

Joint Call within the Member States Initiative (MSI) on Smart Cities

Proposal for call topics

1) Scientific tools and methods

Cities need quantified information to choose the actions that form their roadmaps and action plans and that will enable them to meet their energy and carbon objectives. Once cities have developed an action plan and moved into the phase of implementing this plan, they will need to apply dynamical simulation tools to be able to take a decision on the design (sizing, layout and choice of technology) and operation of the urban energy system's components (i.e. energy consumers such as buildings or mobility infrastructure, energy production units, energy distribution networks and storage components). The integration of components classically designed and operated in isolation will require an integration of their respective dynamical simulation tools as well as newly designed information and communication technologies (in particular monitoring) for the coordinated operation of these components with each other.

Objectives:

The goal of a project funded under this theme will be to create and demonstrate the operation of an integrated simulation/modeling platform, which can be used to provide consultants and tool developers with a standardized basis for further development into commercial tools. An important feature of the platform will therefore be an integrated design which is suited to later support the optimal operation of the systems created on its basis. The platform shall be simple enough in its design, so that it can later be improved and validated on the basis of its use within a variety of cities. It will provide the EC and European cities with a tested pre-commercial tool for the development of their action plans.

Projects proposed under this theme will therefore have to develop well-defined standards (e.g. key performance indicators, scope, calculation methods, data structure, etc.), and to set up and validate an integrated simulation/modeling platform. Such a platform shall comprise two important aspects:

- Decision support tools for the city roadmaps and action plans including appropriate structures for energy data systems in cities.
- Dynamical tools for a city-wide simulation of energy flows

An important part of such projects shall be the demonstration of this platform in cities in at least two member states to produce the development of a city-wide energy concept and provide information that can support the production of economic scenarios for the implementation of this concept.

2) Development of integrated urban energy monitoring concepts

Monitoring is an essential accompanying measure during the implementation and operational phase of any complex project and needs to be well planned and organized in advance. A clearly structured framework at component, building and city level will be necessary in order to collect sufficient reliable energy data of the entire system to be analyzed (transport sector, households, services,

industry, etc.). Therefore, the selection of appropriate monitoring parameters (required to assess chosen “Key Performance Indicators”), devices and the application of advanced data management are of crucial importance in city transformation processes that enable a scientific assessment and evaluation of the collected data.

Objectives:

Development of monitoring concepts to support activities taking place at the following two levels:

- At a strategic level, monitoring activities shall be aimed at implementing corrective actions mainly in terms of funding schemes, local policy making and other sets of energy measures targeted to different city stakeholders. Monitoring is closely linked to the elaboration of periodical statistics characterizing a city from different points of view (CO₂ emissions, demographics and, more generally, socio-economic aspects, energy balance, etc.).
- Monitoring at an operational level shall enable planning and implementation of corrective actions if the performance of particular system components (e.g. energy plants, buildings, etc.) do not live up to specific expectations. From this point of view monitoring is carried out in order to characterize actual energy performance and user satisfaction and optimize the entire system behavior. This monitoring strategy strongly depends on the ownership structure of the building stock and other relevant infrastructure, either owned by public authorities or the private sector.

To be refined for future calls:

Common guidelines for transformation processes towards low-carbon cities

Transnational knowledge exchange between cities through sharing of their experiences and lessons learned from individual city projects is a key factor in order to fully implement the Smart Cities framework on a European scale (“roll-out” of Smart Cities concept). It is foreseen to pool together European cities that are showing strong commitment to initiate sustainable urban development but starting from different levels of maturity and concrete implementation.

Objectives:

Already existing city visions, energy roadmaps, actions plans and implemented energy measures (technologies) shall be screened and analyzed in order to come up with common methodologies that can be used by cities in general to develop their individual strategies with regards to low-carbon energy infrastructure development.

Guidelines for integrated urban energy planning processes shall be drawn up, which can enable a smart technology integration based on a multiple infrastructure layer approach. With this respect, an understanding of local energy infrastructure, related economic framework conditions and of other administrative drivers and barriers within cities that are currently encountered in planning processes shall lead to organizational innovations necessary for the successful transformation of urban energy systems.