ICT for a low carbon economy

This Challenge explores opportunities for harnessing digital technologies to address climate change, especially to increase energy efficiency and to better manage our water resources. It supports speedy progress towards the EU's energy and climate objectives for 2020 while simultaneously supporting existing and opening new business opportunities. The main role of ICT is reducing resource consumption and CO_2 emissions, in particular related to electricity and water distribution, the built environment, transport and logistics. Particular attention is given to cities as platforms for innovation, encouraging the validation of integrated solutions in user-driven, open innovation environments.

The Challenge focuses on the following:

- Future electricity distribution grids fostering synergies between telecommunication and energy networks to increase automation and to improve coordination between production (including renewable sources), distribution and transmission. The focus is on data management and special attention is given to potential new business models for DSOs (Distribution Systems Operators).
- Data Centres in an energy-efficient and environmentally-friendly Internet. This addresses technologies and associated services to monitor energy consumption and automatically optimise power, cooling, computing, storage, and data transmission operations in function of energy consumption, environmental impact and cost policies. It also covers technologies for the integration of renewable energy sources and reuse of heat.
- Water resources management focuses on ICT-enabled demand-side management and resource efficiency solutions, in an integrated water resources management context. Special attention is given to improving household awareness and modifying consumer behaviour as well as the corporate and government actions in response to demand modifications.
- Smart Cities. The aim is to integrate and validate ICT technologies and services in neighbourhoods to make progress towards carbon neutrality in cities. The idea is to develop ICT able to provide intelligence to electricity grids, to district heating and cooling grids, to storage and renewable energy sources from a single system point of view. In addition to technical developments, attention is given to innovative service business models taking into account data security and privacy. Behavioural sciences are a core activity with a view not only to observing subjects but to soliciting innovative ideas from them. This research will contribute to the Energy-Efficient Buildings Public-Private-Partnership launched in 2008 as part of the European Economic Recovery Plan and it is part of the Smart Cities initiative coordinated between Theme 5 (Energy) and Theme 7 (Transport).
- Co-operative mobility is the interconnection of users, vehicles and infrastructure that enables the creation and sharing of new kinds of information, leading to a better cooperation amongst mobility users. Focus is on supervised automated driving for improving both the energy efficiency and safety of individual and public transport and on energy-efficient, safe and accessible services to enhance mobility of citizens.

- Electro-mobility: This objective contributes to the Public Private Partnership "European Green Car Initiative". Related to the fully electric vehicle, it addresses architectures for electronics in the car; and comprehensive energy management systems for its infrastructure integration.

Objective ICT-2013.6.1 Smart Energy Grids

This objective explores the potential of bringing together stakeholders from both the energy utilities and the telecom sector to develop common approaches for future digital networks and smart energy services infrastructure for electricity distribution.
The focus is on data management including the exchange of information with transmission network operators and with end users. Special attention is given to exploring new business models for DSOs (Distribution System Operators).

Targeted Outcome:

Intelligent systems built over existing and future telecommunication networks and services that will assist in the management of the electricity distribution grid in an optimized, controlled and secure manner.

Key research challenges to be addressed:

a) Sharing of backbone infrastructure and last mile connectivity, considering not only technologies (e.g. LTE, GPRS, PLC, and possibility for spectrum allocation) but also the appropriate business models to deliver significant cost and investment savings.

b) Improving robustness and reliability of the existing telecommunication infrastructure in order to cope with mission critical services that require milliseconds response times. Explore the possibility of deploying dedicated services on shared telecoms infrastructure, rather than entirely new infrastructure.

c) ICT technologies for active electricity network management, demand/response, load balancing and forecasting and congestion management. Developing a methodology for capacity calculation.

d) Developing telecommunications services and platforms specific for energy distribution taking into account control of access to customer information and consumer data, in particular smart metering data; data ownership and associated level of security and use of data; business models; system reliability; long term availability; and avoidance of vendor lock-in.

Project should focus on one or a combination of the previous points. Consortia must be compact with partners each making substantial contributions and with expertise in both telecoms and energy domains. In all cases, projects shall include an appropriate validation phase to draw conclusions for future deployment.

Expected Impact:

- Reduction of the percentage of energy lost during energy distribution;
- Reduction of the gap between energy produced and energy consumed;
- Increase of renewable energy sources and Combined Heat and Power - CHP connected to the distribution grid;
- Reduction and shifting of peak loads;
- Number of publications jointly authored by researchers from ICT and energy.

Funding schemes

STREP

Indicative budget distribution

STREP: EUR 18 million

Call: FP7-ICT-2013-11

Minimum number of participants

At least 3 independent legal entities, each of which is established in a Member States or Associated Country, and no two of which are established in the same MS or AC.

Funding schemes

Collaborative projects (CP)

Support to research projects carried out by consortia with participants from different countries, aiming at developing new knowledge, new technology, products, demonstration activities or common resources for research. The size, scope and internal organisation of projects can vary from field to field and from topic to topic. Projects can range from small or medium-scale focused research actions to large-scale integrating projects for achieving a defined objective. Projects may also be targeted to special groups such as SMEs.
The Funding Scheme allows for two types of projects to be financed:

a) '*small or medium scale focused research actions'*,
b) *'large-scale integrating projects*'.

Small or medium-scale focused research actions **(STREP)**

Purpose

Small or medium-scale focused research projects (STREP) are objective-driven research projects, which aim at generating new knowledge, including new technology, or common resources for research in order to improve European competitiveness, or to address major societal needs. They have clearly defined scientific and technological objectives directed at obtaining specific results, which could be applicable in terms of development or provement of products, processes, services or policy.

STREPs target a specific research objective in a sharply focused approach. They have a fixed overall work plan where the principal deliverables are not expected to change during the lifetime of the project.

Size and resources

There must be at least three 'legal entities' established in different EU Member States or Associated countries. The entities must be independent of each other.
A higher number of participants may be specified on a call-by-call basis: check the call fiche.
The size, scope and internal organisation of collaborative projects can vary from research theme to research theme and from topic to topic. During FP6 the number of participants in STREPs for the IST priority varied from 6 to 15 participants and the EU contribution varied between EUR 1 million and EUR 4 million, with an average around the EUR 2 million.

Duration

STREPs are expected to last typically eighteen months to three years. However, there is no formal minimum or maximum duration.

Activities

The activities to be carried out in the context of a STREP can include:

a) research and technological development activities, reflecting the core activities of the project, aimed at a significant advance beyond the established state-of-the-art

b) demonstration activities, designed to prove the viability of new technologies that offer a potential economic advantage, but which cannot be commercialised directly (e.g. testing of product-like prototypes)

c) management activities, over and above the technical management of individual work packages, linking together all the project components and maintaining communication with the Commission.

SICAs

STREPs may also be used to support a special form of international co-operation projects, the so-called Specific International Cooperation Actions (SICAs) with ICPC countries in areas of mutual interest and dedicated to cooperation on topics selected on the basis of their scientific and technological competences and needs.
These SICAs have specific rules for participation. For the SICA projects there must be at least four independent legal entities of which at least two must be established in different Member States or Associated countries and at least two must be established in different ICPC countries in the target regions defined in the objective for the project.
A higher number of participants may be specified on a call-by-call basis: check the call fiche.

Financial Regime

Reimbursement will be based on eligible costs (based on maximum rates of reimbursement specified in the grant agreement for different types of activities within the project). In some cases the reimbursement of indirect costs is based on a flat rate.
The work programmes shall specify if other forms of reimbursement are to be used in the

actions concerned. Participants in International Cooperation Partner countries (see Annex 1 of the Cooperation work programme) may opt for a lump sum.

Specific Characteristics

The description of work (Annex 1 to the grant agreement) is normally fixed for the duration of the project.

The composition of the consortium is normally fixed for the duration of the project.