EERA
European Energy Research Alliance

The Joint Programme on Smart Cities

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www.eera-set.eu

What is the SET Plan?

Strategic Energy Technology Plan

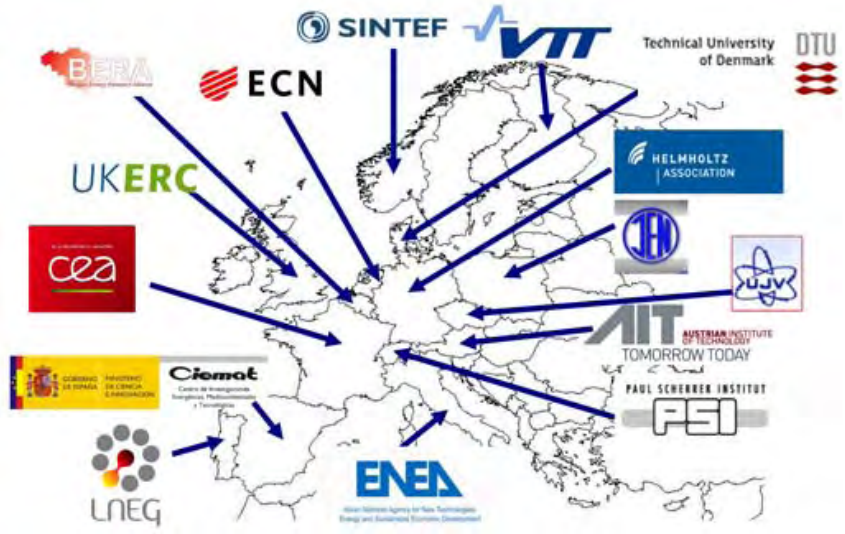
- Key instrument of EU for tackling climate change
- Make low-carbon technologies affordable and competitive
- Large scale programs (Industrial Initiatives)
- Technology roadmaps for research and implementation
- Systemic approaches, organisational innovation, sustainable financial schemes, energy policy framework
- EERA (European Energy Research Alliance)

What is EERA?

- European Energy Research Alliance
- Key instrument of the SET Plan for energy research
- Development of next generations of low-carbon energy technologies
- Strengthen, expand and optimise national research capacities on EU level
- Joint Programming (JP)
  - Sharing of research facilities/capacities based on own funding/resources
  - Maximising complementarities and synergies
  - Avoid duplication, overcoming fragmentation
- Strong link to other EU platforms, bodies and initiatives
- Proactively engage with industry

EERA governance structure

- 15 members in Executive Committee (including AIT)
  - Chairman Erki Leppävuori (President and CEO of VTT, Finland)
  - Strict criteria for membership
- EERA Secretariat (based in Brussels)
  - Helmholtz, ENEA, ECN, CEA, DTU, VTT
- Research institutions participating in 15 JPs
  - JP Coordinators
  - JP Management Board
  - JP Steering Committee
  - Full participants and/or associates
- Other bodies: advisory committee, taskforces, etc.



Current EERA JPs

2010

Smart Grids | Photovoltaics | Wind Energy | Geothermal Energy

Bio Energy | CCS | Materials for Nuclear

2011

Fuel Cells & Hydrogen | Energy Storage | Ocean Energy | CSP

Smart Cities

Advanced Materials and Processes for Energy Applications

2013

Economical, Environmental and Social Impact

Shale Gas

Background

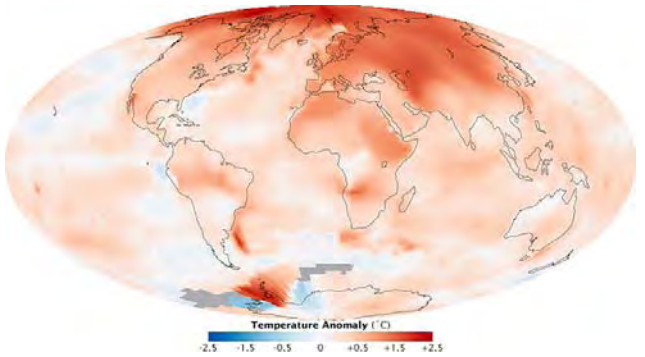
- Climate change – CO_2 reductions

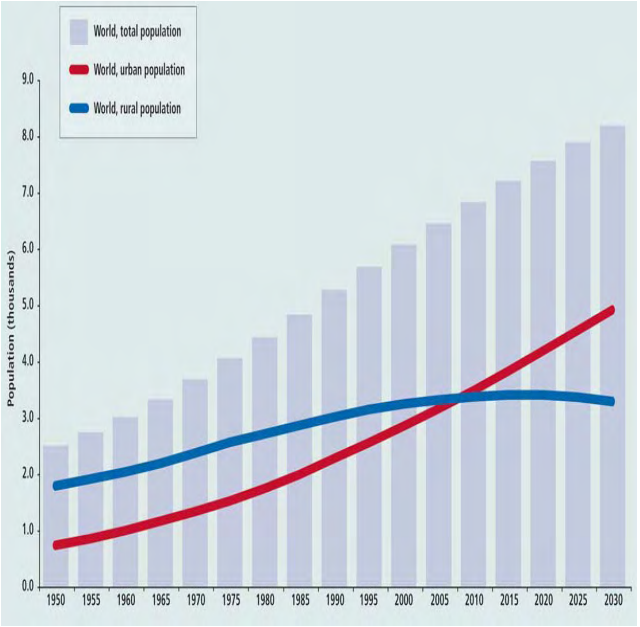
- Dependency on fossil energy sources
- Strong coupling of CO_2 emissions to GDP

- Increasing energy demand
  - Growth of population (7 bn in 2011, 10 bn in 2050)
  - Industrialisation
  - Increasing wealth + living standards

- Worldwide trend of urbanisation
  - EU: 2/3 of energy demand in/ around urban areas

- Challenge and chance
  - Urban areas display huge potential for energy efficiency
  - Cities as centers for innovation
  - Cities at forefrunt of policy, industry and research

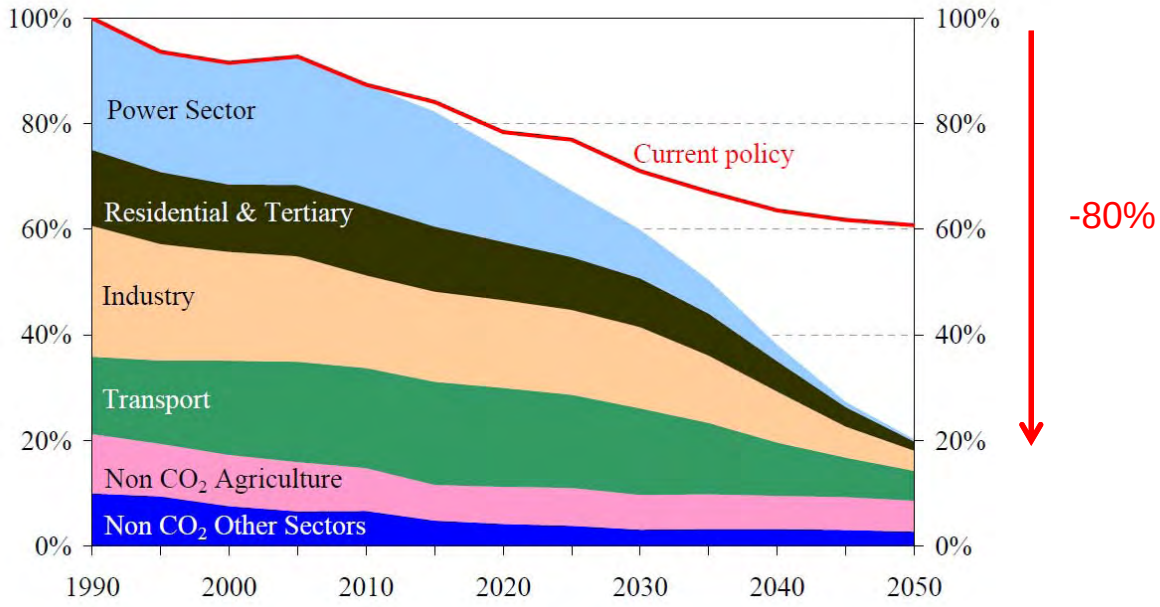




European targets

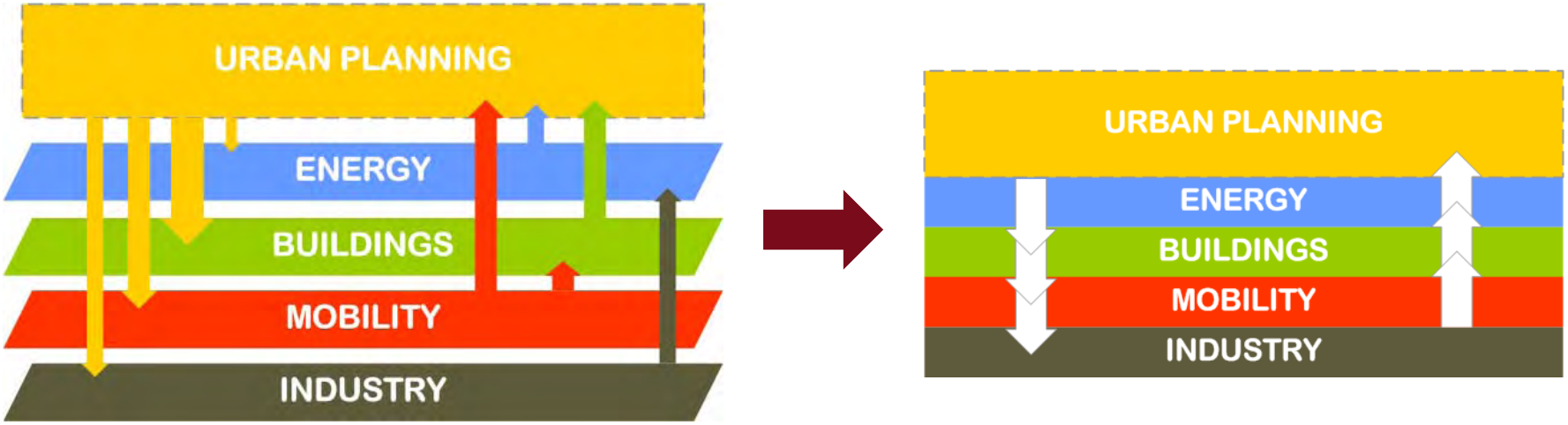
- European „20-20-20 targets“
  - Reduce GHG-emissions by 20%
  - Increase share of renewables in EU energy consumption up to 20%
  - Achieve an energy-efficiency target of 20%

- Energy Roadmap 2050
  - 80% GHG reduction



Integrated Smart Infrastructure Development

- **Understanding + optimising infrastructure on a system level …**
- **….**by developing methods and concepts which focus on a comprehensive approach targeting all energy related aspects



Evolvement of the JP Smart Cities

- JP preparation phase September 2010 – October 2011
  - Series of workshops in Brussels and Vienna
  - Definining the research framework (visions, aims and objectives, etc.)
- Summer 2011: Writing of Description of Work (DoW)
  - Set-up of JP Management Board
  - Approval of DoW by EERA ExCo
- Official launch of the JP Smart Cities @ SET Plan Conference in Warsaw (November 2011)
- During 2012: First year of JP in operation
- April 2013: First official review of the JP Smart Cities in the course of the EERA Congress (Brussels)

Aims and objectives

- Key instrument for supporting SET Plan Smart Cities and Communities initiatives
- Develop necessary scientific instruments for
  - Integrated urban energy planning and smart infrastructure
  - Unlocking full potential of cities regarding energy-efficiency
  - Massive renewables integration in urban areas

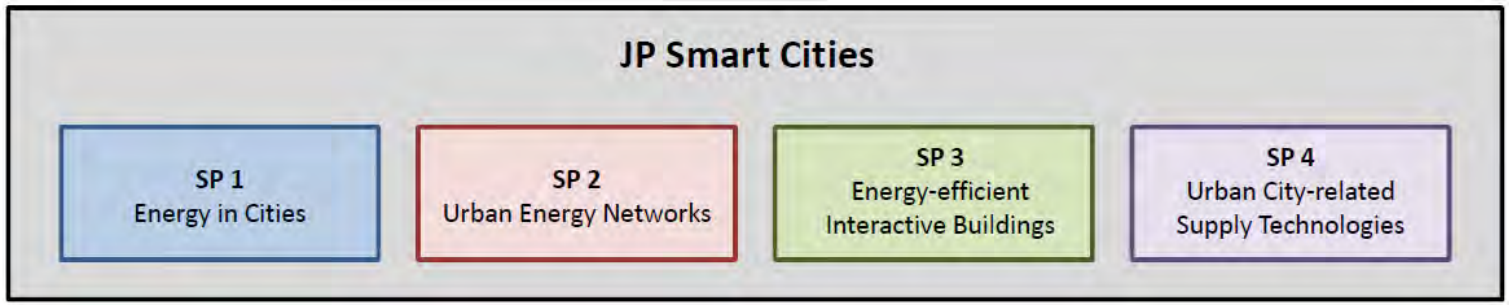
- Guide radical change in urban energy systems
  - Adopt multi-technology perspective and system approach
  - Understand complexity of future energy systems in cities
  - New scientific methods for city-wide integrated energy planning, design and management
  - Support European cities in their transformation towards Smart Cities
  - Development of strong interdisciplinary environment and new options for solving upcoming research questions

Partners on board

- 64 research institutions from 16 European countries
  - 19 full participants
  - 29 associated participants
- 2 umbrella organisations
  - UKERC (United Kingdom, consortium of 8 partners)
  - BERA (Belgium, consortium of 10 partners)
- 4 industry partners (ENEL, Ericcson, Telecom, Loccioni, all Italy)
- Total contributed human resources: **212.05 py/y**
  - SP 1: 39.85 py/y
  - SP 2: 65.10 py/y
  - SP 3: 76.35 py/y
  - SP 4: 30.75 py/y

JP structure

- 4 Sub-Programmes:



- Enabling radical innovation by taking an integrated and multi-technology approach
- Focus on “energy” covering entire chain (urban generation – distribution – consumption)
- Emphasis on energy efficiency and RES
- Extension to further environmental/sustainability issues and mobility aspects
- Synergies and interfaces between sub-programmes (e.g. “Building-to-Grid”)

JP Management

- JP Coordinator (AIT)
  - Brigitte Bach, Reinhard Schütz

- Sub-programme Coordinators:
  - SP 1: Hans-Martin Neumann (AIT) and Guy Vekemans (VITO, deputy)
  - SP 2: Mauro Annunziato (ENEA) and Ralf-Roman Schmidt (AIT, deputy)
  - SP 3: Annemie Wyckmans (NTNU) and Berit Time (SINTEF)
  - SP 4: Pablo Dolado (University Zaragoza) and Michael Hartl (AIT, deputy)

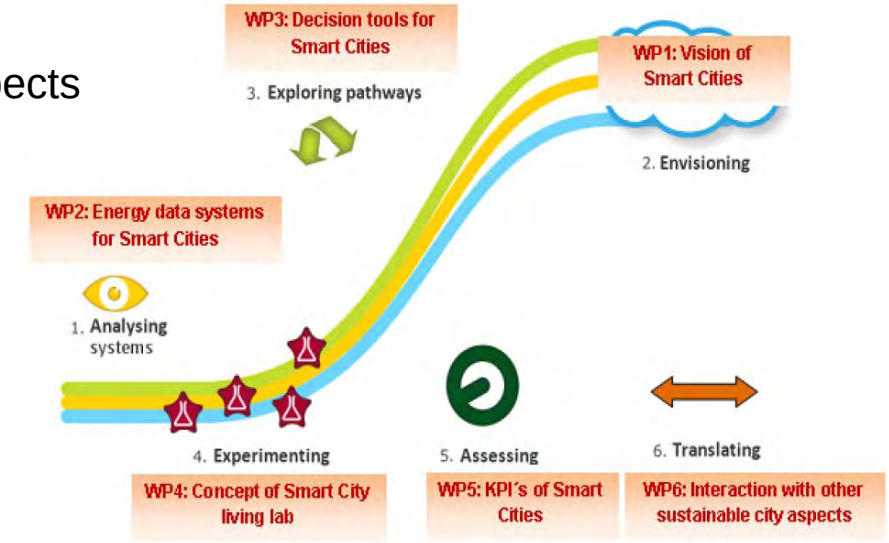
- JP Management Board: JPC + Sub-Programme Coordinators

- JP Steering Committee:
  - One representative from each full participant, currently 19 members

- Link to EERA Secretariat
  - Massimo Busuoli and Salvatore Amico Roxas (both ENEA)

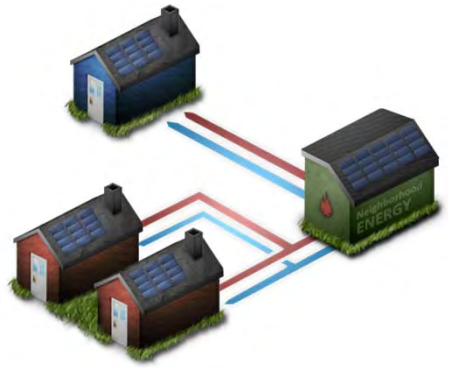
SP 1 – Energy in Cities

- Smart Cities visions and transition processes
- Development of energy data systems for cities
- Decision support tools for energy roadmaps and action plans on urban scale
- “Living lab” concepts in the context of Smart Cities
- KPI’s and progress monitoring
- Interaction with other sustainable city aspects (water, waste, mobility,...)

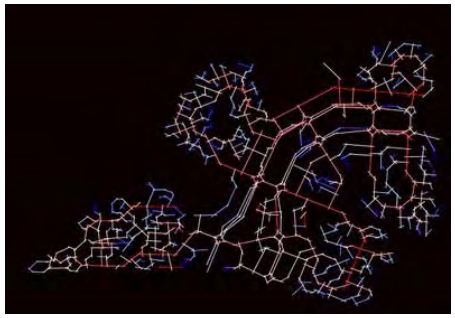


SP 2 – Urban Energy Networks

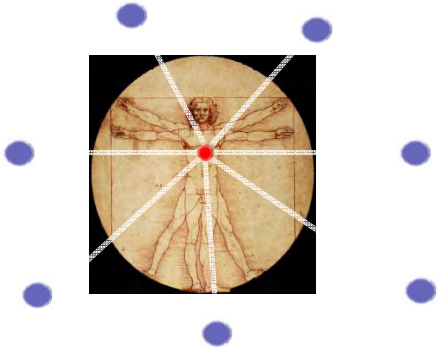
- Smart Energy Districts
  - Building cluster interaction
  - District heating & cooling management
  - Multi-sources energy management/balancing (thermal + electric)
  - Connection of building cluster to smart grid



- Urban network integration
  - Urban sensor networks, data-energy transmission networks
  - Data management
  - ICT architectures of smart streets/districts
  - Integration of smart services in urban networks
  - Energy-mobility network integration

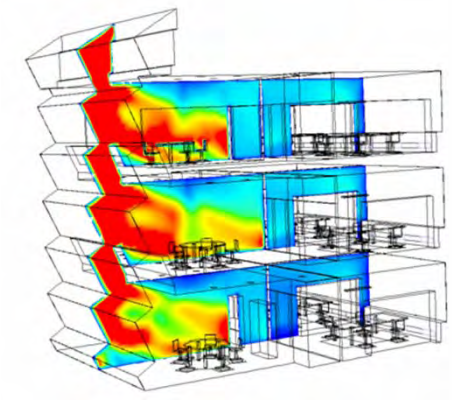


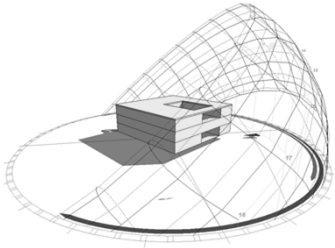
- Human factors: the city-citizen interaction
  - Interaction between citizen and urban networks in public space
  - End-user grid interface



SP 3 – Energy-efficient Interactive Buildings

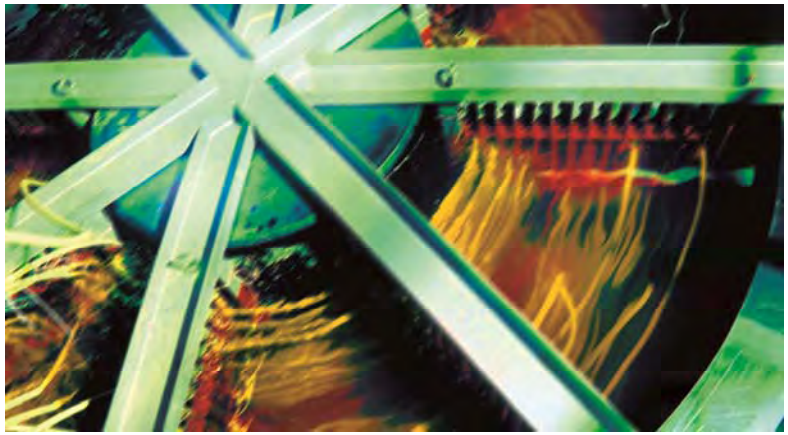
- Building design
  - Design concepts for various types of boundary conditions
  - Modelling and simulation (BIM)
- Innovative building envelope solutions
  - Systems, advanced materials, components, RES integration
- Energy management and grids interaction
  - Building services, smart building management, B2G
- User interaction
  - End/professional users and indoor environment requirements
- Support strategies
  - Policy and market instruments, case studies, dissemination





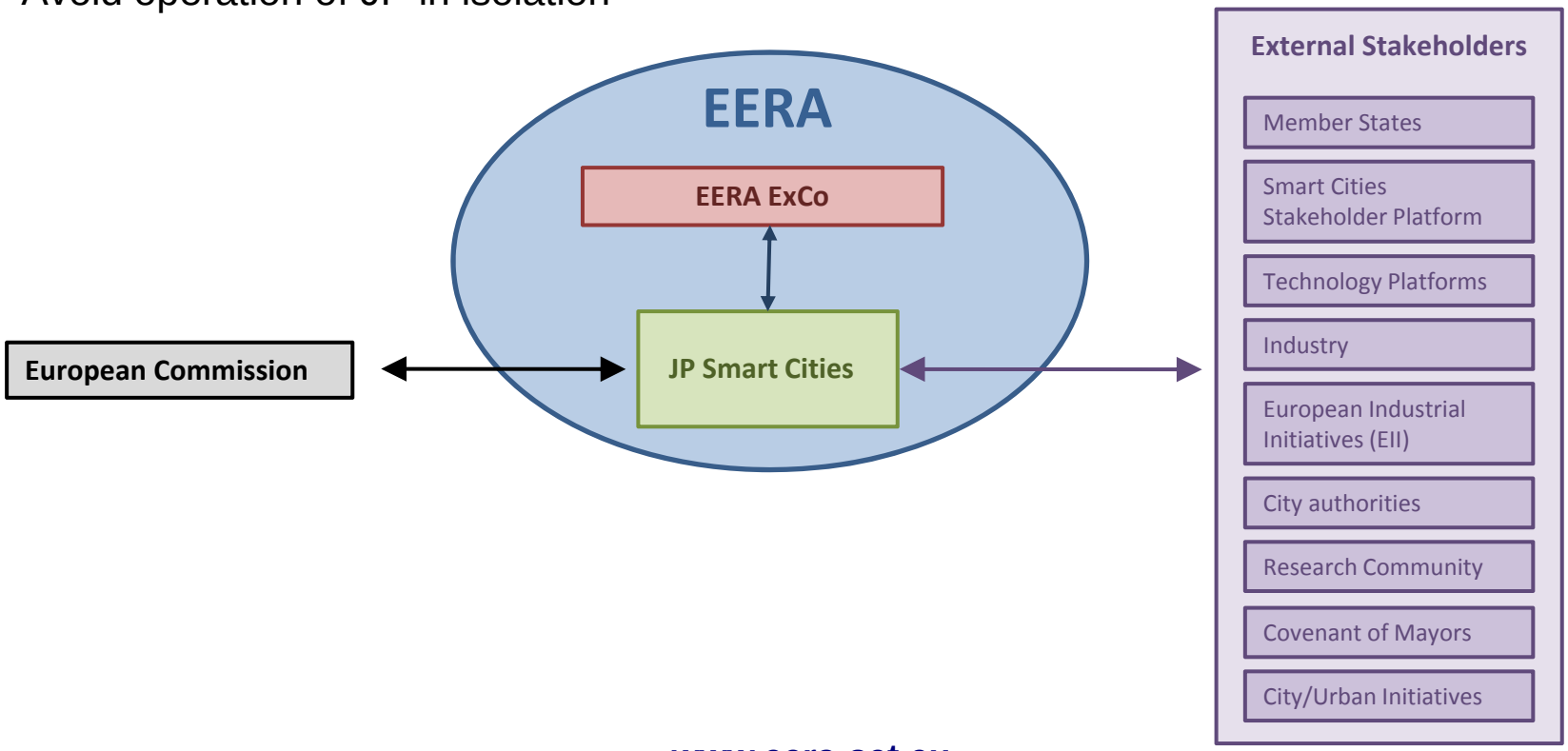
SP 4 - Urban City-related Supply Technologies

- Preliminary focus on solar energy, distributed heat-pumps and thermal energy storage
- Large-scale urban system integration
- Development of modelling & simulation framework
  - Numerical component oriented models and libraries
  - Design and validation on technology level
- Quality assessment: large-scale test infrastructure, standards and procedures, guidelines
- City-industry interaction (use of waste heat, RES integration, etc.)
- Assessment of new technologies and their integration into infrastructure



Communication to external stakeholders

- Strategic partner for European Commission
- Maximising synergies between EERA and the entire SET Plan community for Smart Cities
- Capture the real implementation needs of cities, industries, etc.
- Avoid operation of JP in isolation



International collaborations

- JP Smart Cities is seeking collaborations with partners from emerging markets (China, India, etc.)
  - Urgent need for massive CO_2 reductions in these countries
  - Urban infrastructure development at enormous speed
  - Initiate innovation cycle between Europe and partner countries
  - Create win-win situations
  - Enable economic boost in energy sector for both partners

- JP Smart Cities as a „one-stop-shop“ for international collaborations
  - Strategic partner for EC in official dialogue with partner countries
  - Speaking with one voice representing European research on Smart Cities

- Types of potential collaborations:
  - Research projects with partners from research, academia and industry
  - Collaborations with city authorities on concrete innovative demonstration projects
  - Sharing of best-practise experiences and lessons learned
  - Joint PhD schools etc.

Advancement after one year

- Set-up and organisation of the European Smart Cities research community
  - This community has not existed before!
  - Streamlining strategies, research aims and objectives
  - Team-building, Involvement of new partners with relevant competences/expertise

- Kicking-off first joint activities
  - Collection and analysis of existing ongoing projects (national + EU)
  - Scientific screening and mapping of tools (Taskforce on „Simulation Platform Development“)
  - Identifying major gaps and needs for further development

- Communication with relevant stakeholders at various events

- Interaction with Member States Initiative Smart Cities
  - Towards transnational city projects through new and transparent funding mechanisms
  - Enable transfer of scientific findings of JP into cities

- Initiating international cooperations with India and China

Future next steps

- Further deepening of the research framework
  - Formation of core teams on specific topics
  - Towards agreements for joint use of research facilities
  - Joint proposals for upcoming calls (national, Horizon 2020, etc.)
  - Update of DoW in December 2013

- Next half-year meeting in July 2012 @ CIEMAT premises in Madrid
  - Reporting on progress regarding milstones and thematic working groups
  - Presentation of half-year results
  - Continuation of team-building
  - Inclusion of new partners

- Set-up of „Cities Advisory Board“ under discussion (extend dialogue with cities)

- Intensifying dissemination activities (webpage, logo, flyers, etc.)

- Organisation of EU-China Urbanisation Workshop in Foshan City (China) together with EC (end May 2013)

EERA
European Energy Research Alliance

Thank you!

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