

Proposals for Joint Call Topics

Member States Initiative Smart Cities
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Topic 1: Scientific tools and methods (1/4)

- Background
 - Many cities developing roadmaps and action plans for meeting ambitious energy and environmental targets
 - Open questions of „how to best develop and implement these strategies“
 - For urban infrastructure investment cities need „no-regret strategies“ (avoid stranded investment)
 - Tools for detailed analysis of city-wide energy systems currently lacking
 - Covering all phases: Planning, design and operation
 - Integrated approach
 - Problems with city energy-data (availability, format, accuracy, quality, management, etc.)

Topic 1: Scientific tools and methods (2/4)

- Objective
 - ***Development of integrated modelling/simulation framework***
 - (static) decision support tools for developing roadmaps/action plans (GIS based)
 - (dynamical) tools for city-wide simulation of energy flows (design + operation: sizing, layout, optimization, etc.)

Topic 1: Scientific tools and methods (3/4)

- Requirements for tool development:
 - Analysis of different scenarios/boundary conditions shall be possible (energy efficiency implementation, renewable integration, infrastructure upgrading, technology price evolution, economic development etc.) → „what if.....“ (Parametric studies)
 - Such tools shall be preferably built upon work from already existing tools (not to reinvent the wheel)
 - See e.g. EEA / E5, CitySim (EPFL), Urban Strategy (TNO), others.....
 - Tools of „next generation“ („cutting-edge“) → logical next step in development
 - Platform: Work at the interfaces of different tools → how to link them

Topic 1: Scientific tools and methods (4/4)

- Requirements for tool development:
 - Clear integrative aspect: modelling of various infrastructure layers and their interlinking
 - Grids, buildings, supply, transport, etc.
 - Multi-technology integration aspects
 - Results of simulations shall feed into urban planning processes
 - Clear communication of results to decision makers possible
 - Practicability for city administration
 - Simulation platform shall conform to well-defined standards (KPIs, scope, calculation methods, data structure, etc.)
 - Based upon profound and well-structured database

Topic 2: Integrated urban energy monitoring concepts (1/3)

- Background
 - Monitoring as an essential part during implementation and operational phase of city projects
 - Selection of appropriate parameters („KPIs“) is key
 - Monitoring shall enable assessment of effectiveness of measures
 - Continuous evaluation of progress, longterm perspective

Topic 2: Integrated urban energy monitoring concepts (2/3)

- Objective:
 - **Development of integrated urban monitoring concepts** at two distinctive levels
 - Strategic level: city-wide approach (CO₂, demographics, etc.), identify corrective actions in terms of funding schemes, policy making, energy measures etc.
 - Operational level: evaluation of actual performance of system components and optimisation purposes (direct link to infrastructure)

Topic 2: Integrated urban energy monitoring concepts (3/3)

- Requirements
 - Cover different urban scales (single nodes, buildings, neighbourhoods, districts, city)
 - Integrated approach (buildings, energy plants, grid infrastructure, transport networks, etc.)
 - Ensure data quality, clear data management and data security
 - Selection of appropriate monitoring devices and time-scales
 - Ensure possibility of implementation of monitoring concepts in existing quality management tools of cities/communities → maximise synergies
 - Embedding of monitoring results in urban energy planning

Topic 3: Framework for transnational city co-operations (1/2)

- Background
 - Cities start their transformation processes from different levels of maturity („flagship cities“ vs. „emerging cities“)
 - Urban energy planning processes heavily influenced by local/national boundary conditions (organisation of municipalities, legal framework, policies, etc.)
 - Transnational knowledge exchange is key for „roll-out“ of Smart Cities framework in Europe
 - Knowledge gaps in the field of development and implementation of urban strategies based on integrated approach, based on cutting edge developments
 - Knowledge exchange, capacity building

Topic 3: Framework for transnational city co-operations (2/2)

- Objective:
 - **Development of a fruitful transnational exchange linking lighthouse- and emerging cities additionally**
 - **Joint approach in developing strategies based on new scientific methods (see topic 1 & 2)**
 - Pooling together European cities and research organisations which are in their transformation towards Smart Cities
 - Knowledge exchange, capacity building
 - Comparison of local energy planning processes and developing of process understandings on a meta-level
 - Feedback towards scientific community related to practicability and criteria for tool performance
 - Definition of useful criteria for such exchange/ comparison (KPIs?)

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