



## Struttura di Horizon 2020

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www.apre.it





Initial Commission proposal for a €80 billion research and innovation funding programme (2014-2020); now just over €70 billion (79 billion in current prices including inflation)







## **Europa 2020 - 5 main objectives**

EMPLOYMENT	75% of the population aged 20-64 should be employed
RESEARCH AND INNOVAT	TION 3% del PIL dei Paesi EU investito in R&D
	A reduction of CO2 emissions by 20%
CLIMATE/ENERGY	A share of renewable energies up to 20%
	An increase in energy efficiency by 20%
EDUCATION/TRAINING	The share of early school leavers should be under 10%
_	At least 40% of the younger generation should
	have a degree or diploma
POVERTY	20 million fewer people should be at risk of poverty





## 7 "Flagship Initiatives"

SMART GROWTH	SUSTAINABLE GROWTH	INCLUSIVE GROWTH
Innovation « Innovation Union »	Climate, energy and mobility « Resource efficient Europe »	Employment and skills « An agenda for new skills and jobs »
<b>Education</b> « Youth on the move »	Competitiveness « An industrial policy for the globalisation era »	Fighting poverty « European platform against poverty »
<b>Digital society</b> « A digital agenda for Europe »		



# Innovation Union





### **Innovation Union-THE COMMITMENTS**

- 1. Training researchers
- 2. University ranking system
- 3. Developing new curricula
- 4. ERA Framework
- 5. European Research infrastructures
- 6. Programmes focusing on EU2020
- 7. Involvement of SMEs in R&I

- 8. Forum on Forward Looking Activities
- 9. EIT to expand its activities
- 10. New financial instruments for private finance
- 11. Free Venture Capital funds
- 12. Crossborder matching of innovative firms
- 13. Review of State aid R&D&I
- 14. EU Patent

- 15. Screening of key regulatory frameworks
- 16. Modernise standard-setting
- 17. Precommercial and public procurements
- 18. Ecoinnovation action plan
- 19. European Design Board
- 20. Open access
- 21. Knowledge transfer

- 22. European market for patents and licensing
- 23. Safeguard of IPRs
- 24. Smart Specialisation
- 25. Focus on Innovation in the next Structural Funds
  - 26. European Social innovation pilot
- 27. Research programmes on public sector and social innovation
- 28. Partners consultation on knowledge economy

- 29. European Innovation Partnerships
- 30. Policies for researchers to reside in Europe
- 31. Scientific cooperation with third countries
- 32. International agreements on research infrastructures
- 33. MS to carry out self assessments
- 34. New indicator for fast-growing companies and monitoring

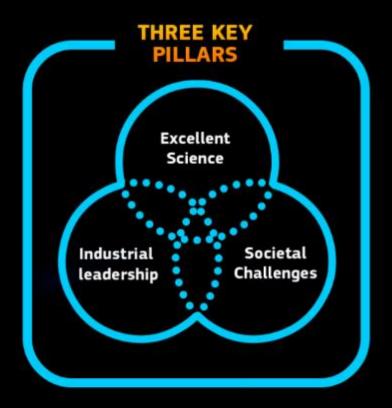




## **HORIZON 2020**







Research and Innovation



## **H2020 Structure**

#### **Excellent Science**

- European Research Council
  - Frontier research by the best individual teams
- Future and Emerging Technologies
  - Collaborative research to open new fields of innovation
- Marie Skłodowska Curie actions
  - Opportunities for training and career development
- Research infrastructures (including e-infrastructure)
  - Ensuring access to world-class facilities

#### **Industrial Technologies**

- Leadership in enabling and industrial technologies
  - ICT, nanotechnologies, materials, biotechnology, manufacturing, space
- Access to risk finance
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- Innovation in SMEs
  - Fostering all forms of innovation in all types of SMEs

#### **Societal Challenges**

- Health, demographic change and wellbeing
- Food security, sustainable agriculture, marine and maritime research & the bioeconomy
- Secure, clean and efficient energy
- Smart, green and integrated transport
- Climate action, environment resource efficiency and raw materials
- Inclusive, innovative and reflective societies
- Security society

**European Institute of Innovation and Technology (EIT)** 

**Spreading Excellence and Widening Participation** 

Science with and for society



# Supporting our excellent science base



#### **Excellent Science**

#### European Research Council

Frontier research by the best individual teams

#### Future and Emerging **Technologies**

 Collaborative research to open new fields of innovation

#### Marie Skłodowska Curie actions

 Opportunities for training and career development

#### Research infrastructures

(including e-infrastructure)

Ensuring access to world-class facilities

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## **Excellent science**

## Why:

- World class science is the foundation of tomorrow's technologies, jobs and wellbeing
- Europe needs to develop, attract and retain research talent
- Researchers need access to the best infrastructures









## **Fundamental activity**

Providing attractive, long-term funding to **support excellent investigators** and **their research teams** to pursue ground-breaking, high-gain/ high-risk research.

Research funded by the ERC is expected to lead to advances at the frontiers of knowledge and to set a clear and inspirational target for frontier research across Europe.







## **ERC Funding Schemes**



#### Starting Grants

starters (2-7 years after PhD) up

#### Consolidator Grants

consolidators (7-12 years after PhD) up to € 2.75 Mio for 5 years

**Prior to 1st January 2015** 

#### Advanced Grants

track-record of significant research achievements in the last 10 years up to € 3.5 Mio for 5 years

## Synergy Grants

2 – 4 Principal Investigators up to € 15.0 Mio for 6 years

#### Proof-of-Concept

bridging gap between research - earliest stage of marketable innovation up to €150,000 for ERC grant holders

**NO SYNERGY GRANTS FOR THE YEARS 2014-2015** 







## Main features

- Scientific excellence is the sole criterion
- Applications can be made in any field of research
- Independent researchers of any age and career stage
- Principal Investigators from anywhere in the world
- The ERC frontier research grants aim to empower individual researchers and provide the best settings to foster their creativity
- Host institutions must provide appropriate conditions for the Principal Investigator to independently direct the research and manage its funding







## Eligible Principal Investigator

- any age and nationality and may reside in any country in the world at the time of the application.
- Principal Investigators funded through the ERC frontier research grants shall spend a minimum percentage of their total working time in an EU Member State or Associated Country<sup>1</sup> and a minimum percentage of their total working time on the ERC project



<sup>1</sup> http://ec.europa.eu/research/participants/data/ref/h2020/grants\_manual/hi/3cpart/h2020-hi-list-ac\_en.pdf?\_=58655886



## **Eligible Host Institution**

- The host institution (Applicant Legal Entity) must engage the Principal Investigator for at least the duration of the project
- It must either be established in an EU Member State or Associated Country
- This does not exclude field work or other research activities in cases where these must necessarily be conducted outside the EU or the Associated Countries in order to achieve the scientific objectives of the project/activity





THE EU FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION



€6 162 million



Providing training & career development opportunities

Research and Innovation

## Marie Skłodowska-Curie Actions (MSCA)

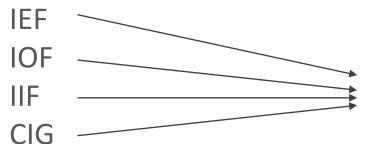


FP7 H2020



Innovative
Training
Networks (ITN)

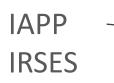
Doctoral and initial training of researchers proposed by international networks of organisations from public and private sectors



Individual Fellowships

(IF)

Individual fellowships for most promising experienced researchers to develop their skills through international or inter-sector mobility



R&I Staff Exchange (RISE) International and inter-sector cooperation through the exchange of research and innovation staff



Co-funding of regional, national and international programmes







At the time of the relevant deadline for submission of proposals, or recruitment/secondment by the host organisation, depending on the action, researchers shall not have resided or carried out their main activity (work, studies, etc) in the country of their host organisation for more than 12 months in the 3 years immediately prior to the reference date.



## **Participants**



#### **Academic sector**

Academic sector includes the following organisation: universities (public and private), higher education institutions (public and private), non-profit research institutions (public and private), research foundations, research institutions associated to foundations and international European interest organisations.

#### Non-academic sector

Non-academic sector includes any socio-economic actor not included in the academic sector and fulfilling the requirements of the Horizon 2020 rules for participation





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THE EU FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION €2 696 HORIZON 2020 million **Development of future &** emerging technologies



## Future and Emerging Technologies (FE



Pathfinding Europe's technological future

"Future and emerging technologies shall support collaborative research in order to extend Europe's capacity for advanced and paradigm-changing innovation.

It shall foster [1] scientific collaboration across disciplines on radically new, highrisk ideas and [2] accelerate the development of the most promising emerging areas of science and technology, as well as [3] the Union wide structuring of the corresponding scientific communities"



## FET Funding Schemes



Open, light and agile

Roadmap based research

## **FET-Open**

#### Early Ideas

Individual research projects

Exploring novel ideas

## **FET Proactive**

## Exploration and Incubation

Topical clusters of research projects

Developing topics & communities

## **FET Flagships**

## Large-Scale Partnering Initiatives

Common research agendas

Addressing grand challenges



## FET Open: 2014-15

## Call FET-Open: novel ideas for radically new technologies

*Open* is open: all technologies, no thematic restriction

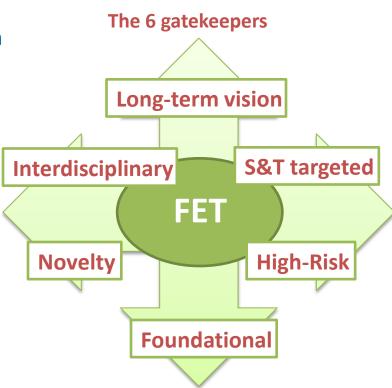
## The scope of FET Open research is defined by 6 gatekeepers

- Bottom-up, but targeted not blue sky research
- Collaborative research

**Total budget**: 160M€ in 2014-15

#### **Instruments**

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





## FET Proactive 2014-2015

A set of thematic initiatives on promising emerging research themes.

#### **Structured around 9 candidate topics**

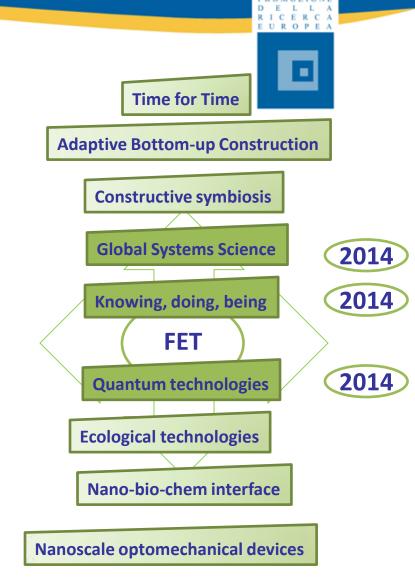
(defined through over 1927 contributions)

- Collaborative research
- Fixed deadlines calls
- 15 page proposals
- 1 step submission, 1 stage evaluation
- 3 evaluation criteria

**Total budget**: 35M€ in WP 2014-15

#### Instrument

Research and Innovation Actions (100% funding)





# FET Flagships: 2014-2015

## Graphene & Human Brain Project selected





Preparatory Phase Pilots 05/2011 - 04/2012

Call for
Preparatory Actions
21 → 6
July 2010

Stimulating ideas & structuring the scientific community 2009 - 2010

Flagship selection 6 → 2 end 2012 FP7 ramp-up phase 10/2013- 03/2016







## Research Infrastructures

## Three main objectives

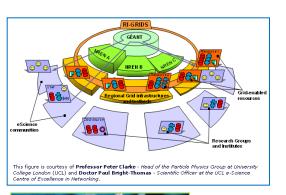
- Developing the European research infrastructures for 2020 and beyond
- Fostering the innovation potential of research infrastructures and their human capital
- Reinforcing the European research infrastructure policy and international co-operation



# A P R E A G E N Z I A P E R L A PROMOZIONE D E L L A R I C E R C A E U R O P E A

## Definition of Research Infrastructures





Any facilities and resources that provide to the scientific community essential services needed for the performance of leading edge research in both an academic and/or industrial environment.

Research Infrastructures should be **open to researchers**, to the scientific community and to the Industry and cover the whole range of scientific and technological fields.





**GEANT** grid

Mouse straine
Alfred Wegener Institute for
Polar and Marine Research Vessel
Mobile facilities
for in situ non-invasive measurements
James Clerk Maxwell Telescope
British Museums



## What the RIs Programme does NOT cov



- Collaborative Research
- Purchasing/modernizing Ris
- Building RIs



Member States are in charge of building new RIs





# What the RIs Programme does cover

- 1. Developing the European RIs for 2020 and beyond
  - Developing new world-class RIs (1st Call);
  - Integrating and opening national and regional RIs of European interest (2<sup>nd</sup> Call);
  - Development, deployment and operation of ICT based e-infrastructures (3<sup>rd</sup> Call).
- 2. Fostering the innovation potential of RIs and their human resources
- 3. Reinforcing European RI policy and international cooperation





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# Building Industrial Leadership in Europe

### Struttura del programma



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# Industrial leadership

## Why:

- Strategic investments in Key Enabling Technologies (e.g. advanced manufacturing, biotechnlogy, micro/nanoelectronics, photonics, ) underpin innovation across existing and emerging sectors
- Attracting more private investment in research and innovation
- More innovative SMEs (small and mediumsized enterprises) to create growth and jobs













Photonics

Manufacturing

Biotechnology

**Advanced Materials** 

Micro/Nanoelectronics

Nanotechnologies

- Knowledge intensive
- Associated with high R&D intensity, rapid innovation cycles, high capital expenditure and highly skilled employment.
- Enable process, goods and service innovation throughout the economy and are of systemic relevance [underpin innovation across existing and emerging sectors].
- They are **multidisciplinary**, cutting across many technology areas with a trend towards **convergence** and **integration**. KETs can assist technology leaders in **other fields to capitalise** on their research efforts

<sup>\*</sup>Current situation of key enabling technologies in Europe, SEC (2009)





RISK FINANCE

€2 842 million

Cooperation with European Investment Bank & European Investment Fund

Debt & Equity Financing

VENTURE CAPITAL

Access to risk finance

INVESTMENT-READY - BANKABILITY - AFFORDABLE FINANCE - SMES-MIDCAPS - GROWTH-EXPANSION



## **HORIZON 2020**

20% of the total budget for societal SME Instrument (E3 000 million) challenges and LEITs Strengthening participation of innovative SMEs

Tackling societal challenges for a better society

### Struttura del programma



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# Societal challenges

# Why:

- Concerns of citizens and society/EU policy objectives (climate, environment, energy, transport, etc) cannot be achieved without innovation
- Breakthrough solutions come from multidisciplinary collaborations, including social sciences & humanities
- Promising solutions need to be tested, demonstrated and scaled up







# HORIZON 2020

€7 472 million



# Better health for all

EVENTING DISEASE - BETTER DIAGNOSTICS AND TREATMENTS - AGEING WELL - SUSTAINABLE HEAL



€3 851 million



Making the best of our biological resources for food security and sustainable growth

BLUE GROWTH - BIOECONOMY - GREEN GROWTH - FOOD SECURITY - RENEWABLE BIOLOGICAL RE

€5 931 HORIZON 2020 million Clean, safe, reliable & affordable energy Secure, clean & efficient energy



# HORIZON 2020

€6 339 million



# Smart, Green & Integrated Transport

ENT TRANSPORT - NEXT GENERATION OF INFRASTRUCTURES - BETTER MOBILITY - MOBILITY FOR G

HORIZON 2020

€3 081 million

Climate action, environment, resource efficiency & raw materials

(ET - SUSTAINABLE SUPPLY OF RAW MATERIALS - LOW CARBON ECONOMY - MANAGING WATER RES



€1 310 million

# Inclusive, innovative & reflective societies

LE AND INCLUSIVE GROWTH - CONTRIBUTING TO THE EUROPEAN RESEARCH AREA - STUDYING NEV





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Joint Research Center (JRC)



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€816 THE EU FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION HORIZON 2020 million EXCELLE Widening participation



#### **HORIZON 2020**



European Institute of Innovation & Technology

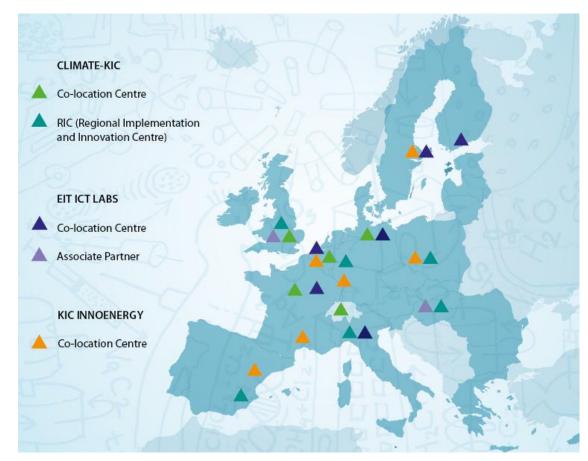
Integrating higher education with Research & Innovation







- sustainable energy ('KIC InnoEnergy'),
- climate change ('ClimateKIC')
- future information and communication society ('EIT ICT Labs')









Joint Research Centre **European Commission's in-house science service**which employs scientists to carry out research in order to provide independent scientific advice and support to EU policy

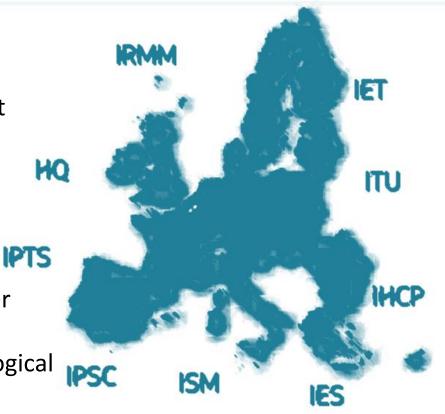


#### **JRC Institutes**

The Institute for Reference Materials and Measurements (IRMM)

- The Institute for Transuranium Elements (ITU)
- 3. The Institute for Energy and Transport (IET)
- 4. The Institute for the Protection and Security of the Citizen (IPSC)
- 5. The Institute for Environment and Sustainability (IES)
- 6. The Institute for Health and Consumer Protection (IHCP)
- 7. The Institute for Prospective Technological Studies (IPTS)
- Headquarters (HQ)
- Ispra Site Management (ISM)









€939 million



Strong focus on nuclear safety

Euratom Programme: nuclear fission & fusion research







**International Cooperation** 



#### HORIZON 2020 BUDGET (EUR 78.6 billion, current prices)

