



## SET PLAN and HORIZON 2020

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# Energy Union

Built with the ambition to achieve in a cost – effective way a fundamental transformation of Europe's Energy System.

Smarter, Flexible, Decentralised, Integrated , Sustainable, Secure and Competitive ways **for the consumers.**

# Energy Union technology and innovation agenda

- Integrated Strategic Energy Technology Plan (SET Plan)
- Strategic Transport Research and Innovation Agenda
- Global Technology and Innovation Leadership Initiative

# SET PLAN

## Communication from the Commission

*Towards an Integrated Strategic Energy Technology (SET) PLAN: Accelerating the European Energy System Transformation*

*15.9.2015*

*C(2015) 6317 final*

# Integrated Roadmap

- The subsequent work on the Integrated Roadmap, that assessed the European Energy research and innovation investment needs, leads to the conclusion that **increased funding efforts and more cooperation between industry, research institutions and among Member States** (based on a better overview of who does what) are needed to accelerate the energy system transformation.

# Targeted focus

- 4 core priorities
  - Renewables,
  - Consumer,
  - Energy efficiency,
  - Transport
- 2 research priorities
  - CCS
  - Nuclear

## **TEN ACTIONS TO ACCELERATE THE ENERGY SYSTEM TRANSFORMATION AND CREATE JOBS AND GROWTH**

- the key research and innovation actions needed to transform the entire energy system;
- 10 priorities should serve as a starting point for discussions with Member States and stakeholders in the development of new research and innovation programmes and activities at European and national level.

## *Number 1 in renewable energy*

1. Sustain technological leadership by developing highly performant renewable technologies and their integration in the EU's energy system:
  - EU can restore and scale-up to competitive manufacturing the next generation **of highly performing PV**, including the technologies to integrate PV into the built environment
  - EU is currently world leader, such as **in offshore wind, lignocellulosic biofuels** or **ocean energy**, leadership should be maintained



# *Number 1 in renewable energy*

- Support the development of the next generation of renewables technologies and the improvement of their performance in particular to **offshore wind, ocean energy, bioenergy, geothermal technologies, solar thermal, and technologies that convert power into chemicals and fuels**

## 2 - Reduce the cost of key technologies

- in the **Northern and Baltic Seas** for **offshore wind** energy systems, including deployment and maintenance technologies and techniques, and develop the associated grid systems,
- on the **Atlantic** sea board for **ocean energy**,
- in **Southern Europe** for **photovoltaic and solar thermal systems, algae and biomass residues**,
- in **Northern, Central, and Eastern Europe** for **bio-energy and bio-fuels**.

***The future smart EU energy system, with the consumer at the centre***

### 3 - Create technologies and services for smart homes that provide smart solutions to energy consumers

- **give consumers** in homes, companies and public administration control to optimise their energy consumption (and production);
- **cities** the opportunity to optimise the use of energy in their infrastructures, through a more interactive/smarter system, relying on smart grid services.

## 4 - Increase the resilience, security and smartness of the energy system:

- EU needs to develop and demonstrate innovative power electronics, flexible thermal generation, demand response and storage, as well as efficient heating and cooling technologies (such as heat pumps and combined heat and power);
- Connecting the different networks in an integrated energy system, will be particularly important for ensuring the stability and security of the electricity system, as well as the protection and privacy of consumer data .

## **5 - Develop new materials and technologies for, and the market uptake of, energy efficiency solutions for buildings**

- The development of advanced materials and industrialised construction processes to reduce costs;
- Accelerate the large-scale market uptake of **Nearly Zero Energy Buildings** .

- 6 - Continue efforts to make EU **industry less energy intensive** and more competitive ;
- 7 - Become competitive in the global **battery sector** to drive e-mobility forward;
- 8 - Strengthen market take-up of **renewable fuels** needed for sustainable transport solutions;
- 9 - Step up research and innovation activities on the application of carbon capture and storage (**CCS**) and the commercial viability of carbon capture and use (**CCU**);
- 10 - Maintaining a high level of safety of nuclear reactors (*Increase safety in the use of nuclear energy* )



## **Horizon 2020**

Societal Challenge 3 "Secure, Clean and Efficient Energy"

# HORIZON 2020

WP 2016/17

'Secure, Clean and Efficient Energy'

1. **ENERGY EFFICIENCY**
2. **COMPETITIVE LOW-CARBON ENERGY**
3. **SMART AND SUSTAINABLE CITIES**
4. Fast-track-to-Innovation pilot (64 itens)



# Energy Work Programme 2016-2017

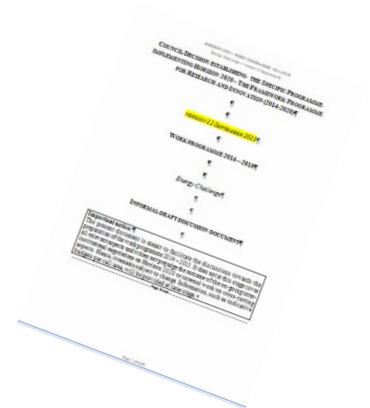
ENERGY EFFICIENCY – 25 Topics



SMART CITIES AND COMMUNITIES – 1 topic

CO

AND



# Calls for proposals 2016/2017 – Energy Efficiency

**TOTAL AMOUNT 194 M€**

2016 – 93 M€ - 17 Topics

2017 – 101 M€ - 18 Topics



Heating and Cooling



Building and  
consumers



Industry and products



Investment

# ENERGY EFFICIENCY

1. Heating and cooling
2. Engaging consumers towards sustainable energy
3. Buildings
4. Industry, services and products
5. Innovative financing for energy efficiency investments

## **1. Heating and cooling** .....

EE-1-2017: Waste heat recovery from urban facilities and re-use to increase energy efficiency of district or individual heating and cooling systems .....

EE-2-2017: Improving the performance of inefficient district heating networks .....

EE-3-2016: Standardised installation packages integrating renewable and energy efficiency solutions for heating, cooling and/or hot water preparation .....

EE-4-2016-2017: New heating and cooling solutions using low grade sources of thermal energy 19

EE-5-2016: Models and tools for heating and cooling mapping and planning .....

## **2. Engaging consumers towards sustainable energy** .....

EE-6-2016-2017: Engaging private consumers towards sustainable energy .....

EE-7-2016-2017: Behavioural change toward energy efficiency through ICT .....

EE-8-2016: Socio-economic research on consumer's behaviour related to energy efficiency 27

EE-9-2016-2017: Engaging and activating public authorities .....

## **3. Buildings** .....

EE-10-2016: Supporting accelerated and cost-effective deep renovation of buildings through Public Private Partnership (PPP)



# Buildings

Buildings	TOPIC	Type of scheme	EC Contribution
EE 10 – 2016	Supporting accelerated and cost-effective deep renovation of buildings	IA (TRL 6-8)	3-4M€
<i>Keywords: more cost effective, higher quality, faster deep renovation, increase rate of renovation, pre-fabricated mass manufactured components</i>			
EE 12 - 2017	Integration of Demand Response in Energy Management Systems while ensuring interoperability through Public Private Partnership (EeB PPP)	IA (TRL 6-8)	3-4M€
<i>Key words: optimisation, integration and demonstration of cost effective and interoperable solutions, including testing of new technologies and systems in real life situations</i>			
EE 11 – 2016/2017	Overcoming market barriers and promoting deep renovation of buildings	CSA	1-2M€
<i>Keywords: remove regulatory barriers and non-regulatory barriers, at least 60% of energy savings, financial mechanisms, instruments and business models</i>			
EE 13 – 2016	Cost reduction of new Nearly Zero-Energy buildings	CSA	1-2M€
<i>Keywords: market ready cost reductions, integration of RES in NZEB, measurable nearly zero energy consumption and LCA in buildings</i>			
EE 14 – 2016/2017	Construction skills	CSA	1-2M€

*Keywords: upgrading or setting up qualification and training schemes to increase the number of skilled building professionals/blue collar workers*

### **3. Buildings** .....

EE-10-2016: Supporting accelerated and cost-effective deep renovation of buildings through Public Private Partnership (PPP) .....

EE-11-2016-2017: Overcoming market barriers and promoting deep renovation of buildings .....

EE-12-2017: Integration of Demand Response in Energy Management Systems while ensuring interoperability through Public Private Partnership (PPP) .....

EE-13-2016: Cost reduction of new Nearly Zero-Energy buildings .....

EE-14-2016-2017: Construction skills .....

### **4. Industry, services and products** .....

EE-15-2017: Increasing capacities for actual implementation of energy efficiency measures in industry and services .....

EE-16-2016-2017: Effective implementation of EU product efficiency legislation .....

EE-17-2016-2017: Valorisation of waste heat in industrial systems .....

EE-18-2017: Energy efficiency of industrial parks through energy cooperation and mutualised energy services .....

EE-19-2017: Public Procurement of Innovative Solutions for energy efficiency .....

EE-20-2017: Bringing to market more energy efficient and integrated data centres .....

EE-21-2016: ERA-NET Cofund actions supporting Joint Actions towards increasing energy efficiency in industry and services .....

### **5. Innovative financing for energy efficiency investments** .....

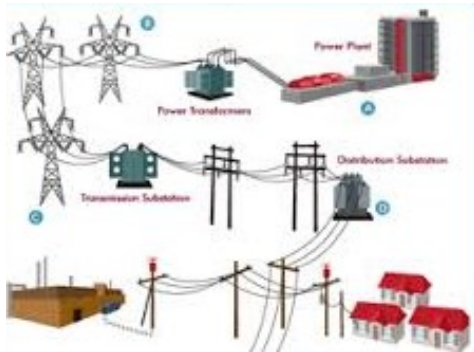
EE-22-2016-2017: Project Development Assistance .....

# Calls for proposals 2016/2017 – Low Carbon Energy

**TOTAL AMOUNT 514 M€**

2016 – 258,1 M€ - Topics

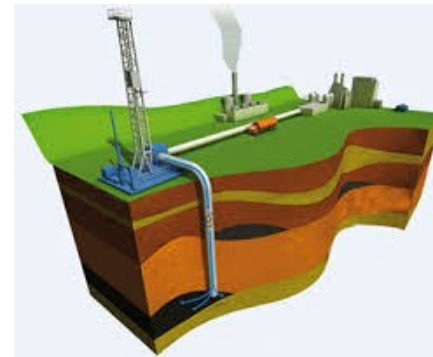
2017 – 256,5 M€ - Topics



**Integrated Systems**



**Renewable Energy  
integration in the  
energy system**



**Decarbonization of  
the use of fossil fuels**



**social,  
economic and  
human aspects  
of the energy  
system**

# COMPETITIVE LOW-CARBON ENERGY

1. Towards an integrated EU energy system
2. Renewable energy technologies
3. Enabling the decarbonisation of the use of fossil fuels during the transition to a low-carbon economy
4. Social, economic and human aspects of the energy system
5. Supporting the development of a European research area in the field of energy
6. Cross-cutting issues



# Towards an Integrated Energy System



## Towards an Integrated Energy System

### TOPIC

### Type of scheme

### TRL

### EC Contribution

LC 1

Next generation innovative technologies enabling smart grids, storage and energy system integration with increasing share of renewables: distribution network

RIA

3-6

2-4 M€

**Keywords:** solutions beyond the state of the art; Areas for 2016: storage (EV) or synergies between energy networks

LCE 2

Demonstration of smart grid, storage and system integration technologies with increasing share of renewables: distribution system

IA

5-8

12-15 M€

**Keywords:** demand response, smartening the distribution grid, energy storage, connections between networks, smart integration of grid users from transport, large scale pilots, real life conditions validation

LCE 3

Support to R&I strategy for smart grid and storage

CSA

4 M€

**Keywords:** new challenges -> novel approach to R&I strategy in the field smart grid and storage

# Renewable Energy Technologies

Portfolio Supported	Basic Research	Advanced Research	Demonstration	Market uptake
Photovoltaics	LCE-6-2017	LCE-7-2016/2017	LCE-9-2016	LCE-21-2017
			LCE-10-2017	
Concentrated Solar Power			LCE-11-2017	LCE-21-2017
Solar Heating and Cooling			LCE-12-2017	
Wind Energy			LCE-13-2016	
			LCE-14-2017	
Ocean Energy			LCE-15-2016	
			LCE-16-2017	
Hydropower				
Geothermal Energy			LCE-17-2016	LCE-21-2017
			LCE-23-2016	
			LCE-18-2017	
Combined Heat and Power				
RES integration in the system				
Bio and Renewable Alternative Fuels		LCE-8-2016/2017	LCE-19 -2016/2017	LCE-21-2017
		LCE-22-2016	LCE-20-2016/2017	

**1. Towards an integrated EU energy system**

- LCE-1-2016-2017: Next generation innovative technologies enabling smart grids, storage and energy system integration with increasing share of renewables: distribution network
- LCE-2-2016: Demonstration of smart grid, storage and system integration technologies with increasing share of renewables: distribution system
- LCE-3-2016: Support to R&I strategy for smart grid and storage
- LCE-4-2017: Demonstration of smart transmission grid, storage and system integration technologies with increasing share of renewables
- LCE-5-2017: Tools and technologies for coordination and integration of the European energy system

**2. Renewable energy technologies**

**Developing the next generation of renewable energy technologies**

- LCE-6-2017: New knowledge and technologies
- LCE-7-2016-2017: Developing the next generation technologies of renewable electricity and heating/cooling
- LCE-8-2016-2017 Development of next generation biofuel technologies

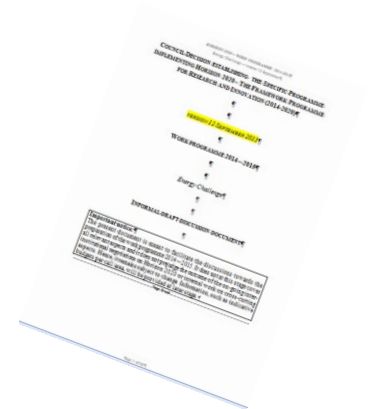
**Demonstrating innovative renewable energy technologies**

- LCE-10-2017: Reducing the cost of PV electricity
- LCE-11-2017: Near-to-market solutions for reducing the water consumption of CSP Plants
- LCE-12-2017: Near-to-market solutions for the use of solar heat in industrial processes
- LCE-13-2016: Solutions for reduced maintenance, increased reliability and extended life-time of wind turbines/farms
- LCE-14-2017: Demonstration of large >10MW wind turbine
- LCE-15-2016: Scaling up in the ocean energy sector to arrays
- LCE-16-2017: 2nd Generation of design tools for ocean energy devices and arrays development and deployment
- LCE-17-2017: Easier to install and more efficient geothermal systems for retrofitting buildings
- LCE-18-2017: EGS in different geological conditions
- LCE-19-2016-2017: Demonstration of the most promising advanced biofuel pathways
- LCE-20-2016-2017: Enabling pre-commercial production of advanced aviation biofuel

# Energy Work Programme 2016-2017



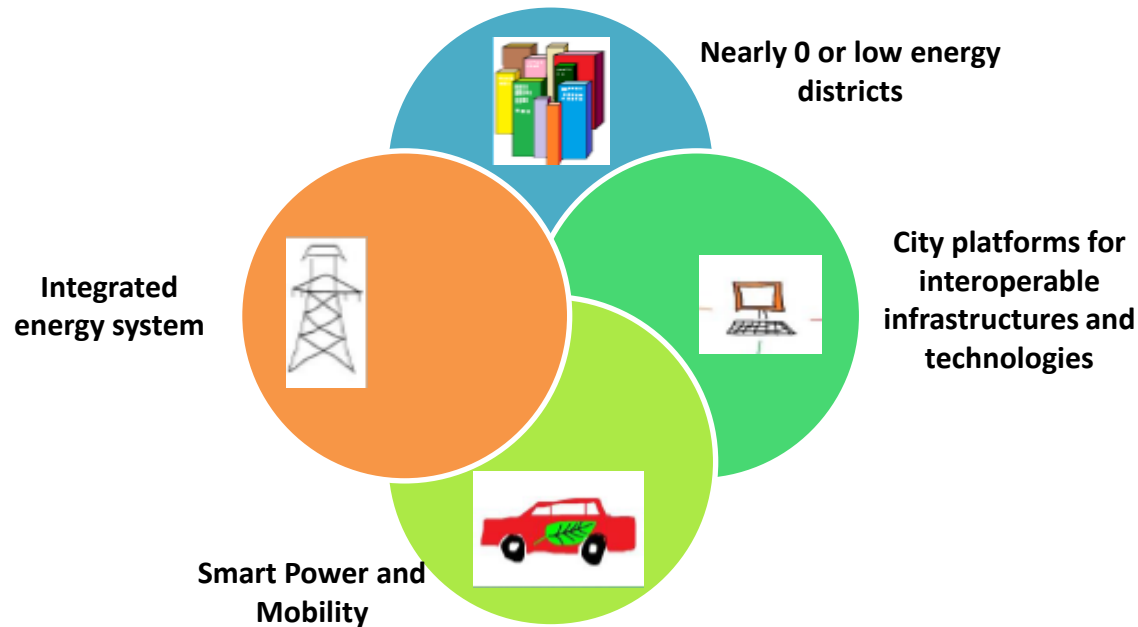
## SMART CITIES AND COMMUNITIES – 1 Topic



# Smart and sustainable cities

Smart Cities and Communities	TOPIC	Type of scheme	EC Contribution
SCC 1 – 2016/2017	Smart Cities and Communities lighthouse projects	IA (> TRL 7)	12-18 M€

*Keywords: smart homes, smart energy, ICT systems and electric vehicles, integration, replication of solutions*





*Thanks*

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