#InvestEUresearch

Horizon 2020 Work Programme for Research & Innovation 2018-2020

Geothermal energy

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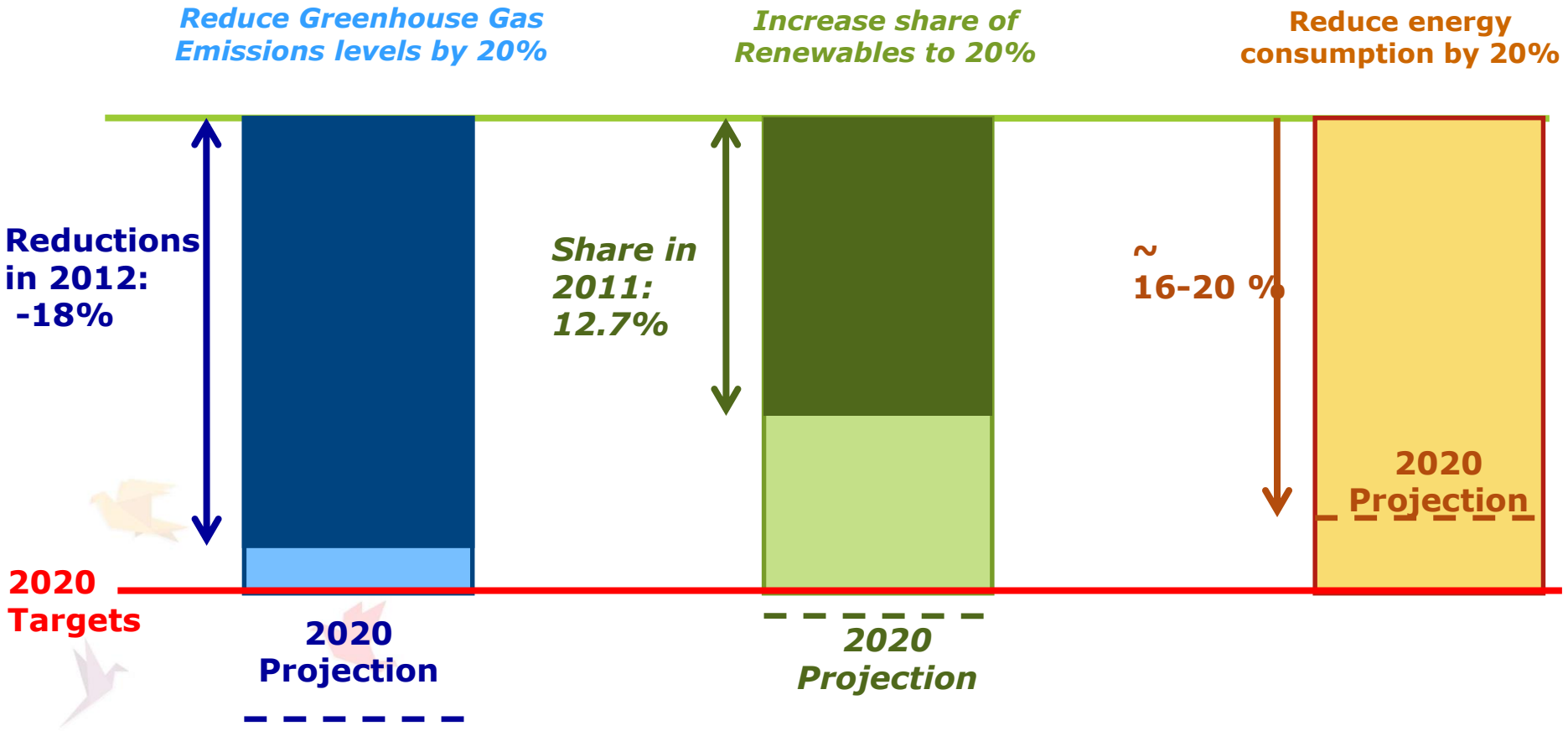
DG RTD, Unit G3

Research and Innovation

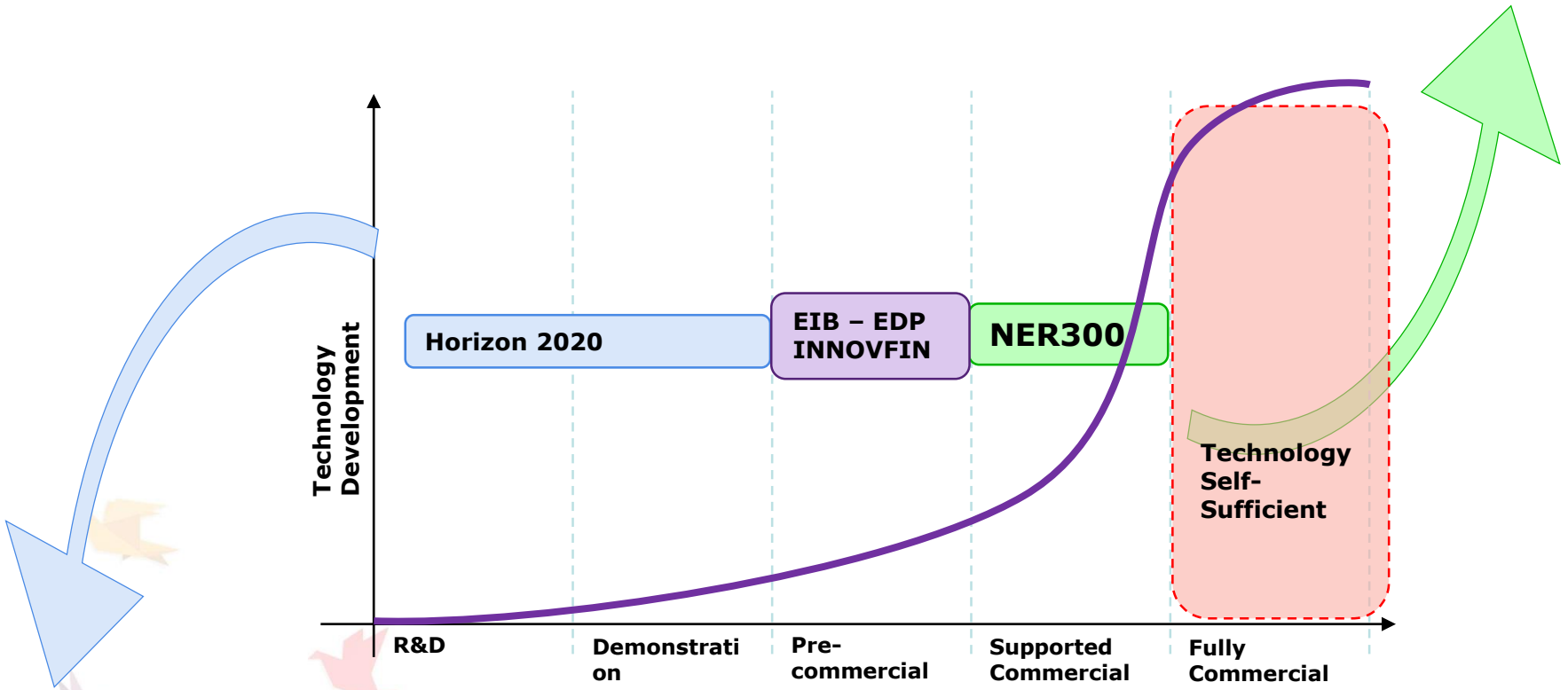
2008 Energy & Climate package



European Commission

EU funding for geothermal energy

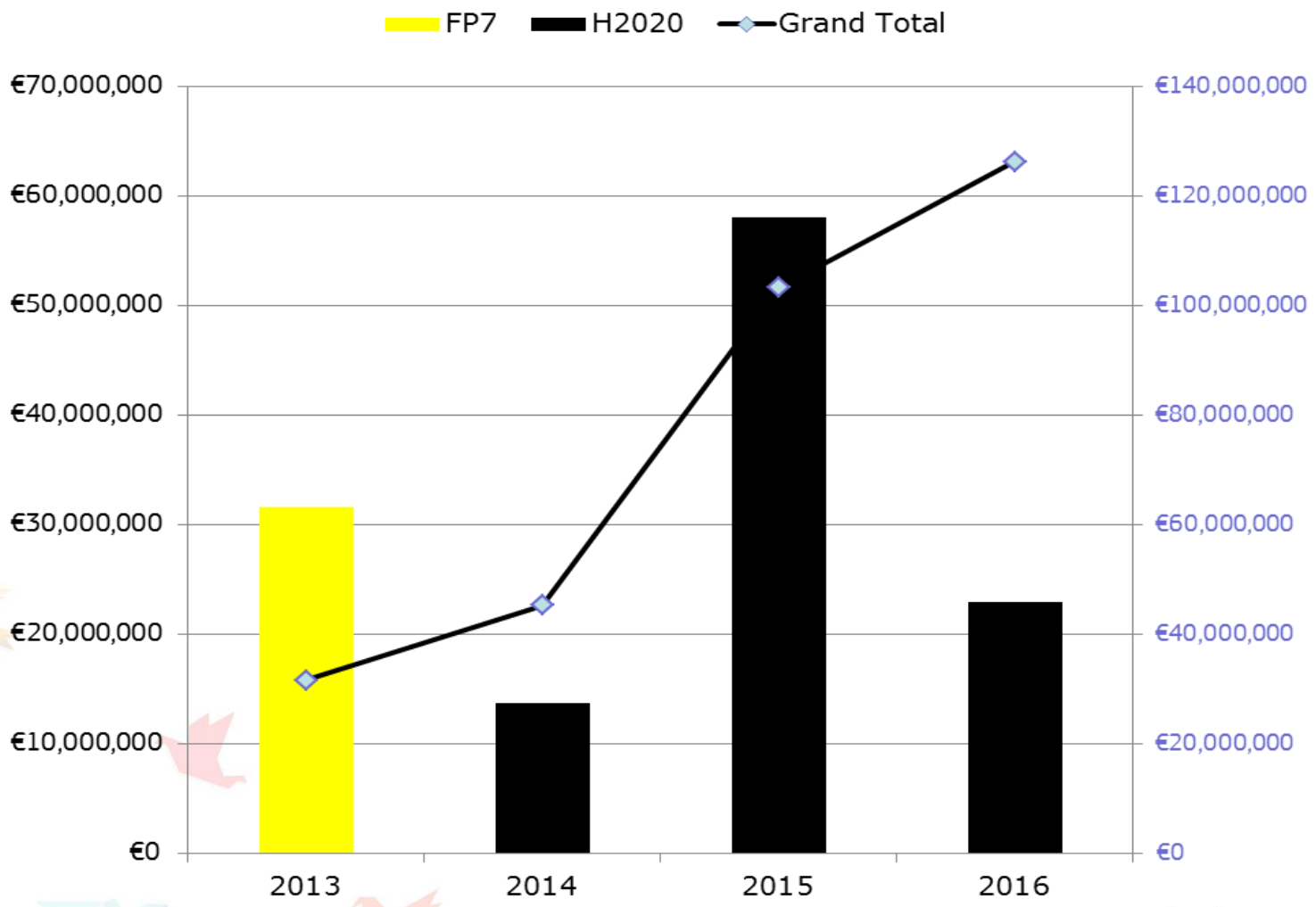
3 Supported projects – France, Croatia, Hungary



Ongoing R&D Projects funded – over Euro 100 MIL

European Commission

Support to R&I via the FPs



European Commission

Ongoing geothermal energy projects

2014 call
21.8MIL (12MIL)

DESCRAMBLE

Thermo Drill

GEOCOND
2016 call – 4MIL

GEMex
2016 call - 20MIL

SURE

2015 call
budget
15MIL

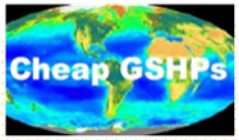
GeoWell

CHPM2030

IMAGE

FP7
10MIL

GEOTHERMICA
2016 call
~30MIL (8.6)



GEOTeCH

2015 call
budget
14.8MIL (12MIL)

DEEPEGS
GEOTHERMAL

DESTRESS

2015 call
budget
69MIL (31MIL)

progRESs HEAT

2014 call
budget
1.7MIL

LCE-06-2017
New Technologies

LCE-07-2017
Materials

LCE-18-2017
EGS

LCE-17-2017
Retrofitting

LCE-21-2017
Market Uptake

Research *Demonstration* *Market*

European Commission

InnovFin EDP

*First-of-a kind commercial-scale industrial demonstration projects (TRL 7-8) for unproven pre-commercial technologies in the field of innovative **low-carbon technologies** in support of the SET-Plan*

- *Loan amount: min EUR 7.5 M€, max EUR 75 M€*
- *Loan maturity: up to 15 years*

European Commission

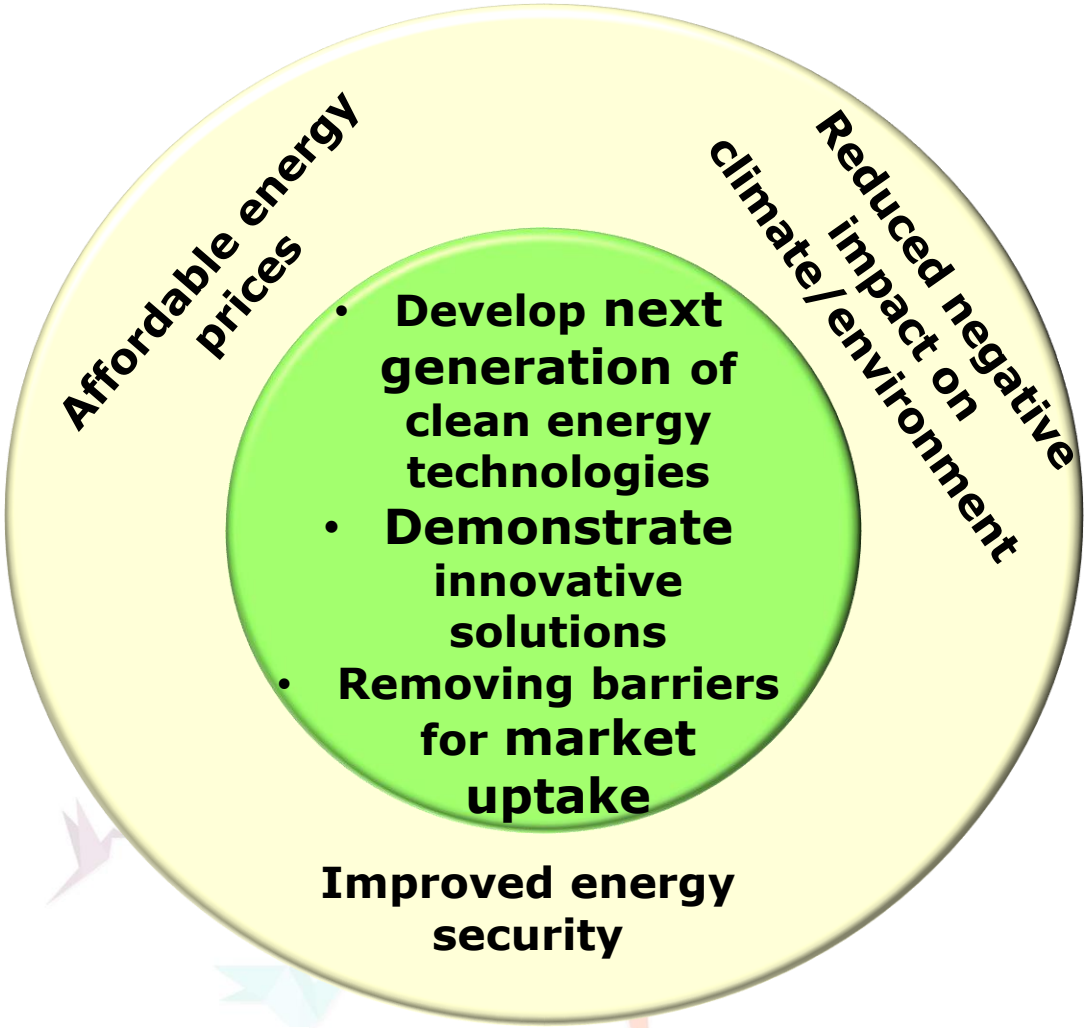
NER 300

- *GEOSTRAS (France / Germany)*
- *€16.8m*
- *Entry into operation in June 2020*
- *Deep underground exchanger increasing chance of succeeding by opening two ways of production: direct flow through long drain or conductive/convective geothermal heating on a forced flow inside the well*
- *Geothermae (Croatia)*
- €14.7m
- *Entry into operation in December 2017*
- CO2 from aquifer gas combustion is cleaned and injected into the same geothermal aquifer, contributing to stability, sustainability and enhanced productivity of the geothermal brine
- *South Hungarian EGS Demonstration (Hungary)*
- *€39.3m*
- *Entry into operation in December 2018*
- *Permeability is created by injecting fluid into the reservoir under carefully controlled conditions and thereby causing pre-existing fractures to re-open*

European Commission

Contributing to the policy

H2020 Energy Challenge - objectives



FP7 Energy (2007-2013) EUR 3.25 bn

Intelligent Energy for Europe (IEE) (2007-2013) EUR 0.73 bn

H2020 – Energy Challenge

Budget (2014-2020): EUR 5.7 billion (as of 2015)

European Commission

Energy efficiency (I)

- LC-SC3-EE-1-2018-2019-2020: Decarbonisation of the EU building stock: innovative approaches and affordable solutions changing the market for buildings renovation
- LC-SC3-EE-2-2018-2019: Integrated home renovation services
- LC-SC3-EE-3-2019-2020: Stimulating demand for sustainable energy skills in the construction sector
- LC-SC3-EE-4-2019-2020: Upgrading smartness of existing buildings through innovations for legacy equipment
- LC-SC3-EE-5-2018-2019-2020: Next-generation of Energy Performance Assessment and Certification
- LC-SC3-EE-6-2018-2019-2020: Business case for industrial waste heat/cold recovery
- LC-SC3-EE-8-2018-2019: Capacity building programmes to support implementation of energy audits
- LC-SC3-EE-9-2018-2019: Innovative financing for energy efficiency investments

Energy efficiency (II)

- LC-SC3-EE-10-2018-2019-2020: Mainstreaming energy efficiency finance
- LC-SC3-EE-11-2018-2019-2020: Aggregation - Project Development Assistance
- LC-SC3-EE-13-2018-2019-2020: Enabling next-generation of smart energy services valorising energy efficiency and flexibility at demand-side as energy resource
- LC-SC3-EE-14-2018-2019-2020: Socio-economic research conceptualising and modelling energy efficiency and energy demand
- LC-SC3-EE-15-2018: New energy label driving and boosting innovation in products energy efficiency
- LC-SC3-EE-16-2018-2019-2020: Supporting public authorities to implement the Energy Union
- LC-SC3-EE-17-2019: European City facility - European Cities as key innovation hubs to unlock finance for energy efficiency

Leadership in RES (I)

- LC-SC3-RES-1-2019-2020: Developing the next generation of renewable energy technologies
- LC-SC3-RES-2-2018: Disruptive innovation in clean energy technologies
- LC-SC3-RES-4-2018: Renewable energy system integrated at the building scale
- LC-SC3-RES-5-2018: Increased performance of technologies for local heating and cooling solutions
- LC-SC3-RES-6-2018: Demonstrate significant cost reduction for Building Integrated PV (BIPV) solutions
- LC-SC3-RES-7-2019: Solar Energy in Industrial Processes
- LC-SC3-RES-8-2019: Combining Renewable Technologies for a Renewable District Heating and/or Cooling System
- LC-SC3-RES-11-2018: Developing solutions to reduce the cost and increase performance of renewable technologies
- LC-SC3-RES-12-2018: Demonstrate highly performant renewable technologies for combined heat and power (CHP) generation and their integration in the EU's energy system

Leadership in RES (II)

- LC-SC3-RES-13-2018: Demonstrate solutions that significantly reduce the cost of renewable power generation
- LC-SC3-RES-14-2019: Optimising manufacturing and system operation
- LC-SC3-RES-15-2019: Increase the competitiveness of the EU PV manufacturing industry
- LC-SC3-RES-16-2019: Development of solutions based on renewable sources that provide flexibility to the energy system
- LC-SC3-RES-17-2019: Demonstration of solutions based on renewable sources that provide flexibility to the energy system
- LC-SC3-RES-21-2018: Development of next generation biofuels and alternative renewable fuel technologies for road transport
- LC-SC3-RES-22-2018: Demonstration of cost effective advanced biofuel pathways in retrofitted existing industrial installations
- LC-SC3-RES-23-2019: Development of next generation biofuel and alternative renewable fuel technologies for aviation and shipping
- LC-SC3-RES-24-2019: Boosting pre-commercial production of advanced aviation biofuels
- LC-SC3-RES-28-2018-2019-2020: Market Uptake support

Smart systems (I)

- LC-SC3-EC-1-2018-2019-2020: The role of consumers in changing the market through informed decision and collective actions
- LC-SC3-EC-2-2018-2019-2020: Mitigating household energy poverty
- LC-SC3-EC-3-2020 - Consumer engagement and demand response
- LC-SC3-ES-1-2019: Flexibility and retail market options for the distribution grid
- LC-SC3-ES-2-2019: Solutions for increased regional cross-border cooperation in the transmission grid
- LC-SC3-ES-3-2018-2020: Integrated local energy systems (Energy islands)
- LC-SC3-ES-4-2018-2020: Decarbonising energy systems of geographical Islands

Smart systems (II)

- LC-SC3-ES-5-2018-2020: TSO – DSO – Consumer: Large-scale demonstrations of innovative grid services through demand response, storage and small-scale (RES) generation
- LC-SC3-ES-6-2019: Research on advanced tools and technological development
- LC-SC3-ES-7-2018: Pan-European Forum for R&I on Smart Grids, Flexibility and Local Energy Networks
- LC-SC3-ES-8-2019: European Islands Facility - Unlock financing for energy transitions and supporting islands to develop investment concepts
- LC-SC3-SCC-1-2018-2019-2020: Smart Cities and Communities

CCS / CCU

- LC-SC3-NZE-1-2018: Advanced CO2 capture technologies
- CE-SC3-NZE-2-2018: Conversion of captured CO2
- LC-SC3-NZE-3-2018: Strategic planning for CCUS development
- LC-SC3-NZE-4-2019: Integrated solutions for flexible operation of fossil fuel power plants through power-to-X-to-power and/or energy storage
- LC-SC3-NZE-5-2019-2020: Low carbon industrial production using CCUS
- LC-SC3-NZE-6-2020: Geological Storage Pilots

LC-SC3-RES-1-2019

Bringing these new energy conversion solutions, new renewable energy concepts and innovative renewable energy uses faster to commercialization

To TRL 3 to 4

RIA

EUR 20 million

Developing the next generation of renewable energy technologies

Beside the development of the technology, the proposal will have to clearly address the following related aspects: the potential lower environmental and climate impact on a life cycle basis, the better resource efficiency, issues related to social acceptance or resistance to new energy technologies, related socioeconomic and livelihood issues.

Support will be given to activities which focus on converting renewable energy sources into an energy vector, or the direct application of renewable energy sources.

Innovative materials for **geothermal** heat exchangers to maximize energy transfer and improve the overall conversion efficiency of a geothermal system

LC-SC3-RES-11-2018

Developing solutions to reduce the cost and increase performance of renewable technologies

Achieving or maintaining global leadership in renewable energy technologies requires cost reductions

TRL 3-4 to 4-5

RIA

EUR 2 to 5 million

Reduce the CAPEX and/or OPEX of energy generation

Floating Wind Technology development including reliable, cost efficient anchoring and mooring system, dynamic cabling, installation techniques, and O&M concepts;

Onshore Wind Disruptive technologies for the rotor, generator, drive train and support structures;

Ocean New integrated design and testing of tidal energy devices;

Geothermal Novel drilling technologies to reach cost-effectively depths in the order of 5 km and/or temperatures higher than 250° C;

CSP Novel components and configurations for linear focusing and point focusing technologies;

Hydropower Novel components for hydropower hydraulic and electrical machinery;

Bioenergy Improve small and medium-scale combined heat and power (CHP) from biomass

European Commission

LC-SC3-RES-12-2018

Progressive replacement of fossil fuels used in the heat and power sectors by means of renewable energy sources

TRL 5 to 7-8

IA

EUR 15 to 20 million

Reduce the cost of combined heat and power generation from renewable sources, making it competitive to fossil fuel based solutions

Demonstrate highly performant renewable technologies for combined heat and power (CHP) generation and their integration in the EU's energy system

Biomass based combined heat and power (CHP) Demonstration of technically feasible and cost-effective installation of medium to large-scale CHP through retrofitting of existing fossil-fuel driven CHP or power plants >10 MW electrical to CHP plants with the use of sustainable biomass feedstock. Commercial operation of the plant with biomass after the end of the project is to be envisaged;

Geothermal Demonstration of geothermal plants to respond cost-effectively to the heat and to the power demand of the network. Proposals are expected to propose technologies for more flexible or more efficient geothermal plants or a combination of these two aspects. Associating other renewable heat sources to geothermal and adding storage would its increase flexibility (not a necessary condition).

European Commission

LC-SC3-RES-13-2018

Reduce the cost of energy generation from renewable energy sources

TRL 5 to 7

IA

EUR 15 to 20 million

Reduce the cost of energy generation rendering the renewable energy technologies competitive

Demonstrate solutions that significantly reduce the cost of renewable power generation

Offshore wind Development and validation of new manufacturing, installation and/or operation and maintenance techniques, introduction of new materials. Health and environmental impact issues will be taken into account;

Deep geothermal Demonstration of cost efficient technologies to limit emissions and/or to condense and re-inject gases. Turning the emissions into commercial products could contribute to cost reduction (not a necessary condition);

CSP Demonstration in operational environment of CSP solutions based on novel heat transfer fluids and/or of solutions which make an innovative use of a heat transfer fluid that is already used in other CSP applications.

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LC-SC3-RES-14-2019

Optimisation of several key processes in their respective value chains

TRL 3-4 to TRL 4-5

RIA

EUR 3 to 5 million

Increased efficiency of the system and/or reduced operational costs of the renewable energy technologies

Optimising manufacturing and system operation

Marine energy (ocean and offshore wind) Development of a new monitoring system (intelligent sensors, fault detection and communication) for accurate condition and structural health monitoring to enable predictive and preventive operation and preventive maintenance processes;

Geothermal Develop a better understanding of the chemical and physical properties of geothermal fluids (including hot and super-hot fluids) as transport media, in order to optimize site development and operation;

Photovoltaics Development of innovative crystalline silicon wafer growth techniques to produce high-efficiency solar cells and modules.

LC-SC3-RES-28-2018-2019-2020: Market Uptake support

CSA

EUR 1 to 3 million

The proposal will develop solutions which can be easily implemented for overcoming barriers to the broad deployment of renewable energy solutions. Introducing and deploying at large scale new and improved technologies entails a number of challenges, notably as regards their initial high cost, the consumer acceptance and the legal and financial barriers arising from bringing novel solutions to a technical environment with already reliable solutions in place

Development of insurance schemes to be available to developers in Europe and worldwide to mitigate risks, such as in **geothermal** drilling and offshore installation

European Commission

Opening date(s), deadline(s), indicative budget(s)

Topic	Opening	Deadline	Budget
LC-SC3-RES-1-2019	01 Aug 2018	16 Oct 2018 (First Stage) 25 Apr 2019 (Second Stage)	€20M
LC-SC3-RES-11-2018	31 Oct 2017	31 Jan 2018 (First Stage) 23 Aug 2018 (Second Stage)	€30M
LC-SC3-RES-12-2018	31 Oct 2017	13 Feb 2018	€30M
LC-SC3-RES-13-2018	31 Oct 2017	13 Feb 2018	€45M
LC-SC3-RES-14-2019	01 Aug 2018	16 Oct 2018 (First Stage) 25 Apr 2019 (Second Stage)	€20M
LC-SC3-RES-28-2018-2019-2020	05 Sep 2018	11 Dec 2018	€15M

Thank you!

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Participant Portal www

European Commission