THE EU FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020

2016 – 17 Work Programme
Competitive Low Carbon Energy (RES)
Geothermal energy topics

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Outline

• The work programme 2014-2015, lesson learned and overall budget distribution
• The work programme 2016-2017, approach, considerations and topics' description
Lessons Learned from 2014-2015 calls

**Over-subscription:**
- 2 stage evaluation: Stage 1 – a factor 20
- Single stage evaluation: a factor 3 to 5

*In the renewable/fuels area, all TRLs have been addressed:*
- The full development chain is covered
Low Carbon Energy Outcome (553,8M€)

Budget allocation per activity (M€)

- New Knowledge Technology: 18.3 M€
- RIA and IA: 38.8 M€
- Market Uptake measures: 337.8 M€

Grand total 553,8M€

(including SSH, Joint Actions, decarbonisation of the use of fossil fuels)
Low Carbon Energy Outcome

Budget allocation by sector (M€)

- Wind: 55.3
- Ocean Energy: 58.4
- Geothermal: 69.6
- Biofuels/Bioenergy (CHP): 82.7
- CSP: 38.6
- Photovoltaic: 18.3
- Solar Heating & Cooling: 4.4
- Alternative fuels: 10.5

The work programme 2014-2015
2016 - 2017 work programme defining over-arching aims

Per sector to complement past and present activities

- Pursuing technology development to be more cost efficient and cost competitive.
- To push emergent technologies

Globally to achieve policy objectives

- European industries to be world leaders (technology & market)
- Motivate deployment of new technologies
- Develop a new energy system
Low Carbon Energy 2016-2017

Overall:
• Budget: 258,1M€ in 2016 and 256,5M€ in 2017
• Single stage evaluation

Number of topics: 31
• Demonstration topics separated by fields
• New knowledge technologies and market uptake measures focused
• ERANET and joint actions
• SSH

International Cooperation
• Coordinated topic with Mexico and Brazil
Call - COMPETITIVE LOW-CARBON ENERGY

NOT published yet

Draft Horizon 2020 Work Programme 2016-2017 in the area of Societal Challenge 3 "Secure, Clean and Efficient Energy"

http://ec.europa.eu/research/index.cfm?pg=events&eventcode=0B56FA95-AFE0-D63B-DD0527FE301EC26C

All TRLs are addressed
LCE-06-2017: New Knowledge and Technologies

- FP7 Future Emerging Technology (FET) topics have been successful in identifying and promoting new technologies, especially in energy;

- Open bottom-up challenges help to identify and to validate new concepts;

- Focused challenges on emerging concepts help to consolidate technologies and applications.
The work programme 2016-2017

LCE-21-2017: Market uptake of renewable energy technologies

- More focused on emerging needs, specific technology sub-challenges;
- **Geothermal systems**: Tackling the bottlenecks of high penetration levels for geothermal energy systems:
  - Identification of existing barriers
  - Identification of the public concerns
  - Understanding of the socio-economic dimension
- **Heat pumps**: Reducing installation and operation costs to accelerate market penetration
LCE-06 and LCE-21

**LCE-06-2017**

*Type of action*: Research and Innovation action (TRL to 4)

*Indicative EU contribution*: 2-4 M€ - available budget 20 M€

**LCE-21-2017**

*Type of action*: Coord. and support action

*Indicative EU contribution*: 1-3 M€ - available budget 15 M€

*Proposal submission*: submission opening date - 16/09/2016; deadline - 05/01/2017
LCE-07-2016-2017: Developing the next generation technologies of renewable electricity and heating/cooling

• Material improvement to make shallow geothermal systems more efficient.

• Material improvement to increase the longevity and efficiency of deep geothermal systems therefore making them more reliable and cost-competitive.
Expected impacts

- Increased performance of shallow geothermal systems.

- Increased performance, reliability and lifetime and reduced operation and maintenance costs of deep geothermal systems.
Challenges

• 2016 – *Shallow geothermal (low temperature) Improving borehole heat exchangers*. The challenge is to develop new materials and systems to improve the efficiency of borehole heat exchangers by increasing the heat exchanged with the surrounding ground and water to make geothermal sources for heating and cooling more economically attractive.

• 2017 - *Deep Geothermal (medium-high temperature): Materials for geothermal installations*. With the increase of the temperature the geothermal fluids become more aggressive, corrosion and scaling might occur and the efficiency and longevity of the plant components are at stake. The challenge is to develop new materials and systems to increase efficiency and longevity of the installations, by securing the integrity of the well and of the equipment, with particular reference to the pumps.
**LCE-07-2016**

*Type of action:* Research and Innovation action (TRL to 4-5)

*Indicative EU contribution:* 2-5 M€ - available budget: 61 M€

*Proposal submission:* submission opening date - 30/09/2015; deadline - 16/02/2016

**LCE-07-2017**

*Available budget:* 66.5 M€

*Proposal submission:* submission opening date - 16/09/2016; deadline - 05/01/2017
Demonstrating innovative renewable energy technologies - Strategy

• Increase the exploitation of geothermal energy sources, for electricity and heat production and for shallow and deep conditions to harness its full potential;

• Demonstrate the cost-effectiveness, the viability and the efficiency of geothermal energy sources to produce electricity, heat or a combination of both.
Expected impacts

• **Shallow Geothermal** demonstrated as a viable and cost-effective source of heating and cooling in retrofitting existing buildings;

• **Deep Geothermal** demonstrated as a viable and cost-effective source of electricity and/or heat in different geological conditions applying the EGS technology;
LCE-17-2017: Easier to install and more efficient geothermal systems for retrofitting buildings

• **Specific challenge**: to demonstrate the cost-effectiveness and efficiency of geothermal systems for heating and cooling in individual installations being retrofitted.

• **Scope**: Proposals shall target easy to install and efficient underground coupling systems for retrofitting existing types of buildings or adaptable to existing types of buildings in difficult drilling conditions. The need for improved and more cost-efficient heat pumps might be addressed.

• **Type of action**: Innovation action (TRL to be achieved: 7)

• **Indicative EU contribution**: 5 – 8 M€

• **Proposal submission**: submission opening date: 26/05/2017; deadline: 07/09/2017
LCE-18-2017: EGS in different geological conditions

- **Specific challenge**: to increase the number of geothermal installations, enhanced geothermal systems (EGS) have to be demonstrated as cost-competitive; innovative solutions are needed to allow for applications in geologic systems with different characteristics and of different origin.
- **Scope**: testing EGS systems to ensure reservoir productivity in different geological settings and energy production at competitive costs. Proposals could propose up-scaling existing EGS systems.
- **Type of action**: Innovation action (TRL to be achieved: 7)
- **Indicative EU contribution**: 6 – 10 M€
- **Proposal submission**: submission opening date: 26/05/2017; deadline: 07/09/2017
International cooperation with Mexico Strategy

- Europe and Mexico have high potential for geothermal energy generation;
- Large commercial interest of European industries in Mexico;
- Better knowledge and expertise needed to reduce technological and social risks;
- Common interesting areas are unconventional geothermal systems: EGS and superhot geothermal fluids.
Expected impacts

• Concepts and technologies applied in different geological context and consolidated. Progress in the technology development (TRL 3-4 to 4-5);

• Scientific framework for geothermal activities established to allow market expansion for European industries.
LCE-23-2016: International Cooperation with Mexico

- **Specific challenge**: to apply and further develop methodologies and technologies in the field of EGS (Enhanced Geothermal Systems) and of superhot systems to reduce technological, environmental and social risks.

- **Scope**: testing and developing further technologies for EGS and for superhot systems in relevant geological environments.

- **Type of action**: Research and Innovation action (TRL 3-4 → 4-5)
- **Indicative EU contribution**: 10 M€, same amount for the Mexican project
- **Proposal submission**: one-stage evaluation; submission opening date: 27/10/2015; deadline: 16/02/2016
Thank you for your attention!

Find out more:
www.ec.europa/research/horizon2020