EN

HORIZON 2020

WORK PROGRAMME 2014 – 2015

10. Secure, clean and efficient energy
Revised

This Work Programme was adopted on 10 December 2013. The parts that relate to 2015 (topics, dates, budget) have, with this revised version, been updated. The changes relating to this revised part are explained on the Participant Portal.

(European Commission Decision C (2015)2453 of 17 April 2015)

Table of contents

Introduction ***7***

CALL – ENERGY EFFICIENCY **10**

A – Buildings and consumers **11**

EE 1 – 2014: Manufacturing of prefabricated modules for renovation of buildings 12

EE 2 – 2015: Buildings design for new highly energy performing buildings 14

EE3 – 2014: Energy strategies and solutions for deep renovation of historic buildings 15

EE 4 – 2014: Construction skills 16

EE 5 – 2014/2015: Increasing energy performance of existing buildings through process and organisation innovations and creating a market for deep renovation 18

EE 6 – 2015: Demand response in blocks of buildings 19

EE 7 – 2014/2015: Enhancing the capacity of public authorities to plan and implement sustainable energy policies and measures 20

EE 8 – 2014: Public procurement of innovative sustainable energy solutions 21

EE 9– 2014/2015: Empowering stakeholders to assist public authorities in the definition and implementation of sustainable energy policies and measures 22

EE 10 – 2014/2015: Consumer engagement for sustainable energy 23

EE 11 – 2014/2015- New ICT-based solutions for energy efficiency 24

EE 12 – 2014: Socioeconomic research on energy efficiency 25

B – Heating and cooling **25**

EE 13 – 2014/2015: Technology for district heating and cooling 25

EE 14 - 2014/2015: Removing market barriers to the uptake of efficient heating and cooling solutions 26

C - Industry and products **28**

EE 15 – 2014/2015: Ensuring effective implementation of EU product efficiency legislation 28

EE 16 – 2014/2015: Organisational innovation to increase energy efficiency in industry 29

EE 17 – 2015: Driving energy innovation through large buyer groups 31

EE 18 2014/2015: New technologies for utilization of heat recovery in large industrial systems, considering the whole energy cycle from heat production to transformation, delivery and end use 31

D - Finance for sustainable energy 33

EE 19 – 2014/2015: Improving the financeability and attractiveness of sustainable energy investments 33

EE 20 – 2014/2015: Project development assistance for innovative bankable and aggregated sustainable energy investment schemes and projects 34

EE 21 – 2014/2015: Development and market roll-out of innovative energy services and financial schemes for sustainable energy 35

CONDITIONS FOR THIS CALL 37

CALL – COMPETITIVE LOW-CARBON ENERGY 40

LCE 1 - 2014: New knowledge and technologies 40

Renewable electricity and heating/cooling 41

LCE 2 – 2014/2015: Developing the next generation technologies of renewable electricity and heating/cooling 43

LCE 3 – 2014/2015: Demonstration of renewable electricity and heating/cooling technologies 46

LCE 4 – 2014/2015: Market uptake of existing and emerging renewable electricity, heating and cooling technologies 49

Modernising the European electricity grid 52

LCE 5 – 2015: Innovation and technologies for the deployment of meshed off-shore grids .. 52

LCE 6 – 2015: Transmission grid and wholesale market 54

LCE 7 – 2014: Distribution grid and retail market 55

LCE 23 – 2015: Supporting the community in deploying a common framework for measuring the energy and environmental efficiency of the ICT-sector 58

Providing the energy system with flexibility through enhanced energy storage technologies 60

LCE 8 – 2014: Local / small-scale storage 60

LCE 9 – 2015: Large scale energy storage 62

LCE 10 – 2014: Next generation technologies for energy storage 63

Sustainable biofuels and alternative fuels for the European transport fuel mix 65

LCE 11 – 2014/2015: Developing next generation technologies for biofuels and sustainable alternative fuels 65

LCE 12 – 2014/2015: Demonstrating advanced biofuel technologies 66

Topic "*LCE 13 – 2015: Partnering with Brazil on advanced biofuels"*, contained in the version of the work programme adopted on 10 December 2014, has been removed because discussions with the Brazilian authorities couldn't be finalised in due time. 68

LCE 14 – 2014/2015: Market uptake of existing and emerging sustainable bioenergy 68

Enabling the decarbonisation of the use of fossil fuels during the transition to a low-carbon economy 70

LCE 15 – 2014/2015: Enabling decarbonisation of the fossil fuel-based power sector and energy intensive industry through CCS 70

LCE 16 – 2014: Understanding, preventing and mitigating the potential environmental impacts and risks of shale gas exploration and exploitation 71

LCE 17 – 2015: Highly flexible and efficient fossil fuel power plants 72

Supporting the development of a European research area in the field of energy 73

LCE 18 – 2014/2015 : Supporting Joint Actions on demonstration and validation of innovative energy solutions 73

LCE 19 – 2014/2015 : Supporting coordination of national R&D activities 74

Social, environmental and economic aspects of the energy system 75

LCE 20 – 2014: The human factor in the energy system 75

LCE 21 – 2015: Modelling and analysing the energy system, its transformation and impacts 76

Cross-cutting issues 77

LCE 22 – 2014: Fostering the network of National Contact Points 77

CONDITIONS FOR THIS CALL 79

CALL – SMART CITIES AND COMMUNITIES 82

SCC 1 – 2014/2015: Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects 83

Enhancing the roll-out of Smart Cities and Communities solutions by stimulating the market demand 86

SCC 2 – 2014 : Developing a framework for common, transparent data collection and performance measurement to allow comparability and replication between solutions and best-practice identification 87

SCC 3 – 2015 : Development of system standards for smart cities and communities solutions 88

SCC 4 – 2014 : Establishing networks of public procurers in local administrations on smart city solutions 89

CONDITIONS FOR THIS CALL 91

CALL – SMEs AND FAST TRACK TO INNOVATION FOR ENERGY 93

SIE 1 – 2014/2015: Stimulating the innovation potential of SMEs for a low carbon and efficient energy system 93

Fast track to Innovation - Pilot 95

CONDITIONS FOR THIS CALL 96

OTHER ACTIONS 99

B.1. Energy efficiency 99

B.1.1: Buildings and consumers 99

B.1.2: Heating and cooling 105

B.1.3: Industry and products 106

B.1.4: Innovative financing for sustainable energy 108

B.2.: Competitive low-carbon energy technologies 109

B.2.1.: Support to policy development and implementation of the Renewable Energy Directive 109

B.2.2.: Coordination of Renewable Energy policies development and implementation through concerted actions with Member States 111

B.2.3.: Support to Research and Innovation Policy in the areas of Renewable Energy, Carbon Capture and Storage and Clean Coal 114

B.2.4.: JRC's assistance for Research and Innovation policy 115

B.2.5.: Engine tests with new types of biofuels and development of biofuel standards under Framework Partnership Agreement with CEN-CENELEC 116

B.2.6.: Realization of a reliable and stable energy supply systems integrating increasing share of variable renewable energy and storage 117

B.2.7.: Energy Storage Mapping and Planning 118

B.2.8.: Energy Policy support on CCS 118

B.2.9.: Energy Policy support on unconventional gas and oil 119

B.2.10.: Innovative Financial Instruments for First-of-a-kind Commercial Demonstration Projects in the field of Energy 119

B.2.11: Contribution to the Global CCS Institute 120

B.2.12.: Studies to support the Internal Energy Market 120

B.2.13.: Mapping and analyses of the current and future (2020 - 2030) heating/cooling fuel deployment (fossil/renewables) 121

B.2.14.: Support to key activities of the European Technology Platform on Renewable Heating and Cooling 122

B.2.15.: Support to key activities of the European Wind Energy Technology Platform (TP Wind) 122

B.2.16.: Support to R&D strategy in the area of SET Plan activities in smart grids and energy storage 123

B.2.17.: Contribution to Implementing Agreements (IA) of the International Energy Agency (IEA) 123

B.2.18.: Contribution to the International Renewable Energy Agency (IRENA) 124

B.3. Smart Cities and Communities 125

B.3.1.: Studies to support Smart Cities and Communities 126

B.3.2.: Support Services for the Covenant of Mayors Initiative ' 126

B.3.3.: Support the coordination of cities' activities via the Green Digital Charter 128

B.3.4.: Administrative arrangement with the JRC on measurement methodologies in the context of the International telecommunications Union (ITU) **Error! Bookmark not defined.**

B.4. Cross-cutting issues 129

B.4.1: Contribution to the IEA Energy Policy Review 129

B.4.2: Modelling and analysing energy policy, system transformation and climate change measures 129

B.4.3.: Support to the Italian Presidency Conference on the European Strategic Energy Technology Plan (SET Plan) 2014 129

B.4.4.: Support to the Luxembourg Presidency Conference on the European Strategic Energy Technology Plan (SET Plan) 2015 130

B.4.5.: Communication activities 130

B.4.6.: External expertise 131

B.4.7.: Experts for policy relevant analyses and forward looking reflection 131

INDICATIVE BUDGET 132

Appendix: Manufacturing Readiness Levels ("MRL") 135

Introduction

The EU has agreed on ambitious Energy and Climate targets for 2020 and beyond to reduce greenhouse gas emissions, increase the share of renewable energies and improve energy efficiency. Achieving these objectives advances Europe along the path to an energy system that will deliver a competitive and secure energy supply which is sustainable.

New technologies and solutions must compete on cost and reliability against energy systems with well-established (and amortised) technologies. Research and innovation are critical to make these new, cleaner, low-carbon, efficient energy sources commercially attractive on the scale needed and must be combined with measures facilitating the market uptake of these energy technologies and services. The Strategic Energy Technology Plan (SET Plan), as the research and innovation pillar of European energy policy, provides the strategic frame for addressing these challenges. It sets out a long term agenda addressing the key innovation bottlenecks and mobilizes efforts across Europe in the form of joint implementation and risk and capacity sharing. Responding to the new challenges that have been appearing in the worldwide energy landscape since the adoption of the SET Plan in 2007, the Commission adopted a Communication on "Energy Technologies and Innovation"[1] in May 2013 which puts forward concrete measures to reinforce the SET Plan and better equips it to respond to these new challenges and to more effectively consolidate research and innovation capacity and resources across Europe.

The activities included in the first work programme of the Horizon 2020 Energy Challenge contribute to the three focus areas "Energy Efficiency", "Competitive Low-Carbon Energy" and "Smart Cities and Communities". These activities cover the full innovation cycle – from 'proof of concept' to applied research, pre-commercial demonstration and market uptake measures[2]. They also exploit synergies with other relevant areas, e.g. information and communication technologies. In addition, the Energy Challenge contributes to the 'Blue Growth' focus area as well as to the Public Private Partnerships Energy-efficient Buildings[3] and Sustainable Process Industries (SPIRE)[4].

This work programme encourages synergies between Horizon 2020 and other European Union funds, such as European Structural and Investment Funds (ESIF), by expanding the scope and impact of both funds in terms of scientific excellence and place-based socio-economic development respectively[5]. The ESIF will invest up to EUR 90 billion in innovation and research in the period 2014-2020 and between 12% and 20% of the European Regional Development Fund will serve also the take-up of energy efficiency and renewable solutions[6].

---

[1] COM 2013(253)

[2] Technology demonstration and verification, for example through the EU Environmental Technology Verification pilot programme, would complement these activities by improving the reliability of the information on performance of technologies arriving on the market.

[3] Topic EE1, EE2 and EE3.

[4] Topic EE18 and LCE 2.

[5] Examples are the development and equipment of innovation infrastructures or the fostering of innovation skills through ESIF that enable the participation in a Horizon2020 project, or the transfer of knowledge and technologies resulting from Horizon2020 projects to firms that can, thanks to ESIF support, develop it further, test, prototype, etc. towards innovations fit for market take-up. ESIF can also be used to expand the support and advisory services for potential Horizon2020 participants. ESIF can also help deploying innovative solutions emanating from Horizon2020, e.g. through public procurement.

[6] See http://ec.europa.eu/regional_policy/activity/index_en.cfm

Applicants are invited to identify the smart specialisation fields of their EU Member State or region[7] and explore potential for synergies with the relevant Managing Authorities in charge of the ESI Funds for their territory[8].

An important novelty of this work programme is its challenge-based approach which gives applicants more freedom to come up with innovative solutions to the outlined challenges. As a consequence, topics are generally broader and allow a range of possible approaches, often encompassing more than one possible action.

Building on the experience of the Intelligent Energy Europe programme and as part of a third generation of such actions, this work programme includes a range of activities[9] aiming at facilitating the market uptake of energy technologies and services, fostering social innovation, removing non-technological barriers, promoting standards and accelerating the cost effective implementation of the Union's energy policies.

An important element of this work programme is the strong partnership with Member States. In line with the conclusions of the Commission's Communication on "Energy Technologies and Innovation", this work programme calls for a number of joint actions between the EU and Member States[10] aiming at delivering the necessary scale and scope, and achieving greater impact from scarce public and private resources.

Industrial participation in the programme is crucial for developing new generations of low-carbon technologies and rolling them out to the market. Given the central role of SMEs as a source of innovation, growth and jobs in Europe, this work programme features a number of topics particularly tailored to the needs of SMEs, including one topic for the SME instrument[11].

International cooperation with strategic partner countries and global technology leaders will support European energy and climate objectives and contribute to the global efforts to mitigate climate change and reduce CO2 emissions. In line with the objectives of the EU's strategy for international cooperation in research and innovation[12], all activities are open for third country participants[13], while certain partner countries are also specifically targeted in a number of topics[14]. In addition, the Commission also pursues its policy goals through bi-lateral cooperation such as under the US-EU Energy Council and contributing to international organizations and initiatives, such as the International Energy Agency (IEA) or the Carbon Sequestration Leadership Forum (CSLF).

Managing the transition to a more sustainable energy system cannot be achieved without taking into account the societal, economic and environmental context in which the energy

[7] See http://s3platform.jrc.ec.europa.eu/eye-ris3

[8] See http://ec.europa.eu/regional_policy/indexes/in_your_country_en.cfm

[9] Topics EE4, EE5, EE7, EE8, EE9, EE10, EE14, EE15, EE16, EE17, EE19, EE20, EE21, LCE4 and LCE14 as well as relevant 'Other Actions'.

[10] Topic LCE 18, LCE 19

[11] Topic for the SME instrument: SIE 1. Additional topics with particular relevance for SME are EE1, EE3, EE14, EE16, SCC4 and SCC5.

[12] COM(2012) 497

[13] Note that participants from industrialized and emerging countries outside of the EU are not automatically eligible for EU funding. For detailed rules concerning participation from third countries see Article 10 of the Rules for the Participation.

[14] Topics targeting third countries: LCE 15 (Australia, North-America) and LCE 16 (US, Canada).

system is embedded. Therefore, this work programme also comprises complementary socio-economic research[15] aiming at increasing our understanding of the complex energy system, improving our knowledge base for policy development and engaging civil society in the transition of the energy system.

The projects funded under the call "Smart Cities and Communities" of the Work Programme 2014-15 will participate in the Pilot on Open Research Data in Horizon 2020 in line with the Commission's Open Access to research data policy for facilitating access, re-use and preservation of research data. Projects have the possibility to opt out of the Pilot. A related new element in Horizon 2020 is the use of Data Management Plans (DMPs) detailing what data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved. The use of a Data Management Plan is required for projects participating in the Open Research Data Pilot. Other projects are invited to submit a Data Management Plan if relevant for their planned research. Further guidance on the Open Research Data Pilot is made available on the Participant Portal.

The projects funded under the other parts of this Horizon 2020 Work Programme may participate in the Open Research Data Pilot in Horizon 2020 on a voluntary basis.

Finally, a number of studies to support the formulation, implementation, communication and monitoring of sustainable energy policy, including its research and innovation dimensions, will be awarded through public procurement, grants to named beneficiaries or through administrative arrangements with the Joint Research Centre (JRC).

[15] Topics EE12, LCE 20, LCE 21

CALL – ENERGY EFFICIENCY

H2020-EE-2014/2015

Energy efficiency is a no-regret option for Europe, addressed by both short-term and long-term EU policies. The key objectives of EU action in the field of energy efficiency are:

(1) to hold **2020** energy consumption down to no more than 1474 Mtoe of primary energy consumption and 1078 Mtoe of final energy consumption[16][17]; and

(2) to hold **2030** energy consumption down to an appropriate level (which may be set as a function of the EU's economic performance).

In 2009, it was forecast that the policies and measures in force at European and national level would still leave EU primary energy consumption at about 1680 Mtoe in 2020. Since then, Member States have committed to energy efficiency as a key element in their energy policies and energy efficiency measures have started to function on a significant scale. It is now projected that primary energy consumption will progressively decrease towards 2020 and 2030[18]. This is encouraging progress but it should be noted that the poor performance of Europe's economy has also made a significant contribution, and that these projections still leave a gap in relation to the EU target for 2020. Moreover, it is clear that more ambitious action in energy efficiency will be needed to achieve EU objectives for 2030.

In the field of EU support for innovation, a package of activities is therefore needed to support 1) research and demonstration of more energy-efficient technologies and solutions; and 2) actions to remove market and governance barriers (financing and regulatory frameworks, improving skills and knowledge).

Research and demonstration activities will focus on buildings (also implemented through the Public Private Partnership on Energy-efficient Buildings, PPP EeB), industry (also implemented through SPIRE), heating and cooling, SMEs and energy-related products and services.

Market uptake measures, which should continue the type of activities supported under the Intelligent Energy Europe programme[19], including the ELENA Facility[20], should address market failures and governance gaps preventing progression in energy efficiency across all sectors.

Where applicable, projects should also include a broader resource efficiency dimension, and pay due regard to gender issues.

The ethical dimension of the activities undertaken should be analysed and taken into account, including relevant socio-economic implications. This implies the respect of ethical principles and legislation during implementation, notably of Opinion No. 27 of the European Group on

[16] EU27; 20% less than the energy consumption projected for 2020 at the time the objective was set

[17] With the accession of Croatia, the Union's 2020 energy consumption has to be no more than 1 483 Mtoe of primary energy or no more than 1 086 Mtoe of final energy (Directive 2013/12/EU).

[18] According to current projections, energy consumption will need to be no higher than 1535 Mtoe in 2020 and 1482 Mtoe in 2030

[19] http://ec.europa.eu/energy/intelligent/

[20] www.eib.org/elena

Ethics in Science and New Technologies (EGE) titled 'An ethical framework for assessing research, production and use of energy'.

Whenever possible, the activities should also demonstrate a good understanding and handling of ethical aspects as well as promoting the highest ethical standards in the field and among the actors and stakeholders. The most common issues to be considered include personal data protection and privacy, protection of participants and researchers and ensuring informed consent, involvement of vulnerable population, the potential misuse of the research results, fair benefit sharing when developing countries are involved and the protection of the environment. In the light of social, environmental and economic concerns, the consideration of these ethical aspects contribute to the achievement of an equilibrium between four criteria - access rights, security of supply, safety, and sustainability.

This call covers the following areas:

A Buildings and consumers

B Heating and cooling

C Industry and products

D Finance for sustainable energy

It includes topics that contribute simultaneously to objectives in all sustainable energy fields (energy efficiency, renewable energy and smart cities and communities). These are in particular: EE 2 on new highly energy performing buildings, EE 4 on construction skills, EE 7 on capacity building of public authorities, EE 8 on public procurement of sustainable energy solutions, EE 9 on empowering stakeholders, and EE 19-21 on finance for sustainable energy.

Proposals are invited against the following topics:

A – Buildings and consumers

Buildings account for 40% of EU final energy demand. Most of those existing today will still be standing in 30 years' time; the rate of new construction remaining generally low. The renovation of existing buildings represents more than 17% of the primary energy saving potential of the EU[21] up to 2050.

The biggest challenge when reducing energy use in buildings is to increase the rate, quality and effectiveness of building renovation (currently only at 1.2%/year[22]).To do this, it is necessary to reduce renovation costs and also to increase the speed at which it can be carried out in order to minimise disturbance for occupiers. To achieve an ambitious increase of the renovation rate (up to 2-3% per year), effective solutions need to be widely demonstrated and replicated.

Both the recast of the Energy Performance Building Directive (EPBD) and the Energy Efficiency Directive (EED) contain provisions to increase renovation rates, especially for public buildings. However, a number of non-technological barriers hamper the implementation of these provisions in the public sector and prevent market actors in the

[21] http://www.isi.fraunhofer.de/isi-media/docs/e/de/publikationen/BMU_Policy_Paper_20121022.pdf

[22] Renovate Europe Campaign

residential and private sectors from following the example that the public sector is expected to set. Likewise some market barriers also hamper the implementation of the Renewable Energy Sources Directive and its obligation to have minimum requirements of renewable energy use in new buildings and in existing buildings that are subject to major renovation.

Specific attention should be paid to historic buildings given their number and the fact that specific renovation constraints often need specialised techniques.

Consumer behaviour can reduce energy consumption by 20%[23]. Smart metering and other consumption feedback systems, building design and capacity building activities that encourage and enable energy conscious behaviour can help to fulfil this potential. Solutions to manage household energy demand patterns (demand response technologies and measures) should also be developed to further reduce greenhouse gas emissions.

To deliver innovative, affordable and applicable technologies for energy efficiency, the Energy-efficient Buildings Public-private partnership (EeB PPP) call, established under the LEIT Pillar of Horizon 2020, will be channelled towards a range of predominantly technology-related energy efficiency R&D topics, such as materials for building envelopes, self-inspection techniques and quality check measures, design tools for renovation at building and district level, integrated solutions for building renovation and thermal energy storage for building applications. Also, the EeB PPP will address new methodologies to reduce the gap between the predicted and actual energy performance of buildings.

This Energy-Efficiency call will complement the call of the EeB PPP with both technology-related, and (mostly) non-technology related topics, focusing on the removal of existing barriers through market uptake measures in order to build capacity, provide support for sustainable energy policy implementation, mobilise financing for sustainable energy investments and foster uptake of technologies relevant for energy efficiency in buildings.

A proposal may cover two or more topics at the same time, but should nevertheless be submitted under the main topic of the proposal and achieve at least the expected impact of that topic.

EE 1 – 2014: Manufacturing of prefabricated modules for renovation of buildings

Specific challenge: Prefabricated components are more and more commonly used in the construction sector. Compared to traditional construction processes, prefabrication aims at reducing costs without compromising quality and facilitating the installation/dismantling/re-use of components. It also facilitates the re-use of residue materials from the construction and industrial sectors. Building components could, when relevant, be prefabricated in factories to reduce construction time and to improve on-site health and safety. Reducing the time for installation is particularly suitable for renovation while being occupied. Prefabrication should be adaptable to individual renovation solutions as well as to mass production for appropriate projects and should be linked to computer design tools.

Further research is needed to improve understanding of material and component behaviour in the whole life cycle[24] and, consequently, to be able to produce better performing products, taking into account important aspects such as the overall thermal performance and airtightness. Innovative technologies for energy efficiency (e.g. HVAC components) and for renewable energy sources (e.g. photovoltaics, solar collector) can also be integrated into

[23] http://www.eea.europa.eu/publications/achieving-energy-efficiency-through-behaviour

[24] Based e.g. on Life Cycle Assessment or Carbon Footprint of Products.

prefabricated multi-functional modules and components. Such prefabricated elements are to be developed, prototyped, optimised and transferred from individual manufacturing to mass production.

Scope: Innovative mass manufacturing processes must be investigated to lower pre-fabrication costs and ease building integration processes, also taking into account the challenge of aesthetics for existing buildings. This requires the development of new controlled processes and cost-effective automated/robotised tools.

These innovations should be combined with integrated processes and the use of advanced computer based tools like Building Information Modelling which will facilitate the industrialisation of the whole construction process and integrate the value chain over the life cycle of the project. Durability of proposed solutions will have to be evaluated in real installation conditions, incorporating integrated and embedded reliable monitoring systems, as this is a crucial factor that influences final product performances. The criteria and methods for evaluation of the benefits should be transparent and simple.

During the development of technology and components for prefabricated facade elements, the use of recycled materials should be investigated and structural engineering aspects must be taken into account to enhance the automated and robotized construction technologies. A business model addressing cost-optimality aspects for given building types and geo-clusters across Europe should be addressed in the proposals.

The proposals should cover mainly demonstration activities. Prototypes and pilot implementations in real industrial settings would represent a clear added-value, as would the participation of SMEs involved in the manufacture and installation of prefabricated modules.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

This topic will be implemented under the PPP on Energy-efficient Buildings. The activities are expected to be implemented at Technology Readiness Level (TRL) 5-7 (please see part G of the General Annexes).

Expected impact:

- Reduction in total buildings (primary) energy consumption by at least a factor of 2 with respect to the current situation, and a cost-level better than traditional renovation activities.
- Significant reduction of renovation operations while ensuring low intrusiveness and impact for users.
- Reduction in installation time by at least 30%, compared to a typical renovation process for the building type.
- Better quality standard and performance guarantee for the installed prefabricated modules and their integrated components, while enhancing indoor air quality.
- Demonstration of replicability potential.
- A maximum return on investment of less than 10 years for end-users.
- Generation of new high-tech SMEs specialised in renovation with prefabricated modules.
- Creation of high-skill jobs for workers who could master innovative construction tools.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 2 – 2015: Buildings design for new highly energy performing buildings

Specific Challenge: By the end of 2020 (2018 for buildings occupied and owned by public authorities), all new buildings should comply with the Energy Performance of Buildings Directive obligations and thus meet 'nearly zero-energy' performance levels using innovative, cost-optimal technologies with integration of renewable energy sources on site or nearby. The drive for nearly zero-energy buildings takes place in the context of the drive for new-buildings towards zero life-cycle material impacts. Moreover, the construction of 'plus-energy' buildings - i.e. buildings producing more energy than they consume - should also be encouraged in order to reduce energy use whilst increasing the share of renewable energies. However the costs of these highly energy performing buildings still represent a barrier for investors. Therefore the construction industry needs to deliver more affordable solutions.

Scope: Projects should focus on development and demonstration of solutions which significantly reduce the cost of new buildings with at least 'nearly zero-energy' performance levels, whilst accelerating significantly the speed with which these buildings and their systems are taken up by the market. The focus should lie on solutions for appropriate indoor air quality and comfort, design adapted to local climate and site, passive solutions (reducing the need for technical building systems which consume energy) or active solutions (covering a high share of the energy demand with renewable energies), building energy management systems (where appropriate), highly efficient Heating, Ventilation and Air-Conditioning (HVAC, e.g. low temperature systems, solar cooling), electric and/or thermal energy storage of renewable energy onsite and nearby. Projects should also provide solutions for automated and cost-effective maintenance of the installed equipment, and assess differences between predicted and actual energy performance. Such differences should be documented and minimized.

The applied solutions should address the challenge to move towards a 'nearly-zero energy' buildings standard at large scale with demonstration projects that go beyond 'nearly-zero energy' buildings levels to the point where buildings are active contributors to energy production and environmental quality in particular when new districts are planned (e.g. net-zero energy neighbourhoods). The energy balance should be calculated by means of a LCA approach, considering among other issues embodied energy.

Projects should also focus on design methods for on-site and nearby-generation of renewable energy for new buildings (electricity as well as heating and cooling generation, e.g. heat pumps, integrated photovoltaics, or other options) accompanying energy efficiency measures to achieve standards higher than those of 'nearly zero-energy' buildings.

The performance of innovative technologies may be verified through technology verification schemes such as the EU Environmental Technology Verification (ETV) pilot programme[25].

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

This topic will be implemented under the PPP on Energy-efficient Buildings.

[25] http://iet.jrc.ec.europa.eu/etv/

The activities are expected to be implemented at TRL 5-7 (please see part G of the General Annexes).

Expected Impact: Significant increase of the share of 'nearly zero-energy' buildings with the aim of 100% market uptake by the end of 2020. Costs reductions of at least 15% compared to current situation, with additional benefits in terms of energy reduction. Demonstration for net-zero energy districts taking advantage of onsite or nearby-generation of renewable energy.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE3 – 2014: Energy strategies and solutions for deep renovation of historic buildings

Specific Challenge: Around a quarter of the existing building stock in Europe was built prior to the middle of the last century. Many such buildings, often valued for their cultural, architectural and historic significance, not only reflect the unique character and identity of European cities but include essential infrastructure for housing, public buildings etc. A significant number of these historic buildings continue to use conventional inefficient fossil-fuel based energy systems typically associated with high energy costs and with greater than average CO2 emissions and cost of refurbishment.

The need to save costs increasingly leads to tighter rationing or shutdown of heating or cooling systems, further worsening conditions for conservation of the buildings, for artworks or collections as well as for living conditions.

Furthermore, changes in building-use and higher indoor comfort expectations than in the past are driving up demand for energy, a particular challenge when buildings of historic value are used or converted for residential, educational, retail, office or other purposes.

Due to the need to preserve authenticity and integrity, many recently developed solutions in the field of renovation are not compatible with or adequately adapted for use in historic buildings. This is particularly the case for listed or protected buildings.

It is also difficult to fully assess and model reliably the energy performance of the many different types of historic buildings across Europe or to assess the effect of energy efficiency measures or more sustainable solutions.

The scope for improved energy-efficiency of historic buildings is significant if addressed by holistic[26] and deep[27] renovation schemes that integrate innovative technologies, adapted standards and methodologies which consider the district dimension and stakeholder involvement.

Energy strategies and solutions for historic buildings have been identified as one of the priority areas in the roadmap of the EeB PPP.

Scope:

[26] Considering all the refurbishment possibilities at building level together with opportunities at district level such as biomass, geothermal, district heating, etc.

[27] Deep renovation should lead to a refurbishment that reduces both the delivered and the final energy consumption of a building by a significant percentage compared with the pre-renovation levels (cf Directive 2012/27/EU on Energy Efficiency).

Project proposals should focus on the development of innovative and affordable building renovation solutions for historic buildings that can deliver significant[28] improvements in energy performance while ensuring indoor comfort requirements and non-invasive, reversible solutions.

The emphasis should be on eco-innovation and sustainability by integrating cost-effective technologies for energy efficiency and renewable energy solutions.

Projects may address specific aspects such as innovative energy and environmental assessment methodologies (based on life-cycle and including specific non-monetary aspects in the cost/benefit and return on investment analysis), tools for planning and implementing the renovation of historic buildings, monitoring and control technologies and systems, non-invasive and non-destructive methods of surveying and diagnosis together with appropriate standards and information management for building maintenance.

Projects should clearly demonstrate the effectiveness of the technologies, methodologies, systems or tools developed and prove the replication potential of the proposed solutions with, where appropriate, the use of case studies.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

This topic will be implemented under the PPP on Energy-efficient Buildings. The activities are expected to be implemented at TRL 4-6 (please see part G of the General Annexes).

Expected Impact: Optimised design and implementation of renovation projects for historic buildings and for listed and protected buildings in particular, delivering significant improvements in energy performance at both building and district level through more tailored solutions. Provision of effective guidelines and contribution to standardisation activities in this field. Reduced fragmentation in this sector through increased collaboration and cooperation and fostering of a more interdisciplinary approach and support to the implementation of the roadmap of the EeB PPP.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 4 – 2014: Construction skills

Specific challenge: The large contribution expected from the building sector to the 2020 energy objectives is a challenge for the construction industry which needs to be ready to deliver renovations offering high energy performance and new, nearly zero-energy buildings using innovative technologies. Many craftsmen and building workers need up-skilling. Existing qualification schemes, accreditation structures and training incentives are not covering enough energy efficiency and renewable energy issues and are sometimes insufficiently attractive to building workers and employers (especially from SMEs). There is also a need to train architects, engineers, building managers and other building professionals. By promoting 'energy literacy', including integrated design and good operational management

[28] Significant savings to both the delivered and the final energy consumption of a building compared with the pre-renovation levels (cf Directive 2012/27/EU on Energy Efficiency, Directive 2010/31 on the Energy Performance of Buildings)

practices, these professions can help in closing the gap between energy performance at the design stage and operational performance.

Scope: Regarding craftsmen and other on-site workers, including apprentices, proposals should build on the results of the recent BUILD UP Skills initiative, be in line with the European Qualification Framework (EQF), and focus on upgrading or establishing large-scale qualification and training schemes in order to increase the number of skilled building workers. They should be based on the national training roadmaps established in BUILD UP Skills. Proposals may also address coordination and accompanying measures (e.g. voluntary certification schemes, accreditation, mutual recognition, incentives to encourage the participation of craftsmen and to attract women to the construction sector).

Regarding other practitioners, proposals should focus on improving the qualification and skills of middle and senior level building professionals. ICT-based training may be used, building on results from the LEIT ICT work programme.

For financial support to trainees, proposals should link to other sources of funding such as the European Social Fund, including the Youth Guarantee Scheme.

Proposals should as much as possible foster better cooperation between disciplines and link to approved qualifications which are in turn based on industry standards.

Organisational and financial mechanisms should be established to sustain training activities for at least 3 years after the projects' end**.**

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

For all proposals, at least three legal entities must participate in the action; each of the three legal entities shall be established in a different eligible country; and all three legal entities shall be independent of each other. However, proposals focusing on upgrading or establishing large-scale qualification and training schemes for craftsmen and other on-site workers, in the continuation of the BUILD UP Skills initiative, may be submitted by one legal entity.

Expected impact: Reduced skills mismatch and increased managerial capacity to support innovation and sustainable energy use in buildings through new leadership and work practices. Improved participation, qualifications and skills for a pool of talented women in the construction sector.

Every million Euro of EU support is expected to increase the skills of at least 2000 craftsmen[29], or 500 construction sector managers[30], resulting in energy savings and/or renewable energy production of at least 25 GWh per year and increasing the employability of the building workforce. In addition, projects should explain how they will result in increased investments in innovative sustainable energy technologies.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

[29] Based on the FEEBAT scheme in France.

[30] EUREM.NET and IDES-EDU projects (IEE programme)

EE 5 – 2014/2015: Increasing energy performance of existing buildings through process and organisation innovations and creating a market for deep renovation

Specific challenge: The Energy Performance of Buildings Directive and the Energy Efficiency Directive contain provisions to increase renovation rates, especially for public buildings. However non-technological barriers hamper the implementation of these provisions and also prevent other market actors in the residential and private sectors from following the example that the public sector is expected to set.

The heterogeneity of the construction industry, the large number of companies and the relative lack of quality standards, inspection protocols and guidelines limit the number and impact of large-scale energy efficiency investments and the effective integration of renewable energies. Many buildings are not commissioned and/or operated properly and energy performance certificates have not yet gained full public acceptance. The pressure to build or renovate towards nearly zero-energy buildings means that the building sector needs to significantly upgrade its working practices.

In addition there is a need to develop a marketplace for deep renovation[31] packages. Currently, there is limited articulated demand from building owners for significant energy performance improvements in existing buildings. Supply side, demand side and public authorities need to cooperate and find solutions that drive compelling offers for building owners, and simultaneously lift as many barriers as possible.

Scope: Proposals should focus on removing market barriers. They should focus on coherent interventions across issues and across actors to drive structural improvement in market conditions (i.e. those able to significantly influence buildings energy use in different sectors including building owners/operators, public authorities, construction and maintenance industry, housing associations, developers, financiers, etc.). All building types may be covered, however the main focus should be on existing buildings, in particular the most inefficient ones, as they represent the largest savings potential. Proposals should create synergies by incorporating at least one of the following three elements:

- *Driving product and process innovation in the construction sector* to improve product offerings by creating an early market.
- *Development, testing and/or implementation of regulations; property valuation techniques; decision-making tools for renovation strategies; quality standards; and/or inspection and monitoring mechanisms* to bridge the gap between expected and actual energy performance.
- *Enabling conditions to finance deep renovation of buildings (including through process and organisation innovation).*

Optional additional activities may include:

- *Support for the implementation of the recast Energy Performance of Buildings Directive* in Member States by promoting dialogue and exchange of best practices; complementing activities of the EPBD Concerted Action[32].

[31] Deep (or major) renovation means the renovation of a building where: (a) the total cost of the renovation relating to the building envelope or the technical building systems is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated; or (b) more than 25 % of the surface of the building envelope undergoes renovation (Energy Performance of Buildings Directive)

[32] www.epbd-ca.eu

- *Support to the implementation of the Energy Efficiency Directive* as regards its provisions on 'long-term strategies for mobilising investment in the renovation of the national stock of residential and commercial buildings' (Article 4) and the renovation of central government buildings' (Article 5); complementing activities of the EED Concerted Action[33]. Proposals should not replace activities that are under the responsibility of Member States but add European value to these activities (e.g. exchange of knowledge and experience between organisations from different countries).
- *Methods to increase the share of on-site and nearby-generated renewable energy in order* to achieve nearly zero-energy buildings performance levels (or better).

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Proposals triggering the renovation of existing buildings towards high energy performance, or raising quality and compliance, should result in energy savings of at least 25 GWh/year per million EUR of EU support. Impacts should also be measured in terms of investment made by stakeholders in sustainable energy; better implementation of energy-efficiency policies; and number of policy makers or building owners/operators influenced.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 6 – 2015: Demand response in blocks of buildings

Specific challenge: Demand response enables end users to participate actively in energy markets and profit from optimal price conditions, making the grid (heat, cold, electricity) more efficient and contributing to the integration of renewable energy sources. The Energy Efficiency Directive adopted in 2012 contains provisions to encourage market actors to facilitate demand response. At the building level, increasing use of energy management technologies for both thermal and electric loads will act as an enabler for the deployment of demand response in both residential and non-residential buildings (e.g. offices). Such systems may be integrated with thermic/electric storage technologies and micro combined heat and power installations (CHP). Considering the important contribution of buildings and occupants to energy efficiency, there is therefore a need for ensuring that buildings have proper energy management systems in place to ensure consumers' engagement and demand response activations.

Scope: At the level of a block of buildings, the focus should be on real time optimisation of energy demand, storage and supply (including self-production when applicable) using intelligent energy management systems with the objective of reducing the difference between peak power demand and minimum night time demand, thus reducing costs and greenhouse gas emissions. Cost-effective and interoperable solutions that do not compromise the comfort of occupants should be demonstrated for a block of buildings consisting of at least 3 different buildings in real life operating conditions. Solutions should be compatible with smart grids and open international standards and with the distribution network infrastructure.

[33] www.esd-ca.eu

The activities are expected to be implemented at TRL 6-7 (please see part G of the General Annexes).

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 and 5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Proposals showing that demand response can be implemented at the level of blocks of buildings with the help of intelligent energy management systems and without unreasonable effort and complexity while triggering substantial energy and cost savings. Moreover, proposals that shed light on the added value of installing demand response facilities for building blocks instead of individual buildings and on the willingness of consumers to participate in demand response solutions. Impacts should be measured in energy and cost savings. Impacts should also be measured for the willingness and capability of consumers to participate in demand response solutions.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 7 – 2014/2015: Enhancing the capacity of public authorities to plan and implement sustainable energy policies and measures

Specific challenge: Public authorities play a key role in the reduction of EU energy consumption and the increase of renewable energy capacity. For instance Member States must produce and implement National Energy Efficiency Action Plans (NEEAPs) and National Renewable Energy Action Plans. They also have the obligation to produce detailed action plans in specific sectors such as the renovation of buildings or the application of high-efficiency cogeneration and efficient district heating and cooling systems. Local and regional authorities are also developing plans at their own level and other public authorities play an important role too; national energy regulatory authorities for instance should provide incentives for grid operators (heat, cold, and electricity) to enable network users to produce renewable energies and implement energy efficiency measures.

Doing this requires multidisciplinary skills to e.g. assess different cross-sector sustainable energy options, according to technical, environmental, economic and social criteria. It also requires skills to engage stakeholders in both the definition and implementation of the solutions, and to secure funding.

The situation regarding the availability of these skills varies from country to country; e.g. while certain public authorities have a long tradition of using energy performance contracting, others have not tried yet; or while a few Member States oblige large cities to develop urban mobility plans, such plans are not common practice in other countries.

Scope: Proposals demonstrating an innovative approach in empowering public authorities to develop, finance and implement ambitious sustainable energy policies and plans (for instance under the Covenant of Mayors initiative), on the basis of reliable data and analyses. Public actors should be encouraged to look at sectors with high energy saving potential such as buildings, industry and urban mobility. The geographical coverage should be well justified on the basis of European added-value. Capacity building should be an integral part of project proposals.

The following actions are part of the scope:

- Raising the capacity of Member States to fulfil their obligation under the new Energy Efficiency Directive.
- Enabling national energy regulatory authorities to address demand issues (e.g. demand response, tariff design, assessment of generation adequacy assessment).
- Capacity building on integrated energy, transport mobility and land-use planning at community and city-level.
- Supporting public authorities in better linking up local, regional and national levels for delivering integrated sustainable energy action planning and projects to achieve synergies and economies of scale.
- Establishing new or exploiting existing networks and other mechanisms to spread knowledge and facilitating the exchange of experiences and best practice on sustainable energy.
- Large-scale capacity building on innovative financing to specific groups of public authorities, such as national, local and regional authorities, energy agencies, structural and cohesion funds managing authorities.
- Defining and implementing standard energy saving packages for households, public sector and industry in particular under Article 7 of the Energy Efficiency Directive.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Impacts must be measured in terms of number of public officers influenced and number of new or improved policies and plans. The number of final consumers impacted should also be measured in millions of people. In addition, proposals targeting governments should also demonstrate that they accelerate the implementation of the new Energy Efficiency Directive.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 8 – 2014: Public procurement of innovative sustainable energy solutions

Specific challenge: Considering the large volume of public spending (19% of EU GDP, or roughly EUR 2,200 billion in 2009[34]), the public sector constitute an important driver to stimulate market transformation towards more sustainable energy products, buildings and services. To this regard, the recent Energy Efficiency Directive requires for instance that central governments purchase only products, services and buildings with high energy-efficiency performance. However, there are many operational barriers related to sustainable energy public spending such as the lack of knowledge, practical training and tailored guidelines; the lack of willingness to change procurement habits; or perceived legal uncertainties.

Scope:

[34] COM staff working paper, Annexes to the impact assessment of Directive 2012/27/EU

- Proposals improving the capacity of public authorities and national/regional/local procurement authorities in purchasing best available sustainable energy products, buildings or services. Project proposals should address the lack of professional procurement training, the lack of experience in implementing sustainable procurement practices and strategies, and/or the lack of sharing and co-operation among procurers. They should where appropriate rely on the use of cost – benefit analysis (e.g. using a life-cycle approach). Actions should include sharing of best practices and involve large multipliers such as central purchasing organisations.
- Support public authorities in procuring fast-evolving information and communication technologies such as Green Data Centres. Project proposals should consider the risks associated to rapid technological evolution, a dynamic industry, scalability and the need for tailored (i.e. not off the shelf) solutions by suppliers. Activities to support networking of public procurers or the use of PPI (Public Procurement of Innovative solutions) or PCP (Pre-commercial Procurement) are to be included.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Every million Euro of EU support is expected to trigger the launch of public tenders for the purchase of sustainable energy products, buildings or services resulting in savings of more than 25 GWh[35] per year of energy savings and/or renewable energy production. Proposals should also increase the skills of public procurers and the market uptake of innovative solutions.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 9– 2014/2015: Empowering stakeholders to assist public authorities in the definition and implementation of sustainable energy policies and measures

Specific challenge: While public authorities have an important role to play to develop energy efficiency policies and plans, the latter require the full involvement of private stakeholders and the civil society for their effective implementation. However there is a general lack of capacity and coordination among those stakeholders to guarantee their full involvement and to effectively convert policies and plans into concrete actions.

Scope: Proposals should target specific actors among a wide spectrum of stakeholders (utilities, industry, financing institutions, non-governmental organisations, consumer associations, interest groups, trade unions, etc.). They should provide large-scale capacity building or engagement activities to those specific groups playing a key role in the definition and/or implementation of sustainable energy policies and measures initiated by public authorities. Proposals should demonstrate a strong European added value and put in place mechanisms ensuring the continuation of the activities beyond the project duration.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 million would allow this specific challenge to be addressed appropriately.

[35] Based on results from previous IEE projects such as BUYSMART

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Each project must prove to influence hundreds of stakeholders playing a key role in the definition and successful implementation of national, regional or local policies. As a result the number of final consumers impacted should be measured in thousands of people.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 10 – 2014/2015: Consumer engagement for sustainable energy

Specific challenge: Residential use of energy is responsible for 28% of EU energy consumption[36]. The barriers to consumer energy saving have been known for more than 30 years[37] but are still present, in particular split incentives (e.g. tenants vs. landlords), lack of information, high initial investment in energy-efficient equipment and habits of energy users. Likewise, while awareness of the existence of renewable energies has improved considerably in the last years, there is still a lack of understanding of how to use them in practice.

Scope: Project proposals should focus on changing the behaviour of consumers in their everyday life (e.g. at home, at work, at school), using market segmentation and focussing on 'action', the last step of the AIDA (Awareness – Interest – Desire – Action) framework. Equipment responsible for main energy consumption (e.g. heating and cooling, lighting, domestic appliances, and consumer electronics)[38] as well as products from the small scale renewable energy market should be addressed in priority. Educational activities or tools (such as comparative ones) may be necessary, e.g. to help consumers read and understand their energy bills or labels; to help them take advantage of ICT devices and tools to monitor and analyse their energy use; to increase trust in individual smart meters or energy audits; or to help them participate in community renewable energy projects (e.g. RES consumer cooperatives, community-owned projects, etc.). Actions should take gender issues into account when relevant and involve manufacturers, retailers and consumer associations when these can play a decisive role. The use of social innovations and innovative technologies (e.g. smart meters/appliances/ICT) should be considered when it brings added value, especially when addressing the younger generation. More fundamental activities aimed at a better understanding of consumers' and other stakeholders' perception, motivation and behaviour are part of the scope (e.g. understanding of product labels and building certificates, difference in patterns of consumption for women and men) provided their results can directly lead to improvements in the effectiveness of consumer-driven initiatives.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

[36] Ballu, M. & Toulouse, E. (2010) Energy savings in practice. Potential and delivery of EU ecodesign measures.

[37] Crossley, D. J. (1983) Identifying barriers to the success of consumer energy conservation policies. *Energy*, 8, 533-546.

[38] Bertoldi, P., Hirl, B. & Labanca, N. (2012) Electricity consumption and efficiency trends in the EU-27.

Expected impact: Bigger market share of the most energy-efficient products (from the highest energy class) and/or of high quality renewable energy products. For example, each million € of EU support in energy efficiency actions is expected to deliver annual energy savings of around 10% for at least 5,000 households[39] (around 8 GWh/year of savings[40]). In any case proposals should demonstrate significant impacts in terms of number of people changing their behaviour and taking informed investment decisions.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 11 – 2014/2015- New ICT-based solutions for energy efficiency

Specific Challenge: To motivate and support citizen's behavioural change to achieve greater energy efficiency taking advantage of ICT (e.g. personalised data driven applications, gaming and social networking) while ensuring energy savings from this new ICT-enabled solutions are greater than the cost for the provision of the services.

Scope: The focus should be on the creation of innovative IT ecosystems that would develop services and applications making use of information generated by energy consumers (e.g. through social networks) or captured from sensors (e.g. smart meters, smart plugs, social media) and micro-generation. These applications range from Apps for smart phones and tablets to serious games to empower consumers stimulate collaboration and enable full participation in the market. The proposed solutions should be deployed and validated in real life conditions in publicly owned buildings (including administrative offices, social housing) and buildings in public use or of public interest. Validation should provide socio-economic evidence for ICT investment in the field and include detailed plans for sustainability and large-scale uptake beyond the project's life time.

Specific attention should be given to development and testing of 'cleanweb' solutions, which not only bring opportunities for consumers, but also represent a promising investment field.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Systemic energy consumption and production and emissions reduction between 15% and 30%. Accelerate wide deployment of innovative ICT solutions for energy efficiency. Greater consumer understanding and engagement in energy efficiency.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

[39] Energy savings in this order have been achieved in former IEE projects (e.g. ACHIEVE, EC-LINC, Energy Neighbourhoods, Eco n'Home).

[40] Considering 1.46 toe of energy consumption per household and per year and an average household size of 2.4 capita, as indicated in Bertoldi et al. 2012 (quoted above).

EE 12 – 2014: Socioeconomic research on energy efficiency

Specific Challenge: Energy efficiency is playing a growing role in local, national and European policy development. It is a complex issue spanning different disciplines including engineering and social sciences. To formulate long-term strategies and define cost-effective policies, policy makers need to better understand the macroeconomic impacts of energy efficiency, and, at the microeconomic level, the evolution of energy (and where appropriate exergy[41]) efficiency, the influence of consumer behaviour, the influence of institutional factors, and the implications of trends in society and technologies.

Scope: Foresight socio-economic activities informing the debate on the development and monitoring of energy efficiency strategies, taking a forward looking approach to the horizon of 2030 and beyond. Proposals may also research the multiple benefits of energy efficiency or look at the evolution of social, economic, cultural and educational barriers. They may also study major trends in society and their implications, or advance knowledge of consumer behaviour (e.g. rebound effect) and the impact of institutional factors. They can either adopt a cross-sectorial approach or be specific to certain relevant sectors. Proposals may feed the development of energy efficiency strategies, policies and programmes at all governance levels. Where appropriate, they should take gender issues into account as well as existing macroeconomic and microeconomic models and results of socio-economic sciences and humanities. A specific priority will be given to the development of micro-economic analysis of the latest energy efficiency measures.

The Commission considers that proposals requesting a contribution from the EU of around EUR 1 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Positive impacts on energy efficiency policy development, evidenced for example by references to impact assessments, strategy papers or other policy documents.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

B – Heating and cooling

EE 13 – 2014/2015: Technology for district heating and cooling

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 and consumer empowerment and exploiting multiple energy resources, including waste heat recovery, heat pumps, thermal storage, cogeneration and renewable energy integration, and to roll-out solutions for the integration of intelligent thermal networks with smart electricity grids.

Scope: Project proposals should address one or more of the following areas:

[41] Exergy is the valuable part of energy which can be converted into useful work.

- Develop, demonstrate and deploy a new generation of highly efficient, intelligent district heating and cooling systems which are capable of integrating multiple efficient generation sources, including different kinds of renewable energy, cogeneration, waste heat from industrial or other sources and storage, and which can be operated at different temperature levels. Such systems can be new schemes or refurbished and optimised existing DH systems. These systems might combine hybrid technologies and/or new thermal carrier fluids to improve the overall efficiency; help decrease the end user cost of transporting heating and cooling energy, be compatible and connected with intelligent electricity and gas networks; and utilize surplus electricity from the grid. Such systems should be compatible with and capable of integration with low-energy buildings, including nearly zero energy buildings (e.g. by means of low-temperature district heating).
- *Bring down heat distribution losses* and integrate storage through the use of innovative pipe and storage design, high performance insulation materials, reduced operating temperatures, intelligent, efficient system for fluid handling or intelligent metering, control and grid optimisation strategies, including from analysing smart meter data, consumer interaction and behaviour.
- Develop optimisation, control, metering, planning and modelling tools such as intelligent thermal agile controllers embedding self-learning algorithms which help to optimise the overall efficiency of technology-hybrid systems and IT supervision systems capable of delivering real-time performance indicators, which are likely to modify consumption behaviour.
- Develop new solutions for low temperature heat recovery and recirculation.

The activities are expected to be implemented at TRL 4-6 (please see part G of the General Annexes).

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Innovative energy systems integrating the electricity grid and the heating/cooling grid (and possibly also energy storage), TRL 6-8, should be addressed in LCE7 and/or LCE8 (please see part G of the General Annexes).

Expected Impact:

- Reduce the energy consumption of space and water heating by 30 to 50% compared to today's level.
- Contribute to the wider use of intelligent district heating and cooling systems and integration of renewables, waste and storage.

Type of action: *Research &* Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 14 - 2014/2015: Removing market barriers to the uptake of efficient heating and cooling solutions

Specific challenge: 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 heating/cooling 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; and empowerment and involvement of consumers through innovative metering, billing and complaint handling processes.

Scope: Project proposals should focus on one or more of the following areas:

- *Individual heating and cooling:* Innovative measures to accelerate the replacement of old, inefficient space heaters and packaged cooling systems with products having A+++ to A+ energy labels. The replacement should not lock out energy savings from other energy measures in the rest of the building/system.
- *Inspection of heating and cooling systems*: support for the implementation of inspection in heating and cooling systems as indicated in Articles 14 and 15 of the EPBD. This includes actions using monitoring and ICT as ways to reduce the need for physical inspections. Actions could also support the provision of advice to users as well as monitoring the results of advice.
- *For industrial heating/cooling*:
    - deploy effective heating/cooling solutions in industry that integrate demand and supply;
    - deploy renewable heating and cooling solutions in relevant industrial sectors (e.g. food and drink industries);
    - contribute to identifying, developing, and promoting new markets for the recovery of heat from industry by putting stakeholders together, including activities aiming at supporting public acceptance of waste heat recovery projects;
    - exchange of information and knowledge.
- *Energy supply systems*[42]: Proposals should lead to the opening up of new markets for the most efficient large, medium or small scale systems, potentially including solar cooling systems. They should build on experience from existing best practice examples. Proposals could address the development and implementation of: a) support and incentive schemes, b) organisational, managerial and business innovative models and c) new regulatory frameworks and codes that lead to substantial growth and improved transparency. Proposals could include activities aimed at improving the performance of existing systems as an example to encourage further use of these technologies.
- *For district heating/cooling industry:* develop good practice, licensing criteria, efficiency benchmarks and consumer protection codes to improve the transparency of the market and increase consumer trust. Ensure exchange of information, knowledge of using best practice examples and knowledge of consumer practices, motivations and barriers.
- *Develop and demonstrate the tools and methodologies* required to conduct the heating and cooling planning procedures necessary at the member state and EU level, such as

[42] Energy supply system: high efficiency co-generation (large, small and micro) and efficient district heating and cooling. Such systems may use waste heat or renewable energy sources. Conventional fuels should not be excluded, but waste heat and RES should be encouraged.

energy system analysis using CHP and energy storage, geographical information systems (GIS) for matching heat supply and demand, as well as measures to overcome implementation challenges. These should make it possible for local communities and member states to develop strategies for the achievement of the overall EU targets.

Consortia should include or engage with the relevant market actors such as industry (equipment and fuel suppliers), installers, real estate developers, public authorities, energy services companies, designers and end user groups / consumer associations. Due consideration should be given to costs and reliability. Furthermore, where appropriate, proposals should devise mechanisms to secure funding for energy efficiency investments.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: More favourable market conditions for efficient heating and cooling solutions and opening up of new markets.

Every million Euro of EU support should in the short term lead to the reduction of at least 25 GWh/yr of fossil fuels for heating and cooling. Significant impacts should also be measured in terms of investment made by stakeholders in sustainable energy; number of policy makers influenced; number of people with increased skills; or number of people changing their behaviour.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

C - Industry and products

To deliver innovative, affordable and applicable technologies for energy efficiency in the process and manufacturing industry, Public-private partnership SPIRE and Public-private partnership Factories of the Future (FoF) established under the Horizon 2020's LEIT Pillar will channel their call towards a range of predominantly technology-related energy efficiency R&D topics. For SPIRE, topics will include improved downstream processing, methodologies and tools for cross-sectorial sustainability assessment of energy and resource efficient, new adaptable catalytic reactor methodologies for process intensification and energy and resource management systems for improved efficiency. The FoF topics will include manufacturing processes for complex structures and geometries with efficient use of material and global energy and other resources in manufacturing enterprises.

This call will complement the call of the SPIRE and FoF with both technology-related, and (mostly) non-technology related topics focusing on the removal of existing barriers through market uptake measures to build capacity, provide support for sustainable energy policy implementation and foster uptake of technologies relevant to energy efficiency in industry.

EE 15 – 2014/2015: Ensuring effective implementation of EU product efficiency legislation

Specific challenge: By 2020 full implementation of the EU product efficiency legislation should be one of the most important contributions to the EU energy efficiency target. The

Ecodesign Directive alone should yield yearly savings of up to 600 TWh of electricity and 600 TWh of heat in 2020, as well as net savings for European consumers and businesses of €90 billion per year – 1% of EU's current GDP – in year 2020 (meaning net savings of €280 per household per year)[43]. Previous initiatives have demonstrated the usefulness of market surveillance activities[44]. However to ensure full implementation of product efficiency legislation, it has also been proven that these activities should be improved.

Scope: Proposals should focus on building up the monitoring, verification and enforcement of the EU's energy-related products policy, in particular for those products that represent the highest energy saving potential (e.g. electric motors, water and space heating and cooling equipment, lighting). Proposals should support higher level of surveillance activities and go beyond product testing activities. They should not replace activities that are under the responsibility of Member States[45] but add European value to these activities (e.g. execution of joint activities, exchange of information, development of common methods, protocols or checklists, etc.). Actions must involve the relevant market surveillance authorities and consumers' (or other end users') associations as appropriate, and demonstrate a high transnational added value.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: For market surveillance proposals every million Euro of EU support is expected to generate at least 15 GWh/year of energy losses avoided from non-compliance[46]. In addition, proposals should result in an increase of confidence among purchasers, manufacturers and retailers. They should also contribute to the enforcement of EU product legislation.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 16 – 2014/2015: Organisational innovation to increase energy efficiency in industry

Specific challenge: Between 2000 and 2010, energy efficiency in industry has on average improved by 1.3% per year[47]. However, by using existing cost-effective energy solutions, the industry sector could further reduce its consumption by at least 13%[48], thus gaining in competitiveness and saving nearly 40 Mtoe a year. Obtaining larger savings in industry can

[43] Molenbroek, E. Cuijpers, M. & Blok, K. (2012) Economic benefits of the EU Ecodesign Directive. Improving European economies.

[44] e.g. by testing the pan-EU compliance of energy-related products (see http://www.eaci-projects.eu/iee/page/Page.jsp?op=project_detail&prid=2613) with the legal requirements.

[45] Article 18 of Regulation (EC) N°765/2008, article 3(2) of the Ecodesign Directive 2009/125/EC, and article 3 of the Labelling Directive 2010/30/EU.

[46] Conservative estimate based on the study from Paul Waide (Navigant), quoted above.

[47] Odyssee-MURE project (http://www.odyssee-indicators.org/)

[48] http://www.isi.fraunhofer.de/isi-media/docs/e/de/publikationen/BMU_Policy_Paper_20121022.pdf

also be achieved by introducing new affordable intelligent energy solutions that secure more uptime in production chains.

Scope: Activities should focus on removing market barriers, in particular the lack of expertise and information on energy management. Proposals should primarily address the uptake of cross-cutting innovative technologies, such as energy efficient electric motor driven systems and steam/hot water generation, because these represent 75% of the potential savings in industry[49]. They should also consider total-site energy management schemes and system optimization methodologies to identify saving potentials, monitor progress, and design energy recovery and energy storage solutions. Proposals should put in place mechanisms to secure funding for energy efficiency investments and facilitate the continuation of the activities beyond the project lifetime**.** The use of renewable energies and waste heat recovery should be encouraged where it is cost-effective. Energy-intensive industries should be prioritised as they account for 70% of industrial energy use. Processes (e.g. drying) which represent a relatively high share of energy consumption in industry should also be considered where appropriate.

The following areas or their combination can also be funded:

- *Industrial systems efficiency benchmarking*: Devise methods and tools including ICT to compare and benchmark the energy performance of industrial systems and processes, and develop guidelines for tailored measures, in particular in energy-intensive industries. Such methods and tools should be based on existing standards where applicable.
- *Development of sector-specific technology pathways* towards 2050 to target the most energy-intensive industrial sectors
- *Energy management in SMEs and industry*: Improve the availability of skilled energy auditors and energy managers and the diffusion of energy management systems and best practices. Develop instruments to ensure the availability of updated, comprehensive and usable information on energy efficiency for industries. Address the issue of access to finance for the actual implementation of energy efficiency upgrades.
- *Human and organizational challenges*: Analysis of motivations, behaviour, perception, and barriers for the involved actors (from decision makers to employees) in the sector, and knowledge about organizational factors influencing energy efficiency.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: For capacity building projects, every million Euro of EU support is expected to increase the skills of hundreds of people working in the sector, resulting in savings of at least 25 GWh per year. All proposals should demonstrate a significant impact in terms of improved competitiveness; larger investments made by stakeholders in sustainable energy; primary energy savings; better implementation of energy-efficiency policies; number of policy makers influenced; number of people with increased skills; and/or number of people changing their behaviour.

Type of action: Coordination and Support Actions

[49] Although this might depend on the industrial sector. Electric motors, for example, might be embedded in process-specific machines.

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 17 – 2015: Driving energy innovation through large buyer groups

Specific challenge: Buyers of energy-related products can foster innovation by specifying energy performance levels that are higher than the best levels available on the market. The larger the group of buyers, the higher is the potential market and therefore the greater is the interest of manufacturers to meet more ambitious product specifications and to deliver new more energy efficient products. This market-transformation tool, commonly referred to as 'technology procurement', has been applied successfully to a few products such as copiers, electric motors and cold appliances but it could be applied to many more energy-related products if more buyers knew how to use it.

Scope: Actions whereby groups of buyers are established and together set higher-than-available performance levels which manufacturers of sustainable energy products are called to meet through product innovation. Products should represent a large potential for meeting the EU energy policy targets and have the potential for a large market demand. Buyer groups should be large and influential and/or composed of market leaders. Technical specifications should be ambitious but achievable without large investments in research and development and without distorting competition between manufacturers of products with the same level of energy performance. It is important that the technology procurement process is associated with communication activities to encourage manufacturers to participate and to make their results more visible.

Proposals addressing the procurement of products that already exist on the market should be submitted under topic EE8.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact: New energy-using or -producing products with at least 25% better performance than the best available products. Improved competitiveness of manufacturers. Creation of influential buyer groups able to transform the appliances market.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 18 2014/2015: New technologies for utilization of heat recovery in large industrial systems, considering the whole energy cycle from heat production to transformation, delivery and end use

Specific challenge: Heat recovery represents an important and unexplored opportunity for reducing energy use in industrial processes and in heating and cooling. Surplus heat is produced in large quantities in many industrial processes but remains largely unutilised due to various technological, market and regulatory barriers. The huge potential for utilising industrial surplus heat should be evaluated not only in the context of increased industrial efficiency, when this heat is recovered for further use in internal processes and for the space heating or cooling and warm water requirements of specific plants, but also in the context for

the decarbonisation and resource efficiency of the energy supply and the potential of significantly reducing primary energy consumption. Many of the potential solutions for recovering wasted energy can be replicated across several industrial sectors (e.g. food exothermic fermentations and heat dissipative technologies) or can be made adaptable to the specificities of the various industrial sectors. However, to exploit this potential, it is critical to increase the economic competitiveness of waste heat recovery and to develop ready-made practical solutions allowing its mainstreaming into the normal operational practices of industrial plants. To minimize the economic costs of heat recovery, and prepare its integration into plant processes and organisation, technologies, new equipment and adaptable integration solutions should be developed and tested in real-world conditions, through research and development of prototypes and industrial procedures. Equally considered in this call are heat recovery solutions that involve the upgrading of waste heat streams to process heat streams at higher temperature levels and heat recovery solutions that involve the conversion of waste heat streams to electric of mechanical energy.

Responses to this call will include proposals for demonstrating replicable technologies to recover and use process heat, which are adaptable to various types of industrial processes, or to recover heat from material flows from industrial processes (e.g. waste streams, by-products, intermediates) or from surplus heat in plant perimeters.

Scope: Research and demonstration on technologies, technical and operational approaches to recover waste heat from industrial processes, from material flows originating in industrial processes (e.g. waste streams, by-products, intermediates) or plant perimeters and to transform it into useful energy forms. Their integration will bring new and innovative solutions, systems, equipment and methodologies, organisation and operational practices and applications useful in several industrial sectors with the highest possible efficiency and quality.

To achieve this goal, a complete validation in real production conditions is preferred with demo sites where pilot systems will be tested in industrial facilities. Furthermore, the equipment developed will need to be adapted to market readiness level. Main subjects to be developed include:

- Technical, organisational and operational solutions addressing heat recovery for process internal use, plant internal use and plant external use, including adaptable solutions for process interface;
- Integration and optimization of the heat chain, including fuel substitution and efficient use of heat recovered from material flows originating in industrial processes (e.g. waste streams, by-products, intermediates);
- Evaluating waste heat recovery potentials internally and externally; planning, modelling, maximising and implementing heat recovery options in the plant energy balance and locally;
- Advanced control and operation techniques, automation and safety measures and protocols;
- Adaptable heat recovery modules for heat recovery in various process and from various sources, heat usage equipment, site and process design, operation organisations
- Advanced co-generation and trigeneration, energy cascading;
- Evaluation of and adaptable and replicable solutions for non-technological issues that hamper heat recovery and a larger use of recovered heat, such as process and business

organisation, operation and plant design, cooperation mechanisms, contractual and financial arrangements.

The aim is to achieve wide replicability and adaptability to the specificities of different sectors. It is expected to identify and combine the best technologies and most innovative solutions to reduce the total energy consumption and the operation costs of the plant. Methodologies and equipment should be subjected to a full scale validation by means of activities at demo sites. Proposals should show large replication potential.

The Commission considers that proposals requesting a contribution from the EU between EUR 3 and 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

The activities are expected to be implemented at TRL 4-7 (please see part G of the General Annexes).

Expected impact:

Design development and demonstration of economically viable solutions and technologies allowing recovering at least 15% of process heat leading to significant savings of energy compared with current practice.

Adaptable technical, organisational and operational modules leading to internal and external heat recovery

In parallel, perceived technical and business risks will be reduced leading to widespread uptake of the technical solutions with a high impact in several industrial sectors

The technologies developed should integrate well into the current industrial landscape ultimately leading to turn-key solutions with a pay-back time appropriate for industrial applications.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

D - Finance for sustainable energy

EE 19 – 2014/2015: Improving the financeability and attractiveness of sustainable energy investments

Specific challenge: Sub-optimal levels of investment in sustainable energy (in particular energy efficiency) are linked to a lack of trust of investors and financiers in the financial viability of sustainable energy measures, a lack of capacity in the public and private sectors to structure their projects,, split incentives (e.g. rental buildings), and a lack of large-scale successful flagship projects. New bank capital requirements[50] have decreased banks´ lending capacity and willingness to invest in the sustainable energy sector, which is still deemed by many to be risky.

[50] Basel III

The financial sector needs to be convinced to develop new financing products and practices that can respond to the constraints of the market.

Scope: Project proposals and activities should foster dialogue with and between financial market actors, standardisation and valuation entities, industry, public authorities, consumers and property owners. They should lead to the development of new business models and financial products, ensuring synergies between public and private finance.

- Proposals focusing on the development of frameworks for the standardisation and benchmarking of investments, such as labelling and standardisation of sustainable energy investments / portfolios, or valuation techniques integrating the 'green value' of buildings. Proposals integrated in a broader approach such as socially responsible investment or 'green buildings' should focus on the energy component.
- Proposals targeting public institutional investors (e.g. public or semi-public pension schemes) in order to increase the share of their funds invested in sustainable energy, or to develop specific funds or investment products.
- Proposals aiming to create EU and national sustainable energy financing platforms to organise dialogue with the relevant stakeholders and (among others) develop roadmaps, propose improvements in the legal frameworks and develop template documents and contracts leading to a better understanding of the market. Proposals must include a clear action plan to communicate across Europe towards potential replicators. The mechanism for knowledge sharing between countries will be established by the Commission services.

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

For all proposals, at least three legal entities must participate in the action; each of the three legal entities shall be established in a different eligible country; and all three legal entities shall be independent of each other. However, proposals aiming to create national sustainable energy financing platforms may be submitted by one entity.

Expected impact: Proposals should lead to reduced uncertainty as regards investments into sustainable energy in terms of increased investors' confidence and trust. Further, relevant projects should deliver innovative (and relevant) asset valuation methodologies agreed by the market and/or standardised descriptions of sustainable energy investments or measures/contracts and/or labelling schemes or harmonised frameworks for sustainable energy investments and/or National strategies for financing sustainable energy investments.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 20 – 2014/2015: Project development assistance for innovative bankable and aggregated sustainable energy investment schemes and projects

Specific challenge: Significant efforts are required to mobilise all relevant stakeholders, draw up investment inventories, develop feasibility studies, financial engineering instruments, and to address legal and procurement issues.

In this context, it is necessary to support project promoters through dedicated project development assistance facilities and capacity building and thus demonstrate the viability and positive impacts of aggregated, sustainable energy investments.

Scope: Project development assistance support will be provided to public and private project promoters such as public/private infrastructure operators, energy service companies (ESCOs), retail chains, cities and SMEs/industry, leading to innovative, bankable and aggregated sustainable energy investment schemes and projects of EUR 6 million – EUR 50 million. The support will be conditional on mobilized investments. The focus should be on existing public and private buildings, retail energy market infrastructure[51], commercial and logistic properties and sites. The major objective of supported projects will be to demonstrate the financial viability and sustainability of large-scale sustainable energy investments. Proposals must have an exemplary/showcase dimension, be replicable as well as deliver organisational innovation in the mobilisation of the investments and/or the financial approach. Innovation should be demonstrated taking into account the situation in the targeted country. Proposals must also include a clear action plan to communicate across Europe towards potential replicators. Further, supported projects will be required to participate in a monitoring and evaluation exercise run by the Commission (see the part on 'Other Actions' of this work programme, item B.1.1.14, for details).

Project development assistance activities implemented through this topic are complementary to the ELENA facility[52] implemented by the EIB (see 'other actions' B.1.4 for details).

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 and 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Development of credible pipeline of bankable aggregated projects and financial schemes and display of innovative financing solutions, leading to improved investor confidence. Every million Euro of Horizon 2020 support must trigger investments worth at least EUR 15 million.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

EE 21 – 2014/2015: Development and market roll-out of innovative energy services and financial schemes for sustainable energy

Specific challenge: The public sector has an exemplary role to play (in particular as regards the management of public assets) in addressing the market deficiencies[53] by setting a stable regulatory environment and by engaging in dialogue with the key stakeholders to improve the legal and financial framework and to put in place innovative financing schemes. However, the

[51] Retail energy market infrastructure includes, for example, smart grids, e-mobility charging points, public lighting networks, district heating networks, distributed renewables (such as on-site PV or micro-CHP) and demand response infrastructure

[52] www.eib.org/elena.

[53] Energy Efficiency Plan, 2011 (COM(2011)109 final) and Energy Efficiency Directive 2012/27/EU

deployed public funds have to be matched and multiplied by private sector capital, to address the financing gap.

The energy services industry together with the financial sector also need to develop and roll out new business models in order to better monetise future energy savings and tackle new sectors with the aim of reaching a potential turnover of some EUR 25 billion per year[54].

Scope:

- Proposals focusing on the roll-out of business models for innovative energy efficiency services (e.g. energy performance contracting), enabling to fully monetise the resulting energy savings.
- Proposals replicating successful innovative financing solutions already implemented across the EU as well as successful innovative energy services. Particular attention should be given to innovative solutions enabling aggregation, securitisation, project bundling, risk sharing, structuring of clearing houses, or developing new investment mechanisms (e.g. crowd-funding for sustainable energy).
- Proposals implementing large-scale capacity building for public authorities and SMEs to set-up or use innovative financing schemes for sustainable energy.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 and 1.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impacts: Every million Euro of EU support invested into the relevant activities is leading primary energy savings of at least 25 GWh/year. All proposals should demonstrate a significant impact in terms of larger investments made by stakeholders in sustainable energy; primary energy savings and/or generated renewable energy; better implementation of energy-efficiency policies; number of policy makers influenced; number of people with increased skills; and/or number of people changing their behaviour.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

[54] JRC 2007, EEP

CONDITIONS FOR THIS CALL

Opening dates[55]: 11 December 2013 for 2014 topics
30 September 2014 for 2015 topics EE2, EE18
10 December 2014 for 2015 topics except EE2 and EE18

Deadlines[56]:

Topic EE 1, 3, 18	20/03/2014[57]	
Topic EE 4, 5 7-16, 19-21	05/06/2014	
Topic EE 2, 18		04/02/2015[58]
Topic EE 5-7, 9-11, 13-17, 19-21		04/06/2015

Indicative budget:

- EUR 97.50 million from the 2014 budget
- EUR 100.71 million from the 2015 budget

	2014	2015	
Topics EE1 and EE2 (implemented under EeB PPP)	EUR 8 million	EUR 9 million	All single stage
Topic EE3 (implemented under EeB PPP)	EUR 5 million		
Topic EE 18 (implemented under SPIRE PPP)	EUR 8 million	EUR 10.56 million	All single stage
Topic EE 12, 13	EUR 8.5 million	EUR 5.35 million	All single stage

[55] The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening

[56] The Director-General responsible may delay these deadlines by up to two months.

[57] Cut-off date synchronised with the PPP topics of LEIT.

[58] Cut-off date synchronised with the PPP topics of LEIT.

Topic 6		EUR 8 million	Single stage
Topic EE11	EUR 8.5 million	EUR 8.5 million	Single stage
Topic EE 4, 5, 7-10, 14-17	EUR 34.5 million	EUR 59.3 million	All single stage
Topic EE 19-21	EUR 25 million		All single stage

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme, with the following exception:

2015: EE2, EE18	The threshold for the criteria Excellence and Impact will be 4. The overall threshold, applying to the sum of the three individual scores, will be 12. In case of equal overall scores in the ranked list, the priority order of proposals will be established in accordance with part H of the General Annexes, except that proposals will be ranked on the basis of individual scores for the Impact criterion before the Excellence criterion.

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

EE 5, EE 7, EE 8, EE 9, EE 10, EE 14, EE 15, EE 16, EE 17, EE 21	In addition, the following eligibility condition also applies: 1. at least three legal entities shall participate in an action; 2. each of the three legal entities shall be established in a different Member State or associated country; 3. all three legal entities shall be independent of each other within the meaning of Article 8 of the Rules for participation.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide[59] published on the Participant Portal.

[59] See: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/pse/h2020-guide-pse_en.pdf

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (single or first stage)	Information on the outcome of the evaluation (second stage)	Indicative date for the signing of grant agreements
All topics	Maximum 5 months from the final date for submission	N/A	Maximum 3 months from the date of information to applicants

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

CALL – COMPETITIVE LOW-CARBON ENERGY

H2020-LCE-2014/2015

One of the major challenges Europe will face in the coming decades is to make its energy system clean, secure and efficient, while ensuring EU industrial leadership in low-carbon energy technologies.

To help achieve such ambitious objectives, this call aims at developing and accelerating the time to market of affordable, cost-effective and resource-efficient technology solutions, to decarbonise the energy system in a sustainable way, to secure energy supply and to complete the energy internal market in line with the objectives of the Strategic Energy Technology Plan (SET-Plan) and of the related energy legislation (notably the Renewable Energy and CCS Directives) and energy policies designed to deliver the 2020 targets and to shape energy market frameworks for 2030 and 2050.

The scale and ambition of research and innovation needed requires enhanced cooperation between all stakeholders, including the EC, Member State administrations at national, regional and local level, the industry, the research community and society at large.

The EU is committed to reduce its greenhouse gas emissions 20% below 1990 levels by 2020, and intends to achieve a further reduction to 80-95% by 2050. In addition, renewables should cover 20% of the final energy consumption in 2020, and a large part of it by 2050, as identified in the Energy roadmap 2050. A reduction of at least 60% of GHGs by 2050 with respect to 1990 is required from the transport sector, while by 2030 the goal for transport will be to reduce GHG emissions to around 20% below their 2008 level.

Time is pressing. The solutions that will be developed and rolled out to the market in the next ten years will form the backbone of the energy system for many years ahead. Besides, the energy system needs to evolve to accommodate, among others, much higher levels of integration of renewable energy. It is essential that energy market stakeholders from both the public and private sectors should understand, accept and implement market up-take measures and procedures cost-effectively at national, regional and local levels. It is also important for society to understand the existing challenges and the implications of their possible solutions, so as to build confidence amongst investors and to ensure sustained public acceptance.

Proposals are invited against the following topics:

LCE 1 - 2014: New knowledge and technologies

Specific challenge: The technologies that will form the backbone of the energy system by 2030 and 2050 are still under development. Promising technologies for energy conversion are being developed at laboratory scale and need to be scaled up in order to demonstrate their potential value in our future energy system. These new technologies should provide more flexibility to the energy system and could help adapting to changing climatic conditions. New knowledge and more efficient and cost-competitive energy technologies, including their supply chains, are required for the long run. It is crucial that these new technologies show evidence of promising developments and do not represent a risk to society. Developments in sectors other than energy may provide ideas, experiences, technology contributions, knowledge, new approaches, innovative materials and skills that are of relevance to the energy sector. Cross-fertilisation could therefore offer mutually beneficial effects.

Scope: Activities will focus on accelerating the development of transformative energy technologies or enabling technologies that have reached TRL2 (please see part G of the General Annexes). The proposals should bring the proposed technology solutions from TRL 2 to TRL 3-4. A multidisciplinary approach bringing expertise from different scientific disciplines and/or different technological sectors (other than energy or within different areas of energy), in order to cross traditional boundaries is expected to bring forward these game-changer technologies. Innovative solutions and their supply chains such as materials and advanced manufacturing will also be supported as long as the application is clearly energy. New approaches to existing technologies with potential for significant improvements in the overall performance are also allowed. Activities should also focus on the early identification and clarification of potential problems (for example environmental, resource efficiency and safety issues), or concerns to society, and on the definition of a targeted and quantified development roadmap. Proposals should also indicate the current Manufacturing Readiness Level (MRL, see Appendix to this work programme) and the activities needed to keep the MRL aligned with the future advances in the TRL of the technology solution proposed to ensure the potential for exploitation.

Novel technology solutions for grid integration, storage – other than integral to the technology solution developed, fuel cells and hydrogen, energy efficiency and smart cities will not be supported under this topic but in the relevant parts of this work programme.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The results are expected to move the technology to higher TRL and to provide better scientific understanding and guidance enabling the players concerned (e.g. policy makers, regulatory authorities, industry, interest groups representing civil society) to frame strategic choices concerning future energy technologies and to integrate them in the future energy system. It is also expected that new, out-of-the-box or advanced innovative ideas will emerge that will provide new impetus to technology pathways, to new solutions, and to new contributions to the energy challenge in Europe or worldwide.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Renewable electricity and heating/cooling

Renewables should cover 20% of the final energy consumption in 2020 and a large part of the final energy consumption in Europe by 2050 as identified in the Energy Roadmap 2050. In this context, Europe has been witnessing a significant growth in the contribution of renewable energy sources to the overall energy mix, fostered through the Renewable Energy Directive, the internal market and the infrastructure package. In addition, the requirements of the EU Energy Performance of Buildings Directive (2010/31/EU) for future net zero-energy buildings is expected to be a major driver in opening the market for novel renewable energy applications in the residential sector. However, to sustain this growth and achieve the EU energy and climate change targets, and to ensure EU industrial leadership in low-carbon energy technologies, thereby contributing to growth and jobs in Europe, energy security and affordability, and global GHG emissions reduction, a number of important challenges need to be solved:

a) Technology performance needs to increase further and cost of equipment to decrease resulting in a decrease of the overall cost of renewable energy production in order for renewable energy to be attractive in the market and cover a large part of the final energy consumption by 2050.

b) Resource efficiency and environmental impacts need to be addressed taking a life-cycle perspective.

c) In order to increase the performance of the energy system as a whole, the particular renewable energy conversion device or renewable energy system will have to address a number of enhancements in delivering energy to the increasingly smarter grid.

d) Renewable energy technology supply chains and manufacturing processes able to compete globally need to be developed and consolidated.

Each market will establish its own, optimum mix of renewables solutions based on, inter alia, geography, geology, weather conditions, market acceptance, public support schemes, accessible industrial capabilities, and pricing conditions. The purpose of these topics is to assist in readying technologies, the associated business cases, and industry for these markets and consider all supply-side issues of relevance, including the evolving requirements of the grids.

Each area of renewables has its own challenges, potential, history, level of maturity, risks, and competitive situation that requires specific and considered approaches. SET-Plan priorities together with the derived technology roadmaps and implementation plans from the European Industrial Initiatives, the Strategic Research Agendas developed by the European Technology Platforms, and the foreseen Integrated Roadmap provide further guidance for the development of all of the renewables. The Energy Challenge will strive to provide an appropriate support to all new and existing renewable energy sources over the framework programme period, but not everything in every year.

A broad portfolio of activities covering different renewable energy technology areas will be supported taking into account potential as well as targeted efficiency, performance, and costs. In addition, elements of industrial competitiveness and security of supply will be considered.

In order to ensure that a balanced portfolio of activities covering different renewable energy technology areas will be supported, it is expected that the share of the EU contribution benefitting one single technology area[60] from topics LCE 2 and LCE 11 shall not exceed 25% of the total budget dedicated to these topics, while the share of the EU contribution benefitting one single technology area[61] in topics LCE 3 and LCE 12 shall not exceed 33% of the total budget dedicated to these topics.

The overall approach is to develop a pipeline of research and innovation funding from basic research (addressed in LCE 1), technology development (addressed in LCE 2), technology demonstration and supply-side market readiness (addressed in LCE 3), demand-side market up-take (LCE 4), as well as support for first market replication of renewable energy plants (B.2.11.).

[60] An area in this context is considered one of the following: 1) photovoltaics, 2) concentrated solar power, 3) wind energy, 4) ocean energy, 5) hydropower, 6) deep geothermal energy, 7) renewable heating and cooling, 8) biofuels, 9) alternative fuels.

[61] An area in this context is considered one of the following: 1) photovoltaics, 2) concentrated solar power, 3) wind energy, 4) ocean energy, 5) renewable heating and cooling, 6) biofuels.

LCE 2 – 2014/2015: Developing the next generation technologies of renewable electricity and heating/cooling

Specific challenge: Complementing the global challenges outlined above, the following technology-specific challenges have to be addressed in 2014:

a. **Photovoltaics**: *Developing next generation high performance PV cells and modules* – Highly efficient, novel PV concepts, need to be developed based e.g. on advanced materials and processes, and/or innovative approaches to light management and solar spectrum matching/modification. The challenge is to bring practical performance close to theoretical limits.

b. **Concentrated Solar Power** (CSP): *Making CSP plants more cost competitive* – Increasing the efficiency and reducing the construction, operation and maintenance costs of CSP plants are the main challenges. Innovative solutions and concepts are necessary in order to increase plant performance and reduce cost through improved components, improved plant control and operation, and innovative plant configurations.

c. **Wind energy**: *Develop control strategies and innovative substructure concepts* - There is a need for i) control strategies and systems for new and/or large rotors and wind farms (on- and offshore); ii) new innovative substructure concepts, including floating platforms, to reduce production, installation and O&M costs for water depths of more than 50m.

d. **Ocean energy** [62]: *Develop emerging designs and components* – Innovative designs and components are needed to ensure efficient and effective long-term cost reduction as well as to achieve high levels of reliability and survivability for at least 20 years in harsh conditions.

e. **Hydropower**: *Boosting peak power through sustainable hydropower* – Existing hydropower stations need refurbishment and this opportunity should be used to modernise the power plants. Therefore, innovative and improved turbines or generators and related main equipment having a more robust design allowing operation in a wider range of heads and loads to increase power output, improve efficiency and dynamics should be developed.

f. **Deep geothermal energy**: *Development of new drilling technologies and concepts for geothermal energy* – New drilling technologies and concepts are necessary to increase the number of economically viable geothermal resources, including in hard rock and high temperature/pressure conditions, and have a demonstrably smaller environmental footprint by comparison to existing drilling methodologies. Cross-fertilisation with hydrothermal oil and gas technologies and operations shall be explored.

g. **Renewable Heating and Cooling**:

   i. *Solar cooling systems*[63] – Solar cooling systems reliability remains uncertain causing high installation and operation costs and hampering acceptance.

[62] Marine energy is also addressed under the cross-cutting 'Blue Growth' focus area led by Challenge 2 (Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy), in particular under the area 'New Offshore Challenges'.

[63] Projects selected under this heading might be considered contributing to the objectives of the SPIRE PPP depending on the centre of their activities.

Innovative solutions are needed to reduce the complexity of the installation, to improve components performance and reliability, and to ensure cost reductions.

ii. *Improving efficiency of biomass CHP systems while widening the feedstock base*[64] – Micro and small-scale CHP (0.5-250 kW and 0.25-1 MW input power respectively) have a high potential for heat and electricity production for decentralized applications. Cost effective, robust and environmentally friendly micro and small-scale CHP systems with high thermal and electrical efficiency need to be developed allowing the use of solid, liquid or gaseous sustainable biomass feedstock, such as agricultural and forest residues, upgraded solid or liquid bioenergy carriers with higher energy density, industrial by-products and biogas/biomethane.

For 2015, the following technology-specific challenges have to be addressed:

a. **Photovoltaics**: *Developing very low-cost PV cells and modules* – Proposals are requested to develop very low-cost but highly performing concepts either reducing constraints on the demand on natural resources (low material use and dependence on rare materials) or using low cost materials, while having efficient manufacturing processes of cells and of modules and improving device performance and durability for competitive energy costs. Proposals are also requested to explore innovative applications.

b. **Concentrated Solar Power** (CSP): *Improving the environmental profile of the CSP technology* – CSP plants rely on water for cleaning the reflecting surfaces, for power generation and for cooling. Innovative solutions are needed to significantly reduce or replace the water consumption while maintaining the overall efficiency of the CSP plants, and limiting their environmental impact.

c. **Wind energy**: *Substantially reduce the costs of wind energy* - There is a need for innovative integrated dedicated offshore systems (e.g. with a significant lower mass per unit power installed) to reduce production, installation and O&M costs for water depths of more than 50m.

d. **Ocean energy** [65]: *Ensure efficiency and effective long term cost reduction and high levels of reliability and survivability* - There is a need to gather experience in open sea operating conditions, structural and power performance and operating data of emerging full scale wave and tidal energy convertors and components in single and/or multiple device configuration. For the overall development cycle a better resource assessment is needed as well.

e. **Hydropower**: *Increasing flexibility of hydropower* – Hydropower is still amongst the largest sources of renewable energy. The challenge is however to make hydropower in the >100MW range available in a time as short as possible. New technologies need to be developed to increase ramping rates and to allow start-stop-cycles to reach up to 30 times per day depending on head and volume, while lifetime of components and

[64] Biomass supply is addressed in LCE 11 and LCE 12. Proposers are advised also to consult the work programme of the Bio-Based Industries JTI, which is expected to be published mid-2014.

[65] Marine energy is also addressed under the cross-cutting 'Blue Growth' focus area led by Challenge 2 (Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy), in particular under the area 'New Offshore Challenges'.

respective life time prediction methods under heavy-duty operating conditions are considerably improved while avoiding adverse effects on downstream water courses.

f. **Deep geothermal energy**: *Development of new technologies and concepts for geothermal energy* - New technologies and concepts for geothermal energy are necessary to increase the number of economically viable geothermal resources, including in hard rock and high temperature/pressure conditions, and to have a demonstrably smaller environmental footprint to existing technologies. Cross-fertilisation with hydrothermal oil and gas technologies and operations shall be explored.

g. **Renewable Heating and Cooling**:

i. *Solar heating for industrial processes*[66]– The potential benefit of using solar heat above 200°C in industrial processes has been already acknowledged. Innovative concepts, processes and technologies for these applications are needed which can be easily integrated into existing industrial plants and processes.

ii. *Improving efficiency of low emission biomass heating systems while widening the feedstock base*[67] – Current residential-scale boilers can combust only one type of feedstock (e.g. wood chips, wood pellets). New flexible and robust residential-scale low emission boilers for heat applications need to be developed using a wider range of sustainable feedstock (including mixtures) with high ash content such as agricultural and forest residues, upgraded solid or liquid bioenergy carriers with higher energy density and industrial by-products.

<u>*Scope:*</u> Proposals should address one or more of the technology-specific challenges described above, including between renewables areas, where new, innovative ideas are welcome. They should bring technology solutions to a higher TRL, from TRL 3-4 to 4-5 (please see part G of the General Annexes).

Technical issues, synergies between technologies, regional approaches, socio-economic and environmental aspects from a life-cycle perspective (including public acceptance, business cases, pre-normative and legal issues, pollution and recycling) need to be appropriately addressed where relevant.

Environment, health and safety issues shall be considered in all developments and appropriately addressed.

An important element for the entire area of renewables will be the need for an increased understanding of risks in each area (whether technological, in business processes, for particular business cases, or otherwise), risk ownership, and possible risk mitigation. Proposals shall therefore include appropriate work packages on this matter.

Proposals shall explicitly address performance and cost targets together with relevant key performance indicators, expected impacts, as well as provide for development of explicit exploitation plans. Proposals should also indicate the current Manufacturing Readiness Level (MRL, see Appendix to this work programme) and the activities needed to keep the MRL

[66] Projects selected under this heading might be considered contributing to the objectives of the SPIRE PPP depending on the centre of their activities.

[67] Biomass supply is addressed in LCE 11 and LCE 12. Proposers are advised also to consult the work programme of the Bio-Based Industries JTI, which is expected to be published mid-2014.

aligned with the advances in the TRL that will be undertaken in the proposal to ensure the potential for exploitation.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Technological innovation related to the integration of renewable generation in the industrial and residential sectors can be addressed in the Energy Efficiency call or Smart Cities and Communities call. Improving the energy efficiency of district heating and cooling networks is addressed in the Energy Efficiency call.

Expected impact: The proposals are expected to have one or more of the general impacts listed below:

- Significantly increased technology performance.
- Reducing life-cycle environmental impact.
- Improving EU energy security.
- Making variable renewable electricity generation more predictable and grid friendly, thereby allowing larger amounts of variable output renewable sources in the grid.
- Increasing the attractiveness of renewable heating and cooling technologies by improving cost-competitiveness, reducing complexity and increasing reliability.
- Bringing cohesion, coherence and strategy in the development of new renewable energy technologies.
- Nurturing the development of the industrial capacity to produce components and systems and opening of new opportunities.
- Strengthening the European industrial technology base, thereby creating growth and jobs in Europe.
- Reducing renewable energy technologies installation time and costs.
- Increasing the reliability and lifetime while decreasing operation and maintenance costs.
- Contributing to solving the global climate and energy challenges.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 3 – 2014/2015: Demonstration of renewable electricity and heating/cooling technologies

Specific challenge: Complementing the global challenges outlined above, the following technology-specific challenges have to be addressed in 2014:

a. **Photovoltaics**: *Accelerating the development of the EU Inorganic Thin-Film (TF) industry* – Inorganic TF technologies offer new application possibilities and additional benefits, such as flexibility, low weight, partial transparency, better low-irradiance performance, short energy pay-back time, and integrated manufacturing. To fully benefit from these, however, TF technologies need to achieve module efficiencies

higher than 12-16% (depending on the technology) while developing low-cost, high-volume manufacturing routes.

b. **Concentrated Solar Power** (CSP): *Improving the flexibility and predictability of CSP generation* – The major asset of the CSP technology is to be able to produce predictable power, which provides the flexibility to adapt the demand from the grid. Only a few CSP technologies allowing this predictability have reached commercial maturity. The challenge is to demonstrate solutions that can significantly improve the dispatchability of CSP plants.

c. **Wind energy**: *Demonstrating and testing of new nacelle and rotor prototypes* - There is a need for demonstration and testing of new nacelle and rotor prototypes with a significant lower mass and material intensity and applicable to several types of large-scale wind turbines.

d. **Ocean energy**[68]: *Demonstration of ocean energy technologies* - Demonstrate advanced full scale devices in real world conditions in order to gain further understanding and certainty over installation, operations and decommissioning costs, as well as of high levels of reliability and survivability.

e. **Renewable Heating and Cooling**

   i. *Shallow geothermal energy: Improved vertical borehole drilling technologies to enhance safety and reduce costs* – Shallow geothermal energy systems are ideally suited to meet the ambitious energy saving targets of the EU. They can provide heating and/or cooling or both. Further improvement of the efficiency of shallow geothermal systems and reduction of installation costs are needed to increase deployment of these geothermal systems for the heating & cooling market.

In 2015, the following technology-specific challenges have to be addressed:

a. **Photovoltaics**: *PV integrated in the built environment* – Building integrated photovoltaic (BIPV) systems will become essential elements in future net zero energy buildings provided a number of challenges are solved, e.g. integration with other functional building components, flexibility in system design, architectural and aesthetic considerations and standardisation, smart interaction with the grid, extension of the lifetime of system components, and cost reduction.

b. **Wind energy**: *Demonstrating innovative substructure and floating concepts* - There is a need for i) demonstration of innovative bottom-fixed substructure concepts for water depths of 30 to 50m capable of reducing costs; and ii) demonstration of innovative floating wind turbine concepts.

c. **Ocean energy**[69]: *Demonstration of ocean energy technologies* - Demonstrate advanced full scale devices in real world conditions in order to gain further understanding and certainty over installation, operations and decommissioning costs, as well as of high levels of reliability and survivability.

[68] Marine energy is also addressed under the cross-cutting 'Blue Growth' focus area led by Challenge 2 (Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy), in particular under the area 'New Offshore Challenges'.

[69] Marine energy is also addressed under the cross-cutting 'Blue Growth' focus area led by Challenge 2 (Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy), in particular under the area 'New Offshore Challenges'.

d. **Deep geothermal energy**: *Testing of enhanced geothermal systems in different geological environments* – Widespread deployment of enhanced geothermal systems (EGS) needs new and improved models and innovative solutions are needed to routinely create EGS reservoirs with sufficient permeability, fracture orientation and spacing. Cross-fertilisation with hydrothermal fields and cross-fertilisation with tight oil and gas fields can be explored.

e. **Renewable Heating and Cooling**:

   i. *Demonstration of solar technologies for residential and non-residential buildings* - The use of solar energy for the production of domestic hot water and for space heating needs to increase to make full use of this renewable energy source. Innovative and cost-effective solutions in terms of components and system design and with a higher share of heating supplied by solar energy need to be demonstrated.

Scope: The proposals should address one or more of the specific technology challenges described above bringing the proposed technology solutions to a higher TRL level, aiming at "demonstration" of these solutions, accompanied, where appropriate, by supporting research activities and activities targeting market uptake. The proposals should bring the proposed technology solutions from TRL 5-6 to TRL 6-7 (please see part G of the General Annexes).

Technical issues, synergies between technologies, regional approaches, socio-economic and environmental aspects from a life-cycle perspective (including public acceptance, business cases, pre-normative and legal issues, pollution and recycling) need to be appropriately addressed where relevant.

Environment, health and safety issues should be considered in all demonstrations and appropriately addressed.

An important element for the entire area of renewables will be the need for an increased understanding of risks in each area (whether technological, in business processes, for particular business cases, or otherwise), risk ownership, and possible risk mitigation. Proposals shall therefore include appropriate work packages on this matter.

Proposals shall explicitly address performance and cost targets together with relevant key performance indicators and expected impacts. Industrial involvement in the consortia and explicit exploitation plans are a prerequisite. All proposals will have to include a work package on 'the business case' of the technology solution being addressed. This work package has to demonstrate the business case of the technology solution and has to identify potential issues of public acceptance, market and regulatory barriers including standardisation needs, financing and other supply-side issues of relevance. It should also address, where appropriate, synergies between technologies (including those for storage), regional approaches and other socio-economic and environmental aspects from a life-cycle perspective (e.g. pollution and recycling). The current Manufacturing Readiness Level (MRL, see Appendix to this work programme) and the activities needed to keep the MRL aligned with the advances in the TRL that will be undertaken in the proposal should also be indicated to ensure the potential for exploitation.

Opening the project's test sites, pilot and demonstration facilities, or research infrastructures for practice oriented education, training or knowledge exchange is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 20 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Technological innovation related to the integration of renewable generation in the industrial and residential sectors can be addressed in the Energy Efficiency call or Smart Cities and Communities call. Improving the energy efficiency of district heating and cooling networks is addressed in the Energy Efficiency call.

Expected impact: The proposals are expected to have one or more of the general impacts listed below:

- Bringing costs of renewable energy down by increasing technology performance, decreasing costs of production, installation time and costs, decreasing of operation and maintenance costs, and increasing reliability and lifetime.
- Reducing life-cycle environmental impact.
- Improving EU energy security.
- Making variable renewable electricity generation more predictable and grid friendly, thereby allowing larger amounts of variable output renewable sources in the grid.
- Increasing the attractiveness of renewable heating and cooling technologies by improving cost-competitiveness, reducing complexity and increasing reliability.
- Nurturing the development of the industrial capacity to produce components and systems and opening of new opportunities.
- Strengthening the European industrial technology base, thereby creating growth and jobs in Europe.
- Contributing to solving the global climate and energy challenges.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 4 – 2014/2015: Market uptake of existing and emerging renewable electricity, heating and cooling technologies[70]

Specific challenge: The legal framework established by the Renewable Energy Directive (2009/28/EC, 'RES Directive')) sets binding targets for all Member States to contribute to the overall 20% target for renewable energy in the EU final energy consumption by 2020, and the 'Energy Roadmap 2050' shows that renewables will have to play a much greater role in all future scenarios beyond 2020. As well as putting in place legal obligations, the RES Directive also makes recommendations for specific actions to be taken by the public and private sectors across the EU. However, in many areas, it leaves open the ways in which Member States may implement policies and support measures aiming to increase use of renewable energy at national, regional and local level.

Consequently, although some Member States have already made good progress in incentivising renewable energy, there are still many opportunities for common learning and sharing of best practices on the cost-effective mobilisation of new investments in renewable energy across the EU. Moreover, such investments contribute to the European 2020 strategy for growth, job creation, industrial innovation, and technological leadership as well as

[70] Market uptake measures for all types of bioenergy are dealt with under LCE 14.

reducing emissions, improving the security of energy supplies and reducing EU's energy import dependence.

Since the adoption of RES Directive in 2009, most Member States have experienced significant growth in renewable energy consumption. However, currently, we are seeing a deceleration of this growth, partly due to the economic crisis, but also because there are a number of market uptake barriers that remain or persist for both established and innovative renewable energy technologies.

Scope: To ensure the level of growth needed to deliver the EU targets for renewable energy, and to create the appropriate business environment for EU industrial leadership in low-carbon energy technologies, a number of important market-uptake challenges still need to be addressed, notably:

- Ensuring sustained public acceptance of renewable energy projects and renewable energy overall, while taking into account the implications of the substantial increase in RES share in the final energy consumption;
- Ensuring speedy and user friendly permitting procedures;
- Implementing renewable energy policies, codes and legislations at EU, national, regional and local levels in a coordinated manner using best practice examples with significant replication potential;
- Capacity building and contributing to the further development of renewable energy policy, legislation and regulation, and informing the debate on post-2020 horizons;
- Capacity building and facilitating the deployment of improved business models and innovative financing schemes for mobilising investments in innovative and established renewable energy systems and services.

Proposals should address one or several of the challenges mentioned above for technologies and systems which are at TRL 7-9 (please see part G of the General Annexes). Regional specificities, socio-economic, spatial and environmental aspects from a life-cycle perspective shall be considered. For all actions, the consortia should involve and/or engage relevant stakeholders and market actors who are committed to adopting/implementing the results.

For RES electricity, actions which address exchanges of information or cooperation among different actors (e.g. on future business models for aggregators), must demonstrate that they are promoting best practices. Actions which are developing new recommendations or which are contributing to the debate on costs and benefits of specific options must provide quantified indicators of the market impacts of future policy options.

For RES heating and cooling, proposals must demonstrate that they are adopting an integrated approach which fully respects the requirements and recommendations given in the energy efficiency and EPBD directives. Actions aimed at promoting the use of geothermal, bio and/or solar heating for individual, industrial or district heating applications must involve / engage with the responsible policy makers and regulators as well as industry and potential financing bodies, and must include relevant capacity building and adoption of best practices.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 to 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Increasing the share of renewable electricity, heating and cooling in the final energy consumption. Reductions in the time taken to authorise the construction of renewable energy plants and related infrastructure. Substantial and measurable reductions in

the transaction costs for project developers as well as for the permitting authorities, whilst still fully addressing the needs for environmental impact assessments and public acceptance. Development of better policy, regulatory, market support and financing frameworks, including at regional and local level.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Modernising the European electricity grid

The fast growing share of variable and/or decentralised renewable generation requires a fast adaptation of the grid, both on a European and local level.

The new grid needs to be more flexible, increase capacity, include demand response and active user involvement (managing the complex interactions among millions of active consumers and micro-generation) while minimizing environmental impacts. The new integrated energy market will be achieved through the integration of balancing opportunities offered by generation, demand response and storage at different levels and scales.

Particular technology challenges are posed by the urgently needed development of offshore grids in the Northern Seas and electricity highways, by the integration of a fast increase of variable RES supply and by stronger variations in the demand.

New business models will be needed to develop new market architectures and rules and provide the information, services, and privacy guarantees. They should support open markets for energy products and services and activate the participation of consumers and new market actors (e.g. aggregators) while ensuring a fair sharing of the newly generated benefits, including to the citizens.

SET-Plan priorities together with the derived technology roadmap from the European Industrial Grid Initiative and the foreseen Integrated Roadmap provide further guidance for the development of the potential of grid technologies and their integration.

The integration of the latest generation of information and communication technologies and services is expected to play a key role in planning, optimisation, monitoring, control, etc. R&D on new ICT components and generic ICT tools should be covered through the 'Leadership in Enabling and Industrial Technologies' (LEIT) part of the programme.

Selected proposals of LCE6 to LCE10 will be requested to cooperate through regular common workshops, exchange of non-confidential reports, etc.

LCE 5 – 2015: Innovation and technologies for the deployment of meshed off-shore grids

Specific challenge: Regulation 347/2013 on guidelines for trans-European energy infrastructure identifies the deployment of several transnational electricity grids among the energy infrastructure priority corridors. Its design, development and deployment include technical, financial, management, regulatory and policy viewpoints.

The first commercial HVDC projects have implemented point-to-point connections, point-to-point and multi-terminal deep off-shore grids. Meshed off-shore grids linking several off-shore wind parks with on-shore grids in different countries and with other available generation resources are urgently required to provide additional flexibility, efficiency, security and market access to off-shore wind resources. Its deployment is delayed through a number of barriers: lack of agreement among operators and manufacturers on architectures, control structures and interfaces to ensure interoperability and multi-vendor compatibility of equipment, lack of market rules and revenue streams allowing the build-up of a suitable financial package (combining, innovation actions with European debt instruments and financing coming from other sources, national, regional or local), permitting and environmental compatibility, and operation and management of these grids from legal, technical and market point of view.

In order to achieve full interoperability and coherent market rules at European Level it is encouraged having a wide representation of the Grid stakeholders and operators addressing a complete European approach.

Scope: The proposals should prepare the first phase for deployment of innovative components of interoperable meshed off-shore HVDC network technologies, services and tools architectures. It is expected that the projects will cover TRL6 or 7, bringing them to TRL 8, with a path to TRL9 in follow-up projects (please see part G of the General Annexes).

Initial technology elements leading to meshed off-shore grids shall first be trialled at full scale as additions to planned off-shore projects (cables and hubs). Appropriate mechanisms to cover risks and potential losses to the commercial operation of these underlying projects shall be investigated.

The proposals should be based on the results of the existing projects funded under the Seventh Framework Programme dealing with the development of innovative components of interoperable HVDC network technologies, services and tools architectures or be closely synchronised through active cooperation in order to ensure a seamless transition without gaps in time or technology. The proposers shall deliver in the first phase a detailed study considering the economic viability and then develop a detailed deployment plan for future projects not only in the Northern seas, but in all transnational electricity grids as defined in the regulation 347/2013 on guidelines for trans-European energy infrastructure.

The proposals should include also a part to develop the appropriate policy, regulatory and financial framework. The project should include a focused and short part to seek agreement among network operators and major equipment suppliers on a technical architecture and on a set of multi-vendor interoperable technologies.

The proposals should further elaborate on finished and running projects on the economics of meshed HVDC off-shore grids through reduction of the typical uncertainties of such economic studies and define possible routes for a reduction of costs and risks.

The project(s) should be seen as a "phase one" project; therefore it should include a compulsory plan that clearly defines all the actions needed to lead towards "phase two" leading to full commercial operation ideally before 2020. Consortia should include a limited number of key partners from manufacturers, TSOs, and renewables operators, and should cooperate also with relevant regulators and authorities.

The Commission considers that proposals requesting a contribution from the EU of between EUR 30 to 40 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The proposals are expected to cover all the general impacts listed below:

- Accelerating the deployment of meshed HVDC off-shore grids, with particular emphasis on Northern Seas partner countries, before 2020.
- Ensuring that the technology will be ready for deployment in other regions in Europe for all transnational corridors defined in the trans-European energy infrastructure regulation, or be compatible (plug-and-play) with other upcoming technologies (e.g. ocean energy, solar energy, geothermal energy, etc. as soon as these technologies are ready for similar capacities).
- Ensuring plug-and-play compatibility of all relevant equipment of the key suppliers.
- Preparing for corresponding priority infrastructure projects identified under the trans-European energy infrastructure regulation.

- Facilitating the efficient connection of off-shore wind resources to on-shore loads and with other available generation resources for balancing, covering the main Northern Seas partner countries.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 6 – 2015: Transmission grid and wholesale market

Specific challenge: Demonstration and R&D are needed in interoperable technologies, services, tools, system integration, network synchronisation, co-ordination schemes, business models, cost-benefit analyses, market architectures and rules and regulatory regimes to plan, build, monitor, control and safely operate end-to-end networks across national borders. The integration of renewable energy and emergence of new services and uses of electricity will require major upgrades and reinforcements of the pan-European power system. A realistic implementation of the "smart grids" concept across national borders becomes a requirement to continue the safe operation of the grid.

Scope: Integrating and validating solutions to grid challenges, concentrating on field demonstration of system integration, up-scaling at industrial scale and supporting R&D. Preparing first replication of the solutions in different contexts and/or countries. Appropriate market models, business cases, user and general public acceptance, regulatory, market up-take (e.g. regulatory issues, capacity building and access to finance), social, environmental and resource efficiency aspects should be included. Opening up demonstration facilities for targeted practice-oriented education and training is encouraged. LCA and economic assessments should be refined

The priorities for Innovation Actions are focussed on:

1. Demonstration and validation of emerging power, transmission and ICT technologies, including e.g. network synchronisation using European GNSS (global navigation satellite system) to increase transmission network flexibility, capacity and operational security (including resilience against disasters).
2. Demonstration of new approaches to the wholesale electricity markets facilitating the participation of variable renewable energy sources.
3. Demonstration of integration of active demand response and of variable renewable generation connected at distribution level to operations at distribution and transmission levels.

Market-uptake studies need to be integrated into the demonstration proposals. Potential risk of lock-in effects of early deployment should be taken into account.

Societal research needs to be integrated into the market uptake part. Societal research shall address concerns about data security, public acceptance and ensure that citizens see the clear financial benefit.

Particular priority elements for Research & Innovation Actions include:

- Joint modelling and simulation of power systems and the underlying ICT infrastructure.
- Interaction between the TSO and DSO, information exchange of RES availability, operational parameters and constraints between transmission and distribution systems.

- Methods and tools for emerging transmission technologies to increase transmission network flexibility, capacity and operational security as well as grid asset maintenance and management to mitigate the costs of grid reinforcement, operation, maintenance, replacement, upgrade and development in the presence of very large share of renewable generation, also taking demand response into account.
- Advanced architectures and tools for pan-European markets for ancillary services and balancing; Integration of advanced power electronics technologies into subsystems that enhance available network capacity and flexibility.

Selected proposals will be requested to cooperate through regular common workshops, exchange of non-confidential reports, etc. Proposals should address these activities in the description of the work. IPR issues will be fully respected.

The Commission considers that proposals requesting a contribution from the EU of between EUR 12 to 15 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The proposals are expected to have one or more of the general impacts listed below:

- Opening up the deployment of solutions for improving flexibility and available capacity of European electricity grids at high voltage levels to integrate renewable and other new electricity producers and users, while managing power flows or balancing while maintaining or enhancing service quality, reliability and security of the power system.
- Demonstrating advanced grid technologies and system architectures and further developing the competitiveness of European industries.
- Devising new market architectures and business models, disseminating effective architectures and models across Europe, demonstrating the infrastructures, processes and information management to develop the active participation of demand, and new players (such as aggregators) in energy markets.
- Mitigating capital and operational costs of the grid modernisation required for the energy transition, and minimising environmental impact.
- Better using scarce resources by maximising the up-scaling and replication of lessons learned from demonstration projects in Europe and by sharing of knowledge and practices.
- Better coordination among activities promoted by Member States and at European level.

Type of action: Innovation Actions, Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 7 – 2014: Distribution grid and retail market

Specific challenge: Demonstration in real user environments are needed in system integration, services, tools, network synchronisation, co-ordination schemes, business models, cost-benefit analyses, market architectures and rules and in regulatory regimes to plan, build, monitor,

control and safely operate end-to-end networks which have increased operational flexibility that allow for a cost-effective integration of intermittent distributed generation and active demand. Smart grids and smart metering require the support from an ICT infrastructure with stringent requirements on e.g. availability and low latency. Different options are possible, in particular whether to exploit as much as possible the telecommunication infrastructure and its future developments, or whether to develop specific telecommunication infrastructure to cover parts of the architecture. In both cases, important investments need to be made and cost-effectiveness should be one of the main drivers. There is no conclusive analysis of the various options and whether dual-use of telecommunication networks would allow savings for consumers versus deploying a parallel infrastructure. The challenge also covers synergies with other types of energy networks (gas, and heating or cooling).

Interoperability is critical for a robust and sustainable grid architecture and needs to be demonstrated (e.g. through standards, protocols, regulatory framework).

Scope: Integrating and validating solutions to grid challenges concentrating on field demonstration of system integration. Preparing first replication of the solutions in different contexts and/or cities integrating retail markets, distributed renewable energy, demand response, new business models, advanced ICT. Appropriate market models, business cases, user and general public engagement, regulatory, market up-take, social, environmental and resource efficiency aspects should be included. Opening up demonstration facilities for targeted practice-oriented education and training is encouraged. Life Cycle Analysis and economic assessments should be refined.

Preparing the development of the next generation ICT infrastructure for smart metering and smart grids, analysing capital costs, operational costs, business models and benefits of different options. The analysis has to be done in the context of the present regulatory frameworks (both for energy and telecommunications) in the Member States.

The Innovation Actions should focus on:

1. Development of ICT tools, and integration and innovative use of ICT for smart grid services to be provided in an open and competitive electricity market. This includes services for next generation distributed renewable energy integration and demand response systems. Particular attention is to be given to new market entrants, including ESCOs, aggregators, etc. and to validation of new business models. The Commission considers that a contribution from the EU in the range of 2.5 to 3 million Euro per proposal would allow this specific challenge to be addressed appropriately. It is expected that 3 to 4 proposals could be supported. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.
2. Demonstration of innovative solutions (innovative integration of existing technologies into the system) offering services to all actors in the retail markets of the electricity system. The projects should improve medium and low voltage network monitoring and control (intelligent active control, of active/reactive power flows, fault and outage management, automatic control concepts, network synchronisation using for example European GNSS (Galileo) active loads and eventually distributed storage integration) in a secure and economic way. The projects should validate innovative models for local dispatching of distributed generation, and methods and tools for grid asset maintenance and management to mitigate the costs of grid maintenance, replacement and development in the presence of a very large share of renewable generation. The projects should validate distributed renewable energy and demand response systems offering advanced services to all actors in the retail markets of the electricity system (including ESCOs, aggregators, etc.) in order to ensure that all consumers (industry and citizens) will benefit from cheaper prices, more secure, stable grids and low

carbon electricity supply. The demand response should be demonstrated in action in the real world, with longer term monitoring in order to validate these new business models. The Commission considers that a contribution from the EU in the range of 9 to 12 million Euro per proposal would allow this specific challenge to be addressed appropriately. It is expected that 3 to 4 proposal could be supported. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

3. Deployment of a flexible architecture for smart metering systems decoupling the metrology part from user functionalities and allowing for smart grid functionalities to be added during system exploitation in a plug and play way. Connection to building management systems (BMS), intelligent appliances, local generation and storage shall also be included. The solutions have to be such that the costs for a prosumer (mono-phased meter + end user functionalities + service provisioning) shall not exceed 100 € for large quantities (such as 10.000 orders). The Commission considers that a contribution from the EU in the range of 2.5 to 3 million Euro per proposal would allow this specific challenge to be addressed appropriately. It is expected that 3 to 5 proposal could be supported. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

All proposals addressing 1, 2 and 3 shall include a part of market uptake measures accelerating the implementation of new policies, market rules, legislation and/or incentives schemes, various tariffs, which shall reduce the overall costs of supplying renewable electricity to end users. Societal research needs to be integrated into the market uptake part, addressing concerns about data security, public acceptance and ensure that citizens see the clear financial benefit.

The Coordination and Support Action: Support from an appropriate ICT infrastructure with stringent requirements on e.g. availability and low latency is essential for large scale deployment of smart grid and smart metering. Different options are possible, in particular whether to exploit as much as possible the telecommunication infrastructure and its future developments, or whether to develop specific telecommunication infrastructure to cover parts of the architecture. In both cases, important investments need to be made. There is however no conclusive analysis on the various options and on whether dual-use of telecommunication networks would allow savings for consumers versus deploying a parallel infrastructure. In this context, the Coordination and Support Action[71] focusses on the cost benefit analysis of deployment options for smart grids ICT infrastructure. Elements to be considered are reduction of both capital and operational costs, including also innovative business models and benefits for different actors. The analysis should be done in the context of the present regulatory frameworks (both for energy and telecommunications) in the EU Member States and should examine possible distortions in current compensations and incentives towards the different options. The Commission considers that one proposal with a contribution from the EU in the range of 1 million Euro would allow this specific challenge to be addressed appropriately.

Expected impact: The proposals are expected to:

- Demonstrate active demand response in real world environments in commercial operation with active involvement of consumers, aggregators, ESCOs, etc. based on new business models

[71] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agency and will be implemented by the Commission services.

- Deliver innovative ICT-based services and tools for even more advanced and high performance solutions
- Substantially increase the share of micro-generation and renewable generation within the local grid.
- Opening up new markets for advanced grid technologies and system architectures to foster European industries' competitiveness.
- Active participation of prosumers, and new players in energy markets.
- Mitigating capital and operational costs of the grid modernisation required for the energy transition, and minimising environmental impact, thus ensuring lower electricity prices for all. New benefits shall be generated; these benefits be shared in a fair way between all actors, from aggregators to industrial end-users and citizens.
- Better using scarce resources by maximising the up-scaling and replication of lessons learned from demonstration projects in different Member States and by sharing of knowledge and practices.
- Accelerating the implementation of new policies, market rules, legislation and/or incentives schemes for smart grids infrastructure
- Accelerating the deployment of innovations in the electricity grids to lower the cost of smart metering and smart grids deployment and to respond in a timely way to the challenges facing grid operators and users in view of the agreed 2020 objectives.
- Enabling an open market for services deployment.
- Developing generic techniques and *b*etter using scarce resources by maximising the up-scaling and replication of lessons learned from demonstration projects in different Member States and by sharing of knowledge and practices.

Type of action: Innovation Actions, Coordination and Support Action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 23 – 2015: Supporting the community in deploying a common framework for measuring the energy and environmental efficiency of the ICT-sector[72]

Specific Challenge: International standardisation bodies and fora (like the ITU, ETSI, IEC and the GHG Protocol) and the Joint Research Centre of the European Commission had developed over the last years a framework of metrics, methodologies and best practices in measuring the energy and environmental efficiency of the ICT-sector. While a number of pilot testing initiatives had been launched and supported by the European Commission (e.g. www.ict-footprint.eu) which successfully pilot tested key elements of the above framework, its broad deployment still remains an issue, particularly by smaller organisations, due notably to the lack of awareness/expertise on their side in deploying the above framework.

Scope: The action will set up a number of support services (notably a helpdesk service, online support, translation of important documents) to facilitate/enable a fast and efficient uptake by

[72] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

the community (particularly by smaller organisations, notably SMEs) of the above framework. Appropriate liaisons will be established with the relevant bodies and fora that developed the above framework to ensure the availability of the relevant expertise when needed. Technical areas of focus will include (but will not be limited to) those of data centres and networks. The duration of the action will be 3-years.

Expected impact: A fast and efficient uptake of such methodologies will lead, among others, to transparency in measuring the environmental effect of the ICT-sector which, in turn, will lead to higher awareness on the energy and environmental footprint of the ICT, more efficient development and use of policy instruments for measuring and controlling the above footprint, new business opportunities and higher competitiveness of industry through the establishment of a level playing field. In this context, the ICT will play an even more important role in helping the EU reaching its energy and environmental objectives.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Providing the energy system with flexibility through enhanced energy storage technologies

With the rapid growth of the share of electricity produced by variable renewable sources, the need of storage increases significantly if other flexibility alternatives for the grids will not be sufficient or too expensive. Storage is not an aim in itself; it is one new link of our very complex energy chain. Therefore all close-to-market proposals should address this complex integration including the wholesale or retail markets, societal problems, novel business models, regulatory, legal or energy policy aspects. The aim of all proposals is to ensure that storage finds its right place in the energy system of the future, with very large shares of variable Renewables on both sides of the energy chain, with a growth of our electricity consumption and a more dynamic variation of the future demand.

Energy storage in this context includes not only storage of electricity, but storage of all energy vectors:

- direct electricity storage (electricity in - electricity out) or
- indirect electricity storage (electricity in – heat, cold, hydrogen, synthetic methane or other energy vectors out),
- Flexibility provided through the integration of direct and indirect storage and other technologies.

R&D activities addressing enhanced performance of chemical storage with hydrogen is not in the scope of this activity area. Integration of Power-to-Gas into the energy system may be covered here.

Activities addressing thermal storage with no interaction with the electricity grid will be supported in the energy efficiency and heating/cooling topics of this work programme. Selected proposals of LCE6 to LCE10 will be requested to cooperate through regular common workshops, exchange of non-confidential reports, etc. Proposals should set aside some funds for this activity and propose how they intend to cooperate.

LCE 8 – 2014: Local / small-scale storage

Specific challenge: This topic will address the need to progress energy storage and reduce the barriers associated with new storage concepts integrated into the distribution grid and at building/house level. For local storage applications, addressed in this topic, it is desirable to include the interaction between the electricity grid and other energy uses such as the district heating/cooling network, CHP, micro-generation, local renewables and to include the most advanced ICT for optimising the whole system. Seen the various barriers that energy storage is facing, the activities under this topic should include the anticipation of potential market and regulatory issues with due consideration to the social, socioeconomic aspects and improved models to demonstrate energy storage systems.

Scope: Activities should focus on integrating solutions that reached already TRL 5 to TRL 6 and above (please see part G of the General Annexes).

The direct/indirect storage must take into account grid interfaces and synergies between electricity, heating/cooling and final applications when they enable a clear benefit to be validated in this context. When appropriate, synergies between technologies could be used. The direct/indirect storage must take into account of grid interfaces and synergies between electricity, heating/cooling and final applications when they enable a clear benefit to be validated in this context. When appropriate, synergies between technologies could be used. LCA and economic assessments of the investigated systems should be refined.

The priority is:

- Demonstration and performance verification of electrochemical and other storage technologies that are connected with low voltage substations or variable distributed electricity generation or in individual houses. This would include community storage systems in residential areas or storage in industrial parks. The activities should include issues on safety, socioeconomic and business models. For islands with insufficient or no grid connection, the integration aspects with all energy vectors/grids shall have very high priority.
- Demonstration and performance verification of compact electricity-grid connected heat and cold storage systems with enhanced performance. This would include integrated systems with e.g. heat pumps and/or micro CHP or the integration of existing heating/cooling grid storage with the electricity grid.
- Demonstration proposals shall include market uptake measures for integrating energy storage in the electricity network and power system management and cost-benefit analyses of the possible uses of the technology seen from a system perspective.
- All projects will have to perform a detailed cost-benefit analysis and operational optimization of storage.

This topic addresses stationary/movable storage; integration of electric vehicles in the grid is expected to be addressed under other calls. The performance of market-ready technologies, with TRL 7 or above, may be verified through technology verification schemes such as EU Environmental Technology Verification (ETV) pilot programme[73].

The Commission considers that proposals requesting a contribution from the EU of between EUR 8 to 12 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The proposals are expected to:

- Demonstrate the technical and economic synergy between local storage (ideally of several energy vectors), smart grid management, demand response and their integration with advanced ICT.
- Demonstration of the integration of storage services in network management, particularly exploiting storage with electronic interfaces to facilitate the integration and back-up of highly variable renewable generation and dispersed demand response.
- Increase the grid security and stability, and reduce grid congestion e.g. through appropriate integration with ICT tools for the control and management of electricity networks.
- Increase the potential for new grid supporting services (balancing and ancillary services) linked with the availability of storage.
- Enhanced supply independence of remote areas by means of local renewable energy generation and storage.
- The impacts are expected to be linked to either energy balancing, increased grid security and stability or improved grid congestion management at local level.

[73] http://iet.jrc.ec.europa.eu/etv/

- Cover a wider use of storage technologies in the energy system through validation of solutions with reduced cost, increased efficiencies, and lower environmental impact.
- Accelerating innovation and business models for deployment of storage at local level.
- Deferred investment for grid reinforcements and lower societal costs associated with high penetration of distributed variable renewable energy resources.

The impacts are expected to be linked to either energy balancing or improved grid congestion management at local level.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 9 – 2015: Large scale energy storage

Specific challenge: The high penetration rates of variable renewable energy resources entail the need for large scale energy storage to balance the production and consumption of high quantities of electricity and during longer time periods. Demonstration activities in this topic will aim to progress large scale energy storage and reduce the barriers associated with new storage concepts. An important market uptake challenge is to reduce the barriers (technological, economic, regulatory, environmental, social and other acceptance, etc.) associated with the deployment of existing or new storage concepts.

Scope: Activities should focus on storage systems that reached already TRL 5 and bring them to TRL 6-7 (please see part G of the General Annexes). This would include anticipation of potential market and regulatory issues with due consideration to the environmental and socioeconomic aspects and improved models to demonstrate energy storage systems.

Activities should pursue direct electricity or indirect storage (electricity with other energy vectors). The activities must address the interfaces for integrating storage in grid management. Where appropriate, synergies between electricity grid, other energy grids, storage and final energy use must be taken into account.

Integrated Power to Gas concepts allowing electricity storage through the production of synthetic gas to be stored in the gas grid in the form of synthetic/green methane are eligible. Electrolysis proposals and proposals with pure hydrogen injection in the natural gas grid are not in the scope of this activity; they should be submitted to the Hydrogen/fuel cells joint undertaking.

The priorities are demonstration and validation of:

- pumped hydro storage in new locations such as underground storage concepts, storage using seawater or similar concepts addressing large scale applications aiming at GWh scale;
- storage with compressed air, liquid air, and similar concepts aiming at the large scale (ideally > 100 MWh scale if appropriate);
- retrofitting of existing hydro dams with pumped hydro or other storage to enable flexible operation, large scale balancing and storage, while applying environmentally friendly design and operation;

- integrated management of existing or retrofitted pumped hydro storage (with variable speed pumps/turbines) also across national borders (e.g. smart grid concepts across alpine (or other) borders and enclosing many existing facilities);
- linking such storage projects with the development of the Northern Seas, Mediterranean ring and other Trans-European grid infrastructure concepts may be envisaged.

Demonstration proposals should include market uptake measures for integrating energy storage in the electricity network and power system management. They shall focus on a limited set of specific issues that currently prevent an up-scaling or the realization of the concept. They should also include research on environmental, economic, legal, societal and public acceptance issues and recommendations for future energy policy by the industrial stakeholders involved. These results should be compared with the results of research oriented projects on the same or similar topics.

All projects will have to perform a detailed cost-benefit analysis and operational optimization of storage.

Organising targeted practice-oriented education and training activities at the project's pilot or demonstration facilities is encouraged.

The Commission considers that proposals requesting a contribution from the EU in the range of EUR 16 to 20 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The proposals are expected to cover the general impacts listed below that are relevant for the proposed demonstration:

- A wider use of storage technologies in the energy system through validation of solutions with reduced cost, increased efficiencies, and lower environmental impact.
- Provision of services for increased renewable energy integration, resulting, among others, in a reduced need for curtailment of wind, solar and other variable renewable energy resources
- Deferred investment for transmission grid reinforcements and lower societal costs associated with high penetration of variable renewable energy resources
- Integration with ICT tools for the control and management of electricity networks.

The impacts are expected to be linked to either energy balancing or improved grid congestion management at transmission level.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 10 – 2014: Next generation technologies for energy storage

Specific challenge: There is a need to develop new or improved storage technologies with higher performance, availability, durability, performance, safety and lower costs. These new and enhanced storage technologies have to contribute to the cost-efficient integration of distributed and variable renewable energy sources.

In addition, life cycle assessment and economic modelling for use of energy storage technologies needs to be refined. Generally, energy storage has to progress in the innovation chain so that the barriers associated with new storage concepts are reduced. This would include adaptation of new materials and developments for improved safety.

Scope: Activities should focus on developing the next generation of storage technologies by bringing them from TRL 2 or above towards TRL 5 (please see part G of the General Annexes). They cover storage technologies of all sizes relevant to energy applications and all types of locations.

The activities need to take into account grid interfaces and, when appropriate, use synergies between technologies. Research should also address environmental, economic and public acceptance issues or develop recommendations for future energy policy.

The Commission considers that proposals requesting a contribution from the EU of between EUR 6 to 9 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The proposals are expected to cover the general impacts listed below that are relevant for the proposed R&D:

- Enlarging the portfolio of effective storage technologies with potential for European wide usage.
- Lowering the cost, increasing the efficiency and durability, lower the environmental impact and reducing location constraints on energy storage systems.
- Contributing to solutions for high penetration rates of distributed energy resources and intermittent renewable energy.
- Integrate storage into the management of the distribution grids to provide increased grid security and stability, e.g. through appropriate integration with ICT tools for the control and management of electricity networks.
- Defer investments of grid reinforcement and lower the societal costs associated with high penetration of variable renewable energy sources.
- The impacts are expected to be linked to either large scale energy balancing or improved grid congestion management or self-consumption at local level.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Sustainable biofuels and alternative fuels for the European transport fuel mix[74]

Renewables should cover 10% of the final energy consumption in transport in 2020. Decarbonising the transport sector is a major challenge in the Energy Roadmap 2050. This can be achieved by several means, notably through the electrification of the transport sector, and the use of alternative, non-fossil fuels.

In the long-term perspective, electrification or hydrogen and fuel cells can provide solutions to the decarbonisation of the transport sector. However, certain sub-sectors such as aviation, and to lesser extent heavy duty road and maritime transport, will still rely on liquid fuels, which should increasingly be produced from sustainable resources.

Bioenergy will play a crucial role in the achievement of the 2020 targets. It currently provides more than 2/3 of the renewable energy in the EU, and is expected to account for more than half the EU's renewable energy in 2020 and for about 11% of the total EU energy consumption. However, comprehensive actions are still needed to foster the development of advanced biofuels and alternative fuels in this key sector, to ensure their sustainability and to commercialise biofuels based on lignocellulose and other non-food feedstocks.

At the same time, new technological concepts need to be developed to allow the introduction of alternative fuels, which are neither based on biomass nor on fossil sources, with applications in all transport sectors.

In order to ensure that a balanced portfolio of activities covering different renewable energy technology areas will be supported, it is expected that the share of the EU contribution benefitting one single technology area[75] from topics LCE 2 and LCE 11 shall not exceed 25% of the total budget dedicated to these topics, while the share of the EU contribution benefitting one single technology area[76] in topics LCE 3 and LCE 12 shall not exceed 33% of the total budget dedicated to these topics.

LCE 11 – 2014/2015: Developing next generation technologies for biofuels and sustainable alternative fuels

Specific challenge: Europe has limited biomass and land resources to cope with an increased demand for fuels and other uses. Thus, in the long-term perspective, new technologies of sustainable biofuels and alternative fuels need to be developed that radically improve the state-of-art, notably in regards to the following sub-challenges:

a) Improving conversion efficiency and/or enlargement of the biomass feedstock basis.

b) Developing alternative fuels through use of new and sustainable resources from non-biomass non-fossil sources.

[74] Biomass mobilisation and logistics for other purposes then biofuels may be addressed under Societal Challenge 2 (Food security, Sustainable Agriculture, Marine and Maritime Research and the Bioeconomy). Proposers are advised also to consult the work programme of the Bio-Based Industries JTI.

[75] An area in this context is considered one of the following: 1) photovoltaics, 2) concentrated solar power, 3) wind energy, 4) ocean energy, 5) hydropower, 6) deep geothermal energy, 7) renewable heating and cooling, 8) biofuels, 9) alternative fuels.

[76] An area in this context is considered one of the following: 1) photovoltaics, 2) concentrated solar power, 3) wind energy, 4) ocean energy, 5) renewable heating and cooling, 6) biofuels.

c) Improving the economic, environmental and social benefits relative to fossil fuels and currently available biofuels, notably regarding cost reduction, minimisation of demand on natural resources (land and water in particular), enhanced energy balance, reduced GHG emissions (including carbon stock changes) and development of rural areas.

Scope: Proposals focusing on the long-term perspective should aim at developing the next wave of alternative and sustainable fuels by moving technologies from TRL 3-4 to TRL 4-5 (please see part G of the General Annexes). In each case, they should address sub-challenge a) or b) and sub-challenge c) described above.

Environment, health and safety issues, regional and social dimension, shall be considered in all developments and appropriately addressed. An assessment of alternative uses of the used feedstocks outside the bioenergy sector should also be done.

Biofuels produced from starch, sugar and oil fractions of food/feed crops are excluded.

An important element will be an increased understanding of risks (whether technological, in business processes, for particular business cases, or otherwise in each area), risk ownership, and possible risk mitigation. Proposals shall therefore include appropriate work packages on this matter.

Proposals shall explicitly address performance and cost targets together with relevant performance indicators, expected impacts, as well as provide explicit exploitation plans. Proposals should also indicate the current Manufacturing Readiness Level (MRL, see Appendix to this work programme) and the activities needed to keep the MRL aligned with the advances in the TRL that will be undertaken in the proposal to ensure the potential for exploitation.

Opening the project's test sites and pilot facilities, or research infrastructures for practice oriented education, training or knowledge exchange is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The new developed technology pathways should permit the use of new feedstock sources that do not compete directly or indirectly with food or feed production for resources, or a more efficient conversion of the current ones. A favourable energy balance is expected, as well as a significant potential for cost reduction, which would permit these fuels to eventually compete favourably with fossil or older-generation equivalent fuels. The development of new technologies will permit robust and reliable assessment of the environmental and social benefits with respect to current technologies, notably in terms of GHG performance, energy balance, efficient use of natural resources, decentralised energy production, and job creation in rural areas, as well as secure and affordable energy supply in Europe or worldwide.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 12 – 2014/2015: Demonstrating advanced biofuel technologies

Specific challenge: In the short-term and medium-term perspective, due to different issues (such as the limited distribution infrastructure of the electrification option, or the unsuitability of such option for certain transport modes), biofuels are expected to be increasing contributors

to the de-carbonisation of the transport sector. In order to achieve the EU targets regarding renewable energy in transport and CO2 abatement (set out in the RES and Fuel Quality Directives), and to address concerns regarding indirect and direct environmental impacts of biofuels, new and advanced biofuels using sustainable feedstock need to reach the market. To this end, the following sub-challenges should be addressed:

- Proving that advanced biofuels and bioenergy carriers technologies, as identified in the Implementation Plan of the European Industrial Bioenergy Initiative (EIBI)[77], are technically viable, environmentally and socially sustainable, and potentially cost-competitive at commercial scale.
- Developing logistic systems for a sound, safe and sustainable feedstock supply.

Scope: Proposals should address the medium-term challenges for market penetration of advanced biofuels as presented above. In each case, they should address one of the respective sub-challenges, or a combination of them. They should bring technology solutions to a higher TRL level (please see part G of the General Annexes), in line with the Implementation Plan of the European Industrial Bioenergy Initiative (EIBI)[78]. Proposals shall aim at moving technologies that reached already TRL 5-6 to TRL 6-7 through industrial demonstration projects[79].

Environment, health and safety issues in the whole life cycle should be considered in all demonstrations and appropriately addressed. An assessment of alternative uses of the used feedstocks outside the bioenergy sector should also be done.

Biofuels produced from starch, sugar and oil fractions of food/feed crops are excluded.

An important element for the entire area of renewables will be an increased understanding of risks (whether technological, in business processes, for particular business cases, or otherwise in each area), risk ownership, and possible risk mitigation. Proposals shall therefore include appropriate work packages on this matter.

Proposals shall explicitly address performance and cost targets together with relevant key performance indicators and the expected impacts. Industrial involvement in the consortium and explicit exploitation plans are a prerequisite.

All proposals have to include a work package on the business case of the technology solution being addressed. This work package has to demonstrate the business case of the technology and identify potential issues of public acceptance, market and regulatory barriers, including standardisation needs. It should also address, where appropriate, synergies between new and existing technologies, regional approaches and other socio-economic and environmental aspects from a life-cycle perspective.

[77] The EIBI Implementation Plan is found on http://setis.ec.europa.eu/set-plan-implementation/european-industrial-initiatives-eiis/eii-implementation-plans

[78] Note that an eligibility criterion sets a **minimum bioenergy content**: at least **70%** of the marketable bio-products produced by the plant shall be bioenergy (biofuels, bioenergy carriers, heat, power) calculated on the basis of the energy content.

[79] Coordination is foreseen to avoid duplication of efforts under the Energy Work Programme and the Bio-Based Industries JTI regarding biomass supply and logistics which could be addressed under both support schemes and regarding energy driven biorefineries, i.e. those with a minimum of 70% bioenergy output, in case such biorefineries are selected for funding under the Bio-Based Industries JTI.

The current Manufacturing Readiness Level (MRL, see Appendix to this work programme) and the activities needed to keep the MRL aligned with the advances in the TRL that will be undertaken in the proposal should also be indicated to ensure the potential for exploitation.

Opening the project's test sites, pilot and demonstration facilities, or research infrastructures for practice oriented education, training or knowledge exchange is encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 5 to 20 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Testing advanced biofuel technologies at large industrial scale reduces the technological risks, paving the way for subsequent first-of-a-kind, commercial-scale industrial demonstration projects. For this purpose, the scale of the proposals should permit obtaining the data and experience required so that a first-of-a-kind, commercial-scale industrial demonstration project can be envisaged as a next step. The industrial concepts demonstrated should have the potential for a significant social and economic impact, notably in terms of job creation, economic growth and safe and affordable energy supply in Europe and beyond.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Topic "*LCE 13 – 2015: Partnering with Brazil on advanced biofuels*", contained in the version of the work programme adopted on 10 December 2014, has been removed because discussions with the Brazilian authorities couldn't be finalised in due time.

LCE 14 – 2014/2015: Market uptake of existing and emerging sustainable bioenergy[80]

Specific challenge: Actions are still needed to foster the development of the bioenergy sector and to ensure its sustainability (Renewable Energy Progress Report [COM(2013)175]). One way to do it is to use more and sustainable bioenergy. However, the EU needs to expand the supply of bioenergy produced in the EU, by encouraging the EU farmers and foresters to produce also energy and energy intermediaries.

In the short- and medium-term perspective, sustainable bioenergy in all its forms is expected to be the main contributor to the de-carbonisation. In order to achieve the EU targets set out in the RES and Fuel Quality Directives, and to address concerns regarding indirect and direct environmental impacts, sustainable bioenergy technologies (both existing and emerging) need to further penetrate the market.

Scope: Proposals should address one or several of the following bullet points using technologies and systems which are already at TRL 7-9 (please see part G of the General Annexes):

[80] In the context of this topic, the term bioenergy covers raw or transformed biomass, biogas, biofuels (gaseous or liquid) and bioliquids. Biofuels produced from starch, sugar and oil fractions of food/feed crops are excluded.

- Setting up or strengthening sustainable local bioenergy supply chains that meet highest environmental criteria and quality standards, including consideration for indirect impacts and energy balances;
- Ensuring development and / or implementation of quality and sustainability standards for bioenergy in all its forms;
- Creating a market for sustainable intermediate bioenergy carriers to enable better technology competitiveness through economies of scale;
- Encouraging European farmers and foresters to produce non-food bioenergy or bioenergy carriers alongside food, feed and other products.
- Development of methodologies for the traceability of biomass feedstocks from which bioenergy is produced (e.g. to distinguish first-generation from advanced biofuels);
- Removing non-technical barriers to widespread production and use of biogas/biomethane from manure and other wastes as one of the most sustainable fuels available today for use in transport and for incorporation into the grid;
- Ensuring sustained public acceptance of sustainable advanced biofuels;
- Exchange of information on best practices for bioenergy policy, regulations and support schemes to allow the most sustainable and energy efficient use of bio-resources.
- Cooperation between different policy areas at national / regional level (e.g. energy, agriculture, environment, waste, transport, etc.) needs to be increased to optimise the regulatory framework and implementing measures for the bioeconomy through exchange of information and best practices;
- All Member States must possess the necessary capacity to enact the EU legislation, while the businesses must make full use of the opportunities that these new markets create for them. Therefore specific capacity building activities targeting the main stakeholders (e.g. biomass suppliers and users, decision makers, financial institutions, auditors and verification bodies) are needed.
- Tailored financing schemes for supporting investments in innovative and established bioenergy technologies must be implemented, and the most successful schemes replicated.

Regional specificities, socio-economic and environmental aspects from a life-cycle perspective shall be considered.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 to 2 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Increasing the share of sustainable bioenergy in the final energy consumption. Substantial and measurable reductions in the transaction costs for project developers as well as for the permitting authorities, whilst still fully addressing the needs for environmental impact assessments and public engagement, including considerations for indirect impacts and energy balance,. Development of better policy, market support and financial frameworks, notably at national, regional and local level.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

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

LCE 15 – 2014/2015: Enabling decarbonisation of the fossil fuel-based power sector and energy intensive industry through CCS

Specific challenge: The EU is committed to an overall reduction of greenhouse gas emissions of at least 80% by 2050. Nonetheless, fossil fuels will continue to be used in Europe's power generation as well as in other industrial processes for decades to come. Therefore, the 2050 target can only be achieved if the emissions from fossil fuel combustion in the power generation sector and energy intensive industries are eliminated from the system. This will require the application of Carbon Capture and Storage (CCS). The assessments made in the context of the EU's Roadmap for the transition to a competitive low carbon economy in 2050 and the Energy Roadmap 2050 see CCS as an important technology contributing to decarbonisation scenarios in the EU, with 7% to 32% of all power generation using CCS by 2050. The application of CCS to industrial sectors other than power (e.g. steel, cement, lime, chemical industry, refining) is expected to deliver half of the global emissions reduction from CCS by 2050. In the near future, these industrial applications will open up new opportunities and avenues for CCS that can accelerate its deployment. For all applications, the demonstration of CO2 storage is of major importance. Therefore, two key challenges in the short-term for driving CCS to deployment are geological storage and the application of CCS to industrial sectors other than power, including bio-CCS.

Scope: Proposals should address one of the respective key challenges as presented above, or a combination of them. Focus should be on progressing technologies that already reached TRL 4-5 to TRL 6 (please see part G of the General Annexes). For geological storage, projects should enable, under "real life" conditions, the development and demonstration of best practices for the entire storage cycle, from site characterisation to operation, risk assessment, monitoring and mitigation/remediation of leakage, and including education and training. Knowledge sharing as well as early and sustained engagement of the local community is essential. In line with the Union's strategy for international cooperation in research and innovation[81] international cooperation is encouraged, in particular collaboration activities between EU project(s) under this topic and non-EU projects (e.g. from Australia and/or North-America). For industrial applications, proposals should aim at integrating CCS technology in the best possible way so as to optimise the use of energy in the capture process, minimise process efficiency losses, achieve a suitable CO2 purity for transport and storage, and maintain the quality of the industrial end product. Piloting under realistic conditions is required to significantly lower the energy penalty and capture costs. Collaboration with industrial end users is essential. Knowledge sharing as well as early and sustained engagement of the local community is essential.

For geological storage, the Commission considers that proposals requesting a contribution from the EU of between EUR 9 to 16 million would allow this specific challenge to be addressed appropriately.

[81] COM(2012)497

For industrial applications, proposals requesting a contribution from the EU of between EUR 4 to 9 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Demonstration of safe and environmentally sound CO2 storage will play a key role in optimising the safe operation of storage sites and in fine-tuning regulatory issues, in promoting confidence in CO2 storage and building public awareness of CCS. The cost- and resource-effective application of CCS in industrial operations will expand the available options for CCS and provide a stepping stone to its wider deployment. Pilot-scale demonstration projects should contribute to accelerating the development and deployment of CCS through an enhanced and effective cooperation in research and innovation between various stakeholders and Member States, thereby allowing a more efficient use and stronger leverage of financial resources and promoting knowledge sharing.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 16 – 2014: Understanding, preventing and mitigating the potential environmental impacts and risks of shale gas exploration and exploitation

Specific challenge: Gas shales have a very low porosity and permeability, and have to be fractured pervasively to create high-permeability pathways for the gas to migrate towards the wells. The fracturing process is subject to discussion, as it requires the injection of large amounts of water and chemicals, a part of which are eventually brought back to the surface. There are also concerns that the fractures may cause natural gas to leak into shallower aquifers that are used for drinking water supplies. In addition, the fracturing process can cause microseismicity, which - when felt at the surface - may give rise to public concerns. The most imminent challenge for shale gas extraction is therefore to address the associated environmental concerns, in particular through a better understanding and monitoring of the fracturing process and its environmental effects (including in the long term), treatment and recycling of flow-back and produced water, and mitigation of induced seismicity and emissions to air (including greenhouse gases).

Scope: Data collection (which could include satellite observation data), model development and identification/assessment of environmental impacts and risks of different exploration and exploitation techniques, and establishment of scientific recommendations for best practices. In line with the Union's strategy for international cooperation in research and innovation[82] international cooperation is encouraged, in particular as regards knowledge sharing and collaboration with relevant US and Canadian partners.

The Commission considers that proposals requesting a contribution from the EU of between EUR 1 to 3 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The resulting knowledge base and scientific recommendations for best practices will contribute to efforts aimed at minimising the environmental footprint of shale gas extraction.

Type of action: Research & Innovation Actions

[82] COM(2012)497

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 17 – 2015: Highly flexible and efficient fossil fuel power plants

Specific challenge: The share of energy produced from renewable resources is growing rapidly. The output of wind and solar power is highly variable, and depends of factors such as weather conditions and time of day. With this growing share of renewable power, in particular when having priority access to the grid, fossil fuel power plants will have to increasingly shift their role from providing base-load power to providing fluctuating back-up power to meet unpredictable and short-noticed demand peaks, in order to control and stabilise the grid. Plants should be able to run both at the lowest part load possible at the highest possible efficiency. Moreover, plants will be required to operate across the entire load range with high load-change velocities, and even operate in start/stop mode with full turndown and very fast re-start, all at minimal fuel consumption. This forces base-load plants to operate closer to their design limits and through significantly more thermal cycles, leading to increased rate of wear on plant components. Operational flexibility therefore presents a significant challenge for fossil fuel power (and CHP) plants.

Scope: Focus on progressing solutions that already reached TRL 3 to TRL 4-6 (please see part G of the General Annexes) and offer the highest potential for full integration into an energy system with ever higher shares of renewable energies. Solutions with lowest greenhouse gas emissions per energy unit are preferred. Collaboration with power plant operators and Transmission System Operators (TSOs) is strongly encouraged.

The Commission considers that proposals requesting a contribution from the EU of between EUR 3 to 6 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Projects should lead to new and cost-effective solutions for highly flexible new and existing fossil fuel power plants (including those using dispatchable renewable fuels), capable of meeting demand peaks and renewable output reductions, at minimal fuel consumption and emissions, while mitigating the effects of cycling operation to avoid excessive service life expenditure, and not impeding the potential CO2 capture readiness of the power plants.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Supporting the development of a European research area in the field of energy

LCE 18 – 2014/2015 [83]: Supporting Joint Actions on demonstration and validation of innovative energy solutions

Specific challenge: Without a technological shift in our current energy system, the EU will fail on its 2050 ambitions to largely decarbonise the energy and transport sectors. The EU needs to accelerate innovation in cutting edge low carbon technologies and innovative solutions, and bridge the gap between research and the market. A European approach is essential to realise the ambition of seeing low carbon technologies effectively developed in view of bringing them to the market: it allows key players to come together on a continental scale; it helps to identify and to tackle the barriers holding back innovative products and services in the single market; and it allows different sources of private and public funding to be brought together. Today, EU funding remains a limited part of the overall funding across Europe. Implementation needs to be increasingly based on partnerships that build the necessary scale and scope, and achieve greater impact from scarce public and private resources.

Scope: The proposals should aim at coordinating the research efforts of the participating Member States, Associated States and Regions in the areas and challenges targeted in this 'Competitive low-carbon energy' call or in the 'Smart Cities and Communities' call and to implement a joint transnational call for proposals resulting in grants to third parties with EU co-funding to fund multinational innovative research initiatives in this domain. Proposers are encouraged to implement other joint activities including additional joint calls without EU co-funding.

Activities should focus on pre-commercial demonstrations and on validating solutions for these technology areas that accelerate their move towards commercialisation and competitive deployment, consistent with SET Plan objectives. Research activities necessary to support this work and forming an integral part of these proposals and solutions, will also be in scope for funding.

Appropriate user and general public acceptance, regulatory, market up-take (e.g. e.g. regulatory issues, capacity building and access to finance), social, environmental and resource efficiency aspects should be included. Opening up demonstration facilities for practice-oriented education and training is encouraged. As regards a possible ERA-NET in the area of 'Smart Cities and Communities', cooperation with emerging countries (e.g. China) is encouraged, without prejudice of their participation as partners in other initiatives, such as in call for Smart Cities and Communities.

The Commission considers that proposals requesting a contribution from the EU of between EUR 10 to 20 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

[83] This activity directly aimed at public-public partnerships with Member States and associated countries is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

Expected impact: Acceleration of the time to market of, affordable, cost-effective and resource-efficient technology solutions to decarbonise the energy system in a sustainable way, secure energy supply and complete the energy internal market. Reduction of the environmental footprint and the energy payback time. Strengthening the European industrial technology base, thereby creating growth and jobs in Europe.

Type of action: ERA-NET Cofund

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 19 – 2014/2015 [84]: Supporting coordination of national R&D activities

Specific challenge: Without a technological shift in our current energy system, the EU will fail on its 2050 ambitions to largely decarbonise the energy and transport sectors. The EU needs to accelerate innovation in cutting edge low carbon technologies and innovative solutions, and bridge the gap between research and the market. A European approach is essential to realise the ambition of seeing low carbon technologies effectively developed in view of bringing them to the market: it allows key players to come together on a continental scale; it helps to identify and to tackle the barriers holding back innovative products and services in the single market; and it allows different sources of private and public funding to be brought together. Today, EU funding remains a limited part of the overall funding across Europe. Implementation needs to be increasingly based on partnerships that build the necessary scale and scope, and achieve greater impact from scarce public and private resources. The challenge is to drive synchronisation of funding processes by fostering cross-border cooperation among partners supported by national projects and programmes.

Scope: As a pilot case, the scope will be on the areas and challenges targeted in this 'Competitive low-carbon energy' call. Research and Innovation activities in the proposals should focus on bringing technology solutions from TRL 3 to TRL 5 (please see part G of the General Annexes). Activities should focus on supporting either:

- The transfer of knowledge among participants and other dissemination activities, activities to foster the use of research outcomes by industry of a project resulting from synchronised funding processes of at least three Member States, or
- The coordination of call for proposals of at least three Member States, for instance, through support to networking activities of public funding bodies, leading to the promotion of the use of single peer-reviewed evaluations, development and use of harmonised monitoring and review methodologies, support to the preparation of high risk, high cost large scale pilots for joint actions with or without EC funding, linking national research programmes and other funding mechanisms and building partnerships with the necessary scale and scope etc.

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.1 to 0.5 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

[84] This activity directly aimed at pilot activities is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

- Reinforcing the European dimension of multinational projects resulting from synchronised funding processes of at least three Member States,
- Increasing coordination and alignment of national research and innovation programmes, overcoming gaps, duplication and fragmentation, creating a leverage effect, enhancing coherence and efficiency of energy research in Europe.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Social, environmental and economic aspects of the energy system

LCE 20 – 2014: The human factor in the energy system

Specific challenge: To better understand the human factor: Managing the transition to a more sustainable energy system is a challenging task, going beyond mere technological aspects. Consumer's and other actor's awareness, attitudes, risk perception, consumption behaviour and investment decisions have a strong influence on the development of our energy system and are a crucial factor in the dissemination of energy relevant technologies, but are on the other hand shaped by the social environment. We need to explore the factors triggering the behaviour of the different stakeholders, including consumers, policy makers, industrial strategists, regulators, technology developers, investors, etc.. This includes the question, whether gender aspects play a significant role in the development of the energy system. Furthermore we need to develop appropriate means to facilitate and actively stimulate the public engagement in transforming our energy system and to foster the dialogue with the public on this matter.

Developing the skills needed: The ambitious goals of the SET-Plan require the mobilisation of appropriate resources. This applies in particular to the availability of skilled workforce. As recommended by the SET-Plan Education and Training Roadmap we need to foster European cooperation in this area by building European networks, both in the university based education sector and in the vocational education and training sector, establishing close links to business and research.

Scope: Proposals should cover one or several of the following aspects:

- Awareness, perceptions, behaviour and attitudes to energy relevant technologies (including nuclear) and to transition pathways to a low carbon economy of actors in the energy system, including perception of risks and benefits. Analysis of the role and the significance of gender aspects related to energy and its consequences for the development of an efficient and reliable low carbon energy system.
- Public engagement in the transformation process to a more efficient, low carbon energy system. Development of measures, methods and tools to launch and stimulate a dialogue with the public on energy policy and energy innovation on European level.
- Development and support of a) vocational education and training networks in domains with potential shortages/domains needing new or upgrade of existing competences or b) networks linking relevant actors in the field of energy related education and training such as universities, other research institutions, business etc. to address knowledge, skills and competences needs and gaps. Both types of networks need to be in line with

the scope described in the SET-Plan Education and Training Roadmap and need to involve the relevant stakeholders along the technology value chain[85]. (appropriate instrument: Coordination and Support Action)

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Support to the implementation of the SET-Plan by better understanding the complex links, interdependencies and interactions of the various actors in the energy system, their motivation, attitudes and perceptions. Development of options and strategies to address these factors with a view to facilitate and support the transition towards a sustainable energy system.

Development of strategies and measures to enhance public engagement in this transformation process and to establish a structured dialogue with the public on this matter including Europeanization of existing national energy dialogues.

Support the provision of appropriately skilled workforce to implement the SET-Plan by identification of needs and gaps, and by improving and accelerating the existing education and training activities in the vocational and in the university sector.

Type of action: Research & Innovation Actions, Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

LCE 21 – 2015: Modelling and analysing the energy system, its transformation and impacts

Specific challenge: In order to ensure efficient follow up of the integrated roadmap, following the Communication on Energy Technologies and Innovation, the complex links, interactions and interdependencies between the different actors, the available technologies and the impact of the different interventions on all levels from the individual to the whole energy system need to be better understood. Furthermore, due to the central role of energy for our societies, the choice of a particular portfolio of energy technologies has far reaching impacts not only on the energy system, but also on the environment, the economy and the society. It is necessary to provide model based decision support tools for the different actors in the energy system in order to facilitate handling the complex system.

Scope: Proposals should cover one or several of the following aspects:

- Comparative assessment of the impacts and the sustainability performance of all relevant energy technologies, including renewable, fossil, and nuclear technologies. Comparative assessment of transformation paths towards a sustainable energy system and the related impacts on environment, society and economy.
- Analysing and modelling the impacts of technological development and innovation on the energy-system and its dynamics. Analysing and modelling of technology policy measures in the framework of the SET-Plan to promote the transition towards a

[85] Networks funded under this topic may cover all kinds of energy technologies. However, their centre of gravity has to be in the areas addressed in the calls for proposals 'Competitive Low Carbon Energy' and 'Smart Cities and Communities'.

sustainable energy system, assessment of the impact of these measures on society, environment and economy, including safety and access to clean, reliable and affordable energy.

Where appropriate this will include development of new or refinement of existing modelling tools.

The Commission considers that proposals requesting a contribution from the EU of between EUR 2 to 4 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: Support to the scientific underpinning for the implementation of the SET-Plan by strengthening the knowledge base for decision-making concerning feasibility, effectiveness, costs and impacts of related measures and options. The results should assist policy makers in identifying and analysing effective strategies for a transition to an efficient low carbon energy system.

Type of action: Research & Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Cross-cutting issues

LCE 22 – 2014: Fostering the network of National Contact Points [86]

Specific challenge: Facilitate trans-national co-operation between National Contact Points (NCPs) within this Societal Challenge with a view to identifying and sharing good practices and raising the general standard of support to programme applicants, taking into account the diversity of actors that make up the constituency of this Societal Challenge.

Scope: Support will be given to a consortium of formally nominated NCPs covering the Challenge 'Secure, Clean and Efficient Energy'. The activities will be tailored according to the nature of the area, and the priorities of the NCPs concerned. Various mechanisms may be included, such as benchmarking, joint workshops, enhanced cross-border brokerage events, specific training linked to this Societal Challenge as well as to gender dimension of Research and Innovation, and twinning schemes. Special attention will be given to enhance the competence of NCPs, including helping less experienced NCPs rapidly acquire the know-how accumulated in other countries.

The focus of activities should be on issues specific to the Societal Challenge 'Secure, Clean and Efficient Energy' and should not duplicate actions foreseen in the NCP network for quality standards and horizontal issues under ‘Science with and for Society’. Where appropriate, links to other energy relevant parts of Horizon 2020, and to the overarching framework of the Strategic Energy Technology Plan should be taken into account.

[86] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

Only NCPs from EU Member States, Associated Countries and – if their participation is deemed necessary for carrying out the action – from third countries, which have been officially appointed by the relevant national authorities are eligible to participate in and receive funding for this action.

The consortium should have a good representation of experienced and less experienced NCPs.

Submission of a single proposal is encouraged. NCPs from EU Member States or Associated Countries choosing not to participate as a member of the consortium should be identified and the reason explained in the proposal. These NCPs are nevertheless invited and encouraged to participate in the project activities (e.g. workshops), and the costs incurred by the consortium for such participation (e.g. travel costs paid by the consortium) may be included in the estimated budget and be eligible for funding by the Commission.

The Commission will only fund one proposal under this topic.

Expected impact:

- An improved and professionalised NCP service across Europe, thereby helping simplify access to Horizon 2020 calls, lowering the entry barriers for newcomers, and raising the average quality of proposals submitted.
- A more consistent level of NCP support services across Europe.

Type of action: Coordination and Support Action

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CONDITIONS FOR THIS CALL

Opening dates[87]: 11 December 2013 for 2014 topics
9 June 2014 for 2015 topics LCE2, LCE11, LCE15 and LCE17
10 December 2014 for 2015 topics (except for the 2nd stage of topics LCE2, LCE11, LCE15 and LCE17)

Deadline(s) [88]:

Topic	Deadlines			
	2014		2015	
LCE 1	01/04/2014 (stage 1)	23/09/2014 (stage 2)		
LCE 2, LCE 11	01/04/2014 (stage 1)	23/09/2014 (stage 2)	03/09/2014 (stage 1)	05/05/2015 (stage 2)
LCE 3, 12	10/09/2014		05/05/2015	
LCE 4, 14	07/05/2014		05/05/2015	
LCE 5, 6			05/05/2015	
LCE 7	07/05/2014			
LCE 8, 10	07/05/2014			
LCE 9			05/05/2015	
LCE 15, 16	01/04/2014 (stage 1)	23/09/2014 (stage 2)		
LCE 15, 17			03/09/2014 (stage 1)	05/05/2015 (stage 2)
LCE 18 [ERA-NET]	07/05/2014		05/05/2015	
LCE 19	10/09/2014		05/05/2015	
LCE 20	10/09/2014			
LCE 21			05/05/2015	
LCE 22	01/04/2014			
LCE 23			05/05/2015	

[87] The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening

[88] The Director-General responsible may delay this deadline by up to two months.

Indicative budget:

- EUR 359.31 million from the 2014 budget
- EUR 383.57 million from the 2015 budget

	2014 EUR million	*2015* *EUR million*	
LCE 1	20		Two stage evaluation
LCE 2, LCE 11	60	65	All two stage evaluation
LCE 3, 12	73	80	All single stage evaluation
LCE 4, 14	20	20	All single stage evaluation
LCE 5, 6		71.48	All single stage evaluation
LCE 7	59.91		Single stage evaluation
LCE 8, 10	44.15		All single stage evaluation
LCE 9		36.34	Single stage evaluation
LCE 15, 16, 17	33	36	All two stage evaluation
LCE 18 [ERA-NET]	34.25	61.25	Single stage evaluation
LCE 19	3	3	Single stage evaluation
LCE 20	10.5		Single stage evaluation
LCE 21		10	Single stage evaluation
LCE 22	1.5		Single stage evaluation
LCE 23		0.5	Single stage evaluation

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

LCE 12 – 2014 LCE 12 – 2015	*Additional eligibility criterion* At least 70% of the marketable bioproducts produced by the plant shall be bioenergy (biofuels, bioliquids, bioenergy carriers, heat, power) calculated on the basis of the energy content.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide[89] published on the Participant Portal.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single or first stage*)	Information on the outcome of the evaluation (*second stage)*	Indicative date for the signing of grant agreements
LCE 3 – 10, 12, 14, 18 – 23	Maximum 5 months from the final date for submission		Maximum 3 months from the date of informing applicants
LCE 1, 2, 11, 15 - 17	Maximum 3 months from the final date for submission	Maximum 5 months from the final date for submission	Maximum 3 months from the date of informing the applicants

Consortium agreements:

In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

[89] See: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/pse/h2020-guide-pse_en.pdf

CALL – SMART CITIES AND COMMUNITIES

H2020-SCC-2014/2015

Cities across Europe are forerunners in the transition towards a low carbon and resource efficient economy. 68% of the EU population lives in urban areas, a proportion that is growing as the urbanisation trend continues, and using 70% of the energy. To meet the increasingly complex challenges of urban areas, an integrated and sustainable response is needed. Within the context of this integrated and sustainable urban approach there is a requirement for new, efficient, and user-friendly technologies and services, in particular in areas of energy, transport, and ICT. These solutions however require integrated approaches, both at the level of research and development of advanced technological solutions, as well as at the level of deployment. The first part concerns enhancing the development and validation of the technology as such, whereas the second part concerns the need for validation of new business cases and financing models, standardisation, scalability and replicability of the solutions, user acceptance and engagement.

The focus on smart cities technologies will result in commercial-scale solutions with a high market potential in areas such as energy efficient and smart buildings, neighbourhoods and communities; smart digital services for better-informed citizens; identification, optimisation and integration of flows (data, energy, people, goods); smart and sustainable digital infrastructures; smart and sustainable energy systems and smart mobility services including through the use of space-enabled applications. A powerful combination of this focus area and the EIP as a deployment mechanism will thus develop a strong pipeline of long-term, sustainable urban solutions in the EU, reduce greenhouse gas emissions as well as in general improve the overall air quality.

As stated in the Communication on Smart Cities and Communities European Innovation Partnership, the EIP aims to:

- accelerate the roll-out of innovative technologies and services, organisational and economic solutions, for urban applications, which ask for a cross-sectorial approach to support the Europe-wide deployment of Smart Cities solutions
- disseminate the results of successful solutions to bridge innovation gaps and stimulate the convergence between value chains in the energy, transport and ICT sectors,
- support market oriented measures to validate and accelerate commercial deployment; and
- build constructively on the existing portfolio of "Smart Cities" initiatives, rationalising and consolidating them to ensure coherence between regulation and standards policies and project financing.

The challenge of deploying solutions related to the energy, transport and ICT sectors, including those which are at the intersection of these three sectors, in an urban environment is to overcome the local specificities. Consequently actions and actors which can ensure the transferability of solutions and create the framework for replicability of solutions should be prioritised and rewarded.

Therefore EU action for Smart Cities and Communities, with inputs from the Strategic Implementation Plan of the European Innovation Partnership Smart Cities and Communities, will focus on providing support to partnerships created between municipalities and industries which propose solutions answering to the complexity of projects in the intersection of the

three sectors and which take actions for large scale deployment of those solutions in other cities across Europe.

This focus area is part of the societal challenges. Solutions proposed here need to be driven by demand side actors, while the generic technological platforms e.g. for smart lighting, the Internet of Things and cyber-security are being developed with strong industry drive in LEIT part of the programme.

The projects funded under the call "Smart Cities and Communities" of the Work Programme 2014-15 will participate in the Pilot on Open Research Data in Horizon 2020 in line with the Commission's Open Access to research data policy for facilitating access, re-use and preservation of research data. Projects have the possibility to opt out of the Pilot. A related new element in Horizon 2020 is the use of Data Management Plans (DMPs) detailing what data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved. The use of a Data Management Plan is required for projects participating in the Open Research Data Pilot. Further guidance on the Open Research Data Pilot is made available on the Participant Portal.

Proposals are invited against the following topics:

SCC 1 – 2014/2015: Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects

Specific Challenge: The EU policy and regulatory framework in the sectors of energy, transport and ICT supports the development of sectoral solutions, i.e. solutions with a limited degree of integration. However, for successful and accelerated implementation in real environments such as urban ones - that also have to take into account local specificities the test of integrated measures will pave the way for faster market roll-out of technologies. The key challenges for Smart Cities and Communities are to significantly increase the overall energy efficiency of cities, to exploit better the local resource both in terms of energy supply as well as through the demand side measures. This will imply the use of energy efficiency measures optimising at the level of districts, the use of renewables, the sustainability of urban transport and the needed drastic reduction of greenhouse gas emissions in urban areas - within economically acceptable conditions - while ensuring for citizens better life conditions: lower energy bills, swifter transport, job creation and as a consequence a higher degree of resilience to climate impacts (e.g. urban heat islands effects) etc.

Scope: To identify, develop and deploy replicable, balanced and integrated solutions in the energy, transport, and ICT actions through partnerships between municipalities and industries.

These solutions at the intersection of the three sectors will have a holistic approach and are still facing first mover risk. These will be the lighthouse projects as identified by the Communication on Smart Cities and Communities. Lighthouse projects will target primarily large scale demonstration of replicable SCC concepts in city context where existing technologies or very near to market technologies (TRL 7 and more, see part G of the General Annexes) will be integrated in an innovative way.

The proposals should address the following main areas:

- *(Nearly zero) or low energy districts:* through the integration and management of: i) the supply of energy with predominant exploitation of local resources (e.g. waste heat, renewables, storage) and the active participation of consumers (e.g. use of aggregators); ii) the cost-effective refurbishment of existing buildings without

significant disruption for tenants (use of sustainable materials) with a special focus on residential buildings iii) the cross-cutting ICT solutions for the design and overall management of energy/ transport systems

- *Integrated Infrastructures:* through the integration of physical infrastructures such as core networks, street scenes, lighting, industrial sites etc to create new forms of value through re-use and repurposing. This should lead to quantifiable benefits such as reduction of capital /operational expenditure as well as reduced carbon / energy footprints. This might also imply exploitation of synergies between requirements for smart grids, broadband infrastructures and in general poly networks (e.g. district heating and cooling).
- *Sustainable urban mobility:* through the integration of energy/ fuelling infrastructure with vehicle fleets powered by alternative energy carriers for public and private transport, including logistics and freight-distribution. Implications on energy management, and in the case of electromobility, the impact on the electricity grid, of the deployment of high numbers of vehicles and/or the alternative fuel blends performance must be assessed.

The proposed proposals should address in addition to the main areas presented above a strategy that addresses appropriate enabler actions to support the commercial exploitation of the proposal. This includes (indicative list): commitment of authorities (even if changes of politicians/ majority, in the course of the project); citizens' engagement and empowerment; optimising policy and regulatory frameworks; open, consistent data and performance measurements; dissemination and unlocking the market potentials worldwide.

According to the Communication on Smart Cities and Communities the light house projects should look for creating partnerships between industries, academics and cities, empower citizens and ensure the replicability of the solutions, ensure the funding from various sources[90].

Therefore each project should:

- Be realised *in 2 – 3 cities or communities (light house cities or communities);*
- include *industry, city planning authorities which should also reflect the view of the consumer* organisations, research *community, local Small and Medium Size Companies (SMEs)*;
- In addition each project should co-involve *2 - 3 follower cities* i.e. cities willing to contribute to the process though the replication of solutions at the end of the project and having access to the knowhow and results of the project and a privileged contact with the project's partners. The involvement of the *follower* cities should be relevant (e.g. participating in definition of user requirements and methodology of transferability of solutions, data collection etc.). The follower cities should aim at improving their energy performance or the share of use of renewables (e.g. 60% reduction of primary energy for buildings, 20 - 30 % RES use for electricity as well as for heating and cooling). EU geographical coverage conditions should be also applied. The quality of the work programme of follower cities will be part of the overall evaluation.
- Ensure that all proposed *activities are a part of ambitious urban plan*. These activities should also lead to the development of *integrated* urban plans. For the lighthouse

[90] C(2012)4701 final

cities or communities these plans should be finalised before submission of the proposal (e.g. those compiled for the Covenant of Mayors, Sustainable Energy Action Plans, plans committed under the Green Digital Charter etc., but without limiting to this list of initiatives). The urban plan shall integrate buildings planning, energy networks, ICT, transport/mobility planning; additional issues may be addressed as well if relevant for the city. These plans shall be submitted with the proposal as a supporting document(s).

- In order to ensure the success of the lighthouse projects, the *funding for the other parts of the programme or initiative in which the lighthouse projects are embedded should be secured from other sources,* preferably private ones, but also other EU funding sources (European Structural and Investment (ESI) funds for example), national or regional funding.
- Projects should demonstrate and *validate attractive business plans* that allow large scale replication of fast economic recovery in cities of varying degrees of economic conditions (from very poor to very rich), varying sizes but significant urban areas and varying climatic conditions to ensure high impact and replication potential.
- The industrial partners and municipality authorities should engage in replicating successful demonstration in their own and other cities, notably 'follower cities'; the replication plans are compulsory and are part of the evaluation.
- Consortia must have a clearly defined structure with roles and responsibilities properly spelled out for all involved entities for lighthouse cities and for follower cities.

Besides economic sustainability, proposals must also commit to scientific and technical requirements in support to reliability:

- Open and consistent data and interoperability of solutions in order to avoid locked –in customers.
- Contribution to common data collection systems (e.g. as those developed by European Commission under SCC2 of this Work Programme), measurement and disclosure methodology, in order to facilitate a common footprint calculation methodology and other metrics (especially for energy saving; CO2 reductions, financial savings, number of jobs created, environmental impact etc.).
- The performance monitoring should last for a period of at least 2 years. Longer term commitment (e.g. 5 years) will give an added value to the proposal. Consortia should develop an integrated protocol for monitoring energy, infrastructure, mobility and governance practices in the lighthouse projects, enabling documentation of improved performance over short and long term periods. The monitoring protocol should be robust and viable also after the end of the project, supporting and increasing municipal capacity over time Participants may be asked to introduce performance data into existing data bases (e.g. CONCERTO technical monitoring data base).

The grant will be composed of a combination of the reimbursement of eligible costs, and flat rate financing determined on the basis of unit costs[91] only for the building-related demonstration activities.

The building components of the proposals will be supported through the unit cost/m².

[91] The unit costs for the Energy societal challenge actions have been established in line with the methodology set up by the Commission Decision n° C(2013)8196.

The Commission considers that proposals requesting a contribution from the EU of between EUR 18 to 25 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected Impact:

The proposals are expected to have the impacts described below:

- deploy wide-scale, innovative replicable and integrated solutions in the energy, transport, and ICT;
- trigger large scale economic investments with the repayment of implementation costs in acceptable time lines (to facilitate the bankability of the projects);
- increase the energy efficiency of districts and of cities and foster the use of renewables and their integration energy system and enable active participation of consumers;
- increase mobility efficiency with lower emissions of pollutants and CO2;
- reduce the energy costs;
- decarbonise the energy system while making it more secure and stable;
- create stronger links between cities in Member States with various geographical and economical positions through active cooperation.

It is envisaged that the proposals will also bring societal benefits:

- reduction of energy bills for all actors and especially for citizens and public authorities;
- Increase quality of life by creating local jobs (that cannot be delocalised) in cities;
- Increase air quality.

Type of action: Innovation Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Enhancing the roll-out of Smart Cities and Communities solutions by stimulating the market demand

Specific Challenge: To drive structural changes and to catalyse development of new markets of smart city solutions, a number of support actions will be taken to deliver impact across-'silos' of policy areas, and groups of stakeholders.

SCC 2 – 2014 [92]: Developing a framework for common, transparent data collection and performance measurement to allow comparability and replication between solutions and best-practice identification

Scope: To develop a framework for common data and performance measurement collection system which should be open, transparent and allow comparability of solutions. It should consider KPI on energy, ICT and transport matters as well as joint indicators to measure possible rebound effects and systemic values. Work has to build on results from CONCERTO, CIVITAS, the Green Digital Charter as well as the ICT-PSP pilots and could embrace other initiatives as the Green Button of the DoE in the US and 'The Social Energy Collective' in the Netherlands. In addition to methodologies and tools proposals should establish a framework for cities' cooperation to exchange best practices and compare achievements.

Performance measurements should consider the solution's impact on greenhouse gas emission reductions, improved energy efficiency and increased integration of RES into a city's energy mix. Moreover quantification of economic, and possibly even social, performance of the solution at hand has to be included to evaluate the potential value for money and consumer engagement. In short, key performance indicators are to be developed at least along the environmental and economic dimensions of sustainability.

The work has to consider existing European initiatives such as the Reference Framework for sustainable Cities and the international dimension, notably the CityProtocol and ITU (International Telecommunication Union) initiatives.

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 to 1 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

- Involvement of society in data management processes of cities according to the value of information and improvement of level of trust of citizens.
- Stimulate market for data-enabled services/solutions (supporting entrepreneurship).
- Improved territorial knowledge for smart city planning.
- Recommendations to policy makers for collecting new sources of data and possibly form the basis for policy recommendations for a 'smart city index'.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

[92] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agency and will be implemented by the Commission services.

SCC 3 – 2015 [93]: Development of system standards for smart cities and communities solutions

Scope: Today the standards are developed for specific components or areas such as smart meters, smart grids, ICT etc. With the development of integrated solutions of Smart Cities and Communities a system approach is needed. Furthermore through standardisation the solutions identified by smart cities and communities can envisage costs reductions. It is expected that this work is carried out by the industries cities and communities contributing to the Smart Cities and Communities European Innovation Partnership in cooperation with the European Standardisation Organisations (CEN, CENELEC, ETSI) as well as other Standard Developing Organisations (SDOs) responsible for technical specifications in the area of Smart Cities. Social acceptance of developed solutions might be considered.

The process for developing smart cities and communities standards should ensure

- interoperability of solutions, i.e. adaptability of solutions to new user requirements and technological change as well as avoidance of entry barriers or vendor lock-in through promoting common meta-data structures and interoperable (open) interfaces instead of proprietary ones;
- open and consistent data, i.e. making relevant data as widely available as possible – including to third parties for the purpose of applications development – whilst using common, transparent measurement and data collection standards to ensure meaningfulness and comparability of performance/outcome measurements.

This action will cross-fertilise and cooperate with actions under topic SCC 1 – 2014/2015.

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 to 1 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact:

The project should lead to

- accelerating the deployment of Smart Cities and Communities solutions by ensuring the up-scaling of the process and lowering their costs,
- enabling the opening of market for multiple actors,
- ensuring the front run position for European smart cities solutions, at forefront worldwide.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

[93] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agency and will be implemented by the Commission services.

SCC 4 – 2014 [94]: Establishing networks of public procurers in local administrations on smart city solutions

Scope: These networks should aim at networking public procurement bodies in order to establish "buyers' groups" for innovative smart city solutions that improve the potential impact of the investment for cities and their citizens, and improve framework conditions for innovation. These networks will help public procurers to increase their capacity to undertake a better coordinated and articulated dialogue with suppliers about future needs by exchanging experience in procurement practices and strategies and by undertaking joint or coordinated actions. The networks must have core set of deliverables (additional actions can also be proposed):

- identifying procurement around a common need by European cities for which goods and services at the intersection of ICT, energy and transport in urban areas are bought as investment;
- prepare a number of formats/scenarios for possible future joint procurements; assessing the state-of-the art of potentially available solutions by developing different approaches for "market consultations" involving the supply chain (paying special attention to SMEs and locally-based businesses);
- carrying out legal work to ensure that the procurement of innovative solutions complies with European and national law;
- improving procurement capabilities by joint trainings, workshops and other networking activities.

It is envisaged that there will be a fairly small consortia (about 10 organisations) that will form the core consortium of public procurers and these will commit to organise dissemination activities for a larger group of public procurers in order to spread the findings in all EU Member States.

The members of the consortia must be public procurers, i.e. contracting authorities in the meaning of the public procurement Directives at all levels (local, regional, national and supra-national) that plan to establish implementation plans for improving the quality and efficiency of their public service offering by procurement of innovative solutions for use in cities and communities. This includes both contracting authorities in the meaning of the public procurement directive for public authorities (2004/18/EC) and utilities (2004/17/EC), for example public transport operators, relevant ministries, utilities, communes and cities, police or fire brigades, e-government administrations etc.

The list of deliverables should include, among others, an analysis of procurement examples already executed in EU Member States; an assessment of the most suitable cases for cross-border action; a set of generic draft procurements ready for adaptation to the particularities of the EU cities; an economic analysis on the benefits of simultaneous procurement from different cities. Work will also include the drafting of reports as well as dissemination activities to make these reports available to all interested parties.

This action will cross-fertilise and cooperate with actions under topic SCC 1 – 2014/2015.

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.1 to 0.15 million would allow this specific challenge to be addressed appropriately.

[94] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agency and will be implemented by the Commission services.

Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Expected impact: The project should mainly

- boost the market demand for smart city solutions by increasing consumer awareness about technologies and processes used in implementing smart city solutions.
- act as lever through procurement and investment planning tools for local administrations and business, a
- create better public acceptance and engagement.
- ensure the framework conditions for the participating organisations for organising joint, cross-border public procurements
- encourage the public procurement bodies active in cities and communities through networks' activities, to increasingly become "launch customers" for innovative smart solutions which are not yet available on a large-scale commercial basis and which may entail a higher risk than purchasing products that are already commercially widely available.

Type of action: Coordination and Support Actions

The conditions related to this topic are provided at the end of this call and in the General Annexes.

CONDITIONS FOR THIS CALL

Opening dates[95]: 11 December 2013 for 2014 topics
10 December 2014 for 2015 topics

Deadline(s) [96]:

SCC 1	07/05/2014		05/05/2015	
SCC 2, SCC 4	07/05/2014			
SCC 3			05/05/2015	

Indicative budget:

- EUR 92.32 million from the 2014 budget
- EUR 107.18 million from the 2015 budget

	2014 EUR million	*2015* *EUR million*	
Topic SCC1	EUR 90.32 million	*EUR 106.18 million*	Single stage evaluation
Topic SCC2	EUR 1 million		Single stage evaluation
Topic SCC3		*EUR 1 million*	Single stage evaluation
Topic SCC4	EUR 1 million		Single stage evaluation

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme.

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide[97] published on the Participant Portal.

[95] The Director-General responsible may decide to open the call up to one month prior to or after the envisaged date of opening

[96] The Director-General responsible may delay this deadline by up to two months.

- Indicative timetable for evaluation and grant agreement:

	Information on the outcome of the evaluation (*single or first stage*)	Information on the outcome of the evaluation (*second stage)*	Indicative date for the signing of grant agreements	
SCC1-SCC4	Maximum 5 months from the final date for submission		Maximum 3 months from the date of informing applicants	

Consortium agreements: In line with the Rules for Participation and the Model Grant Agreement, participants in Research and Innovation Actions or in Innovation Actions are required to conclude a consortium agreement prior to grant agreement.

[97] See: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/pse/h2020-guide-pse_en.pdf

CALL – SMEs AND FAST TRACK TO INNOVATION FOR ENERGY

H2020-SIE-2014/2015

SIE 1 – 2014/2015: Stimulating the innovation potential of SMEs for a low carbon and efficient energy system

Specific Challenge: SMEs play a crucial role in developing resource-efficient, cost-effective and affordable technology solutions to decarbonise and make more efficient the energy system in a sustainable way. They are expected to strongly contribute to one or a combination of more than one of the challenges outlined in the legal base of the Horizon 2020 Societal Challenge 'Secure, Clean and Efficient Energy'[98], in particular with regard to

- Reducing energy consumption and carbon footprint by smart and sustainable use (including energy-efficient products and services as well as 'Smart Cities and Communities'),
- Low-cost, low-carbon electricity supply (including renewable energy as well as CCS and re-use),
- Alternative fuels and mobile energy sources,
- A single, smart European electricity grid,
- New knowledge and technologies, and
- Robust decision making and public engagement.

Scope: The SME instrument consists of three separate phases and a coaching and mentoring service for beneficiaries. Participants can apply to phase 1 with a view to applying to phase 2 at a later date, or directly to phase 2.

In phase 1, a feasibility study shall be developed verifying the technological/practical as well as economic viability of an innovation idea/concept with considerable novelty to the industry sector in which it is presented (new products, processes, design, services and technologies or new market applications of existing technologies). The activities could, for example, comprise risk assessment, market study, user involvement, Intellectual Property (IP) management, innovation strategy development, partner search, feasibility of concept and the like to establish a solid high-potential innovation project aligned to the enterprise strategy and with a European dimension. Bottlenecks in the ability to increase profitability of the enterprise through innovation shall be detected and analysed during phase 1 and addressed during phase 2 to increase the return in investment in innovation activities. The proposal should contain an initial business plan based on the proposed idea/concept.

The proposal should give the specifications of the elaborated business plan, which is to be the outcome of the project and the criteria for success.

Funding will be provided in the form of a lump sum of EUR 50.000. Projects should last around 6 months.

[98] Council decision No 2013/743/EU establishing the Specific Programme implementing Horizon 2020 - The Framework Programme for Research and Innovation (2014-2020)

In phase 2, innovation projects will be supported that address the specific challenges outlined in the legal base of the Horizon 2020 Societal Challenge 'Secure, Clean and Efficient Energy' and that demonstrate high potential in terms of company competitiveness and growth underpinned by a strategic business plan. Activities should focus on innovation activities such as demonstration, testing, prototyping, piloting, scaling-up, miniaturisation, design, market replication and the like aiming to bring an innovation idea (product, process, service etc) to industrial readiness and maturity for market introduction, but may also include some research. For technological innovation a Technology Readiness Levels of 6 or above (or similar for non-technological innovations) are envisaged; please see part G of the General Annexes.

Proposals shall be based on an elaborated business plan either developed through phase 1 or another means. Particular attention must be paid to IP protection and ownership; applicants will have to present convincing measures to ensure the possibility of commercial exploitation ('freedom to operate').

Proposals shall contain a specification for the outcome of the project, including a first commercialisation plan, and criteria for success.

The Commission considers that proposals requesting a contribution from the EU of between EUR 0.5 and 2.5 million would allow phase 2 to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts. Projects should last between 12 and 24 months.

In addition, in phase 3, SMEs can benefit from indirect support measures and services as well as access to the financial facilities supported under Access to Risk Finance of this work programme.

Successful beneficiaries will be offered coaching and mentoring support during phase 1 and phase 2. This service will be accessible via the Enterprise Europe Network and delivered by a dedicated coach through consultation and signposting to the beneficiaries. The coaches will be recruited from a central database managed by the Commission and have all fulfilled stringent criteria with regards to business experience and competencies. Throughout the three phases of the instrument, the Network will complement the coaching support by providing access to its innovation and internationalisation service offering. This could include, for example, depending on the need of the SME, support in identifying growth potential, developing a growth plan and maximising it through internationalisation; strengthening the leadership and management skills of individuals in the senior management team and developing in-house coaching capacity; developing a marketing strategy or raising external finance.

Expected impact:

- Enhancing profitability and growth performance of SMEs by combining and transferring new and existing knowledge into innovative, disruptive and competitive solutions seizing European and global business opportunities.
- Market uptake and distribution of innovations tackling the specific challenges outlined in the legal base of the Horizon 2020 Societal Challenge 'Secure, Clean and Efficient Energy' in a sustainable way.
- Increase of private investment in innovation, notably leverage of private co-investor and/or follow-up investments.
- The expected impact should be clearly described in qualitative and quantitative terms (e.g. on turnover, employment, market seize, IP management, sales, return on investment and profit).

Type of action: SME Instrument (70%)

The conditions related to this topic are provided at the end of this call and in the General Annexes.

Fast track to Innovation - Pilot

Full details on this pilot are provided in the separate call for proposals under the Horizon 2020 Work Programme Part - Fast Track to Innovation Pilot (Part 18 of this Work Programme).

CONDITIONS FOR THIS CALL

Opening dates [99]: 03/03/2014 for 2014 topics for phase 1 and phase 2 of the SME instrument

18/12/2014 for 2015 topics for phase 1 and phase 2 of the SME instrument

Deadline(s) [100]:

Topic	Deadlines			
	2014		2015	
SIE 1 [SME] Open call cut-off dates	Phase 1 18/06/2014 24/09/2014 17/12/2014	Phase 2 09/10/2014 17/12/2014	Phase 1 18/03/2015 17/06/2015 17/09/2015 25/11/2015	Phase 2 18/03/2015 17/06/2015 17/09/2015 25/11/2015

Indicative budget:

- EUR 33.95 million from the 2014 budget
- EUR 34.76 million from the 2015 budget

	2014 EUR million	*2015* *EUR million*	
SIE 1 [SME] Open call cut-off dates	33.95 out of which 3.40 for phase 1, 29.89 for phase 2, 0.68 for mentoring & coaching support and phase 3	34.76 out of which 3.48 for phase 1, 30.58 for phase 2, 0.70 for mentoring & coaching support and phase 3	Single stage for both phase 1 and phase 2. The budget available for phase 1 and phase 2 will be divided equally between each cut-off date.

[99] The Director-General responsible may delay this date by up to two months.

[100] The Director-General responsible may delay this deadline by up to two months.

Eligibility and admissibility conditions: The conditions are described in parts B and C of the General Annexes to the work programme, with the following exceptions:

SIE 1 [SME instrument]	Proposals for phase 1 are not required to provide a draft plan for exploitation and dissemination. A proposal for phase 2 shall include a commercialisation plan.

Evaluation criteria, scoring and threshold: The criteria, scoring and threshold are described in part H of the General Annexes to the work programme, with the following exceptions:

SIE 1 [SME instrument]	The criterion Impact will be evaluated first, then Excellence and Implementation. If the proposal fails to achieve the threshold for a criterion, the evaluation of the proposal will be stopped. For phase 1 the threshold for individual criteria will be 4. The overall threshold, applying to the sum of the three individual scores, will be 13. For phase 2 the threshold for the criterion Impact will be 4. The overall threshold, applying to the sum of the three individual scores, will be 12. The final consensus score of a proposal will be the median of the individual scores of the individual evaluators; and the consensus report will comprise a collation of the individual reports, or extracts from them. Where appropriate, a Panel Review will be organised remotely. Applicants can provide during the electronic proposal submission up to three names of persons that should not act as an evaluator in the evaluation of their proposal for potential competitive reasons[101].

Evaluation procedure: The procedure for setting a priority order for proposals with the same score is given in part H of the General Annexes.

The full evaluation procedure is described in the relevant guide[102] published on the Participant Portal.

- Indicative timetable for evaluation and grant agreement:

	Information on the	Information on the	Indicative date for the

[101] If any of the persons identified is an independent expert participating in the evaluation of the proposals for the call in question, they may be excluded from the evaluation of the proposal concerned, as long as it remains possible to have the proposal evaluated.

[102] See: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/pse/h2020-guide-pse_en.pdf

	outcome of the evaluation (*single or first stage*)	outcome of the evaluation (*second stage)*	signing of grant agreements
SIE 1 [SME topic]	Two months after the corresponding cut-off date set out above for phase 1 and four months after the corresponding cut-off date set out above for phase 2.		One month from the date of informing applicants in phase 1 and two months from the date of informing applicants in phase 2.

Consortium agreements:

SIE 1 [SME instrument]: In the case of two or more SMEs submitting a proposal, in line with the Rules for Participation and the Model Grant Agreement, participants are required to conclude a consortium agreement prior to grant agreement.

OTHER ACTIONS

B.1. Energy efficiency

B.1.1: Buildings and consumers

Support to policy development and implementation of the Energy Efficiency relevant Directives and Regulations, namely Energy Performance of Buildings Directive (EPBD) and Energy Efficiency Directive (EED).

The Energy Performance of Buildings Directive (EPBD) is the main legislative instrument at EU level to achieve energy performance in buildings. Under this Directive, the Member States must apply minimum requirements as regards the energy performance of new and existing buildings, ensure the certification of their energy performance and require the regular inspection of boilers and air conditioning systems in buildings or take equivalent alternative measures.

Consumers: The correct implementation of the Energy Efficiency Directive requires the Commission to collect, analyse and assess a significant amount of market data and complex technical, environmental, economic, legal and social aspects.

To support the ***implementation of the recast EPBD***, the Commission has established an indicative list of services it intends to purchase over the years 2014 and 2015, mainly studies, technical and legal assistance [103]:

Title	Indicative budget (EUR million)	Indicative timeframe for launching the procurement procedure
1. Review study and related technical assistance for the EPBD (specific contract under framework contract)	0.45	2nd quarter 2015
2. Technical support on standardisation work under mandate 480: Monitoring the recast of the energy performance of building Directive (EPBD-recast) and technical support to the Liaison Committee on recast of the energy performance of building Directive (EPBD-recast) (2 specific contracts under framework contract)	0.45	2nd and 4th quarter 2014
3. Guidance on compliance and reporting on the monitoring of the independent control systems (1 direct service contract)	0.25	2nd quarter 2014

[103] All activities mentioned below, except of number 7 will be managed by the Commission services as they are aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders. Therefore they are excluded from the delegation to Executive Agency for Competitiveness and Innovation (EACI).

4. Development of an EU Building stock observatory (1 direct service contract)	1	2nd quarter 2014
5. Consumers uptake of recommendations given to improve the building stock (1 direct service contract)	0.4	2nd quarter 2014
6. Establishment and running of EU voluntary certification scheme for non-residential building (1 direct service contract)	0.45	3rd quarter 2015
7. Support for *Build Up skills* EU exchanges and analysis on construction skills (1direct service contract)	0.45	2nd quarter 2014
8. Detailed technical assessment of national/regional energy performance of buildings calculation methodologies and tools, taking into consideration the set of standards revised/developed by CEN under mandate 480 including Technical support to the Commission on standardisation work on EPBD (2 specific contracts under framework contract)	0.45	2nd quarter 2015

Type of action: Public procurement

Total indicative budget:

- EUR 2.55 million from the 2014 budget
- EUR 1.35 million from the 2015 budget

9. Concerted Action EPBD IV: support to Member States and participating countries for the implementation of the Energy Performance of Buildings Directive (EPBD).

Concerted action with regard to implementation of EU legislation and policy: It covers topics where coordination and/or harmonisation of approaches would be beneficial, but is not required by EU legislation. A concerted action is therefore designed to provide added value compared with measures taken by each MS acting on its own and to achieve an optimum combination of the various instruments at the disposal of both the EU and the MS.

A concerted action meets the conditions laid down in Article 190(1)(f) of the rules implementing the Financial Regulation and the relevant procedures will be applied. Concerted actions will be undertaken by organisations designated by the MS and countries participating in the CA. The Commission Member States (MS) and participating countries (CA) concerns a limited number of specific activities in relation to implementation of EU legislation and policy. It aims at fostering exchanges of information and experience between MS and participating countries with has the role of coordinating this kind of action with the countries concerned.

Each concerted action will be allocated to a consortium of organisations designated and entrusted by the participating countries, under the coordination of one member of the consortium.

Legal entities [104]*:* Bodies officially appointed by their government for the implementation of the EPBD

Part. N°	Participant name	Participant short name	Country code
1	Austrian Institute of Construction Engineering, Schenkenstrasse 4, 1010 Wien, Austria	OIB	AT
2	Belgian Building Research Institute, Rue du Lombard 40-42, 1000 Bruxelles, Belgium	BBRI	BE
3	Sustainable Energy Development Agency, 37 Ekzarh Yosif Str, 1000, Sofia	SEDA	BG
4	Ministry of Energy, Commerce, Industry and Tourism Andrea Araouzou Street 13-15, 1421 Nicosia, Cyprus	MCIT	CY
5	Ministry of Industry and Trade Na Františku 32, 110 15 Praha, Czech Republic	MPO	CZ
6	Ministry of Construction and Physical Planning Republike Austrije 20, 10 000 Zagreb, Croatia	MEPPPC	HR
7	Danish Energy Agency Amaliegade 44, 1256 Copenhagen, Denmark	DEA	DK
8	Climate and Energy Agency of the Credit and Export Guarantee Fund KredEx Hobujaama 4, 10151 Tallin, Estonia	KENA	EE
9	Motiva Oy Urho Kekkosen katu 4-6 A, 00101 Helsinki, Finland	MOTIVA	FI
10	Directorate of Housing, Town Planning and Landscapes 92055 LA DEFENSE - CEDEX	DHUP	FR
11	Federal Institute for Research on Building, Urban Affairs and Spatial Development Deichmanns Aue 31-37, 53179 Bonn, Germany	BBSR	DE
12	Centre for Renewable Energy Sources and Saving 19th Km Marathonos Avenue, 19009 Pikermi, Attiki, Greece	CRES	GR
13	University of Debrecen Egyetem tér 1, 4032 Debrecen, Hungary	UD	HU
14	Sustainable Energy Ireland Authority Wilton Park House, Wilton Place, Dublin 2, Ireland	SEIA	IE
15	National Agency for New Technologies, Energy and Sustainable Economic Development	ENEA	IT

[104] List of legal entities nominated by their government to participate in the on-going EPBD Concerted Action III (2011-2015). This list may be amended if a government decides to appoint a different implementing body.

	Lungotevere Thaon di Revel, 76, 00196 Rome		
16	Ministry of Economics of the Republic of Latvia Brīvības Street 55, 1519 Riga, Latvia	ME	LV
17	Certification centre of buildings products Linkmenu Street 28, 08217 Vilnius, Lithuania	SPSC	LT
18	Building Regulation Office, Ministry for Transport and Infrastructure Francesco Buonamici Street, Project House, 1st floor, FRN 1700 Floriana, Malta	BRO	MT
19	NL Agency Juliana van Stolberglaan 3, 2595 CA Den Haag, The Netherlands	ANL	NL
20	Norwegian Water Resources and Energy Directorate Drammensveien 211, 0301 Oslo, Norway	NVE	NO
21	Ministry of Infrastructure and Development Filtrowa 1, 00-611 Warszawa, Poland	ITB	PL
22	Portuguese National Energy Agency Rua Dr. António Loureiro Borges 5 – 6° andar, Arquiparque - Miraflores, 1495-131 Algés, Portugal	ADENE	PT
23	TSUS, Building Testing and Research Institute Studená 3, 821 04 Bratislava, Slovakia	TSUS	SK
24	Building and Civil Engineering Institute ZRMK Dimičeva 12, 1000 Ljubljana, Slovenia	BCEI ZRMK	SI
25	Institute for Energy Diversification and Conservation Calle de la Madera 8, 28004 Madrid, Spain	IDAE	ES
26	The National Board of Housing, Building and Planning Drottninggatan 18, Box 534, 371 23 Karlskrona, Sweden	Boverket	SE
27	Building Research Establishment BRE, Bucknalls Lane, Watford WD25 9XX, UK	BRE	UK
28	Ministry of the Economy Boulevard Royal 19-21, 2449 Luxembourg, Luxembourg	MinEco	LU
29	Ministry for Regional Development and Tourism Apolodor Street 17, Latura Nord, sector 5, 010873 Bucharest, Romania	MRDT (MDRT)	RO

Type of action: Grant to identified beneficiaries - Coordination and support action

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes.

Indicative budget: EUR 3 million (from the 2015 budget)

Indicative timetable: 2nd quarter 2015

To support the ***implementation of the relevant provisions of the Energy efficiency Directive***, Directive 2012/27/EU, also in view of the development of the EU energy efficiency policy for 2030, the Commission intends to purchase some services, mainly studies, technical and legal assistance, data collection and modelling, communication activities, as mentioned in the following indicative list [105]:

10. Study and analysis on the implementation of the EED with a view of complying with the analysis and reporting obligations under the EED and in the framework of the 2030 objectives (specific contracts)	0.24 0.44	2nd quarter 2014 2nd quarter 2015
11. Evaluation of the legal transposition and implementation of the EED in all Member States. (specific contract under framework contract)	0.4	2nd quarter 2014
12. Study mapping the technological needs (from research to market deployment) and priorities in support of delivering the EU energy efficiency policy till 2020 (and towards 2030) (specific contract under framework contract)	0.4	2nd quarter 2014
13. Studies and analysis regarding EE policies (including EED, EPBD, ecodesign and labelling) on European or national level as well as modelling to assess energy system impacts and macro-economic effects in view of the 2030 perspective (3 specific service contracts)	0.4 0.9	2nd and 3rd quarter 2014 2nd and 3rd quarter 2015
14. Review of impacts of projects managed by the EACI (such as MLEI projects) (2 specific contracts under framework contract)	0.1 0.2	3rd quarter 2014 2nd quarter 2015
15. Communication activities related to Energy Efficiency (4 specific contracts under framework contract)	0.9	1st and 3rd quarter 2015
16. EU Sustainable energy week (1 direct service contract)	2.5	2nd quarter 2014
17. Support to the initiative on sustainable energy in the defence on exchanges, analyses and training to Member States on the implementation of EU policies and legislation on energy efficiency, renewable energy and energy infrastructure. Study on possible options in 2014 and	0.1	2nd quarter 2014 1st quarter

[105] All activities mentioned below, except of number 14, 16 and 18 to be kept in the Commission. These activities, directly aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders are excluded from the delegation to EACI and will be implemented by the Commission services.

development of the initiative in 2015 (2 direct service contracts)	0.7	2015
18. EACI external communication activities (publications, audiovisual, events) (including ca. 8 specific contracts under framework contracts)	0.5 0.5	2nd quarter 2014 2nd quarter 2015

Type of action: Public Procurement

Total indicative budget:

- EUR 4.64 million from the 2014 budget
- EUR 3.64 million from the 2015 budget

19. Administrative arrangement with the JRC, to implement the relevant provisions of Energy Efficiency related Directives or Regulations, such as Directive 2012/27/EU [106]

According to Council conclusions of 26.04.1994 (J.O. C 126 of 7.05.1994) on the role of the DG Joint Research Centre, the JRC activities include Institutional support activities such as Scientific and technical support activities necessary for the formulation and implementation of Community policies and of the tasks allotted to the Commission pursuant to the Treaties, which necessitate the neutrality of the JRC.

Type of action: Provision of technical/scientific services by the EC Joint Research Centre (JRC)

Total indicative budget: EUR 2.1 million from the 2014 budget

19a. Annual subscription to the International Partnership for Energy Efficiency Cooperation (IPEEC)

The purpose of the International Partnership for Energy Efficiency Cooperation (IPEEC) is to strengthen international cooperation on energy efficiency. The action carried out under the auspices of the Partnership should result in more effective energy policy and programme output, in best practices being more widely known, disseminated and applied and in economies of scale. The aim of the Partnership is to offer a topic-driven, structured dialogue and an operational network for enhanced cooperation and exchanges on energy efficiency between countries and international organisations by:

- exchanging information and experience on development of regulatory measures, policies and programmes;
- developing benchmarks and sharing information on goods and services, along with measurement methods regarding energy performance and energy savings;
- strengthening information, education and training for energy consumers;

[106] This activity is, directly aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders. Therefore it is excluded from the delegation to the Executive Agency for Competitiveness and innovation (EACI) and will be implemented by the Commission services.

- building stakeholder capacity by improving contacts between national, regional and local authorities and other relevant partners and stakeholders, exchanging views and sharing knowledge and experience.

On 30 November 2009 the Council adopted a Decision on the signing and conclusion of the Terms of Reference for the IPEEC and the Memorandum concerning the hosting by the International Energy Agency of the Secretariat of the International Partnership for Energy Efficiency Cooperation by the European Community. The Council endorsed the Commission proposal that, from the second year of membership (i.e. 2012), the European Union will voluntarily contribute EUR 60 000 for each subsequent year.

Type of action: Subscription[107]

Indicative timeframe: From 3rd quarter of 2014 onwards

Indicative budget:

- EUR 0.06 million from the 2014 budget
- EUR 0.06 million from the 2015 budget

B.1.2: Heating and cooling

On 25 October 2012, the EU adopted the Directive 2012/27/EU on energy efficiency (EED). This Directive establishes a common framework of measures for the promotion of energy efficiency within the Union in order to ensure the achievement of the Union's 2020 20% headline target on energy efficiency and to pave the way for further energy efficiency improvements beyond that date. It lays down rules designed to remove barriers in the energy market and overcome market failures that impede efficiency in the supply and use of energy, and provides for the establishment of indicative national energy efficiency targets for 2020.

The correct implementation of the Energy Efficiency Directive, requires the Commission to collect, analyse and assess a significant amount of market data and complex technical, environmental, economic, legal and social aspects. To support the implementation of the relevant provisions of Directive 2012/27/EU, the Commission intends to purchase some services, mainly studies, technical and legal assistance, data collection, communication activities, as mentioned in the following indicative list :

20. Studies – including planning, cost-benefit and energy system analyses – for the development of an EU heating and cooling (including ventilation) framework for the transition towards efficient heating and cooling in line with long-term (2050) EU objective. (2 direct service contracts) [108]

Type of action: Public procurement

Total indicative budget:

- EUR 0.3 million from the 2014 budget, 2nd quarter 2014;

[107] According to Article 121(2)(d) of the Financial Regulation and Article 173 of its Rules of application

[108] This activity is directly aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders. Therefore it is excluded from the delegation to EACI and will be implemented by the Commission services.

- EUR 0.6 million from the 2015 budget, 2nd quarter 2015.

Development of standards under Framework Partnership Agreement with Cen-Cenelec [109]:		
21. Standards on the accounting for individual consumption of heating/cooling and domestic hot water in multi-apartment and multi-purpose buildings supplied from a common heating/cooling source - Facilitate implementation of Article 9(3) of Directive 2012/27/EU	1.5	2nd quarter 2014
22. Standardised Primary Energy Saving Calculations, Standard Guaranteed of Origins and PES Certificates/ Facilitate implementation and ensure coherence of implementation of EU legislation, in particular Directive 2012/27/EU and Directive 2009/28/EC	0.2	2nd quarter 2014

Type of action: Grant to identified beneficiaries - Coordination and support action

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes.

Identified beneficiary:

CEN-CENELEC
Avenue Marnix 17
B-1000 Brussels
Belgium

Total indicative budget: EUR 1.7 million from the 2014 budget

B.1.3: Industry and products

The Ecodesign Directive and the Energy Labelling Directive constitute important pillars of the EU's energy efficiency policy. Both Directives play a crucial role in achieving the 20% energy efficiency objective of the 2020 flagship initiative. Additionally, the Tyre Labelling Regulation EC (1222/2009) and Energy-Star Programme contribute to these objectives in bringing focus on the efficiency of car tyres and office equipment.

The correct application and the adoption of the framework of the Ecodesign and the Energy Labelling Directives requires the Commission to collect and to analyse a significant amount of market data and to run complex technical, environmental, economic, legal and social aspects. The Commission's legislative proposals in particular, must be based on reliable and up-to-date data and must meet all mandatory criteria specified in the Directives.

To support the policy development and implementation of the Ecodesign Directive, the Energy labelling Directive and the Tyre Labelling Regulation the Commission intends to purchase the following indicative list of services [110]:

[109] These activities are, directly aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders. Therefore they are excluded from the delegation to Executive Agency for Competitiveness and Innovation (EACI) and will be implemented by the Commission services.

23. Provision of technical assistance and/or studies to collect and analyse the related data and to properly assess complex technical, environmental, economic, legal and social aspects of different product groups in order to inform policy-makers with an objective and unbiased judgement of the likely impacts of different policy options and allow an efficient monitoring of existing legislation (specific contracts under framework contracts)	3.5 2.5	2nd quarter 2014 2nd quarter 2015
24. Technical support to the Commission on standardisation work on energy related products (3 specific contracts under framework contract)	0.3 0.3	2nd quarter 2014 2nd quarter 2015
25. Technical support to stakeholders on standardisation work on energy related products (between 4 and 6 specific contracts)	0.4 0.3	2nd quarter 2014 2nd quarter 2015
26. EU Energy Star Programme: Development and maintenance of the website and Technical support for the development of new technical specifications (2 direct service contracts)	0.3	1st quarter 2014
27. Support for Energy Star impact assessment and market penetration survey (1 direct service contract)	0.3	1st quarter 2014
28. Energy and Resource Efficiency in industry, agriculture and energy production: integrated and system approaches, technology leaps and implementation options (1 direct service contract)	0.4	2nd quarter 2014

Type of action: Public procurement

Total indicative budget:

- EUR 5.2 million from the 2014 budget
- EUR 3.10 million from the 2015 budget

[110] All activities mentioned below directly aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders. Therefore, they are excluded from the delegation to Executive Agency for Competitiveness and Innovation (EACI).

B.1.4: Innovative financing for sustainable energy

The ELENA (European Local Energy Assistance) Facility was established in 2009 under the Intelligent Energy-Europe Programme II. It has been implemented by the Commission and the European Investment Bank (EIB) KfW Bankengruppe, European Bank for Reconstruction and Development (EBRD) and the Council of Europe Development Bank (CEB). The EIB-ELENA Facility will continue under the Energy efficiency focus area of the Horizon 2020, as a support instrument for the implementation of the Energy Efficiency Directive. The implementation of the facility by the European Investment Bank will be subject to dedicated agreement between European Investment Bank and the Commission[111].

The institutions implementing the Facility ensure that Project Development Services are being awarded to eligible entities in accordance with the principles of transparency, proportionality, sound financial management, equal treatment and non-discrimination, lack of conflict of interests and compliance with internationally accepted standards.

The technical assistance grants will be provided to the Final Beneficiary in relation to feasibility and market studies, project structuring, business plans, energy audits, preparation of tendering procedures and contractual arrangements and include any other assistance necessary to develop Investment Programmes, excluding subsidies to investment (hardware) costs.

Request for Project Development Services shall be addressed to the EIB according to the standard procedure for the submission of projects to the EIB. Applications are open to all participating countries and are not restricted by the availability of local financial institutions of the EIB in a specific country.

29. EIB-ELENA Facility for the project development assistance [112]

Type of action: Delegation agreement/FAFA

Indicative timetable: 3rd quarter 2014

Total indicative budget:

- EUR 15 million from the 2014 budget
- EUR 15 million from the 2015 budget

Further, to support the mobilisation of investments in the sustainable energy area, and to address the related market barriers the Commission intends to purchase the following indicative list of services [113]:

[111] The ELENA Facility is being implemented by the EIB, the EBRD, the KfW and the CEB. As funding under ELENA-KfW, ELENA-EBRD and ELENA-CEB is still available from the IEE II (2012-2013) allocations, the 2014-2015 Work programme allocates additional funding to the ELENA-EIB, to ensure the implementation of its pipeline. The Commission will undergo an evaluation of the ELENA Facility in 2014.

[112] This activity, directly aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders is excluded from the delegation to EACI and will be implemented by the Commission services.

30. Evaluation, monitoring and benchmarking accompanying the project development assistance facilities (2 direct service contracts)	1 0.7	2nd quarter 2014 2nd quarter 2015
31. Study for an EU sustainable energy finance roadmap (1 direct service contract)	0.45	2nd quarter 2014
32. Sustainable energy financing portal (2 direct service contracts)	1.6	2nd quarter 2015

Type of action: Public procurement

Total indicative budget:

- EUR 1.45 million from the 2014 budget
- EUR 2.3 million from the 2015 budget.

B.2.: Competitive low-carbon energy technologies

B.2.1.: Support to policy development and implementation of the Renewable Energy Directive [114]

RED sets the EU legislative framework for the meeting the 2020 renewable energy target, but work is needed by public and private sector stakeholders to implement the new framework on the ground. The following technical assistance and study contracts will contribute to the implementation of the Renewable energy Directive in 2014 and 2015.

Type of action: Public procurement

Title	N° of number of contracts	Indicative timeframe for the request or open call	Indicative budget (Million EUR)
1. Information and	2	3rd quarter 2014	0.3

[113] All activities mentioned below, except of number 32 will be managed by the Commission services as they are directly aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders. Therefore, they are excluded from the delegation to Executive Agency for Competitiveness and Innovation (EACI).

[114] All activities mentioned below, except of number 1 and 2 will be managed by the Commission services, as they are directly aimed at supporting the development and implementation of evidence base for energy policy and supporting various groups of stakeholders. Therefore they are excluded from the delegation to executive agencies.

communication activities		3rd quarter 2015	0.3

Type of contract: Framework contract

Title	N° of number of contracts	Indicative timeframe for the request or open call	Indicative budget (Million EUR)
2. Review of bio-energy projects implemented under IEE II	1	2nd quarter 2014	0.25
3. Technical assistance for the preparation of 2016 Renewable energy progress report	1	3rd quarter of 2014	0.8
4. Assessment of voluntary schemes for sustainability of biofuels	1	2nd quarter of 2014	0.3
5. Study on alternative post-2020 policy options (technical assistance for preparation of the Impact Assessment for post-2020 RES proposal)	1	1st or 2nd quarter of 2014	1
6. Technical assessment study for an EU wide support scheme	1	1st quarter of 2015	0.5
7. Technical assessment study for bioenergy optimal use post-2020	1	1st quarter of 2015	0.5
8. Legal assistance in assessment of compatibility of national legislation.	1	1st quarter 2014	1

Type of contract: Public procurement

9. Technical assistance in preparation of the report on the estimated typical and default values for biofuels (Annex V) Directive 2009/28/EC (with technical amendments to the Annex V of the RES Directive) (Administrative agreement with the JRC)	1	3rd quarter of 2014	0.3
10. Modelling tools and capacity (Administrative Agreement with the JRC)	1	2nd quarter of 2014	0.6

Type of contract: Provision of technical/scientific services by the EC Joint Research Centre (JRC)

Total indicative budget:

- EUR 4.55 million from the 2014 budget
- EUR 1.3 million from the 2015 budget

B.2.2.: Coordination of Renewable Energy policies development and implementation through concerted actions with Member States

Concerted action with regard to implementation of EU legislation and policy: It covers topics where coordination and/or harmonisation of approaches would be beneficial, but is not required by EU legislation. A concerted action is therefore designed to provide added value compared with measures taken by each MS acting on its own and to achieve an optimum combination of the various instruments at the disposal of both the EU and the MS.

A concerted action meets the conditions laid down in Article 190(1)(f) of the rules implementing the Financial Regulation,[115] and the relevant procedures will be applied. Concerted actions will be undertaken by organisations designated by the MS and countries participating in the CA. The Commission Member States (MS) and participating countries (CA) concerns a limited number of specific activities in relation to implementation of EU legislation and policy. It aims at fostering exchanges of information and experience between MS and participating countries with has the role of coordinating this kind of action with the countries concerned.

Each concerted action will be allocated to a consortium of organisations designated and entrusted by the participating countries, under the coordination of one member of the consortium.

A concerted action is addressed only to national authorities transposing and implementing a specific item of EU legislation and policy, or to bodies appointed by the national authorities to implement a specific EU legislation and policy. In each case, as national transposition has already started, the national actors involved in transposition and implementation of the directive are identified and national work has been defined. These national actors when nominated for participating in a concerted action qualify for an application of Art 190(1)(f) of the Implementing Rules.

Legal entities:

	Country	**Nominated organisation**	**Address**
1	Austria	Austrian Energy Agency	Mariahilferstraße 136 1150 Vienna Austria
2	Belgium	Service Publique Wallonie	Place Joséphine Charlotte 2 5100 Namur Belgium
3	Bulgaria	Ministry of Economy, Energy and Tourism	Slavyanska beseda str. 8 1040 Sofia Bulgaria

[115] Article 190(1)(f): Grants may be awarded without a call for proposals for actions with specific characteristics that require a particular type of body on account of its technical competence, its high degree of specialisation or its administrative power, on condition that the actions concerned do not fall within the scope of a call for proposals.

4	Cyprus	Ministry of Commerce, Industry and Tourism	13-15 Andrea Araouzou Street 1421 Nicosia Cyprus
5	Czech Republic	Ministry of Industry and Trade	Na Františku 32 110 15 Praha Czech Republic
6	Croatia	Ministry of economy, labour and entrepreneurship	Ulica grada Vukovara 78 10000 Zagreb Croatia
7	Denmark	Danish Energy Agency	Amaliegade 44 1256 Copenhagen K Denmark
8	Estonia	Ministry of Economic Affairs and Communications	Harju 11 15072 Talinn Estonia
9	Finland	Ministry of Economy and employment	Aleksanterinkatu 4 00023 Helsinki Finland
10	France	Ministère de l'Ecologie, du Développement Durable et de l'Energie	Arche de la Défense, paroi Nord 92055 La Defense France
11	Germany	Federal Ministry of the Environment, Nature Conservation and Nuclear Safety	Stresemannstrasse 128-130 10117 Berlin Germany
12	Greece	Centre of Renewable Energy sources	19th km Marathonos Avenue 19009 Pikermi Greece
13	Hungary	Hungarian Energy and Public Utility Regulatory Authority	1081 II. János Pál pápa tér 7, PF. 247. Budapest Hungary
14	Ireland	Department of Communication, Energy & Natural Resources	Adelaide Road 29-31 2 Dublin Ireland
15	Italy	Gestore dei Servizi Elettrici – G.S.E. S.p.a	Viale Maresciallo Pilsudski, 92

			197 Roma Italy
16	Latvia	Ministry of Economy	Brivibas street 55 1519 Riga Latvia
17	Luxembourg	Ministry of Economy	Boulevard Royal 19-21 2449 Luxembourg
18	Lithuania	Ministry of Energy	Gedimino pr. 38 1104 Vilnius Lithuania
19	Malta	Ministry of Economy and External Trade	Berga ta' Kastilja, Triq San Pawi VLT 1061 Valletta Malta
20	Netherlands	NL Agency, the Dutch national energy agency	Croeselaan 15 3521 BJ Utrecht The Netherlands
21	Norway	Ministry of Petroleum and Energy	Akersgt 59, PB 8148 33 Oslo Norway
22	Poland	Polish National Energy Conservation Agency	Ul. Nowowiejska 21/25 00-665 Warszawa Poland
23	Portugal	Laboratório Nacional de Energia e Geologia (LNEG)	Rua da Amieira 4466-901 S. Mameda de infesta Portugal
24	Romania	Ministry of Economy, Trade and Business Environment.	Calea Victoriei 152 10096 Bucharest Romania
25	Slovakia	Slovak Innovation and Energy Agency	Bajkalska 27 82799 Bratislava Slovakia
26	Slovenia	Ministry of Infrastructure and Spatial Planning	Langusova ulica 4 1000 Ljunljana Slovenia
27	Spain	Instituto para la Diversificación y el Ahorro de la Energía (IDAE)	Calle de la Madera 8 28004 Madrid

			Spain
28	Sweden	Swedish Energy Agency (STEM)	P.O. Box 310, SE-631 04 Eskilstuna, 631 04 Eskilstuna Sweden
29	UK	Energy Saving Trust (EST)	Dartmouth Street 21 SW1H 9BP London United Kingdom
30	Iceland	Ministry Energy Industry and Tourism	Skúlagötu 4 150 Reykjavik Iceland

Type of action: Grant to identified beneficiaries – Coordination and support action

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes.

Title	Indicative timetable	Indicative budget (MEUR)
Concerted Action Renewable Energy Sources (CA-RES III): support for Member States with the implementation of the RED	4th quarter 2015	5,5

Total indicative budget: EUR 5.5 million from the 2015 budget

B.2.3.: Support to Research and Innovation Policy in the areas of Renewable Energy, Carbon Capture and Storage and Clean Coal [116]

Technical assistance and economic and policy analysis to support various aspects of the Research and Innovation policy in one or more areas of the energy field. The areas concerned are i) renewable electricity (e.g. wind power, photovoltaics, concentrated solar power, bioenergy, enhanced geothermal systems, ocean energy, hydro power), ii) heating and cooling through renewable energy and fossil fuels, iii) biofuels, iv) Carbon Capture and Storage, including utilisation of Carbon Dioxide and v) Clean Coal.

These analyses may include:

- Technology foresight and potential.

[116] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

- Energy technology dependency;
- Analysis of the above specified EU energy areas vis-à-vis global competitors as well as vis-à-vis other technologies at the various levels of the supply lines: an overview and analysis of trends in the different renewable energy sectors and possible synergies with Carbon Capture and Storage. Key factors to maintain global technological leadership.
- Research and innovation strategies of major international players, including inventory, impacts and best practices of the support put in place in leading countries.
- Impact of various European and national, regional, local policies (energy, industrial and SME policy, fiscal, environmental, employment, R&D etc.) Economic analysis e.g. business cases, supply line economics, value-added analysis.
- Market take-up issues.
- Environmental and health related impacts of projects in the above specified areas and possible areas for risk mitigation to be undertaken by research and innovation.
- Public perception and awareness
- Analysis of capacities and skills.

Type of action: public procurement

Type of contract/Indicative number: Framework contract, with 7 specific contracts planned to be launched in 2015. Overall indicative ceiling of the framework contract over 4 years: EUR 20 million

Timeframe: 4th quarter 2014 for the launch of the framework contract procedure.

Indicative budget for specific contracts:

- EUR 2 million from the 2014 budget
- EUR 5 million from the 2015 budget

B.2.4.: JRC's assistance for Research and Innovation policy [117]

According to Council conclusions of 26.04.1994 (J.O. C 126 of 7.05.1994) on the role of the DG Joint Research Centre, the JRC activities include Institutional support activities such as scientific and technical support activities necessary for the formulation and implementation of Community policies and of the tasks allotted to the Commission pursuant to the Treaties, which necessitate the neutrality of the JRC.

Title

[117] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

Observatory of low carbon energy research and innovation activities (from fundamental research to close-to-market) in EU and Member States building on existing databases and the Energy Research Knowledge Centre under the SETIS

Type of action: Provision of technical/scientific services by the EC Joint Research Centre (JRC)

Timeframe: 3rd quarter 2014

Total indicative budget:

- EUR 8 million from the 2014 budget

B.2.5.: Engine tests with new types of biofuels and development of biofuel standards under existing Framework Partnership Agreement with CEN-CENELEC [118]

New types of biofuels and higher biofuel blends with diesel and petrol are being studied by the biofuel producers, car industry and technology developers. All new types of fuels and blends need extensive testing in several engines to ensure the performance of the engine and the exhaust emissions. The aim is to study the performance of various types of engines with various types of biofuels or new applications of existing biofuels (such as Euro 6 validation above B7, definition of a B10 – B30 reference fuel for the emission testing for Euro6 validation, etc.).

Standards for new types of biofuels are needed to facilitate the introduction of new types of biofuels and intermediate products such as pyrolysis oils for stationary and mobile applications as well as algae. Other type of standards relate to higher blends of biofuels with petrol and diesel such as E25 and B30. Standards facilitate the market deployment of new biofuels and bio-liquids and thus the implementation of the RED by the Member States.

Type of action: Specific Grant Agreement under existing Framework Partnership Agreement.

Partner:

CEN-CENELEC,
Avenue Marnix 17,
1000 Brussels
Belgium

Rate of co-funding: Funding rates in compliance with the conditions set out in the framework partnership agreement with CEN-CENELEC, in particular according to the scale of unit costs for eligible staff costs established therein and up to 100% for other eligible direct costs.

Indicative timeframe: 4th quarter of 2014

Total indicative budget: EUR 3.0 million from the 2014 budget

[118] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

B.2.6.: Realization of a reliable and stable energy supply systems integrating increasing share of variable renewable energy and storage [119]

The future EU energy supply system can be built on integrating and increasing share of renewable energy sources. At this end, different key technologies have been already developed towards functional maturity, like wind, solar, bio-energy. Currently, the tasks for research and development lie for the most part in further cost reduction and development of new approaches.

However, the realization of a reliable and stable supply systems integrating higher share of variable renewable energy under complex technological, economic and environmental boundary conditions is still very challenging.

From one hand, energy system technology should targets the optimal mixture of components of generation and consumption which are necessary for a well-functioning system as a whole. New requirements for the design and control of the individual subsystems and components may emerge from considerations at the system level. From the other hand, economic analysis should detail the overall consequences of the massive influx of variable renewables.

Expected results:

1. Simulations and scenarios analysis

These simulations are being used to develop scenarios measuring the effect to expand the share of renewable energy and for the integration and harmonization of renewable and conventional electricity generation. The computations are based on detailed time series for wind, solar, geothermal, biomass, and hydro power which can be used for assessing network expansion, the addition of storage systems, the management of the energy economy. In addition, conventional power generation scheduling and the balancing of fluctuations are modelled, with high time and spatial resolution. Load flow calculations and planning and analysis tools are also developed.

2. Economic analysis

The economic consequences of integrating an increasing influx of variable renewables in terms of compression effect, grid stability, merit order effect, strain on power lines, disruption of existing business models are analysed at the different time horizons.

Type of action: Public procurement.

Indicative number of direct service contracts: 1

Indicative timeframe: 3rd quarter of 2014

Indicative budget: EUR 3.5 million from the 2014 budget

[119] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

B.2.7.: Energy Storage Mapping and Planning [120]

The transition to a low-carbon energy system in Europe will likely require much increased storage capabilities for different energy vectors or effluents and other uses of subsoil space. Strategic planning for this transition and for avoiding potential use conflicts requires an appropriate view of available sites that could host such storage facilities and to integrate this view with more advanced planning of the whole European energy system. The study should compile detailed maps covering Europe and its neighbouring countries, and assess the potential of all existing and future storage sites in Europe (underground storage of CO2, hydrogen, compressed air, natural gas, underground pumped hydro, etc. and above ground storage such as pumped hydro, LNG, liquid air, etc.) and combine this data with existing and future network development plans (e.g.: ten-year network development plan - TYNDP - for electricity, gas, etc.) for optimised spatial planning across borders as well as map these data with planned and potential alternative energy uses such as "Hydrocarbon extraction" or for geothermal energy As most data exists in a fragmented form, the major work will consist in compiling existing data and to exploit it for an optimised energy systems planning. The study will contribute to strengthen the basis for long term strategic planning and optimising our future energy system and define potential bottlenecks at an early stage. System modellers and policy planners shall be involved since the beginning to ensure that the new set of data will fit their needs for more robust modelling, planning, designing, etc. on a coherent basis and comparable between Member States. This planning shall allow a better assessment of eventual or upcoming bottlenecks in our energy system and to optimise the planning for future cables, pipelines, power plants, storage, etc.

Type of action: Public procurement

Indicative number of direct service contracts: 1

Indicative timeframe: 2nd quarter of 2014

Indicative budget: EUR 2.5 million from the 2014 budget

B.2.8.: Energy Policy support on CCS [121]

Technical assistance and policy analysis to support follow up actions to the consultative Communication of March 2013 and the 2030 Communication (such as support for impact assessment, policy option/instruments analysis workshops etc.)

Type of action: public procurement

Indicative number of direct service contracts: 1

Indicative timeframe: 4th quarter 2014.

Total indicative budget: EUR 0.5 million from the 2014 budget

[120] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

[121] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

B.2.9.: Energy Policy support on unconventional gas and oil [122]

According to Council conclusions of 26.04.1994 (J.O. C 126 of 7.05.1994) on the role of the DG Joint Research Centre, the JRC activities include Institutional support activities such as scientific and technical support activities necessary for the formulation and implementation of Community policies and of the tasks allotted to the Commission pursuant to the Treaties, which necessitate the neutrality of the JRC.

Support by JRC-IET in the area of unconventional gas and oil, especially by:

- Assessing Europe's resources in cooperation with geological surveys, especially by analysing results from current assessments conducted by Member States and from ongoing exploration projects.
- Analysing energy market as well as broader economic impacts.
- Evaluating the technical and economic framework conditions for the development of a European shale gas industry e.g. availability of related service industries and of a skilled workforce, appropriateness of exploration and production technologies and methods including possible needs and scope for their improvement.
- International knowledge sharing.

Type of action: Provision of technical/scientific services by the EC Joint Research Centre (JRC)

Indicative timeframe: 2nd quarter of 2014

Indicative budget: EUR 2.0 million from the 2014 budget

B.2.10.: Innovative Financial Instruments for First-of-a-kind Commercial Demonstration Projects in the field of Energy [123]

First-of-a-kind commercial demonstration projects are essential to demonstrate the technical and commercial viability at industrial scale of new generations of energy technologies and solutions to achieve a cost-competitive, sustainable and secure energy sector by 2050. These actions are predominant in the Strategic Energy Technology (SET) Plan roadmaps. However, most of the first-of-a-kind commercial demonstration projects proposed in the SET Plan have not yet received adequate financing in order to progress due to the risk level and financing volumes required.

The scope of this study is to better understand how to solve the financing problem for moving innovative technologies that reached already TRL 6-7 to TRL 8 in the field of energy. It should contain work packages on risk analysis, risk assessment methodologies, and de-risking

[122] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

[123] This activity directly aimed at pilot activities is excluded from the delegation to the executive agency and will be implemented by the Commission services.

strategies and options as well as recommendations on how new financial instruments or modified existing ones can be used to remove this financing bottleneck.

Type of action: Public procurement

Type of contract/Indicative number: 1 direct service contract

Indicative timeframe: 3rd quarter 2014.

Indicative budget: EUR 0.5 million from the 2014 budget

B.2.11: Contribution to the Global CCS Institute

The EC has been a 'Collaborative Participant' in the Global CCS Institute (GCCSI) so far, a status that has allowed it to express its political support to the Global CCS Institute without any legal obligations attached. Following the changes that the GCCSI is introducing to its business model, GCCSI is gradually moving to a membership system (between 2015 and 2018) based on fees. As of 2015 the EC will be an Associate Member to the Institute, which is very similar to the position it has been enjoying so far. The EC shall in 2015 continue to support the Global CCS Institute's promotion of the development of CCS as a key climate change mitigation tool and its corresponding objectives (such as promoting large-scale demonstration to technology development, encouraging knowledge sharing and increasing public and stakeholders' awareness).

Type of action: Subscription

Indicative timeframe: From 1st quarter of 2015 onwards

Indicative budget: EUR 0,002 million from the 2015 budget

B.2.12.: Studies to support the Internal Energy Market [124]

- *Support to innovative policy development and implementation solutions of the internal electricity and gas market regulatory framework (e.g. in the field of network codes and their implementation).*

  Studies on following topics: preparative studies for scoping new network codes or for amending existing ones, monitoring of implementation, prospective studies to develop future electricity and gas market designs, studies on focused topics to gather best practises and to advice policy making, for example on closed distribution systems, addressing the loop flows and increase the cooperation between gas and electricity markets. SCC best practice worldwide: study on best examples/failures of already existing SCC projects/initiatives with a special focus on intersection of the three sectors covered by the EIP.

- *Support to innovative regulatory and market solutions in the field of the Gas Security of Supply Regulation (including assistance of JRC).*

  As per the provisions of Regulation (EU) 994/2010, Member States are obliged to carry out Risk Assessments, Preventive Action Plans and Emergency Plans related to their

[124] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

security of gas supply, and the Commission is obliged to analyse these documents. JRC has been instrumental in providing guidelines to Member States how to prepare these documents, and in carrying out the evaluation of both the risk assessments and the plans. By December 2014, the Commission must report to the Parliament and the Council about the possible means to enhance security of supply on Union level, the feasibility of a Union-wide risk assessment, Preventive Action Plan and Emergency Plan and about the implementation of Regulation 994/2010. This report will attempt to map the existing weaknesses to the EU gas security of supply and will propose measures to improve the situation. Furthermore, both the Member State risk assessments and plans should be updated by the end of 2014, which will again require the Commission's assessment.

- *Support to innovative regulatory and market solutions in the field of the Electricity Security of Supply Directive.*

  Studies on the monitoring of the implementation of Directive 2005/89/EC by the Members States.

Type of action: Public procurement

Indicative number of direct service contracts: 6

Indicative timeframe: From 1st quarter of 2014 onwards

Indicative budget: EUR 1.2 million from the 2014 budget

B.2.13.: Mapping and analyses of the current and future (2020 - 2030) heating/cooling fuel deployment (fossil/renewables)[125]

Heat is the biggest energy use sector in Europe. Heat has specific demand characteristics which are not sufficiently taken into account in current policies. In order to better evaluate the potential of the decarbonisation of the heating and cooling sector, there is a need to better map the quantities and qualities of fuels used for space heating and domestic hot water production and heat production in industry, as well as and the future technologies potential. The study should quantify today's use of oil, gas, electricity, wood, non-commercial wood and the used technologies as well as develop several scenario for the future. The economic, environmental and social aspects shall be analysed. Targeted instruments on heat may need to be considered to ensure that the EU decarbonisation and energy efficiency objectives are met.

Type of action: Public procurement.

Indicative number of direct service contracts: 1

Indicative timeframe: 2nd quarter of 2014

Total indicative budget: EUR 1.3 million from the 2014 budget

[125] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

B.2.14.: Support to key activities of the European Technology Platform on Renewable Heating and Cooling [126]

The objective is to provide support to those activities of the European Technology Platform on Renewable Heating and Cooling (RHC), which are of interest for the RHC community as a whole, and for the general public.

Such activities may include:

- Analysis and follow-up of the technological, regulatory, financial and market context for heating and cooling (both renewable and fossil fuel based) in Europe and in the World, and providing open information on these issues through reports, factsheets, newsletters, websites or other means.
- Dissemination, discussion and/or networking events open to all RHC stakeholders.
- Defining, setting-up and carrying out an implementation roadmap of the ETP RHC Strategic Research Agenda.

Type of action: Public procurement

Indicative number of direct service contracts: 1

Indicative timeframe: 4th quarter of 2014

Indicative budget: EUR 0.75 million from the 2014 budget

B.2.15.: Support to key activities of the European Wind Energy Technology Platform (TP Wind) [127]

The objective is to provide support to those activities of the European Wind Energy Technology Platform, which are of interest for the wind energy community as a whole, and for the general public.

Such activities may include:

- Analysis and follow-up of the technological, regulatory, financial and market context
- for wind energy in Europe and in the World, and providing open information on these issues through reports, factsheets, newsletters, websites or other means.
- Dissemination, discussion and/or networking events open to all wind energy stakeholders.
- Updating and implementing the TP Wind Strategic Research Agenda.

Type of action: Public procurement

Indicative number of direct service contracts: 1

Indicative timeframe: 4th quarter of 2014

[126] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

[127] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

Indicative budget: EUR 0.75 million from the 2014 budget

B.2.16.: Support to R&D strategy in the area of SET Plan activities in smart grids and energy storage [128]

Content/scope: Public procurements to develop roadmaps and priorities (implementation plans) for research, demonstration and market uptake for technologies for the end-to-end pan-European electricity grids and for energy storage technologies. Monitor and review projects, programmes and developments in the sector in the EU and worldwide. Organise networking activities to foster knowledge sharing.

Expected impact: Support a more efficient allocation of RD&D programmes for the implementation of the SET-Plan in this area by providing prioritised roadmaps and a detailed analysis of on-going activities. Fostering knowledge sharing to increase the leverage of RD&D activities in Europe.

Type of action: Public procurement

Indicative number of direct service contracts: 2

Indicative timeframe: 3rd quarter of 2014 for electricity grid and energy storage (at least 2 year duration); 2nd quarter of 2015 for battery storage (at least 2 year duration)

Indicative budget:

- EUR 1.5 million from the 2014 budget for electricity grid and energy storage
- EUR 1.5 million from the 2015 budget for battery storage

B.2.17.: Contribution to Implementing Agreements (IA) of the International Energy Agency (IEA) [129]

The Commission represents the European Union in the Implementing Agreements concluded under the framework of the International Energy Agency where it participates in activities in certain areas of energy research. The annual financial contributions will be paid to the entities responsible for managing the following agreements:

- Geothermal
- Bioenergy
- Ocean Energy
- ISGAN (International Smart Grid Action Network)
- GHG derived from fossil fuels use

[128] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

[129] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

- Solar Power and Chemical Energy Systems
- Photovoltaic Power
- Energy Technology System Analysis
- Test Solar Heating and Cooling
- Clean Coal Centre
- Wind
- Renewable Energy Technology Deployment
- Hydropower Technologies and Programmes
- Co-operative Programme on Gas and Oil Technologies

Type of action: Subscription

Indicative timeframe: From 1st quarter of 2014 onwards

Indicative budget:

- EUR 0.40 million from the 2014 budget
- EUR 0.48 million from the 2015 budget

B.2.18.: Contribution to the International Renewable Energy Agency (IRENA) [130]

The European Union is a member of IRENA. In the Council Decision on the Conclusion of the IRENA Statute by the EU, it is concluded that the Community becomes a full member of IRENA. According to the organisation's Statute and Financial Regulation this implies the obligation to pay an annual contribution to its budget covering the participation of the EU in IRENA's activities. IRENA's main objective is to disseminate best practices in the field of renewables as the principal platform for international cooperation in the field, a centre of excellence on renewable energy and a repository of policy, technology, resource and financial knowledge. This includes:

- The promotion of the widespread and increased adoption and the sustainable use of all forms of renewable energy globally, including in the EU, in particular to bring down costs and also to increase market experience, in order to contribute to economic growth and social cohesion as well as access to and security of energy supply,
- Support activities for countries in their transition to a renewable energy future,
- Reducing of barriers for renewable energy, stimulating best practice and raising awareness.

Type of action: Subscription

Indicative timeframe: From 1st quarter of 2014 onwards

Indicative budget:

- EUR 0.48 million from the 2014 budget [131]

[130] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

- EUR 0.48 million from the 2015 budget [132]

B.2.19.: Support to key activities of the European Technology Platform for zero-Emission fossil fuel power plants (ETP-ZEP)

The objective is to provide support to those activities of the ZEP Technology Platform, which are of interest for the Carbon Capture and Storage (CCS)-related community as a whole, and for the general public.

Such activities may include:

- Analysis and follow-up of the technological, regulatory, financial and market context for CCS development in Europe and in the World, for both power plants and industrial facilities, and providing open information on these issues through reports, factsheets, newsletters, websites or other means.
- Dissemination, discussion and/or networking events open to all CCS stakeholders.

Legal entity:

ZEP Communications ASBL

Square de Meeûs, 38/40

1000 Bruxelles

Belgium

Type of action: Grant to identified beneficiaries - Coordination and support action

The standard evaluation criteria, thresholds and weighting for award criteria for this type of action are provided in parts D and H of the General Annexes.

Rate of co-financing: The maximum possible rate of co-financing is 75% of the total eligible costs.

Indicative time to grant: 3rd quarter of 2015

Indicative budget: EUR 0.12 million from the 2015 budget

B.3. Smart Cities and Communities

[131] Subject to the adoption of the draft biennial budget 2014-2015 by the IRENA Assembly in January 2014 (IRENA Document C/6/L.3) according to which the annual contribution of the EU to the core budget will be USD 0.6 in 2014 and 2015.

[132] Subject to the adoption of the draft biennial budget 2014-2015 by the IRENA Assembly in January 2014 (IRENA Document C/6/L.3) according to which the annual contribution of the EU to the core budget will be USD 0.6 million in 2014 and 2015.

B.3.1.: Studies to support Smart Cities and Communities [133]

- Key Performance Indicators (KPIs) and baselines: analysis of currently applied KPIs and baselines in the area of Smart Cities and Communities (SCC) – what are the existing databases and data sets that can be used to estimate performance of SCC actions? The drafting of the Strategic Implementation Plan (SIP) shows that even among the European Innovation Partnerships (EIPs) high level stakeholders there is still great confusion about the definition of KPI's and about the existence of necessary data sets to have/create baselines to compare against. DG JRC could be a good contact for collaboration.
- SCC best practice worldwide: study on best examples/failures of already existing SCC projects/initiatives with a special focus on intersection of the three sectors covered by the EIP.
- Multi-dimensional mapping of the SCC landscape all over Europe. Connecting the j3S Data base of JRC regional mapping, DG REGIO data on regional planning, the main Smart city initiatives and their actions, already existing real smart cities, etc. To better understand what is out there, to know where best examples are located, to study where links are missing, to have the full picture of the European SCC reality. A rough analysis shall provide better understanding of where intervention of H2020 could bring the highest benefit European society.
- Analysis of European SCC solutions replicability in different part of the world: analysing the international context (countries and areas, in terms of administrative structure, technologies used, practices, tendencies, strategies), in order to identify where the European solutions have the best possibility to be further demonstrated. The main opportunities and barriers will be addressed, as well as the potential for specific countries/ regions.

Type of action: Public procurement

Indicative number of direct service contracts: 4

Indicative timeframe: From 1st quarter of 2014 onwards

Indicative budget: EUR 0.8 million from the 2014 budget

B.3.2.: Support Services for the Covenant of Mayors Initiative [134, 135]

The Covenant of Mayors has been launched in line with EU Energy Efficiency Action Plan, in 2008. It is an unconditional and voluntary commitment by signatory towns and cities to go beyond the objectives of EU energy policy (decrease of CO2 emissions at least by 20% by 2020) in terms of reduction in CO2 emissions through enhanced energy efficiency and cleaner energy production and use. To justify this, Covenant signatories (cities, municipalities, provinces or regions) commit:

[133] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

[134] The financial support for Covenant of Mayor office is planned to be included in the work programme 2016/17.

[135] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

- to develop and implement the Sustainable Energy Action Plans (SEAP) within 1 year following the signature. The Action plans shall include the analysis of current energy consumption in relevant sectors (buildings, urban transport, local energy infrastructure etc), CO2 emissions inventory, outline of measures and actions to be implemented and their expected outcomes in terms of energy and CO2 emissions savings;
- to inform the Commission on progress of the SEAP implementation, through the monitoring reports, to be submitted every 2 years after submission of the SEAP;
- to accept the right of scrutiny and exclusion of the city in case of non-compliance.

So far, more than 5700 cities have joined the Covenant and the number of signatories continues to grow. To date more than 3600 SEAPs have been submitted. This high number of signatories and the related technical reports requires a solid support provided by the Commission to the municipalities involved in the Covenant.

Type of support	**Description**
1) Technical and scientific assistance to the Covenant of Mayor by JRC	The cities and local authorities under the Covenant of Mayors need support for the development, analysis and implementation of Sustainable Energy Action Plans. In parallel, it is necessary to continuously ensure the overall methodological coherence of the Initiative, to carry out some new methodological developments and to develop and improve the tools to support the operational performance of signatories. This assistance should make a significant contribution to the goals of EU Energy Policy, namely the Energy Efficiency Plan 2011 and related legislative framework. The main objective is to strengthen and structure the Covenant of Mayors Initiative though scientific and technical assistance. Having in mind the specific nature of the Covenant, the different experience and conditions of towns and cities and the large number of signatories, technical assistance by the JRC is needed to evaluate consistently efforts and measures undertaken under the CoM. The Covenant of Mayors related tasks to performed by JRC: - supporting SEAP analysis and providing feedback; - providing helpdesk tasks to increase the capacity of stakeholders and their operational performance, and improving automated data management - ensuring an overall monitoring and follow up of the Covenant of Mayors Initiative, including development of monitoring tools and indicators; - analysing and diving feedback on implementation report by signatories; - contributing to methodological issues and new methodological developments; - providing training and ensuring helpdesk tasks to the Covenant stakeholders;

	- evaluating the Covenant of Mayors Initiative and assessing its potential and impact in EU-28 for the different sectors.

Type of action: Provision of technical/scientific services by the EC Joint Research Centre (JRC)*Indicative time to grant:* 3rd quarter 2014

Total indicative budget: EUR 1.6 million from the 2014 budget

B.3.3.: Support the coordination of cities' activities via the Green Digital Charter [136]

About 40 major EU cities are gathered under the Green Digital Charter with the objective to share best practices on the use of ICT to achieve their sustainability goals.

In order to follow-up and continue implementing the activities successfully initiated by these cities, additional support is needed:

1. to extend the number of signatory cities.

2. to improve the existing tools and services.

3. to promote their activities in and outside the EU

Type of action: Grant to identified beneficiaries - Coordination and support action

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes.

Indicative time to grant: 2nd quarter 2014

Identified beneficiary: EUROCITIES ASBL, Square de Meeus 1, 1000 Bruxelles - Belgium

Indicative budget: EUR 0.5 million from the 2014 budget

[136] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

B.4. Cross-cutting issues

B.4.1: Contribution to the IEA Energy Policy Review [137]

Preparation of the EU energy policy review (second edition of an in-depth review, looking at all facets of the EU energy policy).

Legal entity: IEA, 9, rue de la Fédération, 75739 Paris Cedex 15, France

Type of action: Grant to identified beneficiaries - Coordination and support action

The standard evaluation criteria, thresholds, weighting for award criteria and the maximum rate of co-financing for this type of action are provided in parts D and H of the General Annexes.

Indicative time to grant: 2nd quarter 2014

Indicative budget: EUR 0.06 million from the 2014 budget

B.4.2: Modelling and analysing energy policy, system transformation and climate change measures [138]

Policy analysis and modelling of the energy system is important for sound decision making as the implications of novel technologies new market designs, players and policy instruments need to be explored. This modelling should help provide assessments of the costs and other impacts of energy policies, policy instruments, including the social, environmental and economic impacts of energy policy decisions.

Type of action: Public procurement

Indicative timeframe: 2nd quarter of 2015

Indicative number of direct service contracts: 1

Total indicative budget:

- EUR 1 million from the 2015 budget

B.4.3.: Support to the Italian Presidency Conference on the European Strategic Energy Technology Plan (SET Plan) 2014 [139]

Italy will be organising the EU Technology Summit 2014. The conference will take place in Italy during the Italian Presidency of the Council of the European Union.

Legal entity:

[137] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

[138] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

[139] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

ENEA (Agenzia Nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile)
Lungotevere Thaon di Revel, 76
00196 Roma
Italy

Type of action: Grant to identified beneficiaries - Coordination and support action

The standard evaluation criteria, thresholds and weighting for award criteria for this type of action are provided in parts D and H of the General Annexes.

Indicative time to grant: 3rd quarter 2014

Rate of co-financing: The maximum possible rate of co-financing is 75% of the total eligible costs.

Indicative budget: EUR 0.263 million from the 2014 budget

B.4.4.: Support to the Luxembourg Presidency Conference on the European Strategic Energy Technology Plan (SET Plan) 2015 [140]

Luxembourg will be organising the EU Technology Summit. The conference will take place in Luxembourg during the Luxembourg Presidency of the Council of the European Union.

Legal entity: any entity designated by the Presidency under its responsibility

Type of action: Grant to identified beneficiaries - Coordination and support action

The standard evaluation criteria, thresholds and weighting for award criteria for this type of action are provided in parts D and H of the General Annexes.

Indicative time to grant: 3rd quarter 2015

Rate of co-financing: The maximum possible rate of co-financing is 75% of the total eligible costs.

Indicative budget: EUR 0.263 million from the 2015 budget

B.4.5.: Communication activities

Communication activities, such as meetings, conferences and publications or any other relevant action related to supporting dissemination of knowledge and information to relevant stakeholders will be supported.

Type of action: Public procurement

Indicative number of direct service contracts: 2 per year in 2014 and 2015

Indicative timeframe: From 1st quarter of 2014 onwards

Indicative budget:

- EUR 0.5 million from the 2014 budget
- EUR 0.5 million from the 2015 budget

[140] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

B.4.6.: External expertise

This action will support the use of appointed independent experts for the evaluation of project proposals and, where appropriate, for the monitoring of running projects.

Indicative budget:

- EUR 6.45 million from the 2014 budget
- EUR 6.50 million from the 2015 budget

Type of action: Expert contracts

B.4.7.: Experts for policy relevant analyses and forward looking reflection[141]

Independent experts will namely be appointed to provide analyses of past activities in policy relevant areas and to advise on or support the design and implementation of EU Research Policy and the SET-Plan, such as:

- 2014: Drafting of the Action Plan of the Integrated Roadmap as foreseen in the Communication on Energy Technologies and Innovation;
- 2015: Investigating the best avenues to accelerate market uptake while increasing the coordination of actors and investments.

To attract qualified experts and remunerate their work, a special allowance of EUR 450/day will be paid to the experts appointed in their personal capacity, acting independently and in the public interest.

Indicative budget:

- EUR 0.3 million from the 2014 budget
- EUR 0.3 million from the 2015 budget

Type of action: Expert contracts

[141] This activity directly aimed at supporting the development and implementation of evidence base for R&I policies and supporting various groups of stakeholders is excluded from the delegation to the executive agencies and will be implemented by the Commission services.

INDICATIVE BUDGET

Calls	**2014 Budget EUR million**[142]	**2015 Budget EUR million**
Call H2020-EE-2014/2015 Energy efficiency	92.50 [143, 144] from 32.040301	100.71 [145] from 32.040301
Call H2020-LCE-2014/2015 Competitive low-carbon energy	359.31 of which 100.68 from 32.040301 and 11.63 from 32.045001 and 247.00 from 08.020303	383.57 of which 108.32 from 32.040301 and 275.25 from 08.020303
Call H2020-SCC-2014/2015 Smart cities and communities	73.82 [146] of which 60.07 from 32.040301 and 13.75 from 08.020303	85.68 [147] of which 71.43 from 32.040301 and 14.25 from 08.020303
Call H2020-SIE-2014/2015 SMEs and fast track to innovation for energy	33.95 of which 16.97 from 32.040301 and 16.99 from 08.020303	34.76 of which 18.26 from 32.040301 and 16.50 from 08.020303
Contribution from this societal challenge to call 'H2020-BG-2014/2015' (under Part 9 of the work programme)	3.00 from 08.020303	
Contribution from this societal challenge to call 'H2020-FTIPilot-2015' (under Part 18 of the work programme)		13.70 of which 6.85 from 32.040301 and 6.85 from 08.020303

[142] The budget figures given in this table are rounded to two decimal places which can result in minor discrepancies when summing up rounded figures.

[143] To which EUR 5 million from the societal challenge 'Climate action, environment, resource efficiency and raw materials' (budget line 08.020305) will be added making a total of EUR 97.50 million for this call.

[144] Including a contribution of EUR 8 million to the PPP SPIRE.

[145] Including a contribution of EUR 10.56 million to the PPP SPIRE.

[146] To which EUR 18.50 million from the societal challenge 'Smart, green and integrated transport' (budget line 06.030301) will be added making a total of EUR 92.32 million for this call.

[147] To which EUR 21.50 million from the societal challenge 'Smart, green and integrated transport' (budget line 06.030301) will be added making a total of EUR 107.18 million for this call.

Other Actions	**2014 Budget EUR million**[148]	**2015 Budget EUR million**
Experts (expert evaluators, experts groups, monitors)	6.75 of which 3.00 from 32.040301 and 3.75 from 08.020303	6.80 of which 3.00 from 32.040301 and 3.80 from 08.020303
Subscription – implementing agreements of the International Energy Agency and contribution to the International Renewable Energy Agency	0.95 of which 0.82 from 32.040301 and 0.13 from 08.020303	1.03 of which 0.82 from 32.040301 and 0.21 from 08.020303
Grants to identified beneficiaries	2.52 from 32.040301	8.88 of which 8.62 from 32.040301 and 0.26 from 08.020303
Specific grants under framework partnership agreements	3.00 from 08.020303	0.00
Public procurement – Support actions	33.59 of which 27.34 from 32.040301 and 1.35 from 32.045001 and 4.90 from 08.020303	20.29 of which 15.04 from 32.040301 and 5.25 from 08.020303
Provision of technical/scientific services by the EC Joint Research Centre (JRC)	14.60 of which 4.60 from 32.040301 and 10.00 from 08.020303	
Delegation agreement/FAFA – the ELENA Facility	15.00 from 32.040301	15.00 from 32.040301
Estimated total budget	**638.99**	**670.42**

Horizontal activities (08.020500)		
Dissemination activities (see Part 17 of the work programme)	0.58 of which 0.29 from 32.040301 and 0.29 from 08.020303	0.60 Of which 0.3 from 32.040301 and 0.3 from 08.020303
Corporate communication (see Part 17 of the work programme)	0.30 of which 0.15 from	n.a.

[148] The budget figures given in this table are rounded to two decimal places.

	32.040301 and 0.15 from 08.020303	
Estimated total budget for the horizontal activities	**0.88**	**0.60**

Estimated total budget including horizontal activities	**639.87**	**671.02**

Appendix: Manufacturing Readiness Levels ("MRL")

1. Basic manufacturing implications identified
2. Manufacturing concepts identified
3. Manufacturing proof of concept developed
4. Capability to produce the technology in a laboratory environment
5. Capability to produce prototype components in a production relevant environment.
6. Capability to produce a prototype system or subsystem in a production relevant environment.
7. Capability to produce systems, subsystems or components in a production representative environment.
8. Pilot line capability demonstrated. Ready to begin low rate production.
9. Low rate production demonstrated. Capability in place to begin full rate production.
10. Full rate production demonstrated and lean production practices in place.