Horizon 2020 condensed

Societal Challenge 3: Secure, Clean and Efficient Energy

What is the 'Energy Challenge' and who should apply?

The specific objective of this challenge is "to make the transition to a reliable, sustainable and competitive energy system, in the face of increasingly scarce resources, increasing energy needs and climate change." Funding for the Energy challenge will be predominantly for collaborative projects with activities to support the full innovation cycle – from proof of concept to applied research, pre-commercial demonstration and market uptake measures. There will also be support for the European Innovation Partnership on Smart Cities and Communities and the Public-Private Partnerships on Energy Efficient Buildings and Sustainable Process Industries.

Under each area of activity, projects which implement the main aims of the updated European Strategic Energy Technology (SET) Plan, the ambitious EU 2030 energy and climate targets, as well as the COP21 Paris Agreement will be a priority. Furthermore, the priorities for funding will also be determined by the Research and Innovation aspects of the European Energy Union strategy that aims to make Europe the world number one in renewable energies. The Energy challenge retains most of the essential features of the FP7 Energy theme, but has a greater focus on close-to-market activities (integrating the Intelligent Energy Europe programme, which ran from 2007 to 2013).

What will be funded?

The 2018-2020 Energy Work Programme supports research, demonstration, innovation and market-uptake actions across different low-carbon energy sectors, notably in the core priorities identified in the Energy Union Strategy: renewable energy, smart energy systems, energy efficiency and, as an additional priority, Carbon Capture Utilization and Storage. The vast majority of activities funded under this Work Programme contribute to the Focus Area "**Building a low-carbon, climate resilient future**", while some also contribute to the "**Connecting economic and environmental gains – the Circular Economy**" and "**Digitising and transforming European industry and services**" Focus Areas.

While the Work Programme consists of a single call: "Building a Low-Carbon, Climate Resilient Future: Secure, Clean and Efficient Energy" it is divided in to a number of sub-calls, which reflect the different priorities for funding mentioned above: Energy efficiency, Global leadership in renewables, Smart and clean energy for consumers, etc. – each with several topics that proposals can be submitted to. Furthermore, inducement prizes, public procurement, etc. are included in a section called "Other Actions".

Activities specifically targeting Fuel Cells and Hydrogen are not supported under this work programme, but through calls for proposals of the **Fuel Cells and Hydrogen Joint Undertaking**.

Energy Efficiency

An ambitious approach to energy efficiency is needed across all sectors, but the major challenge of the next decade lies in buildings, which represent 40% of energy used in the EU. A strong boost in research and innovation investments to remove current technological and market uptake obstacles is required for the EU to achieve its 2030 energy efficiency objectives. The Energy Efficiency call has a strong focus on consumer-related issues and a strong consumer-orientated approach in many of the topics. It contributes to the specific objectives, targets and relevant Implementation Plans of the SET Plan action 5.1 and 5.2.

Global Leadership in Renewables

The challenge for Europe is to create an industrial renewable energy sector that is economically sustainable and competitive in European and global markets in the long term. For this purpose, this call supports activities across the full innovation chain, from identifying breakthrough technologies to supporting the entire portfolio of renewable energy technologies at laboratory scale, dedicating

support to validation in relevant environment of most promising technologies, finally supporting market up-take introduction with collaborative and not purely technological activities.

Smart Cities and Communities

To achieve the necessary energy transition in cities, it is essential to increase energy systems integration and to push energy performance levels significantly beyond the levels of current EU building codes and to realise Europe-wide deployment of Positive Energy Districts by 2050.

Integrated innovative solutions for Positive Energy Blocks/Districts will be developed and tested and performance-monitored in the so-called “Lighthouse Cities”. Projects will consider the interaction and integration between the buildings, the users and the larger energy system as well as implications of increased electro-mobility, its impact on the energy system and its integration in planning.

Smart and clean energy for consumers

The Clean Energy for all Europeans package places consumers firmly at the centre of the energy transition, with consumers considered as active market players in the energy system. The future consumer should be better informed and more aware, and have an increased capacity to fully engage in energy markets.

To be successful, the R&I community should not look only at consumers from an electricity grid perspective but make particular effort to understand how consumers consider, use and value the electricity grid and the services it provides to them.

Smart citizen-centred energy system

The EU's energy policy package "Clean Energy for all Europeans" puts the citizen in the centre of the EU's energy system. Actions are needed to support the best implementation of this ambitious legislative proposal and this call on Integrated Energy Systems aims, among others, at preparing and testing solutions to support the new proposals for directives and regulations, which are shaping the energy system of the future.

Enabling near-zero CO2 emissions from fossil fuel power plants and carbon intensive industries

Carbon Capture and Storage (CCS) is one of the key promising technologies that can reduce CO_2 emissions in the power generation sector and the only pathway for very stringent GHG emission reductions from energy and/or carbon intensive industries that generate CO_2 as part of their production processes.

In order to realise its potential, CCS needs to become a cost-competitive technology and prove its safety (mainly regarding pipeline transportation and storage), so that it could start to be commercially deployed and thus contribute to the low-carbon transition of the European economy.

Joint Actions and Cross-cutting Issues

A number of joint actions (e.g. Joint Programming or Pre-Commercial Procurement) will also be funded under this Work Programme, as will actions focusing on cross-cutting issues in Horizon 2020, such as Socio-economic Sciences and Humanities or digitisation.

Other Actions and Contributions to other Work Programmes

Several Energy Challenge-related topics will contribute to the "**Digitising and transforming European industry and services**” Focus Area, and consequently be included in the ICT Work Programme, while others will contribute to the “**Boosting the effectiveness of the Security Union**” Focus Area and will thus be included in the Security Challenge Work Programme.

Under ‘Other Actions’, the Commission will also fund the preparatory and implementation phase of the new **EU-Africa Research and Innovation Partnership on Climate Change and Sustainable Energy (CCSE)**.

Funding, eligibility and project details

Within each priority area, the Energy Work Programme includes funding mainly for collaborative projects, but also for other project types including public procurement, tenders, and EJP and ERA-NET Cofunds.

The majority of calls are addressed through collaborative, multi-national/multi-partner Research and Innovation Actions, with either a one- or two-stage application process and 100% reimbursement rates. There will also be several Coordination and Support Action topics, also with single-stage application process and 100% reimbursement rates.

A small number of calls are addressed through Innovation Actions, with a single-stage application process and 70% reimbursement rate (100% for not-for-profit organisations, including universities).

While the way in which applicants choose to address a specific topic challenge is largely at their discretion, any specific individual topic requirements will be given in the topic description. Topic specific requirements might include, for example, a multi-disciplinary approach, emphasis on ICT solutions, the involvement of public stakeholders, civil society, SME or other private sector involvement.

2020 Call timings

The 2020 calls are all single-stage and have deadlines in August and September 2019, January and April 2020 and September 2020.

Relevant EU policy areas and developments

Funding under the Energy challenge of Horizon 2020 will reflect the priorities of the updated SET-Plan. The main aims of the SET-Plan are to reduce costs and improve performance of existing energy technologies, and encourage the commercial implementation of these technologies.

This includes second-generation biofuels, capture, transport and storage of carbon, integration of renewable energy sources into the electricity network and energy efficiency in construction, transport and industry. It also supports the longer-term development of new low carbon technologies.

Research priorities include the competitiveness of new technologies relating to renewable energies, energy storage, sustainability of fission energy, fusion energy, and the development of trans-European energy networks. Objectives of the broader EU 2030 Energy Strategy, in particular the goals of achieving significant improvement in energy efficiency and greenhouse gas emissions, are also an important driver.

Funding under the Energy challenge will also reflect the research and innovation aspects of the new Comprehensive Research, Innovation and Competitiveness Strategy of the Energy Union, unveiled in late 2016. The strategy commits the EU to address four core priorities:

- Being a world leader in developing the next generation of renewable energy technologies, including environmentally friendly production and use of biomass and biofuels, together with energy storage;
- Facilitating the participation of consumers in the energy transition through smart grids, smart home appliances, smart cities, and home automation systems;
- Efficient energy systems, and harnessing technology to make the building stock energy neutral; and
- More sustainable transport systems that develop and deploy at large scale innovative technologies and services to increase energy efficiency and reduce greenhouse gas emissions

In addition to the Energy Union, this challenge also contributes, to the EU Digital Single Market, the EU transport policy (in particular the "Europe on the move" package), the Commission's "Jobs, Growth and Investment" agenda, its "Blue Growth" initiative as well as to the EU's research and innovation policy.

As for international cooperation in the area of energy, a **Roadmap for a new joint EU-Africa Research and Innovation Partnership on Climate Change and Sustainable Energy** (CCSE) was agreed by political leaders in October 2017 and will be implemented through the Energy Challenge of Horizon 2020. **PRE-LEAP-RE** is a 14 month project currently running to set the basis for a long-term African-European European Join Programme (EJP).

At the international level, the Commission pushes the acceleration of energy innovation through the Mission Innovation Initiative, which was launched at COP21 in Paris and in addition, many of the activities funded under the current Work Programme contribute in their entirety to the Horizon 2020 spending targets on climate action and sustainable development, addressing in particular the Sustainable Development Goals (SDGs) 7 ("Ensure access to affordable, reliable, sustainable and modern energy for all") and 13 ("Take urgent action to combat climate change and its impacts").

Over €2 billion is earmarked in support of these priorities during the last three years of Horizon 2020 under the 2018-2020 Energy, Climate and Transport Societal Challenges Work Programmes, while additional financing is expected to be available through the European Innovation Council (EIC) and by deepening synergies with the European Structural and Investment Funds.

More information:

- European Commission Research and Innovation Participant Portal for:
  - Calls for proposals: **ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/**
  - Energy Work Programme 2018-2020: **ec.europa.eu/research/participants/data/ref/h2020/wp/2018-2020/main/h2020-wp1820-energy_en.pdf**
- Focus Areas Booklets:
  - **Building a low-carbon, climate resilient future**
  - **Digitising and transforming European industry and services**
  - **Boosting the effectiveness of the Security Union**
  - **Connecting economic and environmental gains – the Circular Economy**
- European Energy Union: **ec.europa.eu/priorities/energy-union**
- EU 2030 Energy Strategy: **ec.europa.eu/energy/en/topics/energy-strategy/2030-energy-strategy**
- Research, Innovation and Competitiveness Strategy of the Energy Union: **ec.europa.eu/energy/sites/ener/files/documents/1_en_act_part1_v6_0.pdf**
- SET Plan: **setis.ec.europa.eu**
- Mission Innovation: **mission-innovation.net**
- UN Sustainable Development Goals: **sustainabledevelopment.un.org**
- European Technology Platforms in the area of energy: **ec.europa.eu/research/innovation-union/index_en.cfm?pg=etp**
- Fuel Cells and Hydrogen JU: **www.fch.europa.eu/**
- Sign up to the UKRO Portal News to stay up to date on Horizon 2020 calls, events and results: **ukro.ac.uk**
- For specific questions, contact your UKRO European Advisor.