



THE EU FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION

HORIZON 2020

**H2020 - Energy
Calls 2016-2017**



European Commission



Content overview

- ❑ Context
- ❑ Relevant Calls 2016-2017
 - Energy Efficiency (EE)
 - Competitive Low-Carbon Energy (LCE)
 - Smart and Sustainable Cities – Smart Cities and Communities (SCC)
 - SME instrument
 - Fast track to Innovation
- ❑ Cross-cutting issues
- ❑ Rules for Participation
- ❑ Support



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Political Context

2030 Climate-Energy Package

- 40% reduction of Greenhouse Gases
- 27% of renewable energy
- 27% improvement in energy efficiency



Energy Union

- *Energy security, solidarity and trust*
- *A fully integrated internal energy market*
- *Energy efficiency first*
- *Transition to a low-carbon society*
- *An Energy Union for Research, Innovation and Competiveness*

SET-Plan

- *Integrated Roadmap*
- *Communication on Integrated SET-Plan (COM[2015]6317)*





Horizon 2020 – Overall Objectives

HORIZON 2020

Responding to the economic crisis by investing in future jobs and growth

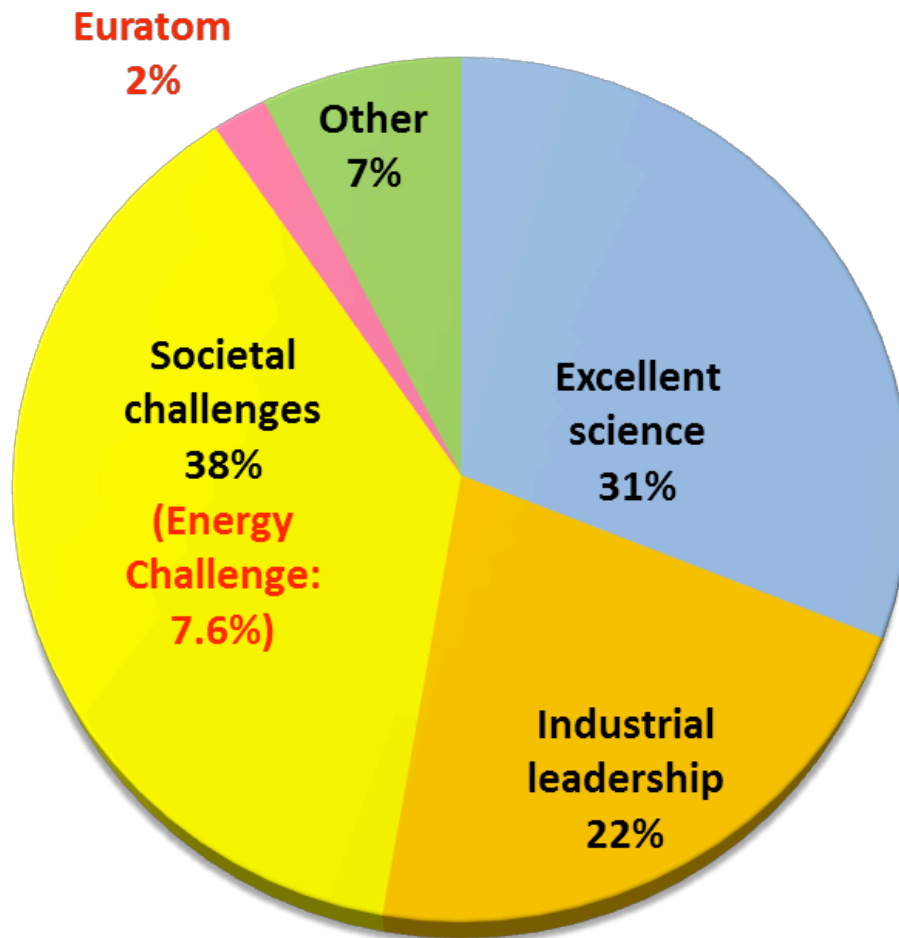
Strengthening the EU's global position in research, innovation and technology

Addressing people's concerns about their livelihoods, safety and environment

Contributing to sustainable development (at least 35% of the overall budget)

Supporting EU policies (e.g. Europe 2020 / Energy Union)

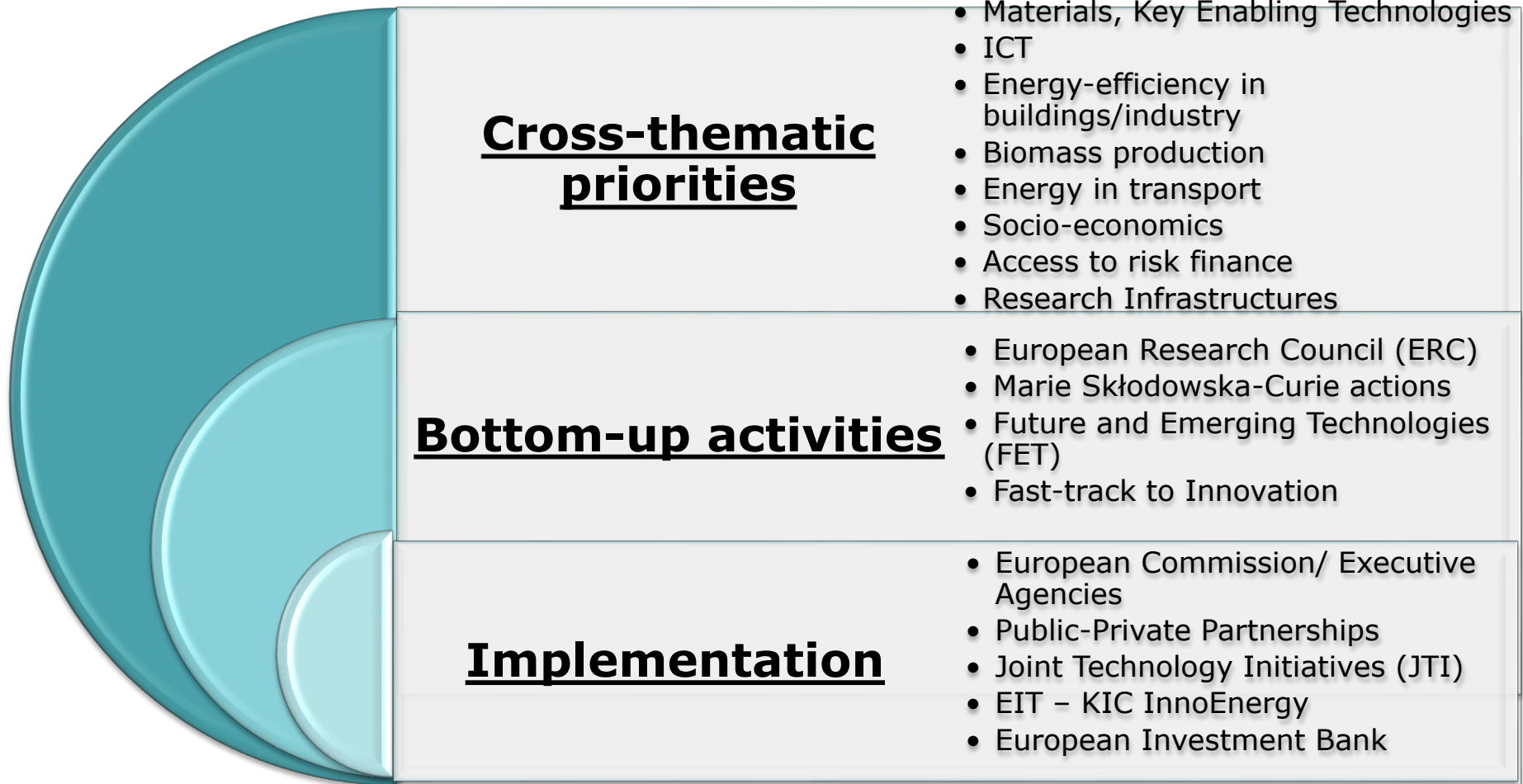
Horizon 2020 – Overall budgets



Total budget H2020:
EUR 74,83 billion

Budget of the
Energy Challenge:
EUR 5,69 billion

Energy **outside** the Energy Challenge



The 2016-2017 calls of the Energy Challenge

Energy Efficiency (EE)

- Heating and Cooling
- Engaging consumers
- Buildings
- Industry, services and Products
- Innovative financing

Competitive low-carbon energy Technologies (LCE)

- Energy system (grids, storage)
- Renewable energies
- Decarbonising fossil fuels
- Socio-economic research
- European Research Area in energy

Smart Cities and Communities (SCC)

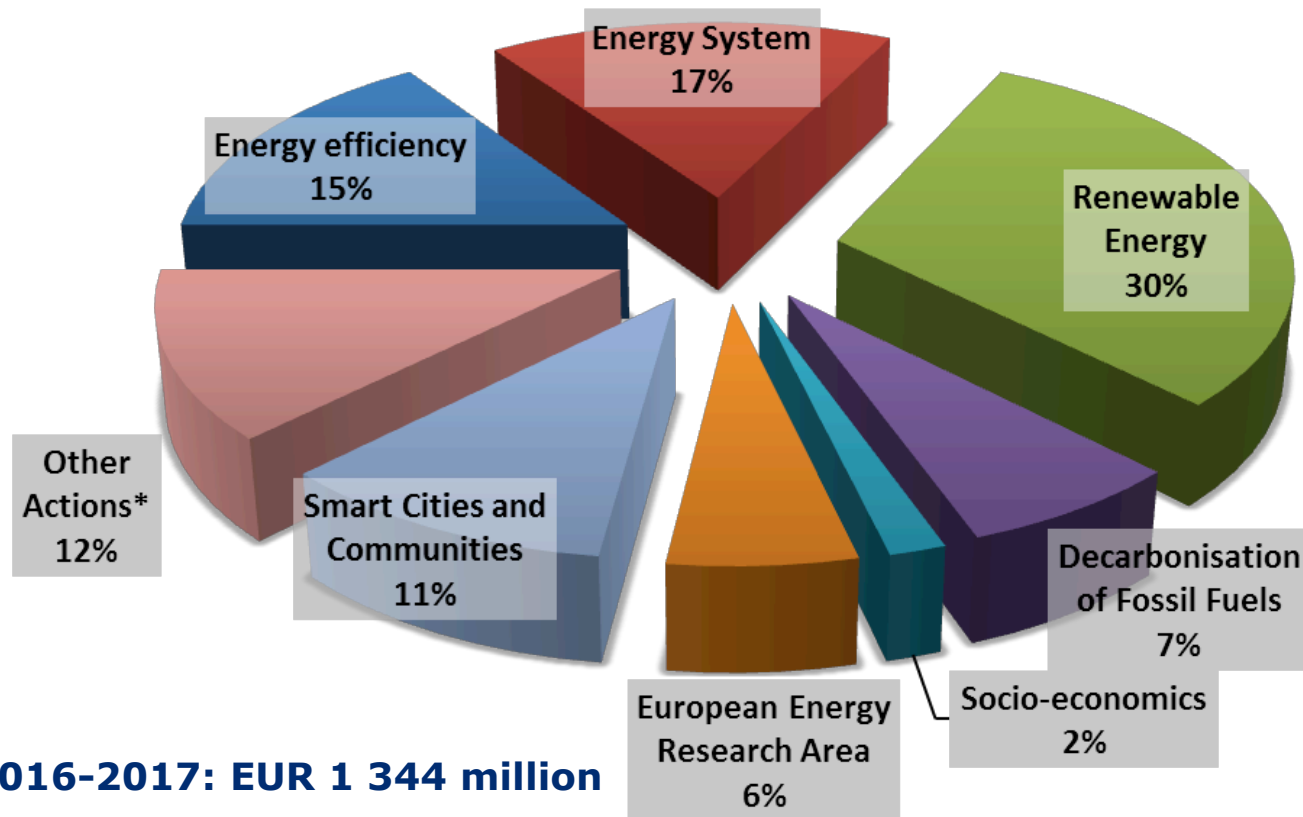
- Light-house demonstration projects

SME instrument (SIE)

Call budgets (in Mio €)

Call	2016	2017
EE	93	101
LCE	352,66	367,62
SCC	60	71,50
SME	46	50

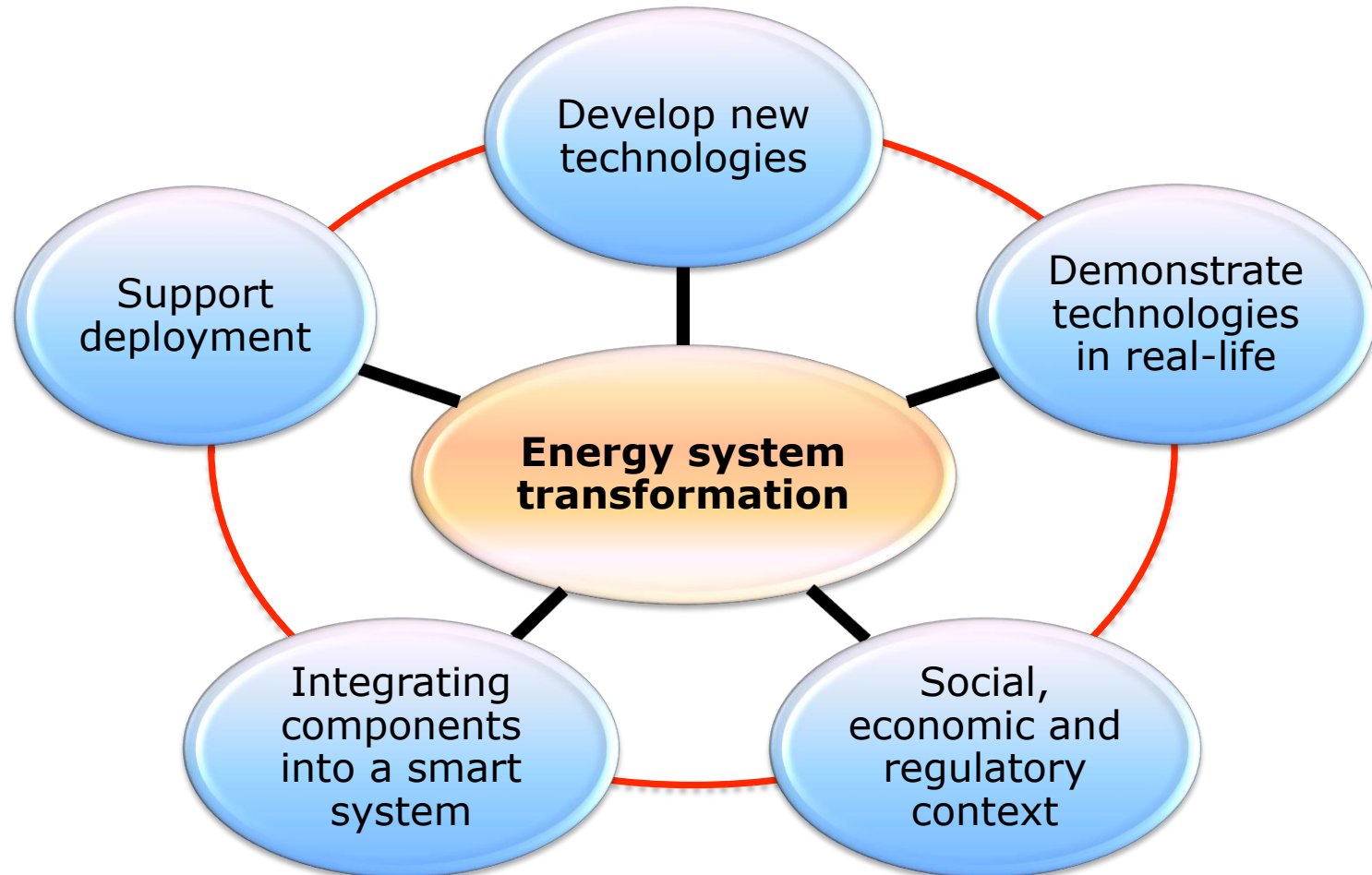
Indicative budget distribution per area for Energy calls 2016-2017



Total budget 2016-2017: EUR 1 344 million

* **Other Actions** = actions not implemented through calls for proposals (e.g. Risk Finance, procurements, subscriptions, contributions, grant to identified beneficiaries)

Systemic approach of the Energy Challenge



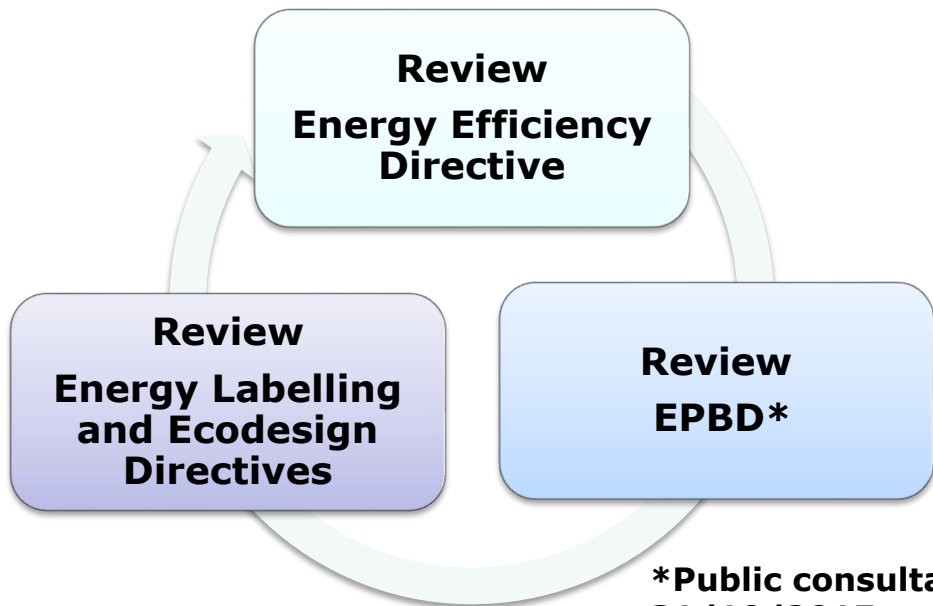


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Policy context

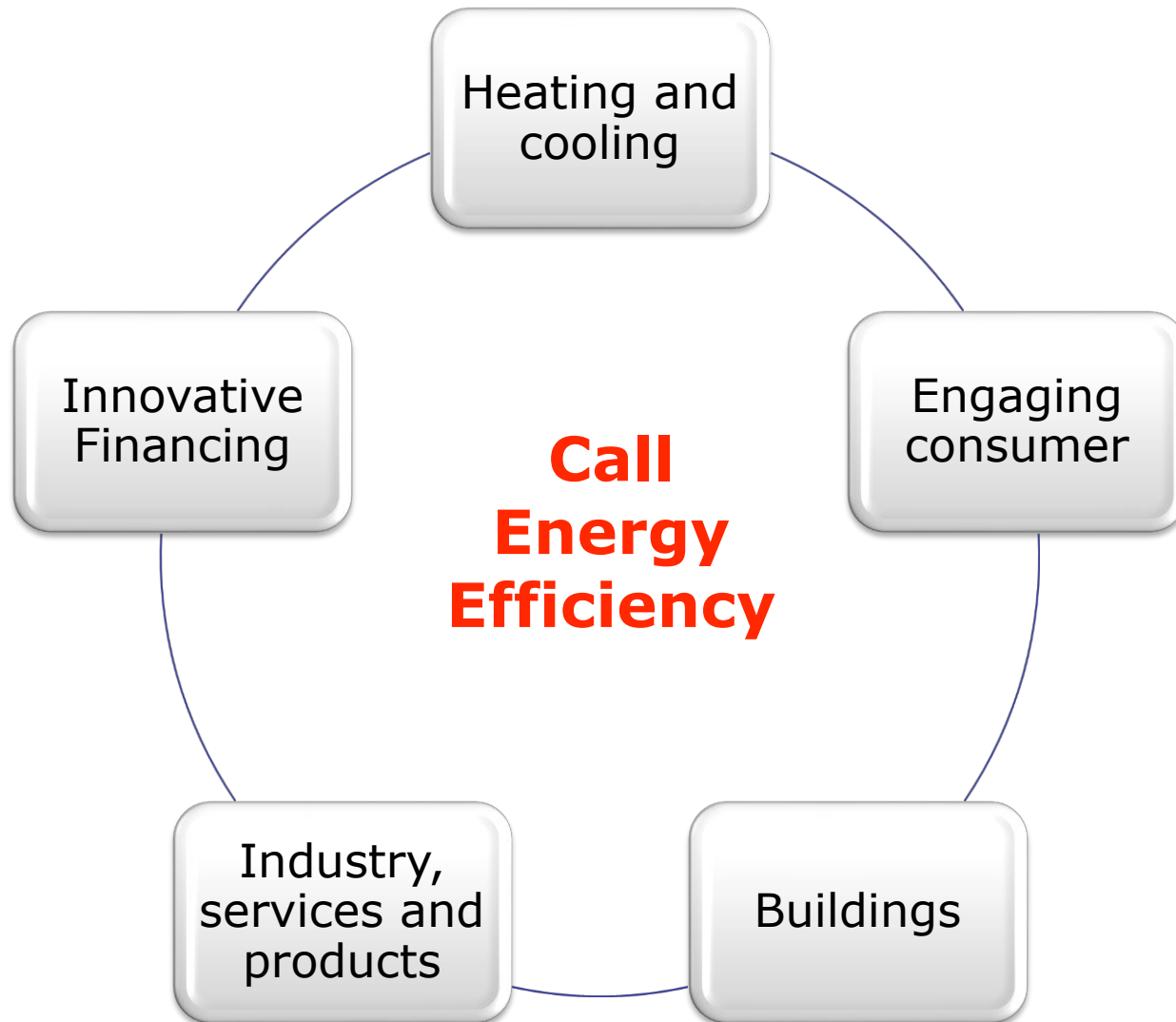
- 2020 & 2030 Framework for Climate and Energy
- Energy Union and its third pillar – Energy Efficiency



***Public consultation until
31/10/2015**

WP 2016-2017:

- Focussing on consumer-related issues
- More topics on heating and cooling
- Multi-level approach to eliminate market barriers to finance for energy efficiency

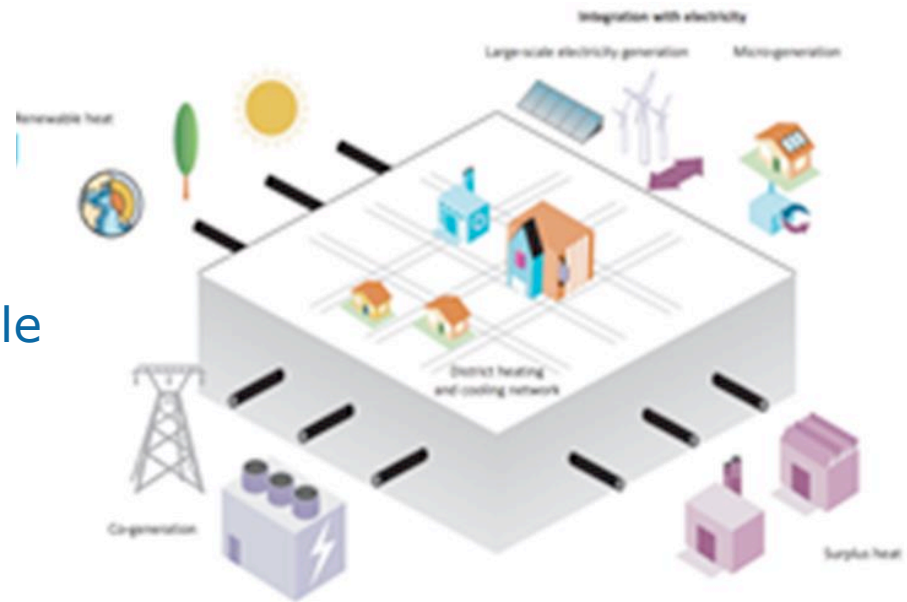


Heating & Cooling

Communication on policy strategy foreseen beginning 2016, based on broad consultation of stakeholders

Objectives :

- Tackling H&C consumption – Moderating demand
- Increasing energy efficiency in supply
- Maximising use of local sustainable and renewable energy sources
- Recovering waste heat
- Linking with electricity system
- Achieving affordable costs





Heating & Cooling – Topics 2016-2017

Innovation in **waste heat recovery** and **reuse technologies** (in cities and industry)

- *Topics EE-1-2017, EE-17-2016-2017, EE-20-2017*

District heating networks: innovation in urban waste heat reuse in DH, replication of efficient retrofitting of DH networks

- *Topics EE-1-2017, EE-2-2017*

Research and innovation of **efficient and low-carbon H&C technologies**

- *Topic EE-3-2016, EE-4-2016-2017*

Consumer in the centre

New deal for energy consumers:

- ✓ Empowering consumer
- ✓ Deploying demand side response
- ✓ Using smart technologies
- ✓ Protecting vulnerable customers

Objectives:

- Achieve a deeper understanding of consumer behaviour and motivation structures
- Inform, engage and activate consumers

WP 2016-2017 :

- A specific consumer-focused area with four dedicated topics
- Consumer-oriented approach in other parts





Consumer engagement – Topics 2016-2017

Engaging private consumers towards sustainable energy

- *Topic EE-6-2016-2017*

Behavioural change toward energy-efficiency through ICT

- *Topic EE-7-2016-2017*

Socio-economic research on consumer's behaviour related to energy efficiency

- *Topic EE-8-2016*

Engaging and activating public authorities

- *Topic EE-9-2016-2017*

- **Consumer empowerment** through smart homes system and demand response EE-12-2017
- **Consumer information** through EU product efficiency legislation EE-16-2016-2017



Buildings

Buildings account for 40% of the final energy consumption

Challenges

- Increasing the rate, quality and effectiveness of renovation to reduce the energy use in buildings, as well as their replication capacity;
- Integration of demand response in energy management systems while ensuring interoperability;
- Reducing the cost of designing and constructing new Near-Zero Energy Buildings (NZEBs) in order to increase their market uptake;
- Building capacity and provide support for sustainable energy policy implementation.



Buildings – Topics 2016-2017

Deep renovation of buildings

- *Topics EE-10-2016 (EeB-PPP), EE-11-2016-2017*

Demand response in energy management systems

- *Topic EE-12-2017 (EeB-PPP)*

Cost reduction of new Nearly Zero-Energy buildings

- *Topic EE-13-2016*

Construction skills

- *Topic EE-14-2016-2017*



Industry, services and products – Topics 2016-2017

Industry and service sectors represent more than 39% of the EU's final energy consumption

Challenges

- Energy efficiency investments in industrial & service sectors are not implemented due to a combination of market factors & barriers;
- Waste heat recovery in large industrial systems is not fully exploited and waste energy from one industry could be a resource for another;
- European industry needs to develop a global technological leadership in energy efficiency solutions
- Non-compliance with EU legislation (Eco-design and Energy labelling) is reducing savings;
- Demand for computing and data handling is driving increased energy consumption for data centres;
- Public sector spending means that it can act as a driver for procurement of innovative energy efficiency solutions



Industry, services and products – Topics 2016-2017

Capacity building in industry and energy services for industrial parks

- *Topic EE-15-2017, EE-18-2017*

Waste heat recovery / Energy symbiosis in industrial systems

- *Topic EE-17-2016-2017 (SPIRE-PPP)*

Joint energy-efficiency R&I efforts in industry & services (ERA-NET Cofund)

- *EE-21-2016*

Effective implementation of EU product legislation

- *Topic EE-16-2016-2017*

Energy efficient and integrated data centres

- *Topic EE-20-2017*

Public procurement of innovative energy efficiency solutions

- *Topic EE-19-2017*



Financing Energy Efficiency

100 bn € investments/year needed to achieve EE targets

Existing framework :

EFSD, ESIF, H2020, Smart Finance for Smart Buildings

Challenge:

• Improve supply of **large-scale finance** at a low cost for by:



- Providing **Project Development Assistance** to public and private sectors to deliver innovative and bankable sustainable energy investments;
- Development of **innovative financing schemes** insuring flow of private finance for EE investments;
- Increase "readability" of market fundamentals for financiers and investors through **benchmarking and standardisation** of EE investments;
- Develop, demonstrate and standardise new types of **energy efficiency services and business models**

Financing Energy Efficiency – Topics 2016-2017

Aggregation - Project development assistance

- *Topic EE-22-2016-2017*



De-risking - Standardisation and benchmarking

- *Topic EE-24-2016*

Market based culture - Energy efficiency services and innovative financing schemes

- *Topic EE-25-2016, EE-23-2017*



Energy Efficiency call 2016 - Overview

Deadline 21 January 2016

- Sub-budget: EUR 16 million
 - EE-10
 - EE-17
- Sub-budget: EUR 34 million
 - EE-3
 - EE-4
 - EE-5
 - EE-7
 - EE-8

IA – green
RIA – blue
CSA- orange
ERA-NET - black

Deadline 15 September 2016

- Sub-budget: EUR 30 million
 - EE-6
 - EE-9
 - EE-11
 - EE-13
 - EE-14
 - EE-16
 - EE-24
 - EE-25
- Sub-budget: EUR 8 million
 - EE-22
- Sub-budget: EUR 5 million
 - EE-21



Energy Efficiency call 2017 - Overview

Deadline 19 January 2017

- Sub-budget: EUR 16 million
 - EE-12
 - EE-17
- Sub-budget: EUR 30 million
 - EE-1
 - EE-4
 - EE-7
 - EE-20

IA – green
RIA – blue
CSA- orange
ERA-NET – black
PPI - purple

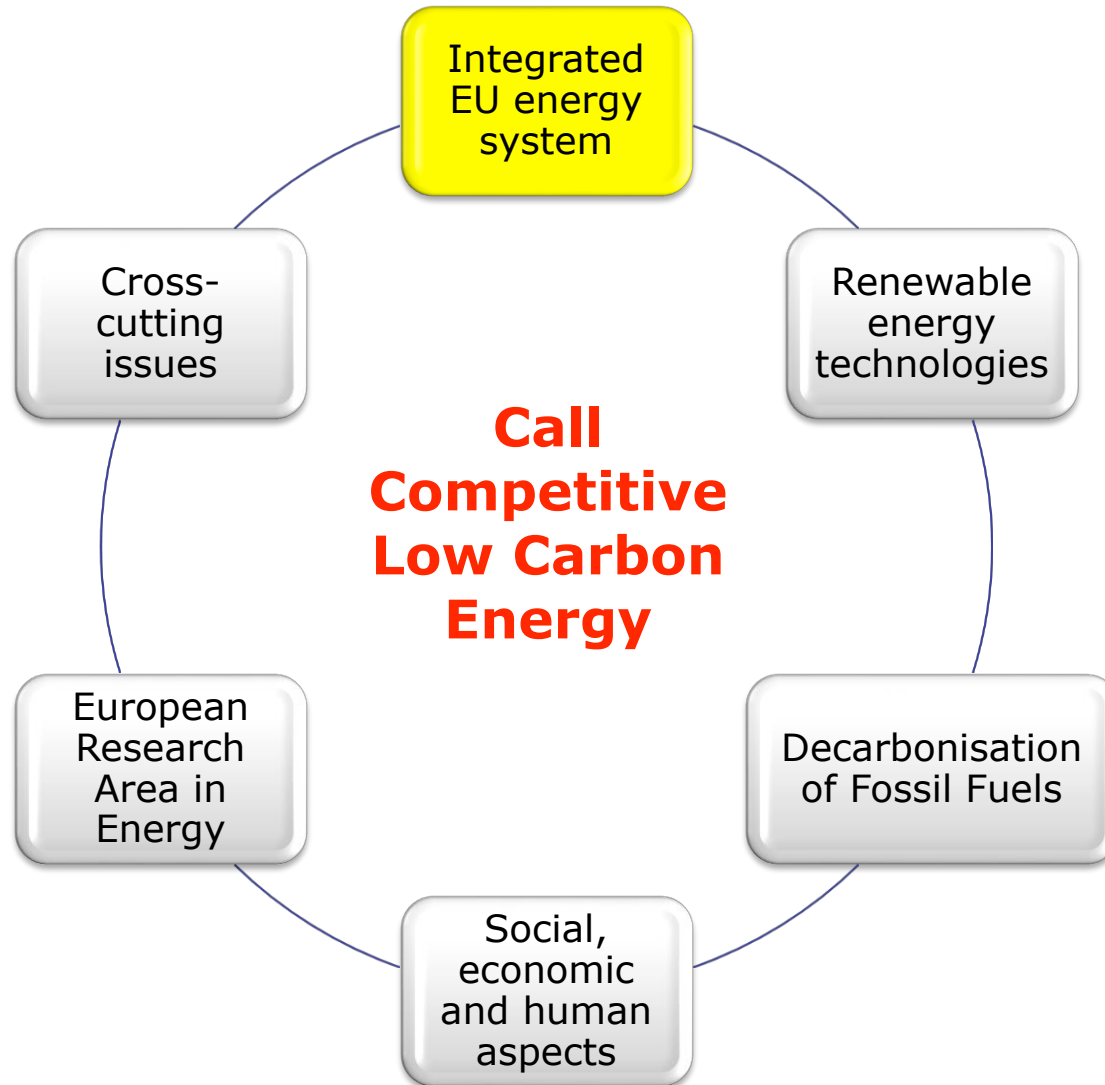
Deadline 7 June 2017

- Sub-budget: EUR 47 million
 - EE-2
 - EE-6
 - EE-9
 - EE-11
 - EE-14
 - EE-15
 - EE-16
 - EE-18
 - EE-19
 - EE-23
 - EE-24
- Sub-budget: EUR 8 million
 - EE-22



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Energy system – Context

Challenges for the European energy system

- Increasing electricity generation and consumption
- Increasing share of renewable energies in electricity generation
- Strong growth of variable RES (wind, solar)
- Huge differences between national energy systems

Energy system – topics 2016

LCE-1

Next generation Distribution Technologies

Research and
Innovation Action
(TRL 3-6)
2-4 M€/project
Budget: 20 M€

Address either

- Storage or
- Synergies between networks

LCE-2

Demonstration of Distribution Technologies

Innovation Action
(TRL 5-8),
12-15 M€/project
Budget: 73,46 M€

Address at least 3 :

- Demand response
- Smartening the distribution grid
- Energy storage and management
- Integration of transport needs

LCE-3

Support to R&I strategy

Coordination and
Support Action (CSA)
1 proposal for up to 4
M€

- Develop R&I Roadmap
- Analyse R&I landscape/projects
- Organise workshops



Energy system – topics 2017

LCE-1

Next generation Distribution Technologies

Research and
Innovation Action
(TRL 3-6)
2-4 M€/project
Budget: 18 M€

Address either

- Demand response
or
- Smart grids

LCE-4

Demonstration of Transmission Technologies

Innovation Action
(TRL 5-8),
15-20 M€/project
Budget: 65,12 M€

Address at least 2 :

- Power transmission
- Large-scale storage
- ICT/tools for flexibility
- Wholesale market

LCE-3

Support to R&I strategy

Research and
Innovation Action
2-4 M€/project
Budget: 28 M€

Address at least 1:

- energy system planning
- Tools for TSO/DSO coordination
- Data handling
- Synergies between gas and electricity
- socio-economics



Energy system - Overview

Deadline 5 April 2016

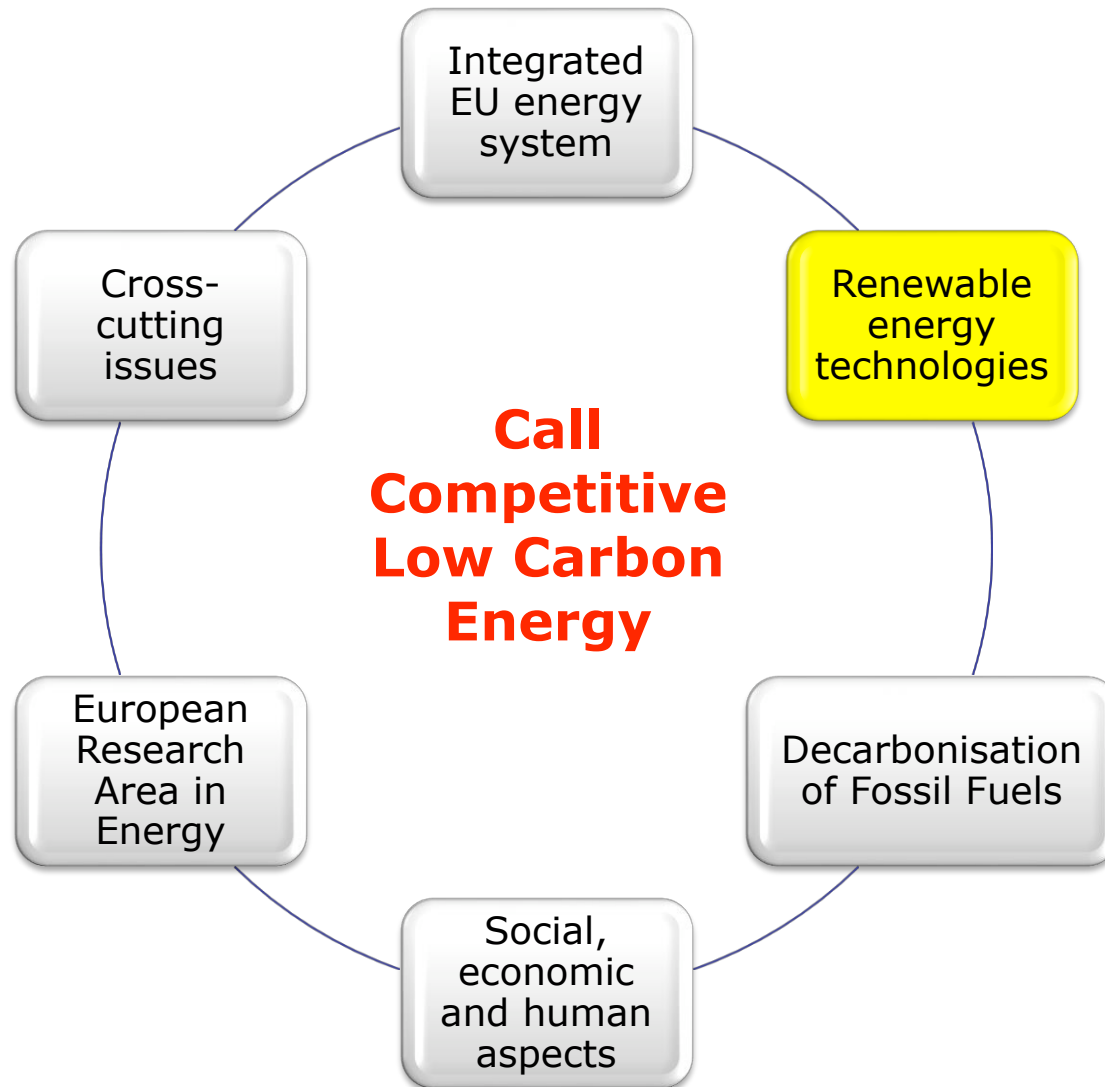
- LCE-1 – budget 20 M€
- LCE-2 – budget 73.46 M€
- LCE-3 – budget 4 M€

IA – green
RIA – blue
CSA- orange

Deadline 14 February 2017

- LCE-1 – budget 18 M€
- LCE-4 – budget 65.12 M€
- LCE-5 – budget: 28 M

N.B.: Revision of topics and budgets for 2017 in early next year





Renewable energies - Overview

	Basic Research (TRL <4)	Advanced Research (TRL 3-5)	Demonstration (TRL 5-7)	Market uptake
PV	LCE-6	LCE-7	LCE-9, LCE-10	LCE-21
CSP			LCE-11	
Solar Heating and Cooling			LCE-12	
Wind Energy			LCE-13, LCE-14	LCE-21
Ocean Energy			LCE-15, LCE-16	
Hydropower				
Geothermal Energy			LCE-17, LCE-23, LCE-18	
CHP				
RES integration in the system				
Bio- and Renewable Alternative Fuels			LCE-8, LCE-22	LCE-19, LCE-20



Photovoltaics (PV)

Rationale:

- High power generation potential;
- Reducing the total cost of installed solar energy systems and grid-integration bottlenecks remains a priority for the sector;
- PV R&D is necessary to re-launch an innovative and worldwide competitive industry relying on the existing PV technology knowledge-base in Europe.

Basic research

- Upscaling technologies currently at lab-scale (!excluding activities funded under NMBP 19-2016!) - *LCE-6-2017*

Advanced research

- Next generation of c-Si (2016) and perovskite (2017) PV cells and modules – *LCE-7-2016-2017 (no ringfenced budget)*

Demonstration

- Manufacturing innovations at pilot-line level for industrial production of cells and modules – *LCE-9-2016 (EUR 25 million)*
- Reducing cost of PV electricity – *LCE-10-2017 (EUR 10 million)*

Market-uptake

- Tackling the bottlenecks of high penetration levels of PV electricity into the electric power network – *LCE-21-2017 (no ringfenced budget)*



Concentrated Solar Power (CSP)

Rationale:

- Strong European industrial presence but the larger share of the market is outside Europe. The competition is growing.
- Need to reduce further the capital and the operational costs as well as to improve system operations, performances and environmental footprint (water consumption).

Basic research

- Upscaling technologies currently at lab-scale - *LCE-6-2017*

Advanced research

- Innovative components and configurations for reducing costs of CSP plants – *LCE-7-2016*
- New cycles and power blocks for reducing costs of CSP plants – *LCE-7-2017*

Demonstration

- Reducing water consumption of CSP plants – *LCE-11-2016 (EUR 12 million)*

Market-uptake

- Facilitating the supply of electricity from CSP plants in Southern Europe to Central and Northern European countries – *LCE-21-2017*



Solar Heating and Cooling

Rationale:

- Mature technology exists but it still remains under-exploited;
- New technology is needed to enlarge the application sectors;
- Issues of cost, performance and operability still exist;
- Cost competitiveness and acceptability of solar heating systems need to be improved.

Basic research

- Upscaling technologies currently at lab-scale - *LCE-6-2017*

Advanced research

- Innovative components for solar compact hybrid systems – *LCE-7-2016*
- Development of components for residential single-family solar-active houses – *LCE-7-2017*

Demonstration

- Solar heat in industrial processes – *LCE-12-2016 (EUR 8 million)*



Geothermal energy

Rationale:

- Geothermal energy has great untapped potential for diversifying the energy mix.
- "Shallow geothermal": retrofitting existing installations with improved technology;
- Enhanced geothermal systems (EGS): reduction of drilling costs and risks; demonstration of viable technologies to create new reservoirs.

Basic research

- Upscaling technologies currently at lab-scale - *LCE-6-2017*

Advanced research

- Improving borehole heat exchanger (shallow geothermal) – *LCE-7-2016*
- Materials for geothermal installations (deep geothermal) – *LCE-7-2017*
- International cooperation with Mexico (deep geothermal) – *LCE-23-2016* (EUR 10 million)

Demonstration

- Geothermal systems for retrofitting buildings – *LCE-17-2016* (EUR 8 million)
- EGS in different geological conditions – *LCE-18-2017* (EUR 10 million)

Market-uptake

- Tackling bottlenecks for high penetration – *LCE-21-2017*
- Accelerating the penetration of heat pumps for heating and cooling – *LCE-21-2017*



Wind energy

Rationale:

- European industries are still world leaders but the competition is growing;
- Cost reductions for all components essential, in particular for offshore;
- Offshore considered as the future market - large turbines to be demonstrated
- Issues remain on environmental and social impact, and on public acceptance

Basic research

- Improved understanding of the physics of wind as primary energy source and wind energy technology - *LCE-6-2017*

Advanced research

- Advanced control of large-scale wind turbines and farms – *LCE-7-2016*
- Reduction of environmental impact – *LCE-7-2017*

Demonstration

- Solutions for reduced maintenance, increased reliability and extended life-time of off-shore wind turbines/farms – *LCE-13-2016 (EUR 10 million)*
- Large >10 MW wind turbines – *LCE-14-2017 (EUR 25 million)*

Market-uptake

- Increase market share of wind energy – *LCE-21-2017*



Ocean energy

Rationale:

- European industries are leading the emergence of the technologies.
- Many devices developed / prototypes tested, but market potential yet to be realised.
- Demonstration of reliable and survivable systems essential.
- Environmental, social and public impacts to be addressed

Basic research

- Upscaling technologies currently at lab-scale - *LCE-6-2017*

Advanced research

- Increased performance and reliability of ocean energy sub-systems – *LCE-7-2016*
- Innovative power take-off systems and control strategies – *LCE-7-2017*

Demonstration

- Scaling up in the ocean energy sector to arrays – *LCE-15-2016 (EUR 15 million)*
- Design tools for ocean energy devices and arrays development/deployment – *LCE-16-2017 (EUR 7 million)*

Market uptake

- Multi-use of the oceans' marine space, offshore and near-shore: compatibility, regulations, environmental and legal issues (CSA), *BG-3-2016*, Budget: EUR 2 million



Combined Heat and Power (CHP)

Rationale:

- CHP installations already in use, commercial applications exist and have been supported under previous framework programmes
- Market potential for residential scale and for specific industrial applications to increase generation flexibility.

Basic research

- Upscaling technologies currently at lab-scale - *LCE-6-2017*

Advanced research

- Highly efficient, low emission, medium- and large-scale biomass-based CHP systems – *LCE-7-2016*
- Transforming renewable energy into intermediates – *LCE-7-2017*



Integration of RES in the energy system

Rationale:

- Growing share of renewable energy sources requires rethink of system management;
- Complementing activities supported under the area '*Integrated EU energy system*', integration is also addressed from the perspective of the generation sources in order to share burden and costs.

Advanced research

- LCE-7-2016-2017:
 - Developing system support functions enabling RES technologies to contribute - at transmission and distribution grid level - to a stable and safe energy system;
 - Define most suitable pathways for including integration considerations into the different RES development roadmaps



Biofuels (1/2)

Rationale:

- European industries have leading technologies, but currently little deployment in EU;
- Biofuels are medium-term solution for road and maritime transports and the only solution for air transport;
- Both biological and thermo-chemical pathways are necessary to provide technology diversity, but the challenges in each pathway are different;
- Large scale demonstrations are needed to boost market access;
- Research needed to reduce cost, improve environmental impact and performance efficiency.

Basic research

- Diversification of renewable fuel production through novel conversion routes/fuels - *LCE-6-2017*

Advanced research

- LCE-8-2016-2017: Next generation of:
 - *Paraffinic biofuels from sugar through chemical and/or biochemical pathways (2016)*
 - *Biofuels from pyrolysis or hydrothermal liquefaction (2016)*
 - *Synthetic biofuels/hydrocarbons through biomass gasification (2016)*
 - *Biofuels from CO₂ in industrial waste flue gases or other waste through different pathways (2017)*
 - *Biofuels from phototropic algae / bacteria (2017)*



Biofuels (2/2)

Advanced research

- Cooperation with Brazil on advanced lignocellulosic biofuels - *LCE-22-2016 (EUR 5 million)*

Demonstration

- *LCE-19-2016-2017* (EUR 15 million for each 2016 and 2017)
 - Biomass gasification (2016)
 - Biomass pyrolysis and torrefaction to intermediate bioenergy carriers (2016)
 - Biochemical conversion to diesel and jet fuels (2016)
 - Biofuels from waste flue gases / other wastes and residues (2017)
 - Biomass from aquatic biomass (2017)
- Pre-commercial production of advanced aviation biofuels – *LCE-20-2016-2017* (EUR 15 million in 2016; EUR 10 million in 2017)

Market-uptake

- Market roll-out of liquid advanced biofuels and liquid renewable alternative fuels – *LCE-21-2017*



Renewable energy – Topic overview

Deadline 16 February 2016

- LCE-7 – budget 61,3 M€
- LCE-8 – budget 10 M€
- LCE-23 – budget 10 M€

Deadline 5 January 2017

- LCE-6 – budget 20 M€
- LCE-7 – budget 66,5 M€
- LCE-8 – budget: 10 M€
- LCE-21 – budget 15 M€

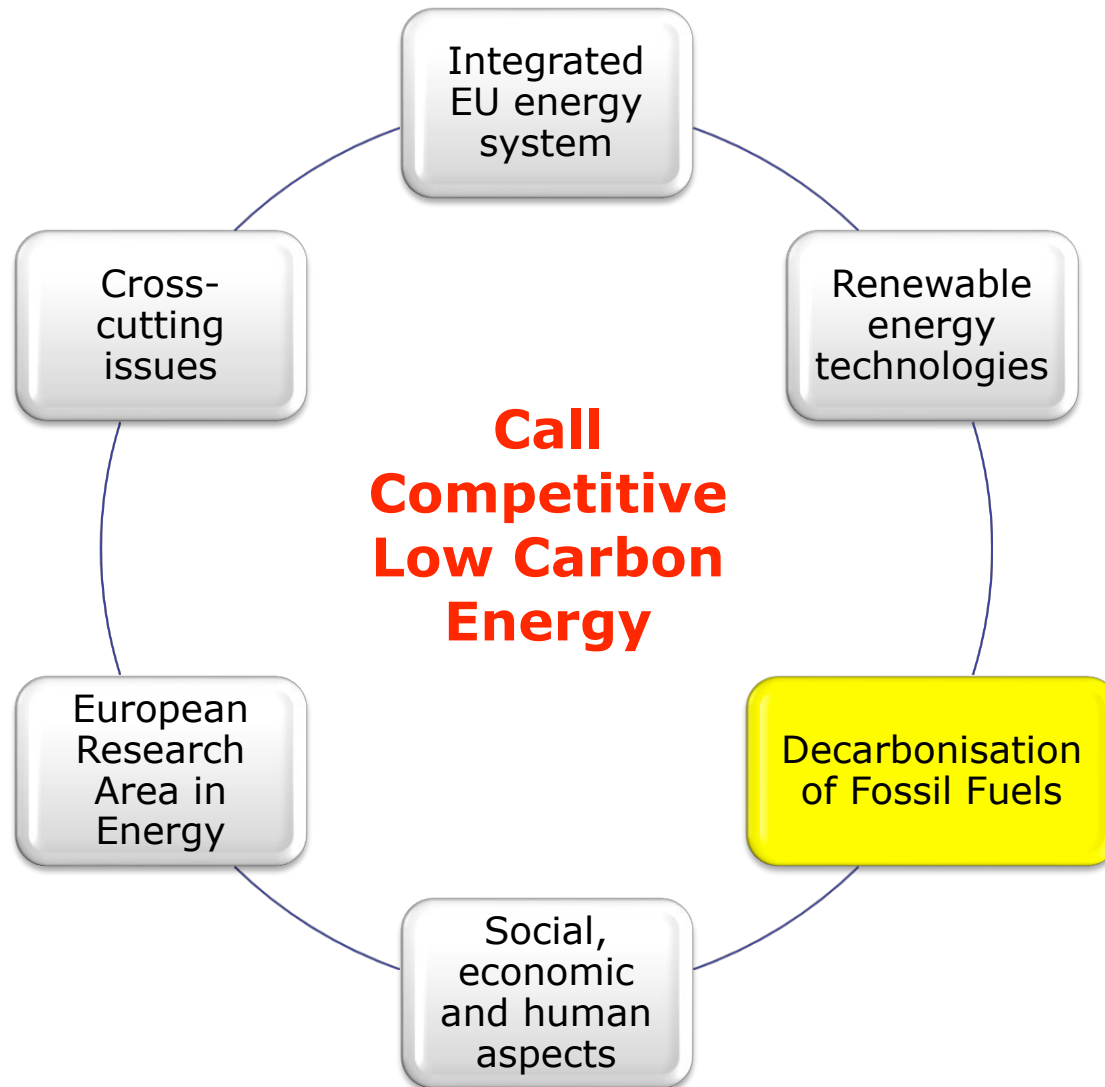
Deadline 8 September 2016

- LCE-9 – budget 25 M€
- LCE-13 – budget 10 M€
- LCE-15 – budget 15 M€
- LCE-19 – budget 15 M€
- LCE-20 – budget 15 M€
- LCE-22 – budget 5 M€

Deadline 7 September 2017

- LCE-10 – budget 10 M€
- LCE-11 – budget 12 M€
- LCE-12 – budget: 8 M
- LCE-14 – budget 25 M€
- LCE-16 – budget 7 M€
- LCE-17 – budget 8 M€
- LCE-18 – budget 10 M€
- LCE-19 – budget 15 M€
- LCE-20 – budget 10 M€

IA – green
RIA – blue
CSA- orange





Decarbonisation of Fossil Fuels - Context

- Fossil fuels will be used in Europe's power generation as well as in industrial processes for decades to come.
- A forward-looking approach to **Carbon Capture and Storage (CCS)** and **Carbon Capture and Use (CCU)** for the power and industrial sectors is crucial for reaching the 2050 climate objectives in a cost-effective way.
- **Shale gas** can contribute to our energy security, provided that issues of public acceptance and **environmental impact** are adequately addressed.
- The integration of (fluctuating) renewable electricity generation in our energy system requires new solutions for fossil fuel power plants to provide **highly flexible yet efficient back-up power** to stabilise the grid.



Decarbonisation of Fossil Fuels – Topics 2016

Activities supported in **2016**

LCE-24: New generation high-efficiency capture processes

- TRL 2/3 -> 5; Budget: EUR 17 million (~ 2-5 M€/project)
- Twinning with South Korean projects

LCE-25: Utilisation of captures CO₂ as feedstock for the process industry

- TRL 5/6 -> 6/7; Budget EUR 10 million (~ 6-10 M€/project)

LCE-26: ERA-NET on Applied Geosciences

- Covering ground water, raw materials and geo-energy
- Produce reliable scientific information on resources and potential consequences of their exploitation
- Budget: EUR 10 million; ERA-NET Cofund



Decarbonisation of Fossil Fuels – Topics 2017

Activities supported in **2017**

LCE-27: Measuring, monitoring and controlling the risks of CCS, EGS and unconventional hydrocarbons

- Scope to be defined in 2016

LCE-28: Highly flexible and efficient fossil fuel power plants

- TRL 3 -> 4-6; Budget EUR 15 million (~ 3-6 M€/project)

LCE-29: CCS in industry, including Bio-CCS

- TRL 4/5 -> 7; *budget to be confirmed 2016*

LCE-30: Geological storage pilots

- TRL 4/5 -> 6; *budget to be confirmed 2016*

ERA-NET on Commercial Scale Demonstration of CCS
to be confirmed 2016



Decarbonising Fossil Fuels – Topic overview

Deadline 16 February 2016

- LCE-24 – budget 17 M€
- LCE-25 – budget 10 M€

Deadline 16 February 2016

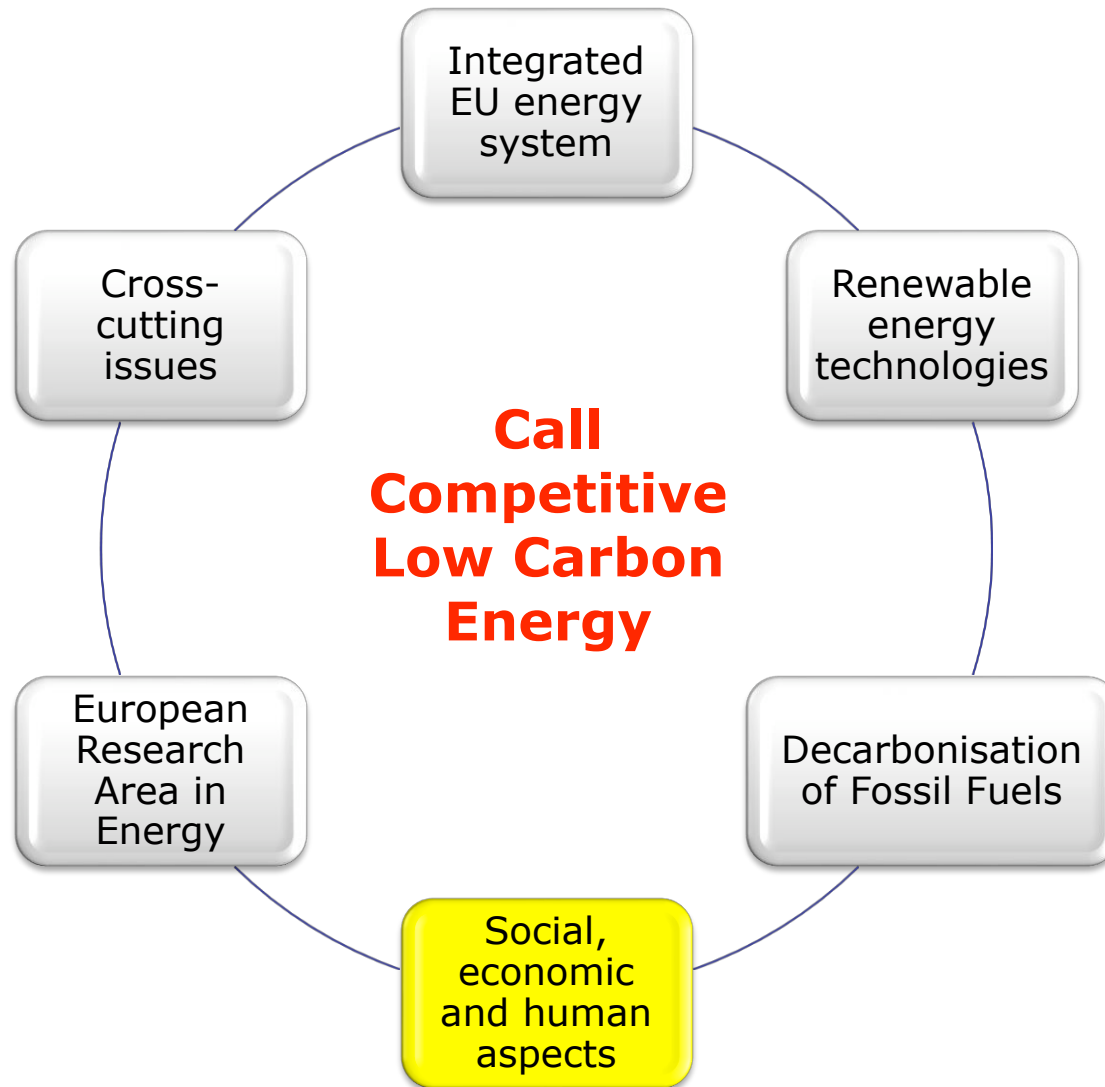
- **LCE-26 – budget 10 M€**

Deadline 5 January 2017

- LCE-27 – budget 15 M€
- LCE-28 – budget 15 M€
- LCE-29*
- LCE-30*

** The budget for topics LCE-29 and LCE-30 will be confirmed in the first half 2016. In case the ERA-NET on CCS demonstration will be supported, both topics will be withdrawn due to budget constraints.*

RIA – blue
ERA-NET - black





Social Sciences and Humanities (SSH)

Transition to a low-carbon energy system is a **complex societal problem** because it changes the interrelations between all relevant actors in the system (-> policy, economic, governance challenges)

- **Horizon 2020:** *Commitment to embed SSH aspects across all the research support provided.*
- **Energy Union:** *SSH aspects as enablers for tackling related priorities (e.g. citizen involvement, social dialogue, social innovation)*
- **SET Plan:** *SSH considerations cut across and inform other challenges – 'main-streaming' of SSH (modelling, societal impacts, innovation support)*



SSH-related topics

Social Sciences in support of the Energy Union (*LCE-31-2016-2017*)

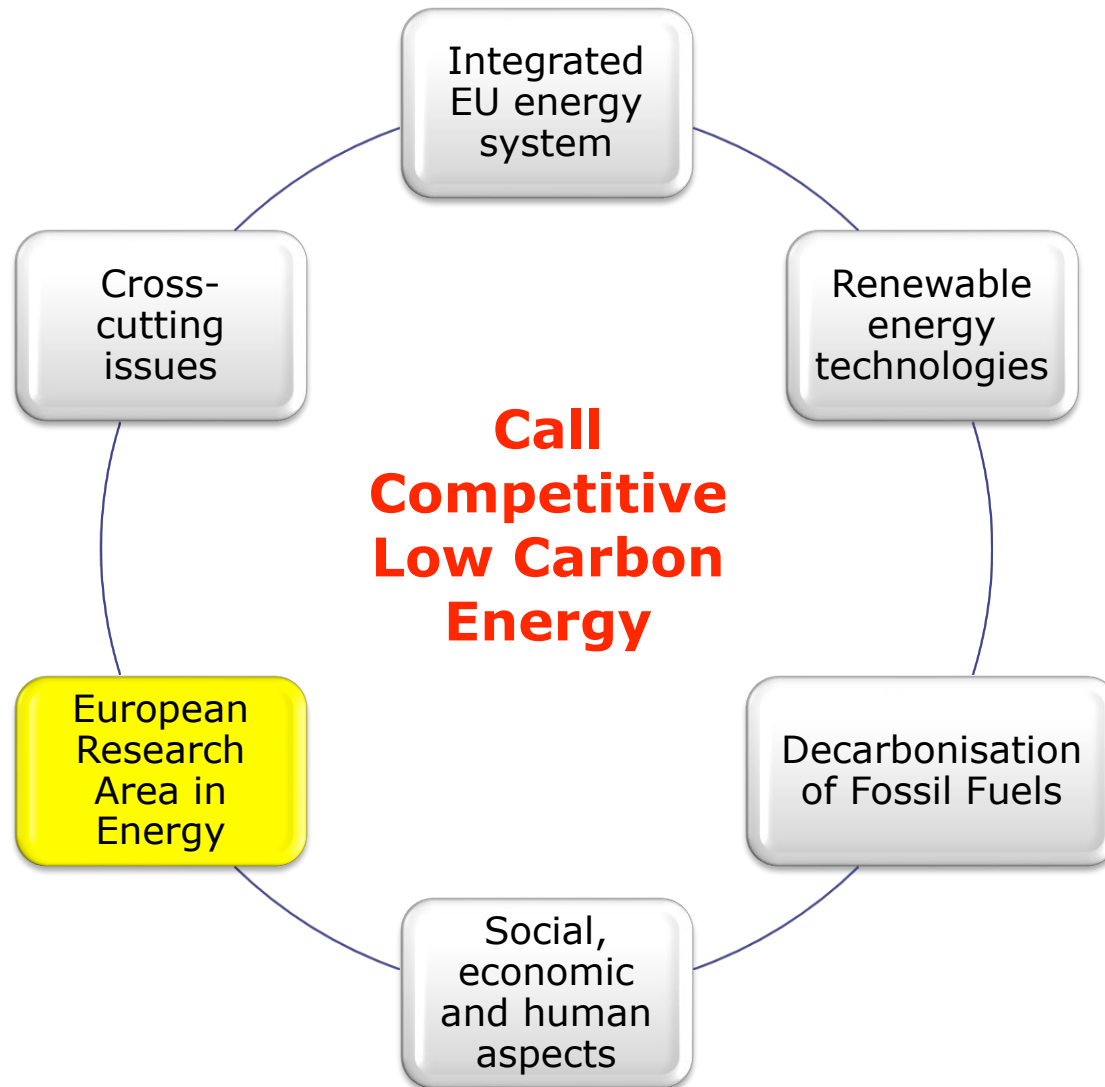
- **Focus 2016:** Energy-related choices and behaviour (individually and collectively)
- **Focus 2017:** Socioeconomic incentive structures, and political, institutional and organizational (i.e. governance) frameworks
- **Budget:** EUR 10 million for both 2016 and 2017 (~ 2-4 M€/project)
- **Deadlines:** 16 February 2016; 5 January 2017

European Platform for energy-related SSH research (*LCE-32-2016*)

- Setting up a new European platform to integrate existing energy-related SSH networks, identify research gaps for SSH in the energy field and strengthen the dialogue among different stakeholders
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- **Budget:** EUR 1.7 million (Coordination and Support Action – CSA)
- **Deadline:** 5 April 2016
- **Budget:** EUR 1.7 million (Coordination and Support Action – CSA)
- **Deadline:** 5 April 2016

Main-streaming of SSH

- For example topics EE-8, LCE-6, LCE-7, LCE-11, LCE-15, LCE-17, LCE-18, LCE-19, LCE-20, LCE-22, LCE-28



Supporting the development of the European Research Area in energy

- Encourage coordination of national and EU efforts to increase effectiveness and efficiency;
- Pool resources and create critical mass to address challenges that no country can tackle alone;



European Research Area



- **Align efforts to develop a European Research Area in energy and to create the Energy Union, one of the political priorities of the Juncker Commission;**
- **The new Integrated SET Plan provides the strategic framework for setting priorities and for discussing implementation:**





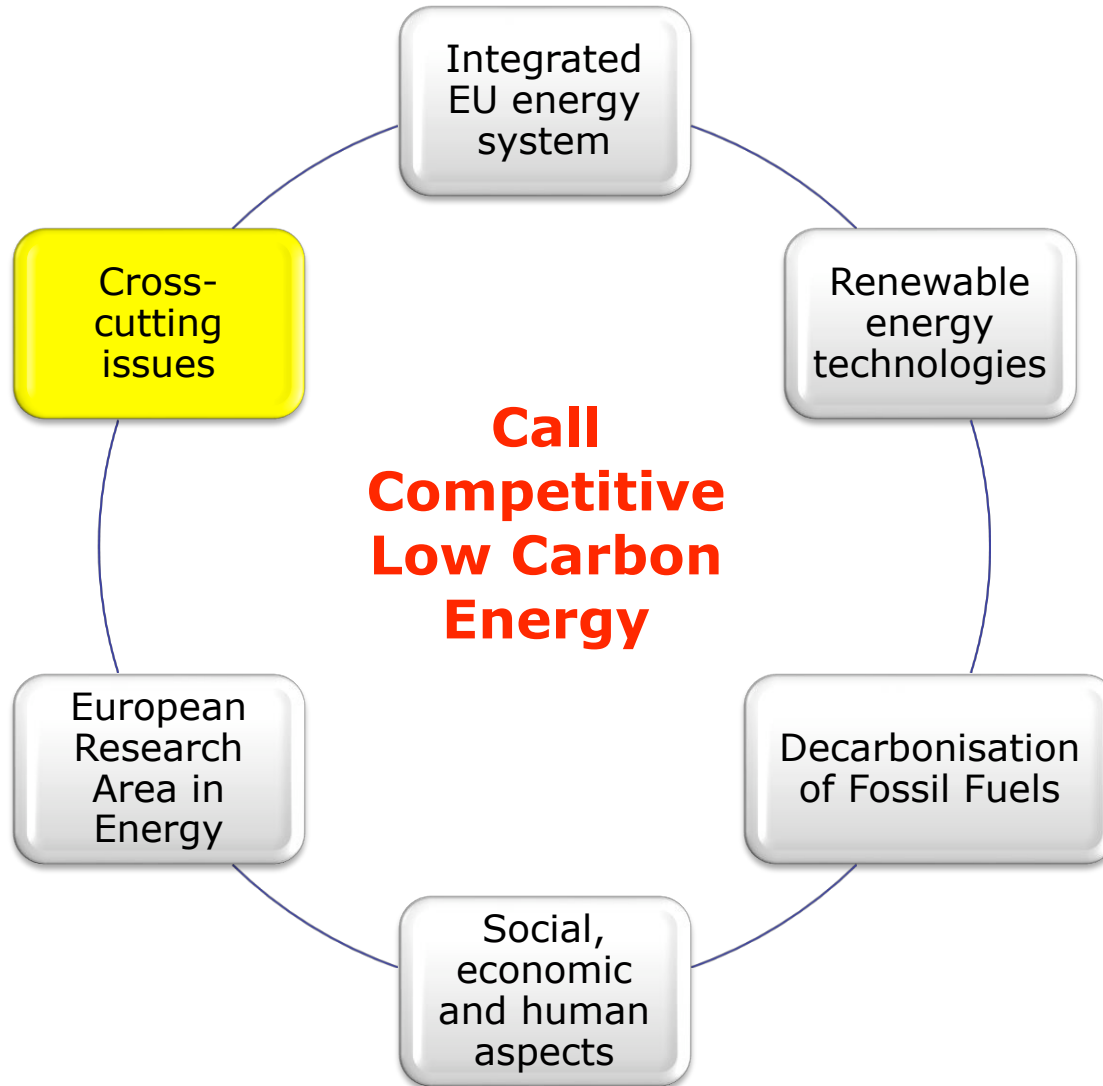
European Research Area in Energy

**ERA-NETs (LCE-34,
LCE-35 + OA#62,
LCE-26,EE-21)**

- Focus on demonstration projects and encouraging industrial participation
- Eligible participants: only programme owner and programme managers
- Combination of national and European funding.
- Budget LCE-34-2016: 30.8 M€
- Approach for 2017 to be reviewed in 2016

**European Common
Research and
Innovation
Agendas (ECRIA,
LCE-33)**

- Creating a transnational critical mass of research capacity in a certain area.
- Combination of national and European funding.
- Addressing integration aspect of the energy system.
- TRLs 2 -> 5; clear deliverables
- Deadline: 5 April 2016; Budget: 10 M€





Cross-cutting issues

**Support to the energy stakeholders to contribute to the SET-Plan
(LCE-36-2016-2017)**

- Areas supported:
 - **Photovoltaics**
 - **Ocean energy**
 - **Zero emission fossil fuel power plants and energy intensive industry**
 - **Biofuels**
- Coordination and support action (up to one project per area)
- Budget: 2.4 M€ (~ 0.6 M€ / project)
- Recommended grant duration: 2 years
- Deadline: 16 February 2016



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- ❑ Cross-cutting issues
- ❑ Rules for Participation
- ❑ Support

Call Smart Cities and Communities



- Improving quality of live, competitiveness and sustainability
- Exporting European knowledge in a strong growth market estimated globally at €1.3 trillion in 2020



Smart Cities and Communities

Topic SCC-1-2016-2017:

- Sustainable, cost-effective and replicable district-scale solutions at the intersection of energy and transport enabled by ICT
 - Intelligent, user-driven and demand-oriented city infrastructure and services
 - Continuation of the 'Lighthouse project' approach
 - Integrating smart buildings, smart grids, energy storage, electric vehicles, smart charging infrastructures and the latest generation of ICT platforms based on open specifications
-
- **Budget:** 60 M€ in 2016 and 71,5 M€ for 2017 (12-18 M€ per project)
 - **Deadlines:** 5 April 2016 and 14 February 2017
 - Part of the '**Smart and Sustainable Cities**' call which also includes actions on sustainable cities through nature-based solutions



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The SME Instrument

- Seamless business innovation support
- Completely bottom-up – all areas of the Energy Challenge covered
- Only open to SMEs – also single-beneficiaries possible

3 phases of support (no need to start with phase 1)

- 1. Business innovation grants** (feasibility studies, lump sum of EUR 50,000 per project);
 - 2. Business innovation grants for innovation development & demonstration purposes** (between EUR 0.5 – 2.5 million / project)
 - 3. Free-of-charge business coaching**, access to a wide range of innovation support services and facilitated access to risk finance to facilitate the commercial exploitation of the innovation.
- ✓ 4 submission deadlines per year for phase 1 and 2
 - ✓ Budget for the Energy SME topic (SMEInst-09-2016-2017):
 - ✓ **46 M€ in 2016**
 - ✓ **50 M€ in 2017**



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Fast-track to Innovation Pilot

- Innovation from the demonstration stage through to market uptake (starting as of TRL 6)
- Completely bottom-up – covers all areas addressed by H2020
- Small consortia with strong participation from industry
- Business plans mandatory
- 3 submission deadlines in 2016 (15/3, 1/6, 25/10/2016)
- Budget 100 M€ (no earmarking for areas)



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Horizon Prizes in Energy

New instrument to generate breakthroughs and induce innovation in low carbon energy technologies

Title	Budget (EUR million)	Publication of the contest	Submission of proposals
CO2 reuse (Innovative products utilising CO ₂)	€1.5	3 quarter 2016	Until 2nd quarter 2019
Combined Heat and Power(CHP) Installation with 100% RES (hospital with a perfectly integrated CHP installation)	€ 1.0	3 quarter 2016	Until 2nd quarter 2019
Integrated Photovoltaic System (European protected historic urban district with PV system in its buildings)	€ 0.75	3 quarter 2016	Until 3rd quarter 2018



Risk finance for demonstration projects

InnovFin Energy Demo Projects Pilot Facility (EDP)

(Other Action#28)

- First-of-a kind commercial-scale industrial demonstration projects (TRL 7-8) for unproven pre-commercial technologies in the field of innovative **renewable energy, fuel cells and hydrogen** in support of the SET-Plan
- Loan amount: min EUR 7.5 M€, max EUR 75 M€
- Loan maturity: max 15 years

InnovFin
Energy Demo Projects

Application & inquiries: directly with the EIB - New Products & Special Transactions, EIB, Luxembourg

Tel: +352 4379 85002, E-mail: innovfinFDP@eib.org

<http://www.eib.org/products/blending/innovfin/products/index.htm>



International Cooperation

Open to the World

General opening

- Participation to all international partners
- Common interest, mutual benefits
- Direct participants to grant agreements or as third parties

Dedicated Actions

Targeted openings & Coordinates calls

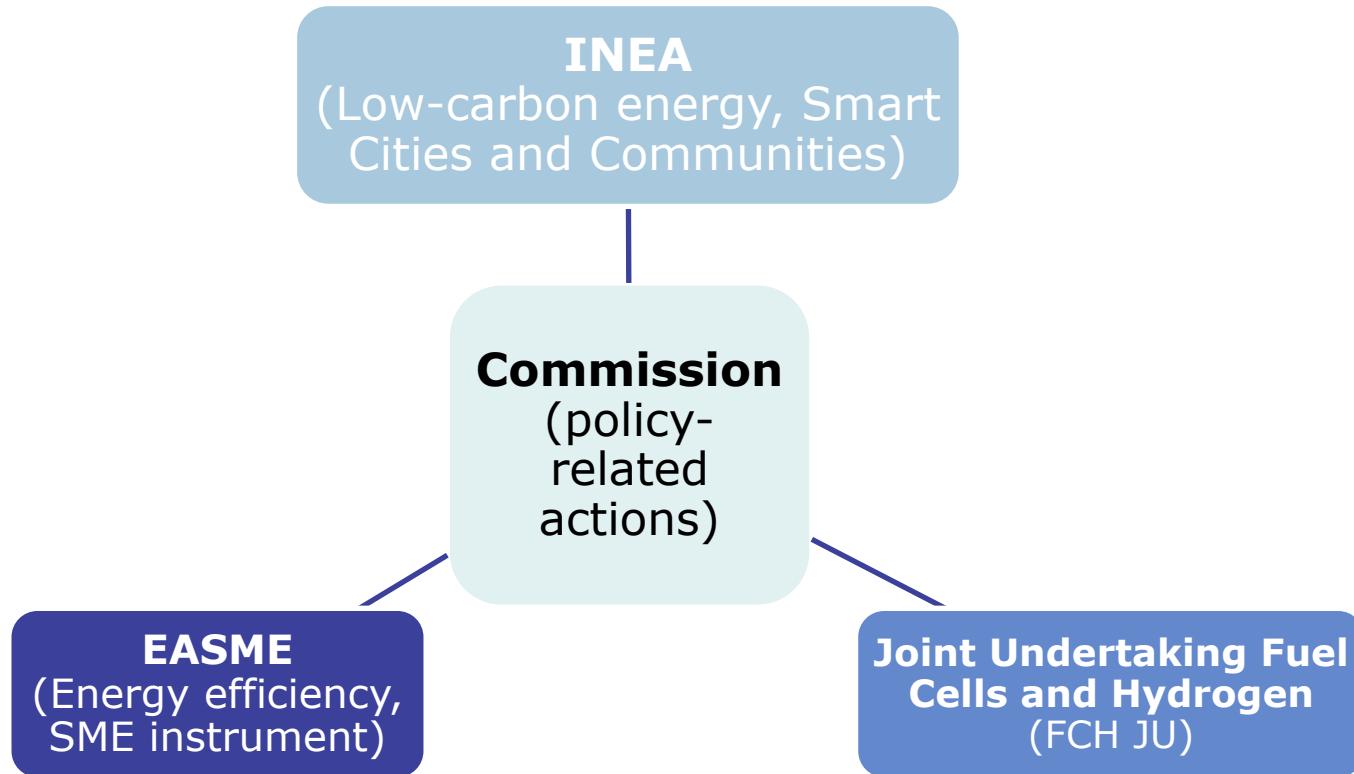
- Encouraged or required participation
- Specific international partners

Other cooperation

- Exploring other types of cooperation (on-going)



Implementation of the Energy Challenge





Implementation of the Energy Challenge

European Commission

Defines the policy

- Defines strategy, objectives and priority areas/work programmes
- Selects projects for co-financing
- Makes programme decisions
- Evaluates the programme and the Agency's performance

Executive Agency

Turns policy into action

- Organises Calls for proposals
- Monitors the technical and financial implementation of projects
- Ensures sound financial management
- Manages project life-cycle



FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

<http://www.fch.europa.eu/>

Transport

- Road vehicles
- Non-road vehicles and machinery
- Refuelling infrastructure
- Maritime, rail and aviation applications

Energy

- Hydrogen production and distribution
- Hydrogen storage for renewable energy integration
- Fuel cells for power and combined heat & power generation

Cross-cutting Issues

(e.g. standards, consumer awareness, manufacturing methods, ...)

EU budget (2014-2020): 665 M€

Objectives:

- Reduce the (production) cost,
- Increase the lifetime
- Increase the efficiency
- Reduce 'Critical raw materials'



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Funding rates

FP7

Maximum reimbursement rates	Research and technological development activities (*)	Demonstration activities	Other activities
Network of excellence	50% 75% (**)		100%
Collaborative project(***)	50% 75% (**)	50%	100%
Coordination and support action			100% (***)

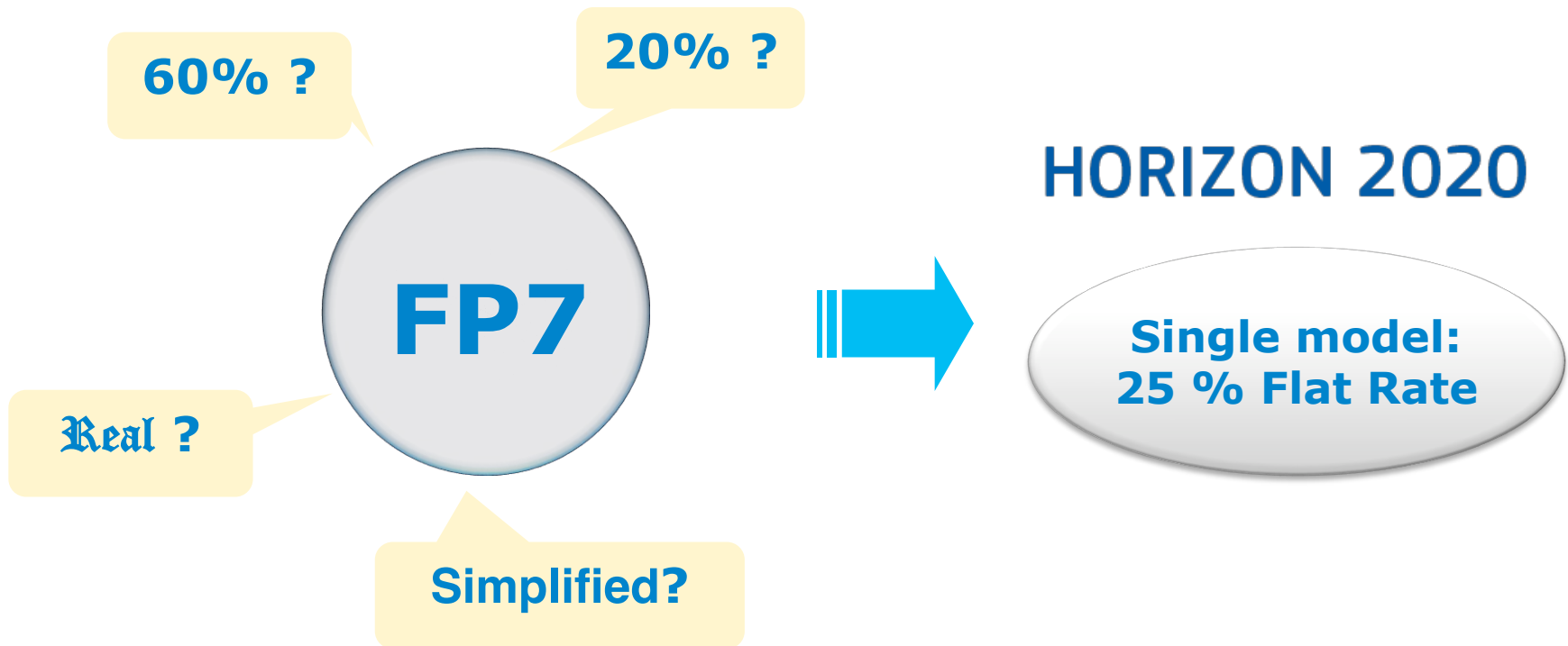


HORIZON 2020

- *One project = One rate*
- ✓ *For all beneficiaries and all activities in the grant.*
- ✓ *Defined in the Work Programme:*
 - *Up to 100 % of the eligible costs;*
 - *but limited to a maximum of 70 % for innovation projects (exception for non-profit organisations - maximum of 100%)*
 - *Specific reimbursement rates for programme co-fund actions*

(*) Research and technological development includes scientific coordination.
 (**) For beneficiaries that are non-profit public bodies, secondary and higher education establishments, research organisations and SMEs.
 (***) The reimbursement of indirect eligible costs, in the case of coordination and support actions, may reach a maximum 7% of the direct eligible costs, excluding the direct eligible costs for subcontracting and the costs of resources made available by third parties which are not used on the premises of the beneficiary.
 (****) Including research for the benefit of specific groups (in particular SMEs)

Single indirect cost-model





Time to Grant

*A maximum Time-to-Grant of **8 months***

5 months

for informing all applicants
on scientific evaluation

But likely earlier

up to 8 months

for signature of GA

*Some exceptions apply, including complex actions or where
requested by applicants*



Simplification

Personnel costs

- No time records for researchers working exclusively on the project.
- Wider acceptance of average personnel costs

"Bonuses"

- Up to 8000 Euro/year/person working full-time exclusively in the action, for non-profit legal entities

Financial viability

- Restricted to coordinators for projects \geq €500 k€

Ex-post audits

- Commission's audits up to two years after payment of the balance
- Audit strategy focused on risk and fraud prevention

Guarantee Fund

- Continuity with FP7 – 5% withheld from pre-financing



Types of actions

Research and Innovation Action (RIA)

- establish new knowledge and/or to explore the feasibility of a new or improved technology, product, process, service or solution
- 100% funding rate
- At least 3 legal entities from 3 different MS/AC

Innovation Action (IA)

- producing plans/arrangements or designs for new, altered or improved products, processes or services (incl. prototyping, testing, demonstrating, piloting, large-scale product validation and market replication)
- 70% funding rate (but 100% for non-profit organisations)
- At least 3 legal entities from 3 different MS/AC

Coordination and Support Action (CSA)

- accompanying measures such as standardisation, dissemination, awareness-raising and communication, networking, coordination or support services
- 100% funding rate
- At least 1 legal entity from MS/AC

ERA-NET Cofund

- support public-public partnerships in their preparation, networking, design, implementation and coordination of joint activities as well as EU topping-up of a trans-national call for proposals
- At least 3 legal entities from 3 different MS/AC
- participants must be 'research funders'



Types of action

Public Procurement of Innovative Solutions (PPI)

- **Cofunding** for a group of procurers ('buyers group') to undertake together one joint PPI procurement
- Buyers group is launch customer of innovative goods or services which are not yet available on a large-scale commercial basis, and may include conformance testing'
- 20% funding rate (exceptionally 35% for EE-19-2017)
- At least 3 legal entities from 3 different MS/AC of which at least 2 legal entities from 2 different MS/AC that are public procurers

SME Instrument

FTI

Financial Instruments

Prizes

Grants to identified beneficiaries

(CSA)

Procurement



Additional eligibility criteria set in the WP

EE-19-2017	PPI at 35% funding rate (instead of 20%)
EE-02-2017, EE-06-2016-2017, EE-09-2016-2017, EE-11-2016-2017, EE-13-2016, EE-15-2017, EE-18-2017, EE-23-2017, EE-24-2016-2017, EE-25-2016	CSA but three minimum participants
EE-16-2016-2017	CSA but three minimum participants Market surveillance authorities included
LCE-22-2016	Coordination with Brazil
LCE-23-2016	Coordination with Mexico
LCE-20-2016-2017	Off-take agreement requirement
SCC-1-2016-2017 SCC-02-2016-2017	Minimum "front-runner"/"follower" and "lighthouse"/"follower" cities



Admissibility criteria set in the WP

➤ **Proposals must be**

- submitted in the electronic submission system (no paper, email submissions)
- before the deadline
- readable, accessible and printable.

➤ **Proposals must be complete:**

- Include administrative data, the proposal description, and any supporting documents specified in the call
- Include supporting documents for operational capacity (CVs, up to 5 prior publications/products, up to 5 prior projects, major infrastructure, third parties)
- Proposals **must** include **draft plan for the exploitation and dissemination of the results** (not required for proposals at the first stage of two-stage procedures)



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National Contact Points (NCPs)

NCPs are in the front line for providing specialist advice and on-the-ground guidance to potential applicants

Main services:

- Guidance on choosing relevant H2020 topics and types of action;
- Advice on administrative procedures and contractual issues;
- Training and assistance on proposal writing;
- Assistance in partner search.

Find your national NCP:

http://ec.europa.eu/research/participants/portal/desktop/en/support/national_contact_points.html

Network of Energy NCPs: www.C-energy2020.eu



More Information

Participants Portal:

<http://ec.europa.eu/research/participants/portal/desktop/en/home.html>

Research Enquiry Service:

<http://ec.europa.eu/research/index.cfm?pg=enquiries>

Presentations of the Energy Info Day 2015:

<https://ec.europa.eu/inea/en/H2020-Energy-Infoday-presentations>

Horizon 2020 Homepage:

<http://ec.europa.eu/programmes/horizon2020/>

Joint Undertaking on Fuel Cells and Hydrogen (FCH JU): <http://www.fch.europa.eu>



**Thank you for your
attention**





Additional slides



LEITs (Leadership in Enabling and Industrial Technologies)
Nanotechnologies, Advanced materials, Advanced manufacturing and processing, Biotechnology

Energy-efficient Buildings
(*EEB-01 - EEB-8*)

Sustainable Process Industry
(*SPIRE-04, SPIRE-05, SPIRE-08*)

Materials for Energy
(*NMBP-2, NMBP-3, NMBP-17 - NMBP-20*)

LEITs (Leadership in Enabling and Industrial Technologies)
Information and communication technologies

Low energy computing
(*ICT-5*)

Power electronics

Big Data
(*ICT-15*)

Photonics
(*ICT-29*)

Internet of Things
(*EUB-2*)



Societal Challenge 2

Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy

Biomass production

(BB-01)

Marine energy

(RUR-07, RUR-08)

Societal Challenge 4

Smart, green and integrated transport

Energy-efficient transport

(MG-1.1, MG-2.1.)

Electric mobility

(MG-4.2)

Green Vehicles

(GV-1, GV-4, GV-5, GV-6, GV-8)

Use of alternative fuels

(MG-1.1, MG-2.1, GV-1)



Societal Challenge 5

Climate action, environment, resource efficiency and raw materials

Nature-based solutions for Smart and Sustainable Cities

(SCC-2, SCC-3, SCC-4)

Societal Challenge 6 - Europe in a changing world; Science with and for Society

Social Innovation

(Horizon Prize - SwafS-10)

Responsible Research



Societal Challenge 7

Secure societies

Critical Infrastructures

(CIP-1)

Access to Risk Finance

Support for first-of-a-kind demonstration projects

(InnovFin Energy Demonstration Projects - EDP)

European Research Infrastructures (including e-Infrastructures)

Research Infrastructures for energy *(INFRAIA-01)*



WP General Annexes

- A. LIST OF COUNTRIES ELIGIBLE FOR FUNDING
- B. STANDARD ADMISSIBILITY CONDITIONS AND RELATED REQUIREMENTS
- C. STANDARD ELIGIBILITY CONDITIONS
- D. TYPES OF ACTION: SPECIFIC PROVISIONS AND FUNDING RATES
- E. SPECIFIC REQUIREMENTS FOR INNOVATION PROCUREMENT (PCP/PPI)
- F. MODEL RULES OF CONTEST (ROC) FOR PRIZES
- G. TECHNOLOGY READINESS LEVELS (TRL)
- H. EVALUATION RULES
- I. BUDGET FLEXIBILITY
- J. ACTIONS INVOLVING CLASSIFIED INFORMATION
- K. ACTIONS INVOLVING FINANCIAL SUPPORT TO THIRD PARTIES