

European Programme for Research and Innovation Horizon 2020:

Opportunities for research and commitment to society

If you ask a member of the public about the meaning of FP7 or H2020, they might wonder, 'What on earth this has to do with us?'. Indeed, not so long ago scientists were considered a closed society living in ivory towers, spending much of their time in exotic laboratories and academic institutions.

Now, there is a growing commitment of scientists to share our knowledge and opinions with society. Indeed, it is our duty to explain how we use public funds invested in the development of basic science and technology. Investment in scientific research and education is essential for sustainable economic development. This is a basic principle, which motivated the goal established in 2000 by the European Council in Lisbon for Europe to become the world's most competitive and dynamic knowledge-based economy. Achieving this requires a firm commitment from the European Union, and each country in Europe, to continue to invest in scientific education and research, and to work to implement a unified research policy. The European Physical Society (EPS) strongly supports this view and moreover affirms its belief that re-focusing Europe as a knowledge-based society is the best way to deal with present and future social and economic challenges.

Horizon 2020 opportunities for research

The European research programme Horizon 2020 is a unique opportunity to reinforce the vital relation between basic science and technological applications, and thus to advance Europe's position in both research and innovation. Funding priorities and mechanisms in Horizon 2020 are founded on the principles that basic science and technology are interdependent, they drive each other in a synergetic way, and that both must be supported [1].

Horizon 2020 is an opportunity for both researchers and policy makers to recognise and expand Europe's scientific and technological strength. Europe has a dynamic culture of research creativity and diversity, and leads the world in areas ranging from fundamental particle physics to communications and aerospace technologies. But there is much room for improvement: for example, reducing research fragmentation and bureaucracy will improve use of public resources; simplifying academic-industry linkages will reduce time to market for new technologies; strengthening public-private partnerships will better promote growth and create jobs. Horizon 2020 has potential to support Europe's strengths and address Europe's

weaknesses. Investment in research is essential for economic growth, and reaffirms Europe's commitment to its future.

Horizon 2020 funding structure

The European Research Programme Horizon 2020 (H2020) will provide funding (in the range of €70 billion) for research and innovation from 2014 to 2020, bringing together all EU research and innovation funding provided through the Framework programme for Research and Technological development (FP), the Competitiveness and Innovation Framework Programme (CIP) and the European Institute of Innovation and Technology (EIT), with three strategic objectives [table 1]:

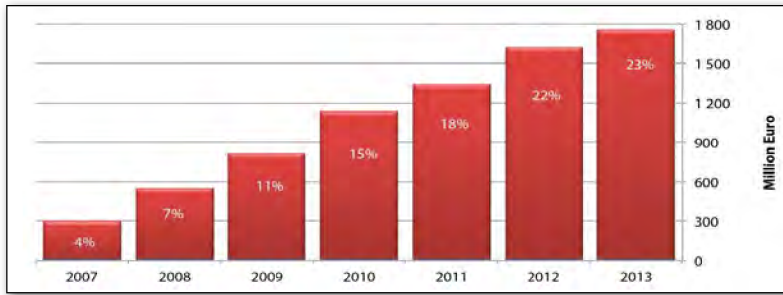
'Excellent science' including European Research Council grants to top-level individual researchers working in Europe, investment in emerging technologies to open up new fields of research and Marie Curie Actions to develop research and innovation skills through the training, mobility and career development of young researchers.

'Industrial leadership' including major investments in key industrial technologies such as, Information and Communication Technologies, Industry and Societal challenges, Nanotechnologies, Biotechnology and Space.

'Societal challenges' focusing on key areas like health and ageing, food security, clean and efficient energy, climate and smart transport where there is a need to involve the general public in the debate as well as in the scientific and political institutions. Societal challenges, as

▼ Table 1:
Foreseen
distribution
of H2020
budget

I. Excellent Science	31.73 %
1. European Research Council	17.00
2. Future and Emerging Technologies	3.50
3. Marie Curie actions	8.00
4. Research infrastructures	3.23
II. Industrial Leadership	22.09 %
1. Leadership in enabling and industrial technologies	17.60
2. Access to risk finance	3.68
3. Innovative small and medium-size enterprises	0.80
III. Societal Challenges	38.53 %
1. Health, demographic change and wellbeing	9.70
2. Food quality and marine research	5.00
3. Energy	7.70
4. Transport	8.23
5. Climate action, resources and raw materials	4.00
6. Inclusive societies	1.70
7. Secure societies	2.20
Spreading excellence and widening participation	1.06
Science with and for society	0.60
European Institute of Innovation and Technology-EIT	3.52
Joint Research Centre	2.47
Total	100%



◀ Fig 1: ERC budget evolution during FP-7 [<http://erc.europa.eu/about-erc/facts-and-figures>]. The ERC represents 15% of the overall FP7 budget (€ 7.51 billion of € 50.5 billion) as compared with 17% of the H2020 budget.

Outlook

Science and education provide the tools to understand current social challenges. They provide citizens with the capability of critically examining options presented to them. This free thinking enables independent and well-founded views on the difficult social and economic issues that lie ahead of us.

We urge research policy makers at the European level to support European research and development through a coherent and inclusive European and regional policy that strengthens the mutually beneficial relationship between education, research and innovation. Research and education provide the opportunities for innovation that Europe needs. ■

■ C. Hidalgo, D. Lee and J. Dudley,
European Physical Society

powerful drivers of change in economy, require cooperation along the whole chain from research to solutions.

The H2020 goal is to bring excellent research results to market with benefits to citizens by strengthening innovation with bottom-up activities, allowing Europe's brightest minds to propose their own solutions, reversing brain-drain and attracting talent from around the world and retain researchers in Europe, developing industrial leadership and competitiveness and promoting science education.

The European Research Council (ERC) has fulfilled the high expectations placed on it by the research community during the short time since it was established at the beginning of the 7th Framework Programme (FP-7). Thus, we are pleased with the increased funding in H2020 as compared to FP-7 [fig. 1]. The ERC is a successful pan-European funding organisation for frontier research that has funded, through both ERC Starting and Advanced Grants, over 3,600 frontier research projects throughout Europe [2] and has become a reference of the competitiveness and excellence of national research and innovation systems, complementing existing funding schemes at national and European levels. The last ERC call under FP-7, saw an increase in the demand for these grants, which is a continuing trend. The next Starting Grant calls will fall under the new Framework Programme, H2020. Providing clean and efficient energy is a key strategic challenge in Europe, with the H2020 programme bridging previous FP7 and CIP programmes (e.g. Fuel Cells and Hydrogen, Intelligent energy Europe programme) and the Strategic Energy Technology Plan-SET [3] (e.g. European Industrial Initiatives, European Energy Research

Alliance) initiatives [table 2]. The H2020 funds for energy (in the range of 7 %) and climate action (4%) are symbols of the importance of these challenges worldwide [4].

Europe 2020 financial instruments

We believe that current austerity measures in many countries in Europe should not jeopardise the future of Europe as a knowledge-based society. It is more important than ever that Horizon 2020 maintain its ambitious objectives, including support for: infrastructure and new facilities; both team-driven research and individual researchers; mobility, training and education. The European H2020 funding must be also supported with actions at national level for re-launching Europe as knowledge based society.

In addition, synergy is required between Horizon 2020 and the structural funds as financial tools set up to implement the regional policy of the European Union. The full commitment of EU and national politicians is essential, as key pillars in our democratic societies, with a truly European Research and Education global policy.

▼ Table 2: H2020 programme bridging previous FP7, Competitiveness and Innovation Framework (CIP) Programmes and the Strategic Energy Technology (SET) Plan

FP7	Horizon 2020
Energy	Challenge: secure, clean and efficient energy
Fuel Cells and Hydrogen-Joint Undertaking [www.fch-ju.eu]	Challenge: Secure, Clean and Efficient Energy. Alternative fuels and mobile energy sources (Reducing time to market for hydrogen and fuel cells technologies)
Competitiveness and Innovation Framework Programme (CIP)	Horizon 2020
Intelligent Energy Europe Programme (IEE)	Robust decision making and public engagement. Market uptake of energy innovation, empowering markets and consumers.
Strategic Energy Technology Plan (SET Plan Initiatives)	Horizon 2020
European Industrial Initiatives (EII) - EII Solar, Wind, Carbon capture and storage (CCS), Bioenergy, Smart Grids.	It may be envisaged that existing European Industrial Initiatives of the SET Plan are turned into formalised public-private partnerships to increase the level and coherence of national funding and to stimulate joint research and innovation actions among Member States.
European Energy Research Alliance (EERA) [www.eera-set.eu]	Further support may also be provided to the EERA established under the Strategic Energy Technology Plan (SET Plan).