



THE EU FRAMEWORK PROGRAMME  
FOR RESEARCH AND INNOVATION

# HORIZON 2020 and energy research

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# CURRENT EU POLICY FW AND ACHIEVEMENTS

- Clear EU framework and support by SET-Plan
- Three **headline targets 20/20/20** + specific transport targets
- **2011 GHG** emissions estimated at **16% below 1990** - EU on track
- Progress: **2010 EU renewables share 12.7% vs. 8.5% in 2005** - new measures needed for most MS to achieve their 2020 targets
- **Energy savings target** not legally binding but significant progress made – but current policy targets likely to be missed

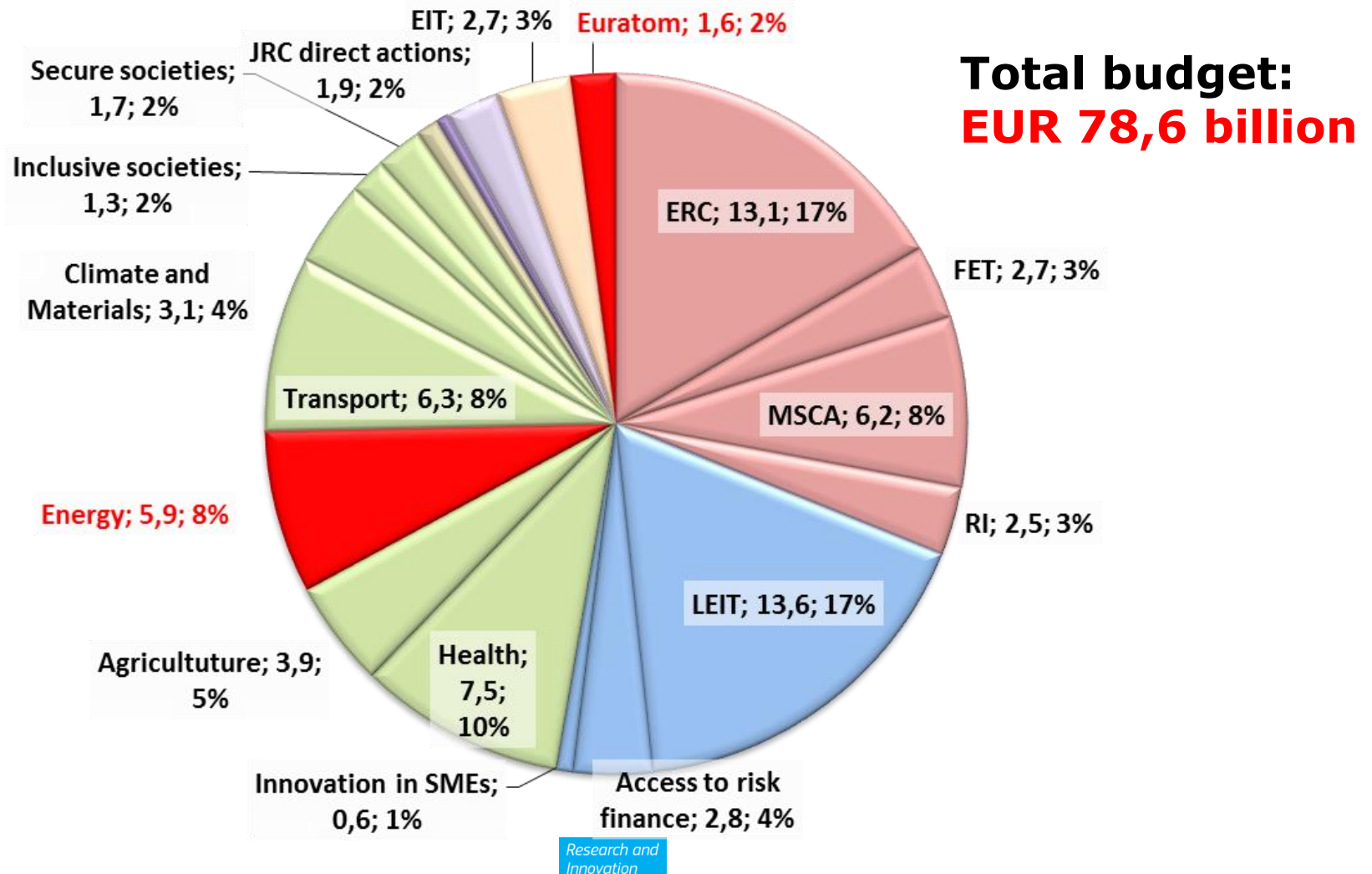
# Horizon 2020 - What's new

- **A single programme** bringing together three separate programmes/initiatives (former FP7, CIP, EIT)
- **Coupling research to innovation** – from research to retail, all forms of innovation
- **Focus on societal challenges** facing EU society, e.g. clean energy, health and transport
- **Simplified access**, for all companies, universities, institutes in all EU countries and beyond



European  
Commission

## Horizon 2020 - Budget allocation (2014-2020, bn €)



# Energy Challenge - main challenges

## **Support the transition to a reliable, sustainable and competitive energy system**

- Reducing energy *consumption* and *carbon footprint*
- Boosting development of *renewable and alternative energy* technologies and their *integration in the energy system*
- Making the *grid* more flexible (inclusion of new energy sources, lowering costs of necessary infrastructure upgrades)
- *Decarbonising* the power and other industrial sectors

## **Increase the competitiveness of European industry**

- Addressing the whole *supply chain*
- Increase *energy efficiency* in industry, decrease energy costs

## **Building a European Research Area in the field of energy**

- *Coordinating research activities* of Member States, Associated States and Regions (promoting SET-Plan)

# Energy Challenge - scope

- ***Reducing energy consumption and carbon footprint by smart and sustainable use:*** *New concepts, non-technological solutions, technology components and systems for buildings, cities/districts, industry and individuals*
- ***Low-cost, low-carbon electricity supply:*** *innovative renewables, efficient and flexible fossil fuel power plants and carbon capture and storage, or CO2 re-use technologies*
- ***Alternative fuels and mobile energy sources:*** *bio-energy; power and heat; surface, maritime and air transport; hydrogen and fuel cells; new options*

## Energy Challenge - scope

- ***A single, smart European electricity grid:*** smart energy grid technologies, including storage; systems and market designs to plan, monitor, control and safely operate interoperable networks; standardisation issues; emergency conditions
- ***New knowledge and technologies:*** multi-disciplinary research for energy technologies (including visionary actions)
- ***Robust decision making and public engagement:*** tools, methods, models and perspective scenarios for a robust and transparent policy support
- ***Market uptake of energy innovation:*** applied innovation; promotion of standards; non-technological barriers; smart and sustainable use of existing technologies

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**HORIZON 2020**

# **Secure, Clean and efficient Energy Work Programme 2014-2015**



# Basic principles

- **2-year work programme** to allow for better preparation of applicants
- **Challenge-based** approach
  - Definition of specific challenge to be tackled - broader scope of topics
  - Applicant can propose the most appropriate solution to the challenge
- Integration of **cross-cutting issues** (social sciences, international cooperation, etc.)
- Cross-thematic cooperation in strategic '**focus areas**'
- Covering the **full innovation cycle** (use of TRLs to specify scope of activities)

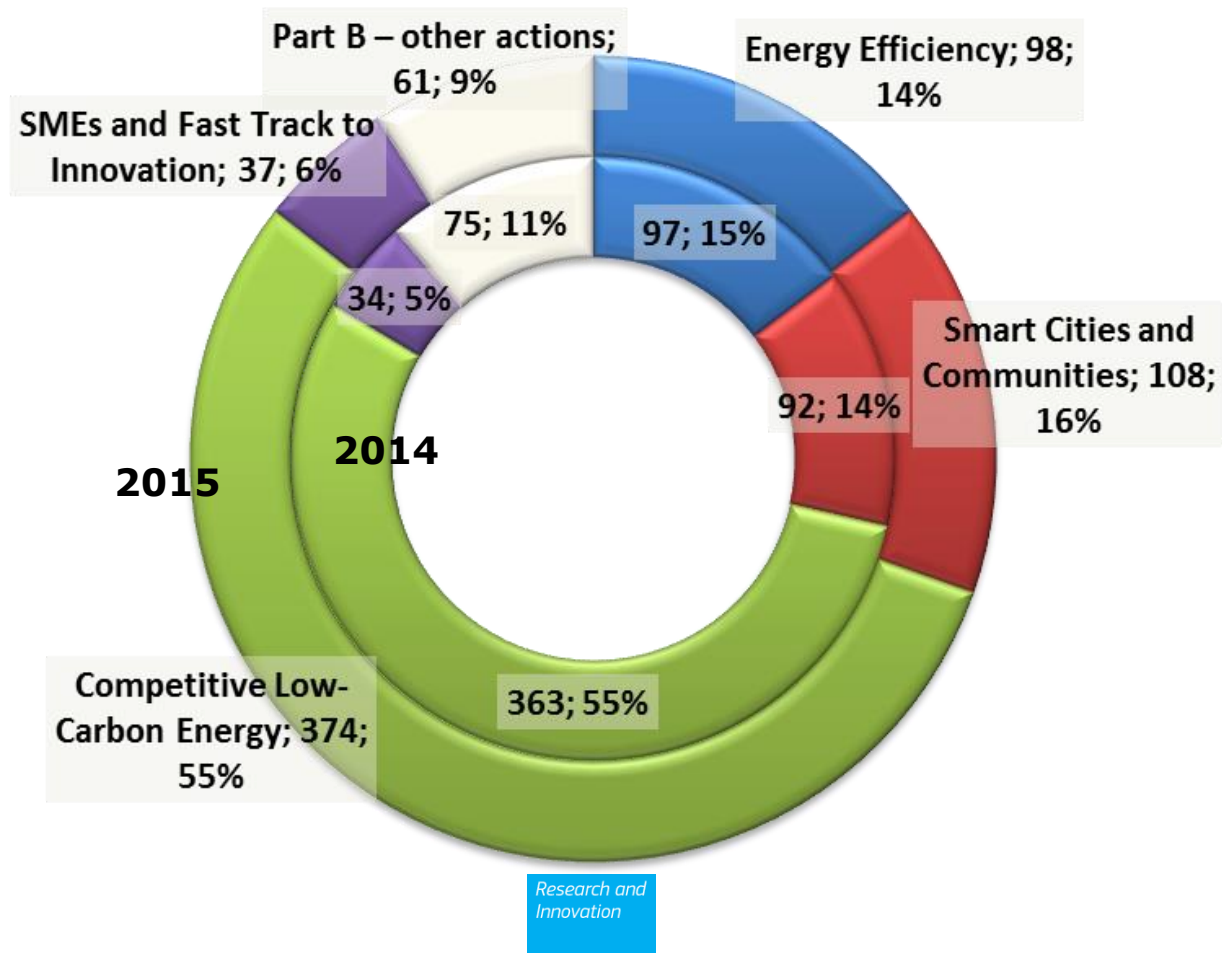
Publication of the first calls for proposals: **11 December 2013**

First deadlines: as of **April 2014**

# Technology Readiness Levels

- TRL 0: Idea.** Unproven concept, no testing has been performed.
- TRL 1: Basic research.** Principles postulated and observed but no experimental proof available.
- TRL 2: Technology formulation.** Concept and application have been formulated.
- TRL 3: Applied research.** First laboratory tests completed; proof of concept.
- TRL 4: Small scale prototype** built in a laboratory environment ("ugly" prototype).
- TRL 5: Large scale prototype** tested in intended environment.
- TRL 6: Prototype system** tested in intended environment close to expected performance.
- TRL 7: Demonstration system** operating in operational environment at pre-commercial scale.
- TRL 8: First of a kind commercial system.** Manufacturing issues solved.
- TRL 9: Full commercial application,** technology available for consumers.

## Energy WP 2014-15 - budget for main activities (million €)



# Energy Efficiency Call

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



# Energy Efficiency Call (1)

## Buildings and Consumers

Research and demonstration activities targeting:

- **Prefabricated modules** for renovation of building (EE1)
- **Buildings design** for new buildings (EE2)
- Deep renovation of **historic buildings** (EE3)
- **Demand response** in blocks of buildings (EE6)
- Developing new **ICT-based solutions** for improving energy efficiency (EE11)
- **Socioeconomic research** on energy efficiency (EE12)

# Energy Efficiency Call (2)

## Buildings and Consumers

Accompanying support actions aiming at:

- Improving **skills** of construction workforce (EE4)
- Improve market conditions and **remove barriers for renovation** (EE5)
- **Building capacities** of public authorities for sustainable energy policies and plans (EE7)
- Helping public **procurement authorities** to purchase best available sustainable energy products (EE8)
- **Empowering stakeholders** to assist public authorities in sustainable energy policies and measures (EE9)
- Changing **consumer behaviour** (EE10)

# Energy Efficiency Call (3)

## Heating and Cooling

- Improving technologies for **district heating and cooling** (EE13)
- Accompanying **support measures** for removing non-technological market barriers for efficient heating and cooling solutions (EE14)

# Energy Efficiency Call (4)

## Industry and Products

### Demonstration actions

- New technologies for recovering **waste heat** from industrial processes and transforming it into useful energy forms (EE18)

### Accompanying support actions aiming at

- effective **implementation** of ambitious EU product efficiency **legislation** (EE15)
- Removing market barriers for energy efficiency in industry through **organisational innovations** (EE16)
- Helping **large buyer groups** to demand energy products with high performance levels (EE17)



# Energy Efficiency Call (5)

## Finance for Sustainable Energy

Support Actions aiming at

- Improving financeability of sustainable energy investments by stimulating **new financial products** and **business models** (EE19)
- Supporting **project developers** to set up innovative bankable sustainable energy investment schemes and projects (EE20)
- **Rolling-out** innovative energy services and financial schemes for sustainable energy (EE21)

# Call Energy Efficiency: Deadlines

Topics*	2014	2015
Implemented via PPP EeB or SPIRE (EE1, EE3, EE18)	20/03/2014	
All other topics (EE4, EE5, EE7, EE8, EE9, EE10, EE11, EE12, EE13, EE14, EE15, EE16, EE19, EE20, EE21)	05/06/2014	
Implemented via PPP EeB or SPIRE (EE2, EE18)	09/12/2014	
All other topics (EE5, EE6, EE7, EE9, EE10, EE11, EE13, EE14, EE15, EE16, EE17, EE19, EE20, EE21)		10/06/2015

\* Corresponds to the topic code in the work-programme

# Call Energy Efficiency: Budget

Topics*	Short-hand Description	2014 (M€)	2015 (M€)
EE1, EE2	EeB PPP: Pre-fabricated modules and New Energy Efficient Buildings	8	9
EE3	EeB PPP: Historic Buildings	5	
EE18	SPIRE Topic PPP: Heat recovery	8	8
EE6, EE12, EE13	Demand response in building blocks, socio- economic research and technology for DHC	8,5	13,35
EE11	ICT for energy efficiency	8,5	8,5
EE4, EE5, EE7, EE8, EE9, EE10, EE14, EE15, EE16, EE17	Market uptake in Buildings, Consumers, Industry and Products; Empowering public authorities and its stakeholders	34,5	32,8
EE19, EE20, EE21	Finance for sustainable energy including project development assistance	25	26,5

# Competitive Low-Carbon Energy

## Renewable electricity and heating/cooling

Support for

- **Research activities** to develop the next generation technologies (including photovoltaics, concentrated solar power, wind energy, ocean energy, hydropower, deep geothermal energy and renewable heating and cooling) (LCE2),
- **Demonstration** of renewable electricity and heating/cooling technologies (including photovoltaics, concentrated solar power, wind energy, ocean energy, deep geothermal energy and renewable heating and cooling) (LCE3)
- Accompanying **market uptake measures** removing non-technological market barriers for existing and emerging renewable electricity, heating and cooling technologies (LCE4)

# Competitive Low-Carbon Energy

## Sustainable biofuels and alternative fuels for the European transport fuel mix

Support for

- **Research activities** on next generation technologies for biofuels and sustainable alternative fuels (LCE11)
- **Demonstration activities** for advanced biofuel technologies (LCE12, LCE13 cooperation with Brazil)
- Accompanying **market uptake measures** for removing non-technological market barriers for existing and emerging sustainable bioenergy (LCE14)

## RES / biofuels - Budget

The share of the EU contribution benefitting **one single technology area**:

- 1) from topics **LCE 2 and LCE 11**, research & innovation actions in the field of renewables (electricity, heat, cooling and fuels), shall **not exceed 25% of the total budget** dedicated to these topics,
- 2) from topics **LCE 3 and LCE 12**, innovation actions in the field of renewables (electricity, heat, cooling and fuels), shall **not exceed 33% of the total budget** dedicated to these topics.

# Competitive Low-Carbon Energy

## Modernising the European Electricity Grid

Support for

- Demonstration of innovative components for **meshed off-shore grids** linking off-shore energy generation resources with on-shore grids in different countries (LCE5)
- Demonstration of integration of the **transmission system** and the **wholesale market** (LCE6)
- Integration and validation of solutions for the main challenges of the **distribution grid** and **retail market** (LCE7)

# Competitive Low-Carbon Energy

## Providing the energy system with flexibility through enhanced energy storage technologies

Support for

- Advancing **local/small-scale energy storage** and their integration into the distribution grid and at building/house level (LCE8)
- Further develop **large scale energy storage** and reduce the barriers for new storage concepts (LCE9)
- Developing the **next generation** of energy storage technologies (LCE10)



# Competitive Low-Carbon Energy

## Enabling the decarbonisation of the use of fossil fuels during the transition to a low-carbon economy

Support for

- Enabling decarbonisation of the fossil fuel-based power sector and energy intensive industry through **CCS**, including geological CO<sub>2</sub> storage (LCE15)
- Understanding, preventing and mitigating the potential environmental impacts and risks of **shale gas** exploration and exploitation (LCE16)
- Improving **operational flexibility** of efficient fossil fuel power plants to facilitate integration renewables with variable output (LCE17)

# Competitive Low-Carbon Energy

## Social, environmental and economic aspects of the energy system

Support for

- Understanding the role of the **human factor** in the energy transition, including support for education and training networks (LCE20)
- **Modelling** and analysing the energy system, its transformation and impacts (LCE21)

# Competitive Low-Carbon Energy

## Cross-cutting issues

Support for

- Developing early stage **transformative energy technologies** or enabling technologies (LCE1)
- **Joint Actions** between Member States on demonstration and validation of innovative energy solutions (open for all technology areas included in this and the Smart Cities and Communities call) (LCE18)
- **Coordination** of national R&D activities (open for all technology areas included in this call) (LCE19)
- Fostering trans-national co-operation between **National Contact Points (NCPs)** for the Energy Challenge (LCE22)



# Call Competitive low-carbon energy : Deadlines

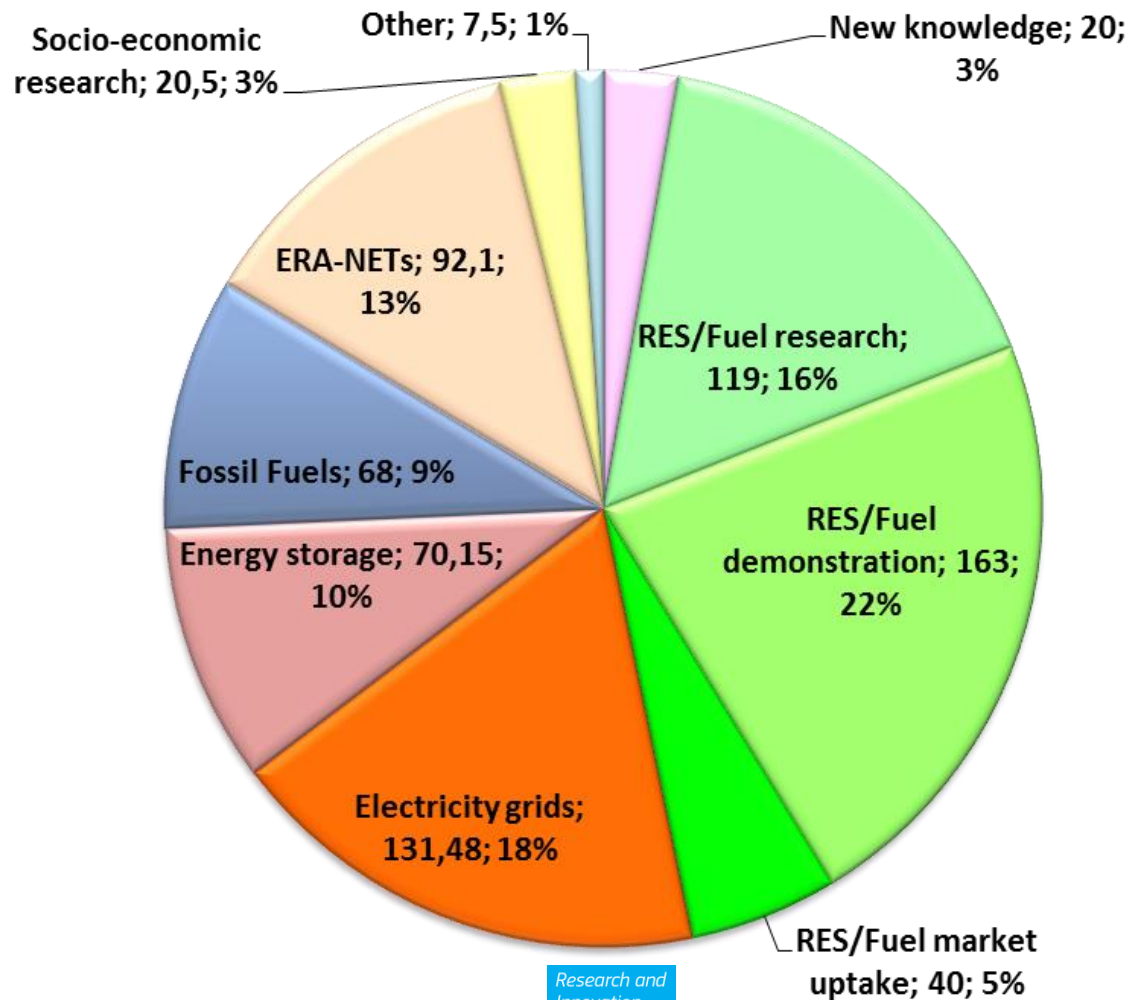
Topics*	2014		2015
LCE1, LCE2, LCE11, LCE15, LCE16	01/04/2014 (Stage 1)	23/09/2014 (Stage 2)	
LCE22	01/04/2014		
LCE4, LCE7, LCE8, LCE10, LCE14, LCE18	07/05/2014		
LCE1, LCE2, LCE11, LCE15, LCE17	03/09/2014 (Stage 1)		03/03/2015 (Stage 2)
LCE3, LCE12, LCE19, LCE20	10/09/2014		
LCE3, LCE12, LCE19, LCE21 LCE4, LCE5, LCE6, LCE9, LCE14			03/03/2015
LCE18			28/04/2015
LCE13			05/05/2015

\* Corresponds to the topic code in the work-programme

# Call Competitive **low-carbon energy:** **Budget (M€)**

Topics*	Short-hand Description	2014	2015
LCE1	New knoweldge & technologies	20	
LCE2, LCE11	RES/Fuels – Research	60	59
LCE3, LCE12, LCE13	RES/Fuels – Demonstration	73	90
LCE4, LCE14	RES/Fuels – Market uptake	20	20
LCE5, LCE6, LCE7	Smart grids	60	71,48
LCE8, LCE9, LCE10	Energy Storage	44,15	26
LCE15, LCE16, LCE17	Fossil Fuels (CCS & other)	33	35
LCE18	ERANET	34,25	57,85
LCE19	Coordination of national programmes	3	3
LCE20, LCE21	Socio-economic research	10,5	10
LCE22	NCP Network	1,5	

## LCE call - budget allocation (2014-15, M€)



# Smart Cities and Communities

Support for

- **Large scale demonstration of integrated solutions** between the energy, transport, and ICT sectors through partnerships between municipalities and industries
- Accompanying support measures focussing on:
  - Developing a framework for common data and performance measurements (SCC2)
  - Developing system standards for smart cities and communities solutions (SCC3)
  - Establishing networks of public procurers in local administrations on smart city solutions (SCC4)
  - Prize competition for smart solutions (SCC5)

# Call Smart cities & communities: Deadlines

Topics*	2014	2015
SCC1	07/05/2014	
SCC2, SCC4	07/05/2014	
SCC1		03/03/2015
SCC3, SCC5		03/03/2015

\* Corresponds to the topic code in the work-programme



# Call Smart cities & communities: Budget

Topics*	Short-hand Description	2014 (M€)	2015 (M€)
SCC1	Large-scale demonstration	<b>90,32</b>	<b>106,8</b>
SCC2	Developping framework for monitoring	<b>1</b>	
SCC3	Developping system standard		<b>1</b>
SCC4	Public procurers networks	<b>1</b>	
SCC5	Prize		<b>1</b>



# SMEs and fast track to innovation for Energy

Support for

- Stimulating the **innovation potential of SMEs** for a low carbon and efficient energy system (SME instrument) (SIE1)
  - Bottom-up approach
  - Continuously open call
  - Only SMEs eligible for participation
  - 3 Phases: feasibility study, innovation project, commercialisation phase
- Fast track to Innovation (SIE2)

# Call SIE: Cut-Off Dates

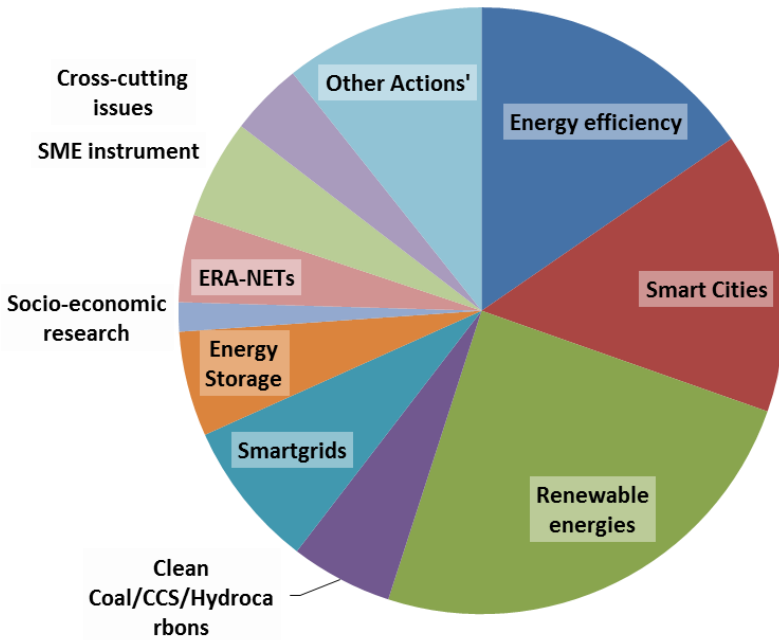
## Topic SIE1 = SME Instruments

### Open for submission on **01/03/2014**

	2014	2015
Phase 1	18/06/2014 24/09/2014 17/12/2014	18/03/2015 17/06/2015 17/09/2015 16/12/2015
Phase 2	09/10/2014 17/12/2014	18/03/2015 17/06/2015 17/09/2015 16/12/2015

Budget	2014	2015
Phase 1	3,40	3,73
Phase 2	29,89	32,79
Mentoring & coaching and Phase 3	0,68	0,74
Budget	33,95M€	37,26M€

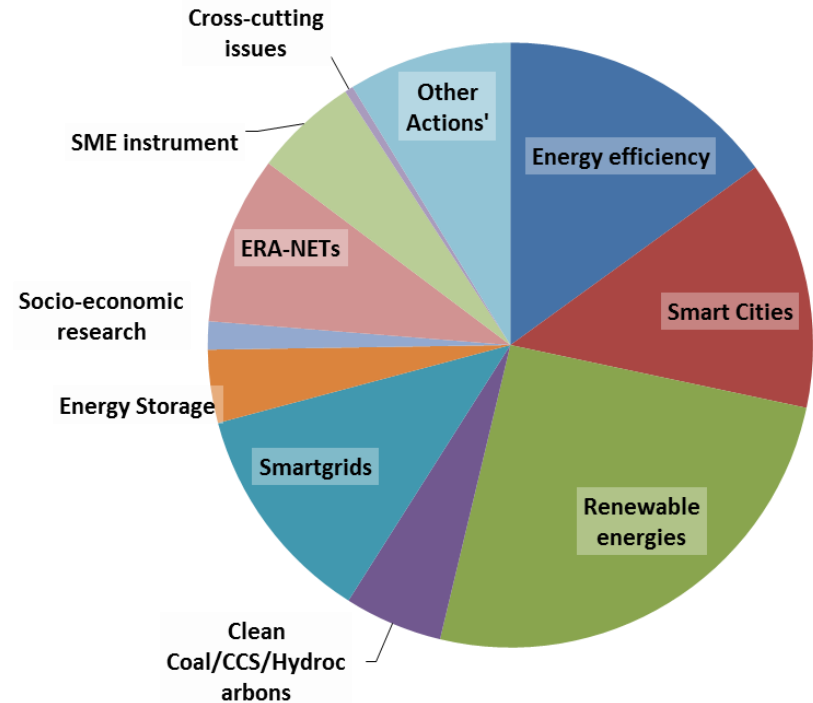
## Budget allocation of the Energy WP (2014)



TOTAL budget for 2014: **EUR 607 million**

+ Contribution to JTI Fuel Cells and Hydrogen in 2014: **EUR 60 million**

## Budget allocation of the Energy WP (2015)



TOTAL budget for 2015: **EUR 647 million**

+ Contribution to JTI Fuel Cells and Hydrogen in 2015: **EUR 70.5 million**

## Other parts of H2020 of direct relevance to Energy

- LEIT – KET materials, nano, electronics, manufacturing, processing, PPPs on Energy-efficient Buildings, SPIRE, Factories of the Future etc.
- FET-open and FET-pro-active
- Research Infrastructures
- ERC, EIT
- JRC direct actions (IET, IPTS)

## Close links

- Transport (societal challenge)
- Agriculture, marine, bio-economy (societal challenge), including Blue growth (strategic focus area)
- Climate action, resource efficiency, raw materials (societal challenge)
- Secure societies (societal challenge)

# Fuel Cells and Hydrogen

## Commission's proposal

- Adopted on 10 July 2013
- Proposes continuation of the FCH JU until 2024
- Adoption by Council expected for 1st half 2014
- Start of operational activities and launch of first call for proposals by mid-2014



## Transport

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

## Energy

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

## Cross-cutting Issues

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

- **Implemented mainly through calls for proposals**
- **Follow H2020 Rules for Participation, no derogations**

# Research and Innovation actions

- Actions primarily designed to establish new knowledge and/or to explore the feasibility of a new or improved technology, product, process, service, or solution, including testing and validating on a small scale laboratory prototype.
- Projects may contain closely connected but limited demonstration or pilot activities to show technical feasibility in a near to operational environment.

**Funding rate: maximum 100%**



# Innovation actions

- Actions primarily aimed at producing plans and arrangements or designs for new, altered or improved products, processes or services. For this purpose they may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication.

**Funding rate: maximum 70%**

# Coordination and support actions

- Actions consisting primarily of accompanying measures such as standardisation, dissemination, awareness-raising and communication, networking, coordination or support services, policy dialogues and mutual learning exercises and studies, including design studies for new infrastructure and may also include complementary activities of networking and coordination between programmes in different countries.

**Funding rate: maximum 100%**

# A single funding rate

## 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% (***)

(\*) 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)

## 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



# Further Information

- **Information Day in Brussels** (presentations, videos):  
[http://ec.europa.eu/research/conferences/2013/energy\\_infoday/infoday\\_energy\\_en.htm](http://ec.europa.eu/research/conferences/2013/energy_infoday/infoday_energy_en.htm)
- **Horizon 2020 Helpdesk - Research Enquiry Service:**  
<http://ec.europa.eu/research/index.cfm?pg=enquiries>
- **National Contact Points (NCPs):**  
[http://ec.europa.eu/research/participants/portal/desktop/en/support/national\\_contact\\_points.html](http://ec.europa.eu/research/participants/portal/desktop/en/support/national_contact_points.html)
- **Enterprise Europe Network:**  
<http://een.ec.europa.eu/about/branches>
- **Participant Portal:**  
<http://ec.europa.eu/research/participants/portal/desktop/en/home.html>



# HORIZON 2020

**Thank you  
for your attention!**

**Find out more:**  
[www.ec.europa/research/horizon2020](http://www.ec.europa/research/horizon2020)