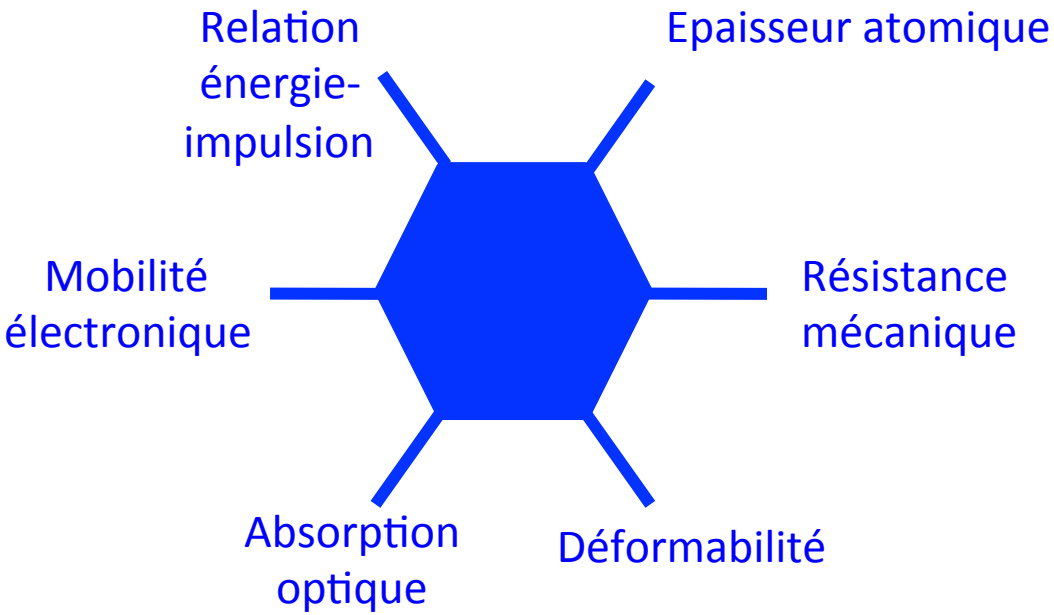
- Grâce à la force des liaisons entre atomes de carbone, la contrainte à rupture est de 42 Newtons / m
- Image équivalente:
résistance d'un film alimentaire sur lequel on appuirait un poids de 2 tonnes avec une pointe de 1 mm

.... et super transparente

Le graphène absorbe 2,3% de la lumière visible

Source A.Loiseau, 4/12/2013, MESR

Des propriétés aux applications



Source A.Loiseau, 4/12/2013, MESR

Des propriétés aux applications

Informatique et communication

Energie

Photovoltaique

Membranes
Capteurs chimiques

Relation énergie-impulsion

Electronique rapide

Mobilité électronique

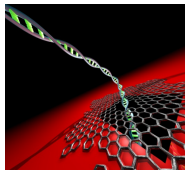
Conducteurs transparents

Absorption optique

Ecrans tactiles souples

Déformabilité

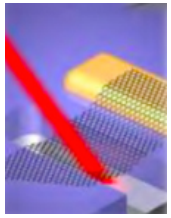
Aéronautique
Automobile



Santé

Epaisseur atomique

Résonateurs



Matériaux

Résistance mécanique

Composites conducteurs
Encres conductrices

Source A.Loiseau, 4/12/2013, MESR

Le projet en l'état actuel

- Cofinancement Union Européenne et états membres (100 M€ / an pendant 10 ans)

  - volet entièrement financé par l'UE: 'Core Project'
  - volet cofinancé UE et états membres: ERANET +

- 1° Phase: Phase de lancement @ FP7 (30 mois = octobre 2013 – mars 2016)

  - Core Project = Collaborative project – coordinated support action' CP-CSA
  - ERANET + = Flag ERA

- 2° Phase: Phase de maturité @ H2020 avec une nouvelle gouvernance (> 2016)
  - élargissement du consortium du 'Core Project'
  - projets satellites
  - montée en puissance des financements
  - négociation en cours

Source A.Loiseau, 4/12/2013, MESR

Appel ouvert

Latest news...

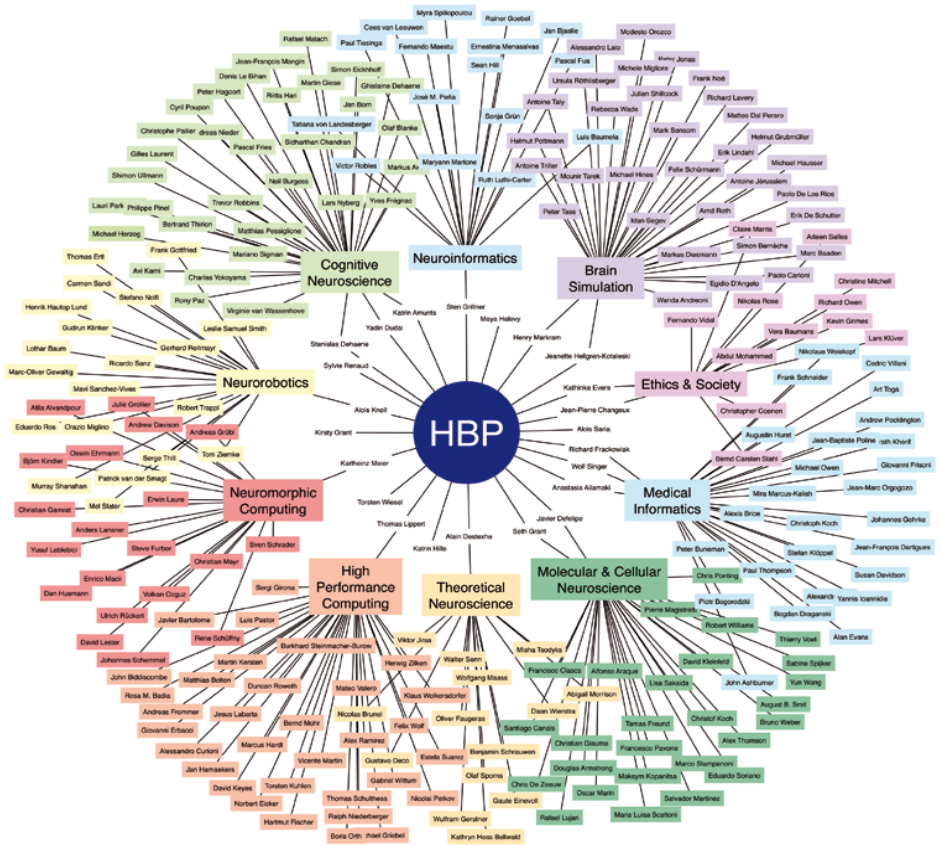
- Première extension du Core Project dans la première phase
- Réserve de 9.2M€ pour de nouveaux partenaires soit 18 – 24 consortia d'équipes
- 11 thèmes orientés vers des recherches applicatives + 1 thème blanc
- 1 à 2 projets seront sélectionnés par thème (350 ou 700 k€ / projet)
- Projets portés par des consortia de 2 - 4 équipes, partenaire industriel souvent requis
- Intégrabilité et complémentarité vis-à-vis des WP existants doit être démontrée
- Institutions déjà partenaires non éligibles (CNRS, CEA...)
- Ouverture: 25 novembre 2013 - date limite de soumission: 5 février 2014
  http://www.graphenecall.esf.org/
- Evaluation et sélection par un comité d'experts extérieurs au Flagship

The Human Brain Project (HBP)

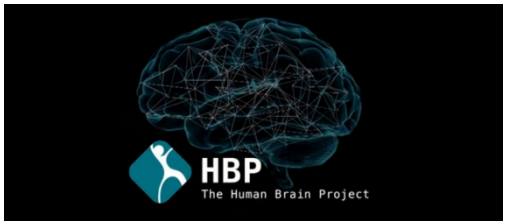
HBP will create the wold's largest **experimental facility for developing the most detailed models of the brain** (from genes to mind), for studying how the human brain works and ultimately for simulating and developing personalised treatment of brain diseases.

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€)

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FETFLAG 1: Framework Partnership Agreement (FPA) - 2014

- **Two Framework Partnership Agreements between the EC and the Flagship partners** will be established through a call in 2014 in order to formalise in particular:
  - the EC long-term commitment to support the Flagships, and
  - the partners' commitment to establish, maintain and implement the strategic research agenda of each of the Flagships

- At later stages, specific grant agreements will be signed, using the modalities set out in the FPA. Initially this will be the follow-up core projects called for in 2015.

- No budget
- Deadline: 10/4/2014

FET Flagships Core projects -2015

The core project should progress FET Flagship research tasks in accordance with the defined roadmap, and also (amongst others)

- ensuring the overall continuity and coherence
- governance of the initiative
- collaboration with other initiatives or programmes at regional, national, transnational or global level (e.g. related ERANET projects)

Type of action: Research and Innovation Action funded through a specific grant agreement Framework Partnership Agreement.

Budget:

Graphene FPA: EUR 89 million from the 2015 budget
HBP FPA: EUR 89 million from the 2015 budget

Indicative timetable: Second quarter of 2015

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FETFLAG 2: Policy environment for FET Flagships - 2014

Specific challenge: The overall challenge is to foster a common European effort by contributing to dissemination efforts, impact assessments and other actions which support and strengthen the FET Flagship initiatives. This also extends to enhancing the interplay between FET Flagships and other Union policies and technology transfer of technologies towards exploitation.

Scope: Supporting the policy environment by addressing aspects such as:
•Supporting collaboration between the FET Flagships and international programmes;
•Assessing the impacts of FET Flagship initiatives, including through metrics and indicators;
•Analysing market potential and supporting technology transfer;
•Collection of information need for policy making, e.g. through consultation actions and surveys.

Budget and deadline: 1,6M€ -> Deadline 10/4/2014

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

  - Coordonné par l'ANR
  - Contact Edouard Geoffrois (edouard.geoffrois@agencerecherche.fr)

FET 2014-2015 – EN RÉSUMÉ

HORIZON 2020
LE PROGRAMME DE RECHERCHE ET D'INNOVATION DE L'UNION EUROPÉENNE

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FET WP2014-15
Budget prévisionnel 479,2M€

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- **Call FET-Open - fostering novel ideas** **160M€**
  - FETOPEN1: FET-Open research projects
    - 77M€ 30/9/2014
    - 38,5M€ 31/3/2015
    - 38,5M€ 29/9/2015
  - FETOPEN2: Coordination and Support Activities 2014
    - 3M€ 30/9/2014
  - FETOPEN3: Coordination and Support Activities 2015
    - 1,5M€ 31/3/2015
    - 1,5M€ 29/9/2015
- **Call FET-Proactive - nurturing emerging themes and communities** **35M€**
  - FETPROACT1: Global Systems Science (GSS)
    - 10M€ 01/4/2014
  - FETPROACT2 : Knowing, doing and being; cognition beyond problem solving
    - 15M€ 01/4/2014
  - FETPROACT3 : Quantum simulation
    - 10M€ 01/4/2014

FET WP2014-15
Budget prévisionnel 479,2M€

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- **Call FET Proactive - towards exascale High Performance Computing 97,4M€**
  - FET HPC1: HPC Core Technologies, Programming Environments and Algorithms for Extreme Parallelism and Extreme Data Applications
    - 93,4M€ 25/11/2014
  - FET HPC2: HPC Ecosystem Development
    - 4M€ 25/11/2014

Call FET-Flagships - tackling grand interdisciplinary science and technology challenges 179,6M€

- FETFLAG1: Framework Partnership Agreement (FPA)
  - na 10/4/2014
- FETFLAG2: Policy environment for FET Flagships
  - 1,6M€ 10/4/2014
- Graphene & Human Brain Project FET Flagship Core Projects (under FPA)
  - 2x89M€ Q2/2015

- **Other (study, experts, communication) 7,2M€**

HORIZON 2020

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

PCN – Technologies Futures et Emergentes (FET)

Frédéric Laurent, représentant Comité de programme, MESR
Fabienne Ragache, experte Comité de programme, DGCIS

Coordination – Martine Garnier-Rizet, responsable scientifique

Martine Knibiehler, mission interdisciplinarité

Subbarao Bassava, responsable des relations internationales

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

PCN - Calendrier des journées en région

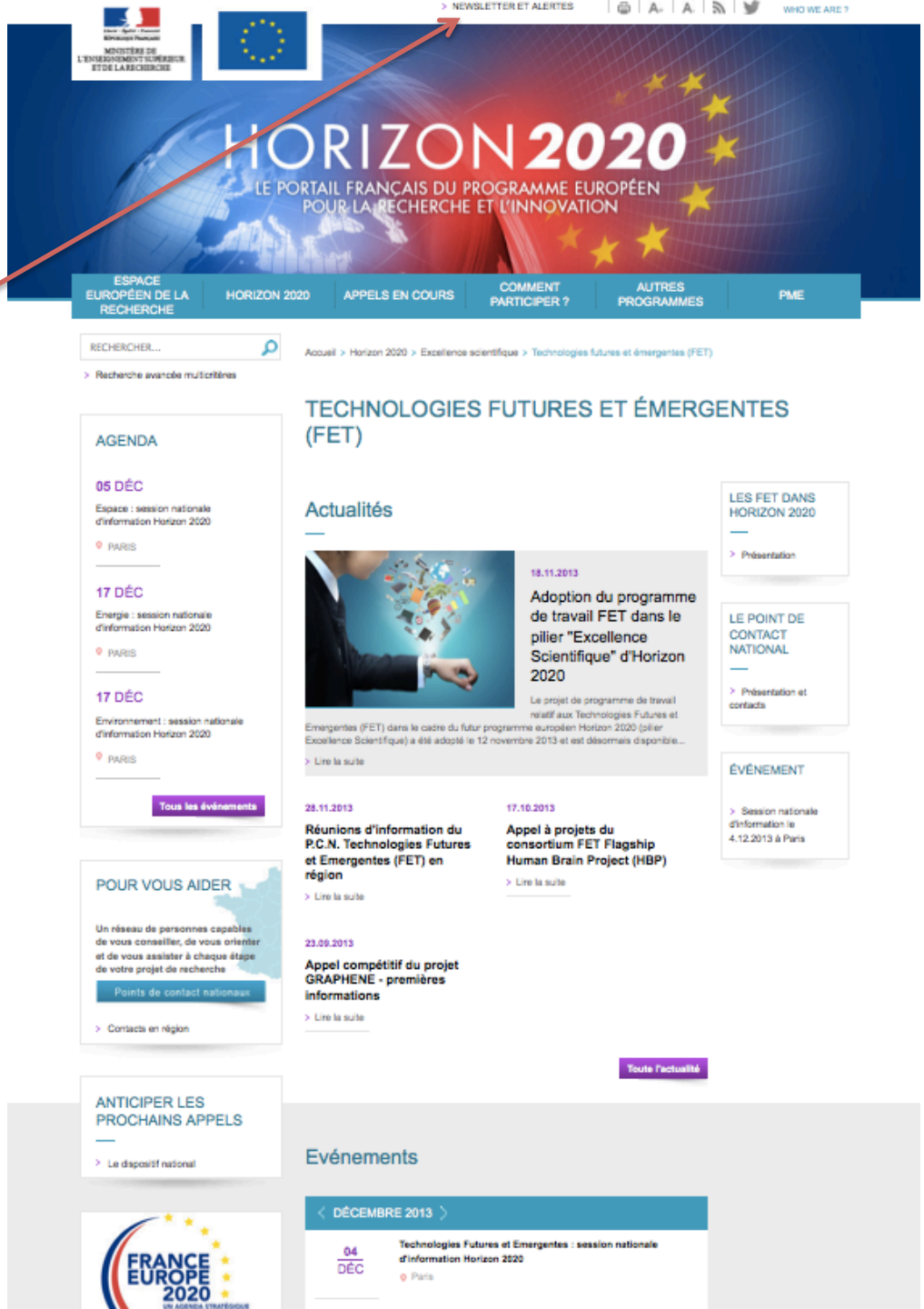
Région	Date
Basse-Normandie	2/12/2013
Aquitaine	6/12/2013
PACA-Nice PACA-Marseille	12/12/2013 23/01/2014
Midi-Pyrénées	20/01/2014
Ile de France	20-22/01/2014
Pays de la Loire	01/2014
Nord Pas de Calais	01/2014
Alsace	01/2014
Lorraine	01/2014

Infoday - FET Proactive
20 janvier 2014, Bruxelles

Inscription en ligne
jusqu'au 12 janvier 2014

https://ec.europa.eu/digital-agenda/en/news/horizon-2020-future-emerging-technologies-fet-information-day

Abonnez-vous à la Lettre d'information et aux alertes !



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Merci de votre attention !

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