



Alliance of Liberals and Democrats for Europe  
Alliance des Démocrates et des Libéraux pour l'Europe

# Energy Efficiency and Renewable Energy

in

Horizon 2020

European Structural and Investment Funds (ESIF)

2014-2020

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# Synergies and Complementarity

## Horizon 2020 and ESIF

- Horizon 2020

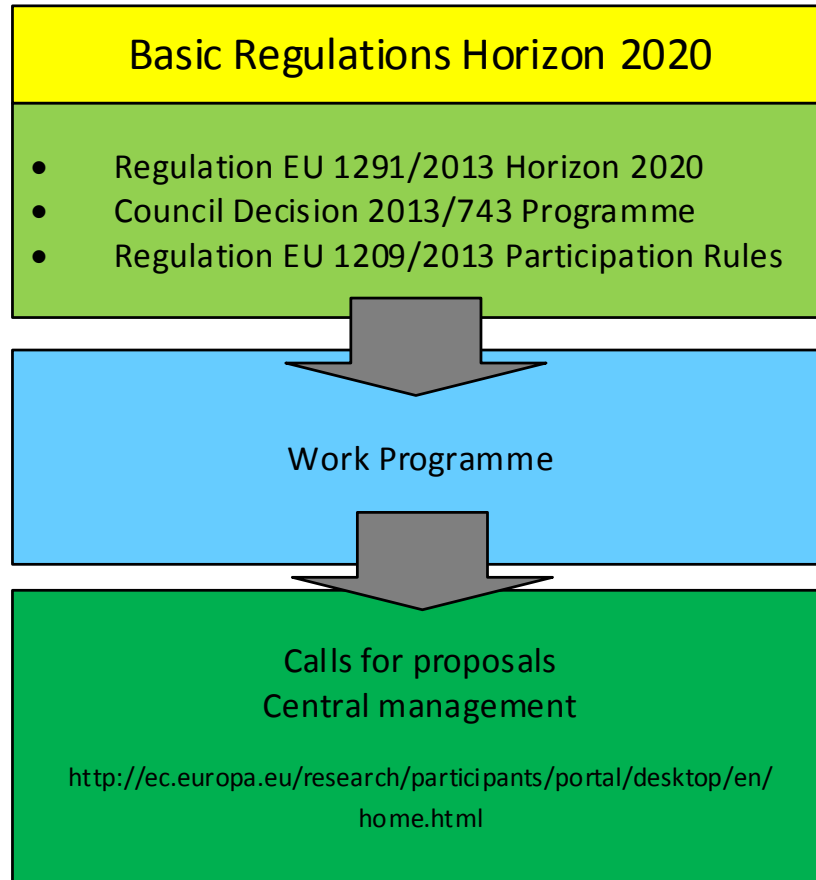
- Excellent science
- Industrial leadership
- **Societal challenges**
  - **Secure clean and efficient energy**

- ESIF

- R&D and Innovation
- Low carbon economy ( EE and RES)

ESIF	
<b>ERDF</b> At least 12% and 20% on EE and RES	<b>Cohesion Fund</b> Investing in housing on EE and RES

# Legal basis and programming process



# ESIF 2014-2020

- **Low carbon economy ( EE and RES)**

- European Regional Development Fund (Thematic concentration – 80/20; 60/15 and 50/12)
- Cohesion Fund
- European Social Fund

- **ERDF Thematic concentration**

- R&D and Innovation
- SMEs
- Low Carbon economy ( EE and RES)
- ICT

# Horizon 2020

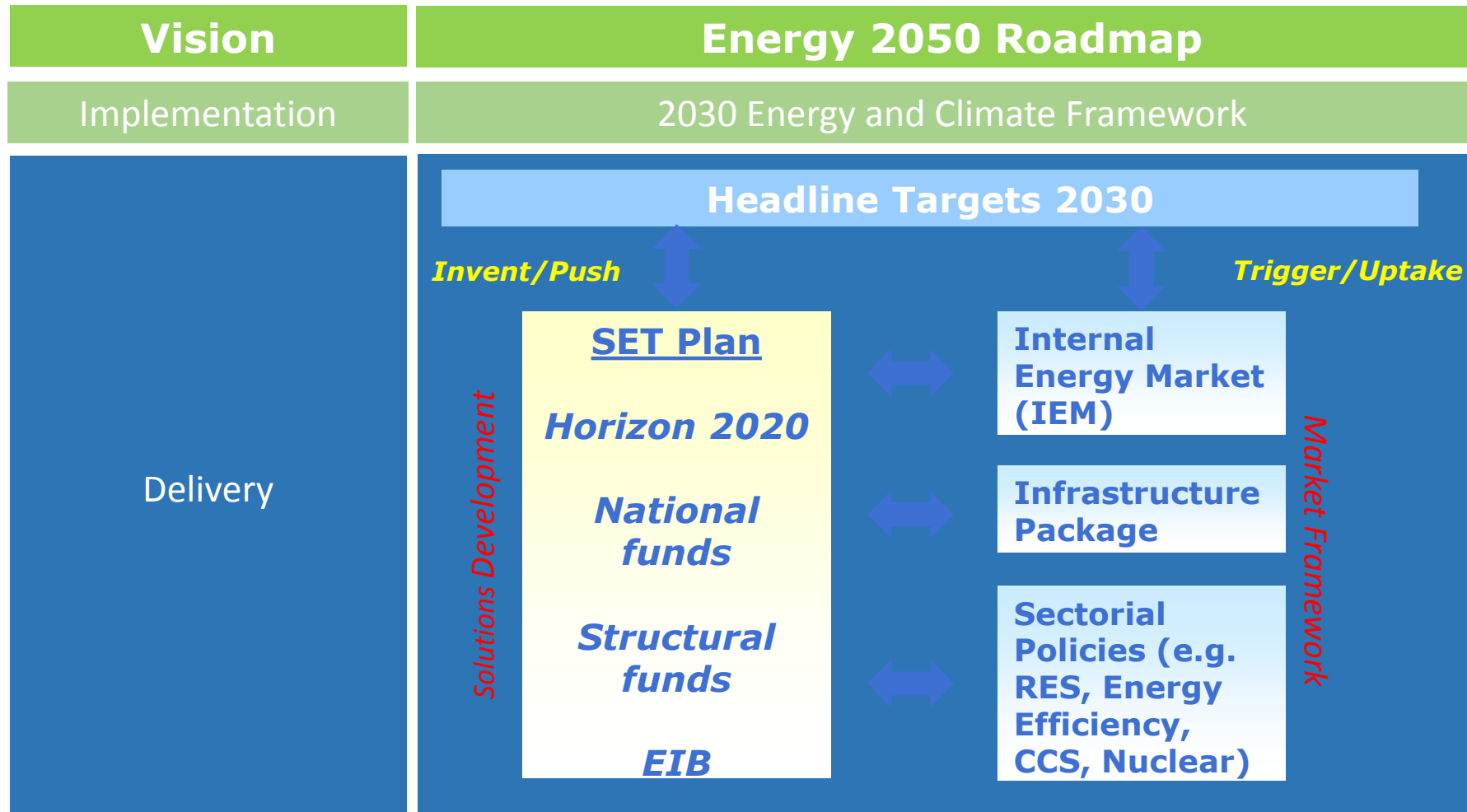
- **EU Energy Priorities**

- Achieving Energy savings (EP role)
- Energy security
- Realising the European Energy Market
- Ensuring sustainable energy generation and consumption
- Leading in low carbon technologies
- Global approach for a global challenge

- EU 2020 strategy

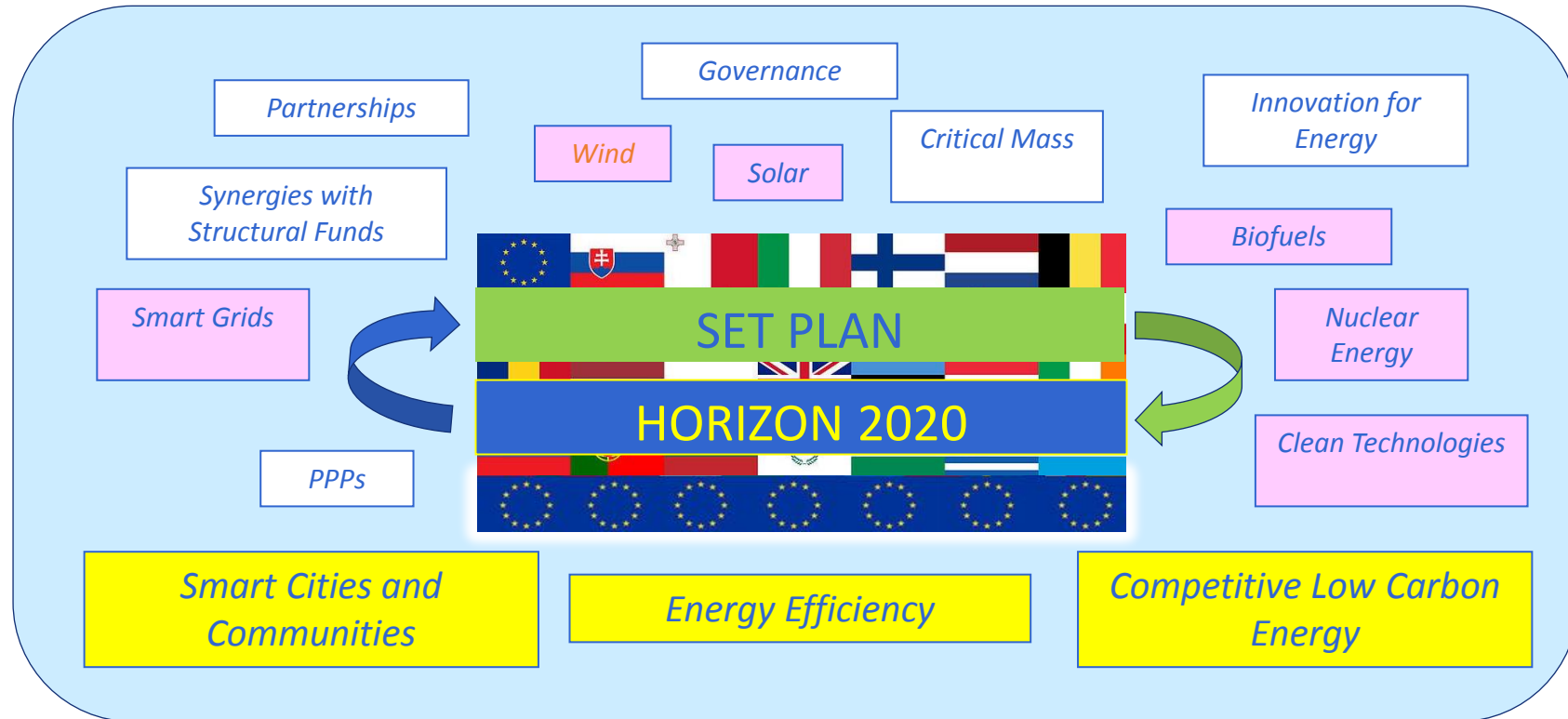
- EU Energy Roadmap 2050

# EU Energy Policy Framework



# Horizon 2020

A major instrument to strengthen EU energy R&I policy and implement the SET-Plan

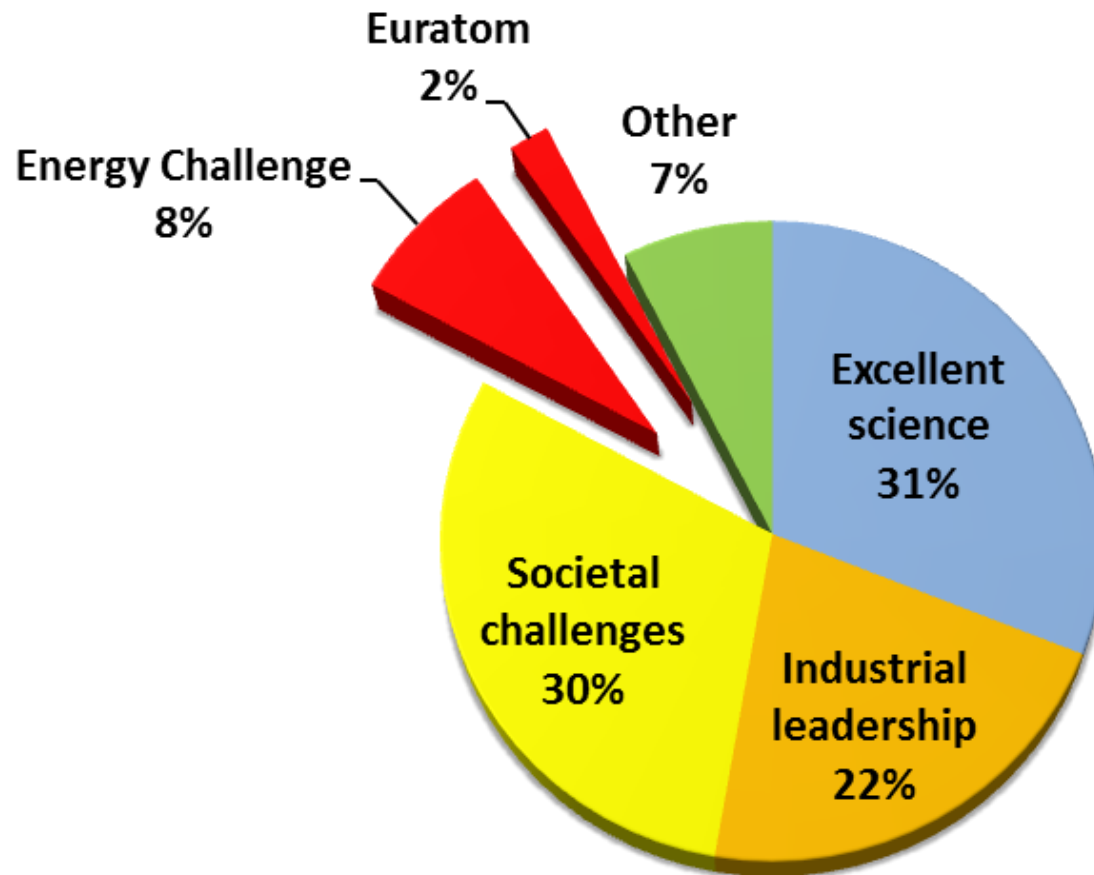


# Horizon 2020 2014-2020

- **Coupling research to innovation** – from research to retail, all forms of innovation
- **Focus on societal challenges** facing EU society
- **Simplified access** for all
- **A single programme**
  - EURATOM → same key priorities and Rules for Participation as Horizon 2020 FP
  - Combining three separate programmes/initiatives (former FP7, CIP, EIT)



## Horizon 2020 - Budget allocation (2014-2020)



Total budget:  
EUR 78,6 billion

Budget for energy R&I  
almost **doubled**  
compared to 2007-2013  
(FP7, IEE)

## Energy Challenge - main challenges

- Supporting the transition to a **reliable, sustainable and competitive energy system**
- Increasing the **competitiveness of European industry**
- Building a **European Research Area** in the field of energy

## Key activities of the WP Secure, Clean and efficient Energy Work Programme 2014-2015

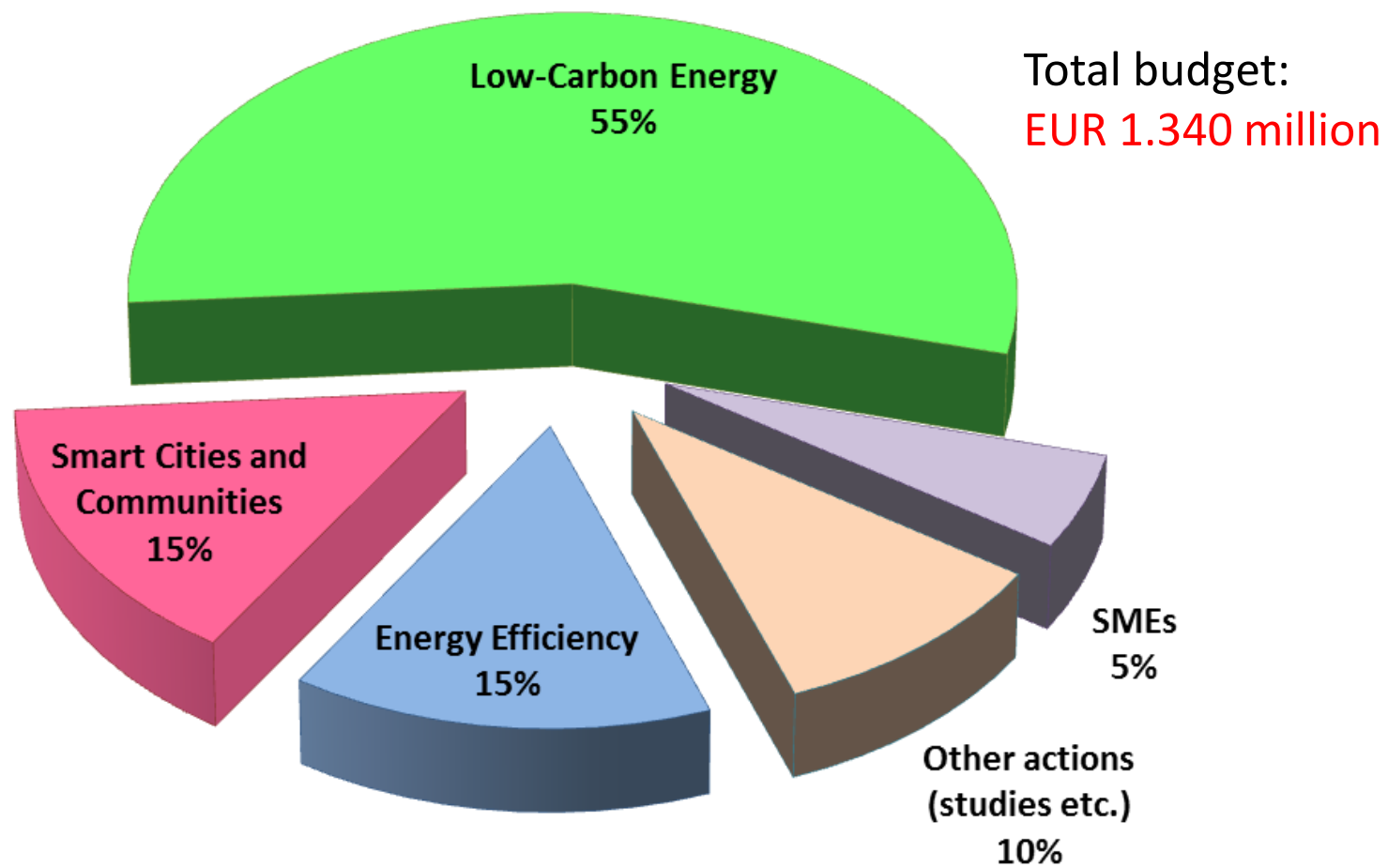
2-year work programme → better planning for applicants

Challenge-based topics → increased competition through broader topics

Focus on innovation → increase impact of project results

Address societal concerns → Mainstreaming of socio-economic aspects and cross-thematic cooperation

## Budget distribution of the Energy WP 2014-2015



# Energy Efficiency Call

- Buildings and Consumers
- Heating and Cooling
- Industry and Products
- Finance for sustainable energy

# Competitive Low-Carbon Energy call

- Pushing forward **renewable energy** technologies and **biofuels/alternative fuels**
- Modernising the European **electricity grids**
- More flexibility through **energy storage**
- Decarbonise the use of **fossil fuels**
- Promoting a **European Research Area** in energy
- **Socio-economic research**
- **New knowledge and technologies**

# Smart Cities and Communities call

- Large scale demonstration of integrated solutions between the energy, transport, and ICT sectors through partnerships between municipalities and industries (2014+2015)
- Accompanying support measures focussing on:
  - Developing a framework for common data and performance measurements (2014)
  - Developing system standards for smart cities and communities solutions (2015)
  - Establishing networks of public procurers in local administrations on smart city solutions (2014)
  - Prize competition for smart solutions (2015)

# SMEs and fast track to innovation for Energy call

## Support for

- Stimulating the innovation potential of SMEs for a low carbon and efficient energy system (SME instrument) (2014+2015)
  - Bottom-up approach
  - Continuously open call
  - Only SMEs eligible for participation
  - 3 Phases: feasibility study, innovation project, commercialisation phase
- Fast track to Innovation (2015)



# Horizon 2020 and cPPP

Contractual Public Private Partnerships in Horizon 2020	EU indicative funding 2014-2020 (M€)
Factories of the Future (FoF)	1150
Energy-efficient Buildings (EeB)	600
European Green Vehicles Initiative (EGVI)	750
Sustainable Process Industry	900
Advanced 5G network infrastructure for the Future Internet (5G)	700
High Performance Computing (HPC)	700
Robotics	700
Photonics	700
<b>TOTAL:</b>	<b>6200</b>

**Contractual PPPs:** budget is only committed on an annual basis through H2020 calls in WPs, prepared on the basis of an industry-developed multi-annual roadmap and a contractual arrangement which specifies an indicative 7 years EU funding, and the commitments of industry to match this and to additional investments outside the PPP calls with high leverage factors, but not legally binding.

# Energy Efficiency

## 1. Buildings and Consumers

PPP

- *Prefab. modules*
- *Historic buildings*
- *New EE buildings*

- *Demand response in building blocks*
- *ICT for EE*
- *Socio-eco. research*

- *Construction skills*
- *Organisational innovation*
- *Capacity-building for public authorities and other stakeholders*
- *Public procurement*
- *Consumer engagement*

## 2. Heating and cooling

Technology for district heating and cooling

Removing market barriers to the uptake of EE solutions

## 3. Industry and Products

- Innovation through large buyer groups

- Heat recovery

- Market surveillance
- Organisational innovation in industry

# 4. Finance for Sustainable Energy

- Making investments more attractive
- Innovative financing and energy services
- Project development assistance including Other actions: ELENA-EIB Facility

## A) Buildings and consumers (1/4)

**EE 1: Manufacturing of prefabricated modules for renovation of buildings, PPP:** Lower cost, ease building integration process, and lead to reduction in total buildings primary energy consumption. Mainly demonstration activities.

**EE 2: Building design for new highly energy performing buildings, PPP:** Development and demonstration of solutions which reduce cost of new buildings with at least NZE performance levels and accelerate market uptake. Demonstration projects where buildings are active contributors to production and environmental quality (e.g. for new districts planned)

**EE 3: Energy strategies and solutions for deep renovation of historic buildings, PPP:** Innovative, affordable, non-invasive, reversible solutions to deliver significant improvements in energy efficiency. Insulation, monitoring technologies and systems, integration of renewables etc.

## A) Buildings and consumers (2/4)

**EE 4: Construction skills.** Addressing the gap in knowledge and skills in the construction sector through building on BUILD up Skills with focus on upgrading or establishing large-scale qualification and training systems in order to increase the number of skilled building workers.

**EE 5: Increasing energy performance of existing buildings** through process and organisation innovations and creating a market for deep renovation. Removing market barriers. Product and process innovation. Development, testing and/or implementation of regulations and enabling conditions to finance deep renovation of buildings.

**EE 6: Demand response in blocks of buildings.** Cost effective, real time optimisation of energy demand, storage and supply in blocks of buildings with the help of intelligent energy management systems.

Footnote 9 in the WP: building on the experience of IEE: Topics EE4, EE5, EE7, EE8, EE9, EE10, EE14, EE15, EE16, EE17, EE19, EE20, EE21, LCE4 and LCE14 as well as relevant 'Other Actions'

## A) Buildings and consumers (3/4)

**EE 7: Enhancing the capacity of public authorities to plan and implement sustainable energy policies.** Empowering public authorities to plan, finance and implement ambitious sustainable energy policies and plans. Especially sectors with high energy saving potential. Capacity building.

**EE 8: Public procurement of innovative sustainable energy solutions.** Reducing barriers to sustainable energy public spending through e.g. sharing best practice and involve central purchasing organisations.

**EE9: Empowering stakeholders to assist public authorities in the definition and implementation of sustainable energy policies and measures.** Projects to target specific actors among stakeholders (utilities, industry, financing institutions, non-gov. org., consumer associations, interest groups, trade unions...). Large scale capacity building or engagement activities.

## A) Buildings and consumers (4/4)

**EE 10: Consumer engagement for sustainable energy.** Reducing market barriers through changing behaviour of consumers using market segmentation and focus on "action" part of AIDA. E.g. through use of social innovations and comparative ICT solutions and educational activities or tools.

EE 11: New ICT-based solutions for EE. Motivate and support behavioural change to achieve greater EE taking advantage of ICT. Creation of innovative IT ecosystems that would develop services and applications making use of information generated by energy consumers or captured from sensors and microgeneration.

EE 12: Socioeconomic research on energy efficiency. Foresight socioeconomic activities informing the debate on the development and monitoring of EE strategies looking to the horizon 2030 and beyond. Multiple benefits of EE or evolution of social, economic, cultural and educational barriers. Priority to development of micro-economic analysis of the updated EE measures.



## B) Increasing energy efficiency in heating and cooling

EE 13: Technology for district heating and cooling. Develop, demonstrate and deploy a new generation of highly efficient, intelligent district cooling and heating systems. Bring down heat distribution losses. Develop optimisation, control, metering, planning and modelling tools. New solutions for low temperature heat recovery and recirculation.

EE 14: Removing market barriers to the uptake of efficient heating and cooling solutions. Innovative measures to accelerate the replacement of old, inefficient space heaters and packaged cooling systems with products having A+++ to A+ energy labels. Inspection of heating and cooling systems.

## C) Industry and products (1/2)

EE 15: Ensuring effective implementation of EU product efficiency legislation. Building up monitoring, verification and enforcement of the EU's related products policy.

EE 16: Organisational innovation to increase energy efficiency in the industry. Removing market barriers like lack of expertise and information on energy management. Uptake of cross-cutting innovative technologies. Industrial systems efficiency benchmarking. Sector specific technology pathways. Energy management in SMEs and industry. Human and organisational change.

## C) Industry and products (2/2)

EE 17: Driving energy innovation through large buyer groups. Actions where groups of buyers can set higher-than-available performance levels which manufacturers of sustainable energy products are called to meet through product innovation.

EE 18: New technologies for utilization of heat recovery in large industrial systems, considering the whole energy cycle from the heat production to the delivery and end use. Research and demonstration of technologies to recover waste heat from industrial processes. Validation at real production conditions with demo sites, testing in industrial facilities.

## D) Finance for sustainable energy

**EE 19: Improving the financeability and attractiveness of sustainable energy investments.**

Activities that foster dialogue with and between financial market actors, standardisation and valuation entities, industry, public authorities, consumers and property owners.

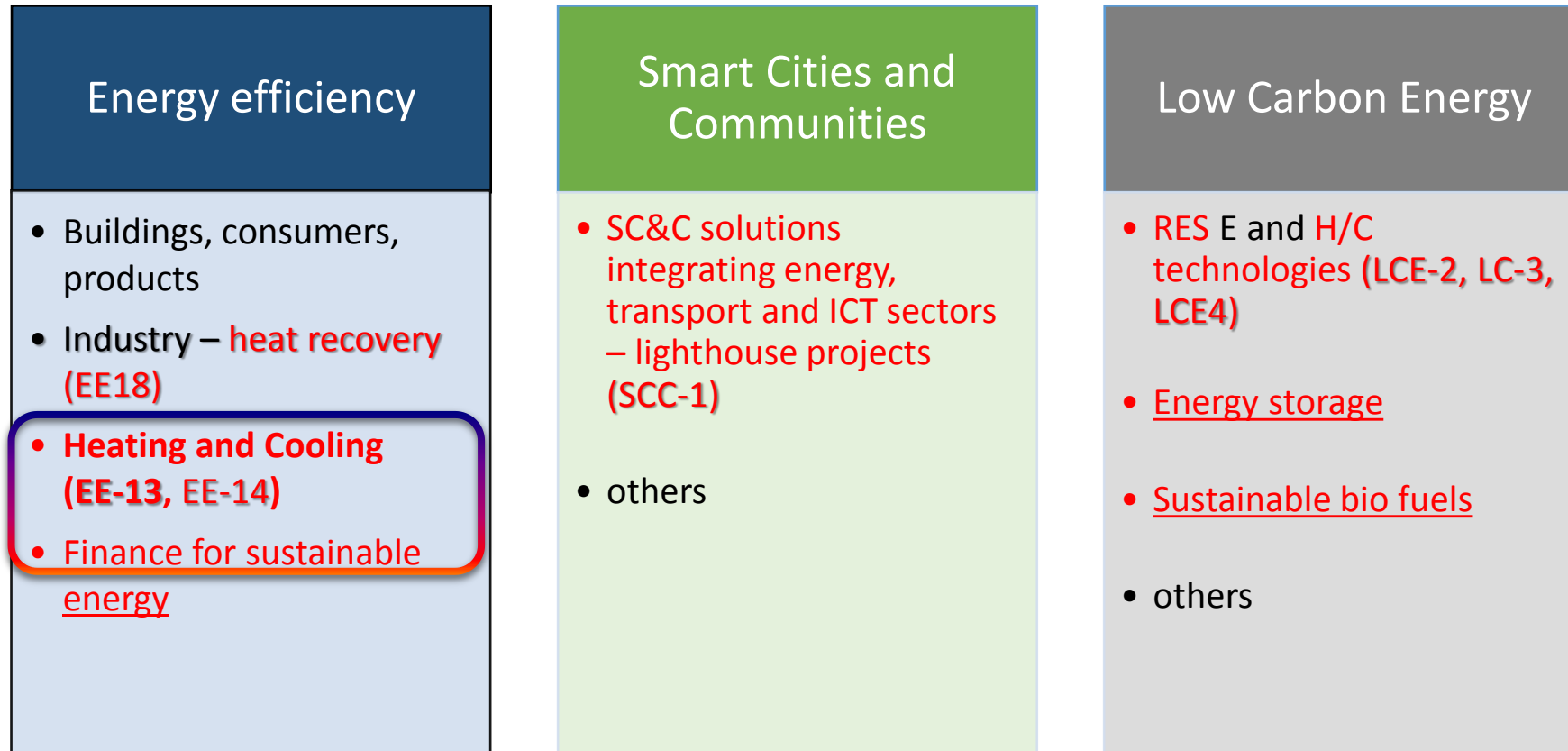
**EE 20: Project development assistance for innovative, bankable and aggregated sustainable energy investment schemes and projects.** To Public and private project promoters such as public/private infrastructure operators, retail chains, cities and SMEs/industry, leading to innovative, bankable sustainable energy investments schemes.

**EE 21: Development and market roll-out of innovative energy services and financial schemes for sustainable energy.** Roll-out of business models for innovative EE services. Replication of successful innovative financing solutions. Implementation of large-scale capacity building for public authorities and SMEs to set-up or use innovative financing schemes for sustainable energy.

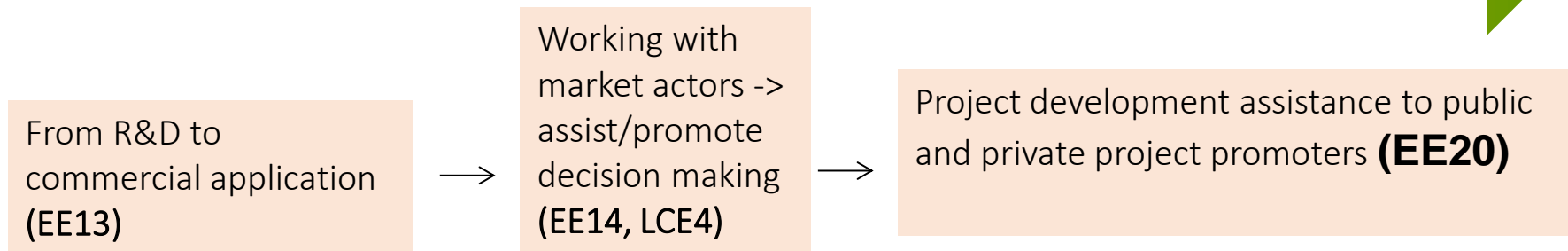
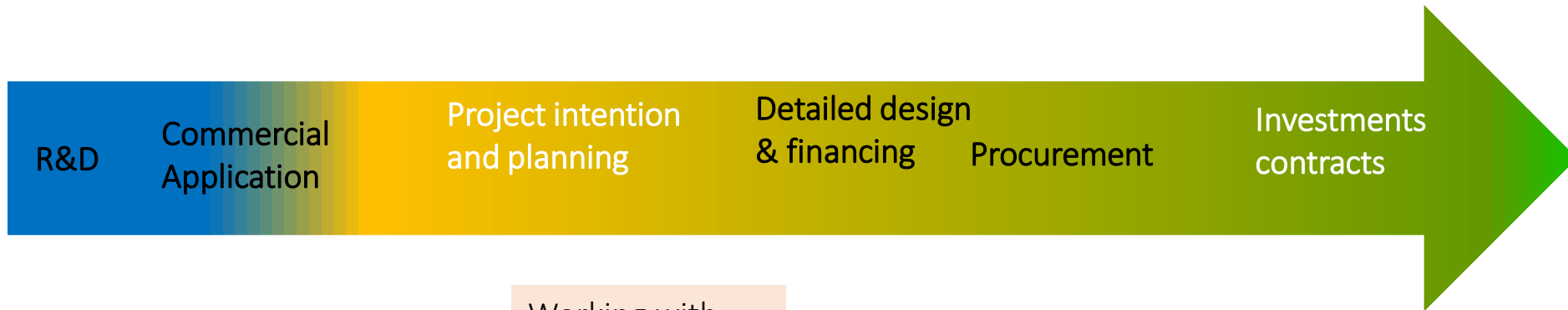
## Market uptake in Low Carbon Energy

- **LCE 4** : Market uptake of existing and emerging renewable electricity, heating and cooling technologies
- **LCE 14** : Market uptake of existing and emerging sustainable bioenergy

# Heating and cooling in Horizon 2020



# Support to H/C in the H2020 energy challenge: from R&D to implementation



Support is provided under the EC H2020 programme via Call for Proposals

## Topic EE 13: Technology for district heating and cooling

Source: Work Programme and Annex G of General Annexes to the Horizon 2020

<http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/2065-ee-13-2014.html#tab2>

TRL 1: Basic principles / implications identified

TRL 2: Technology concept formulated

TRL 3: Experimental proof of concept developed

**TRL 4: Component and/or system validated in a *laboratory environment (small scale prototype)***

**TRL 5: The technology, a *large scale prototype development unit*, has been qualified through testing in *relevant environment*.**

**TRL 6: The *prototype system or subsystem* have been scaled up to prove the industrial potential and its integration within the energy system.**

TRL 7: Demonstration of full-scale system in operational environment

EE - 13





## Topic EE 13: Technology for district heating and cooling

### 1. SPECIFIC CHALLENGE

District heating and cooling systems need to be more efficient, intelligent and cheaper.

It is necessary to:

- develop and deploy intelligent systems using smart metering and control solutions for:
  - *Optimisation*
  - *Consumer empowerment*
  - *Exploiting multiple energy resources (waste heat recovery, HPs, thermal storage, cogeneration)*
  - *Renewable energy integration*
  
- roll-out solutions for the integration of smart thermal networks with smart electricity grids

## 2. SCOPE

- Develop, demonstrate and deploy a new generation of highly efficient, intelligent district cooling and heating systems that are capable of integrating multiple generation sources
  - Reduce heat distribution losses and integrate storage
  - Develop optimisation, control, metering, planning and modelling tools
  - Develop new solutions for low temperature heat recovery
- proposals should address one or more of the respective areas

Topic SCC-1: Smart cities and Communities solution (large scale demonstration – first of the kind projects)

## 1. SPECIFIC CHALLENGE

Increase overall energy efficiency of cities to exploit better the local resource in terms of energy supply as well as through demand side measures – measures at the district

## 2. SCOPE

- the focus is not on new technology development but on the identification, development and deployment of innovative integration of existing/very near to the market technologies (TLR7 or more)
- lighthouse projects in the energy, transport and ICT
- main areas:
  - (nearly zero) or low energy districts
  - integrated infrastructures
  - sustainable urban mobility

Topic SCC-1: Smart cities and Communities solution (large scale demonstration – first of the kind projects)

## 2. SCOPE

### ➤ Conditions

- Consortia: industry & cities
- Involving 2-3 cities (lighthouse cities or communities)
- 2-3 follower cities - willing to replicate
- Proposed activities should be part of an ambitious urban plan
- Other party funding from other parts of the initiative should be secured
- Affordable solutions

## Topic EE 14: Removing market barriers to the uptake of efficient H/C

### 1. SPECIFIC CHALLENGES

Action is needed to **remove non-technological** (including legislation) **barriers** to exploit the full potential of efficient heating and cooling solutions. This involves:

- integrated planning and integration of H/C into the territorial context;
- active participation of local administrations;
- adaptation and compatibility/connectivity with low energy building standards;
- inclusion of heating/cooling in building renovation strategies
- empowerment and involvement of consumers through innovative metering, billing and complaint handling processes.

## 2. SCOPE

A number of areas relate to DHC, for example:

- Identifying, developing, and promoting **new markets for the recovery of heat from industry**
- For district heating and cooling industry
  - improve the transparency of the market and increase consumer trust
  - exchange of information, best practice examples, consumer practices, motivations and barriers
- Heating and cooling planning

The information in this slide does not cover all areas under the topic EE-14. Refer to the H2020 Energy Challenge work programme for more details [http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014\\_2015/main/h2020-wp1415-energy\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/main/h2020-wp1415-energy_en.pdf)

# Calls Energy Efficiency: Budget

Topics ref.*	Area	Indicative budget 2015 (M€)	Open/close call '	Type of action
EE6, EE12, <b>EE13</b>	Demand response in building blocks <sup>(1)</sup> , socio- economic research and <b>technology for DHC</b>	13.35	10 Dec 14/ 4 June 15	Research and Innovation
EE11	ICT for energy efficiency	8.5	10 Dec 14/ 4 June 15	
EE4, EE5, EE7, EE8, EE9, EE10, <b>EE14</b> , EE15, EE16, EE17	<b>Market uptake</b> in Buildings, Consumers, Industry and Products, <b>H/C</b> Empowering public authorities and its stakeholders	32.8	10 Dec 14/ 4 June 15	CSA
EE18 EE19, <b>EE20</b> , EE21	Finance for sustainable energy including <b>project development assistance</b>	26.5	10 Dec 14/ 4 June 15	
EE18	<b>New technologies for heat recovery in large industrial systems</b>	8	30 Sep 2014/ 4 Feb 2015	

(\* ) corresponds to the topic code in the Work Programme,

(') opening date may change please visit the H2020 participant portal

## Topic LCE 4: Market uptake of existing RES E and RES H/C

### 1. SPECIFIC CHALLENGES

Support to the MS to achieve the EU targets for RE:

- Accelerate the uptake in the market of RES E and RES H/C technologies
- cost effective mobilisation of new investments in RE across the EU
- Implementation of policies and support measures at national, Regional and local levels



## Topic LCE 4: Market uptake of existing RES E and RES H/C

### 2. SCOPE

Address market uptake challenges including:

- Ensure sustained public acceptance of RES projects
- Ensuring speedy and user friendly permitting procedures
- Implementation of RE policies, codes and legislation - EU national, regional and local levels
- Facilitate informed decision making – capacity building
- Promotion of geothermal, bio and/or solar in individual, industrial and **district heating applications**
- Involve necessary market actors and stakeholder necessary to achieve adoption of best practices

Thank you