

# Smart Cities Member States Initiative

Helping Cities to become  
the Drivers of Innovation

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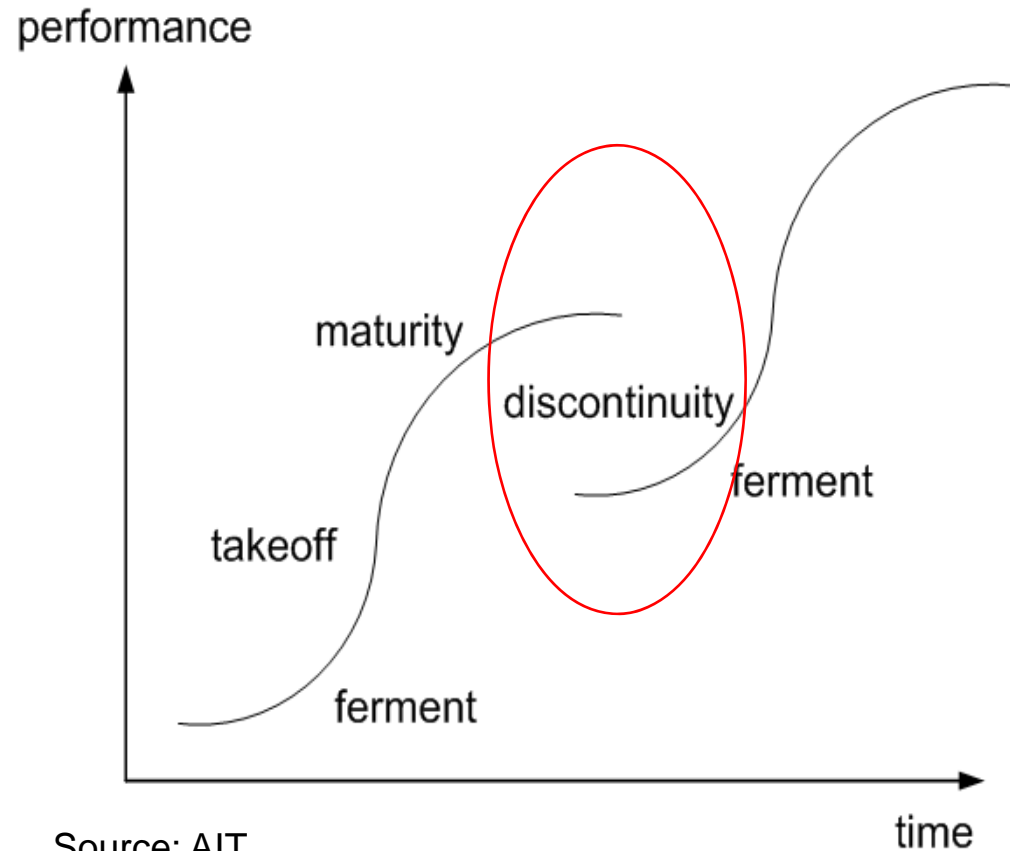
# Drivers of Innovation in the Urban Context

- Systems thinking
- Technology integration
- Management of complexity
- Involvement of all relevant actors
  - cities
  - regional authorities
  - municipal (multi) utilities
  - industry
  - research institutions

# Managing Urban Complexity

- **Systemic** orientation (i.e. analyzing the system as a whole and the interrelations between different areas instead of purely sectoral analysis (transport, settlements, energy supply,... ))
- A **‘human-centered’** approach (that is, taking human behavioural patterns as a starting point und not projected technological changes per se).
- **Interdisciplinary** analysis and development of respective planning tools and technologies for urban areas
- **Integrative and trans-disciplinary** demonstration and implementation of solutions, uniting researchers, industry AND urban practitioners
- **Long-term oriented** in analysis and planning, stretching beyond the next 15-20 years

# Guiding Radical Innovation



single technologies	integrated approach
re-active	active
static	dynamic
local	urban-wide
fragmented	system oriented
quick fix	solution oriented

Source: AIT  
See also: Transition Management

# The Vision of Energy Efficient Smart Cities

# Smart Cities: Smart, Sustainable and Resilient Energy Systems

- ICT & energy technologies are merging
- Intelligent energy management on regional & city level

## **New integrated planning approach**

- Integrated energy planning
- Active buildings
- Smart grids
- Smart supply technologies and inclusion of regional renewable sources
- Sustainable mobility

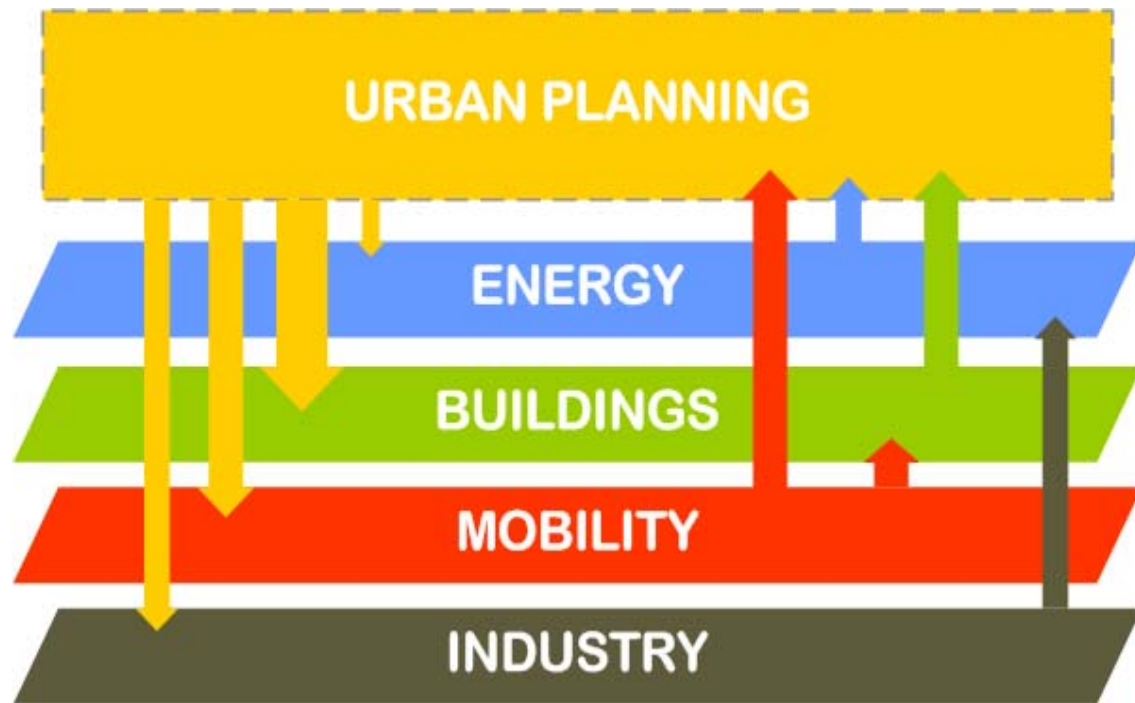
## **New approach to technologies**

- New Business Models
- New innovation processes (test beds, living labs, stakeholder dialogues, etc.)



# Urban Planning Structures: Status Quo

- Diverging planning tasks / goals / time dependencies
- Inhomogeneous stakeholder processes
- Optimisation of single processes and technologies



Source: AIT, Energy Department



# The Integrated Planning Approach

- Integrated planning tasks
- Heterogeneous stakeholder-processes
- Common goals
- Common time dependencies
- Continuous communication
- Optimisation of the overall 'system' of the city



Source: AIT, Energy Department

## Smart Cities = Systems Integration

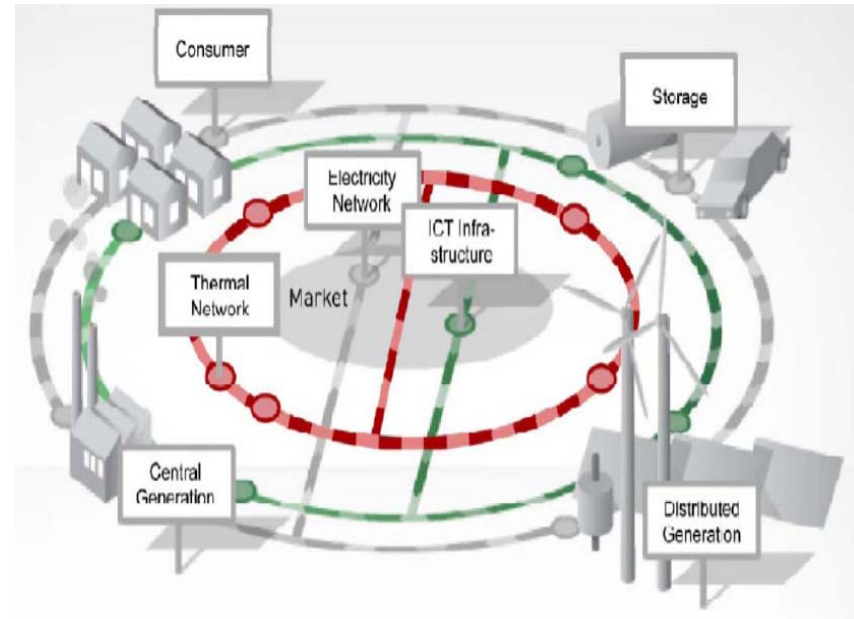
- Energy harvesting, renewable energy sources
- Active buildings, plus-energy-buildings
- Polygeneration
- Smart energy grids
- E-Mobility and integration into grid
- Heating and cooling networks
- Energy storage (power to gas, etc.)
- Intelligent energy management, load transfers, demand side management
- New innovation processes and business models
- Integrative simulation, planning, and monitoring tools



# Smart Cities Implementation

Smart Cities require new approaches:

- Fully integrated design and intelligent management of energy systems
  - From a single technology perspective to a multi technology perspective
  - Multi-stakeholder involvement
  - Trans-disciplinary approaches
- 
- Paradigm shifts in the sectoral innovation system required!
  - Transformation of energy innovation system to gain a competitive advantage for the realisation of Smart Cities

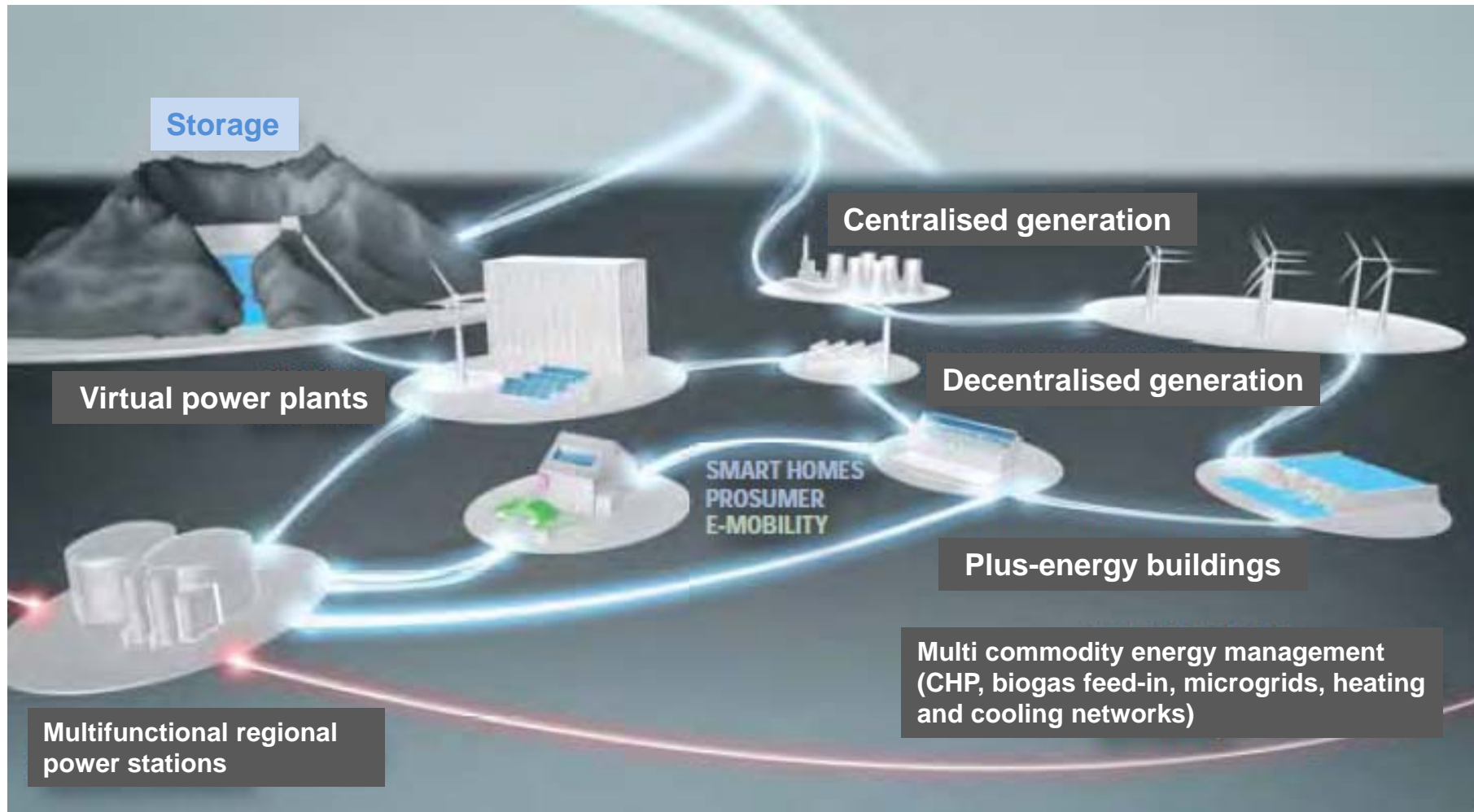


Source: AIT

Enabling Technology:

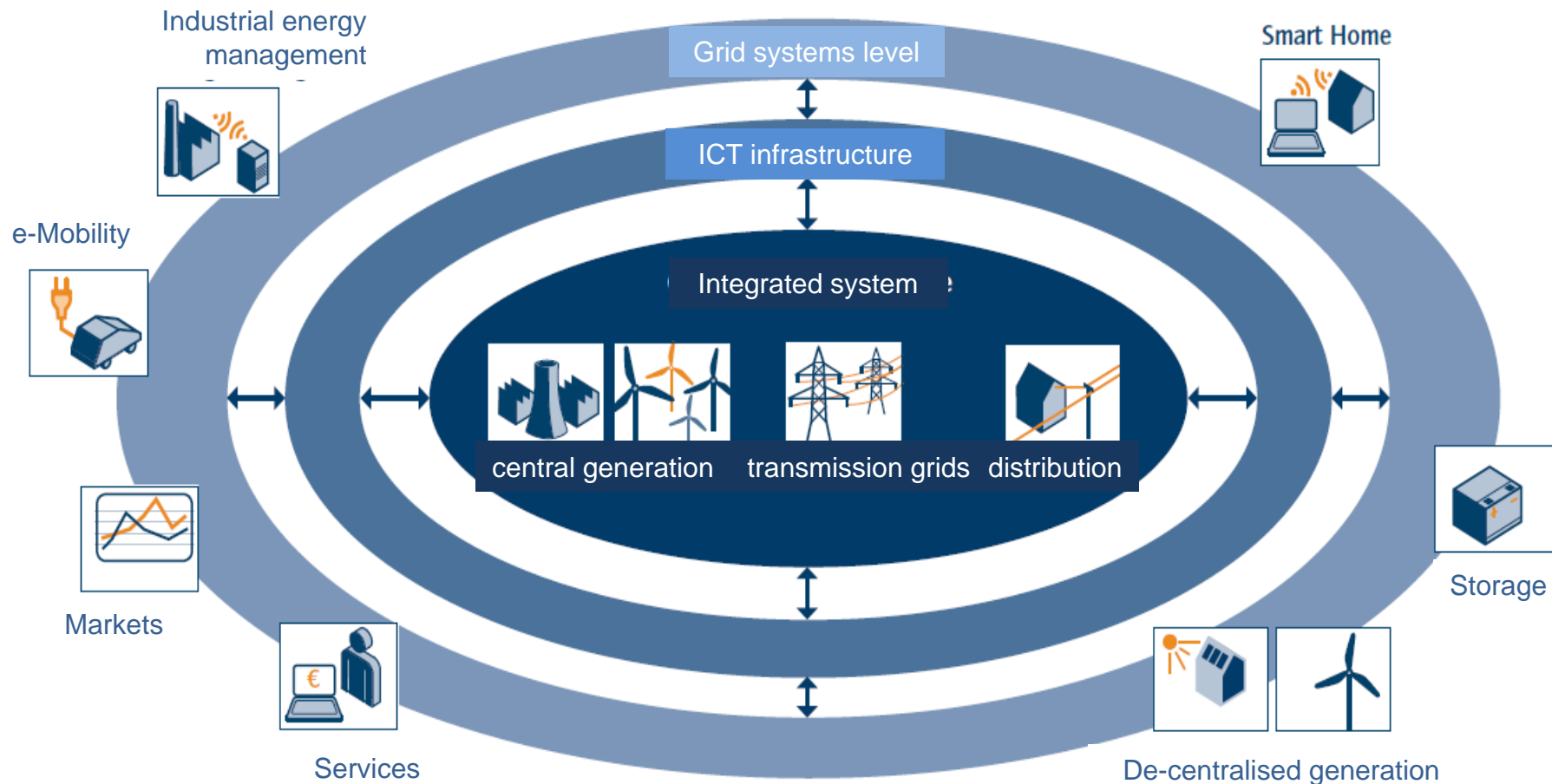
Smart (Hybrid) Grids

# Smart and Hybrid Grids



# Systems Model

(selected technologies, functionalities and applications)

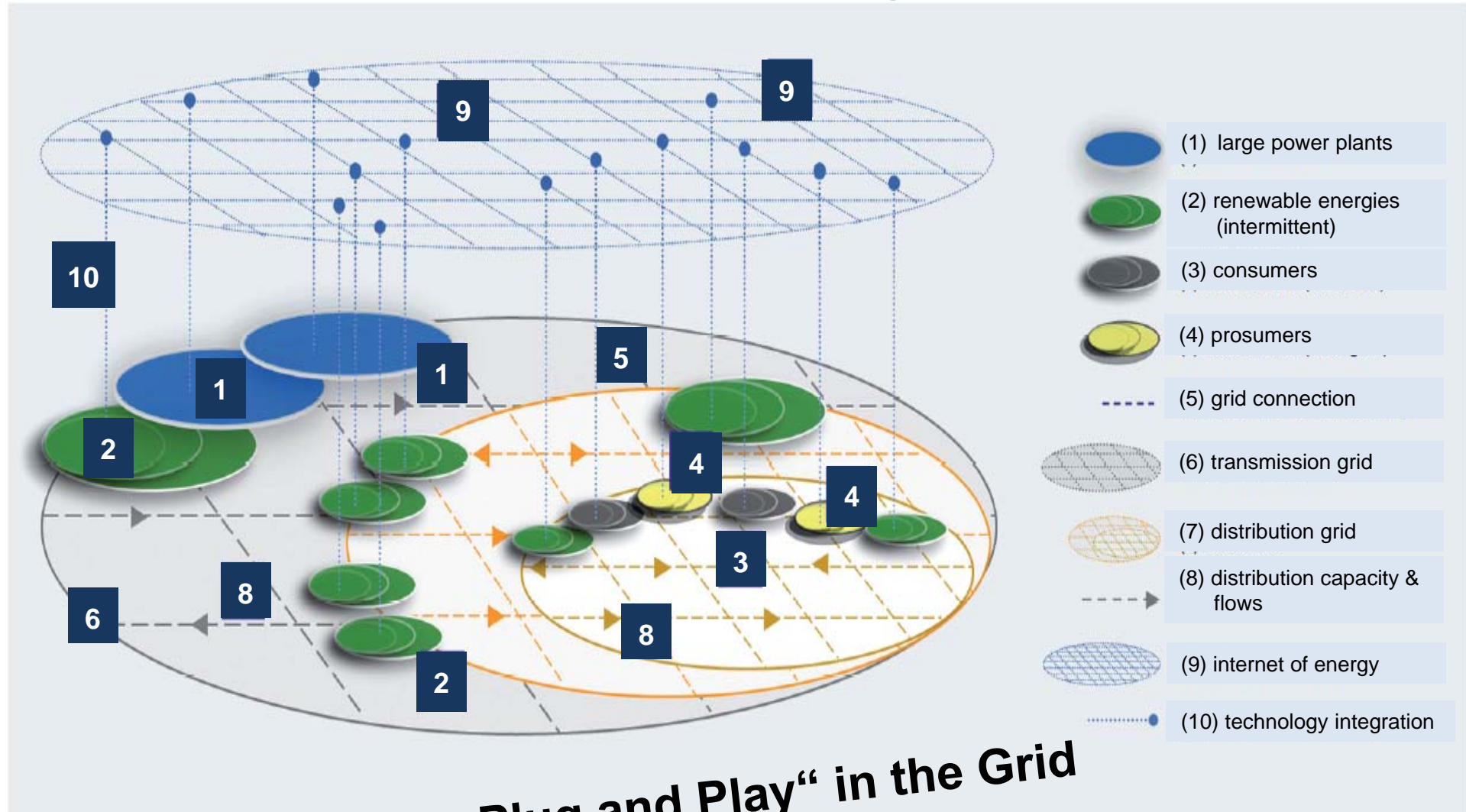


Source: „Future Energy Grid“, acatech 2012 / E-Energy



# Vision: „Internet of Energy“ as an Enabler for Technologies and Markets

Smart Cities  
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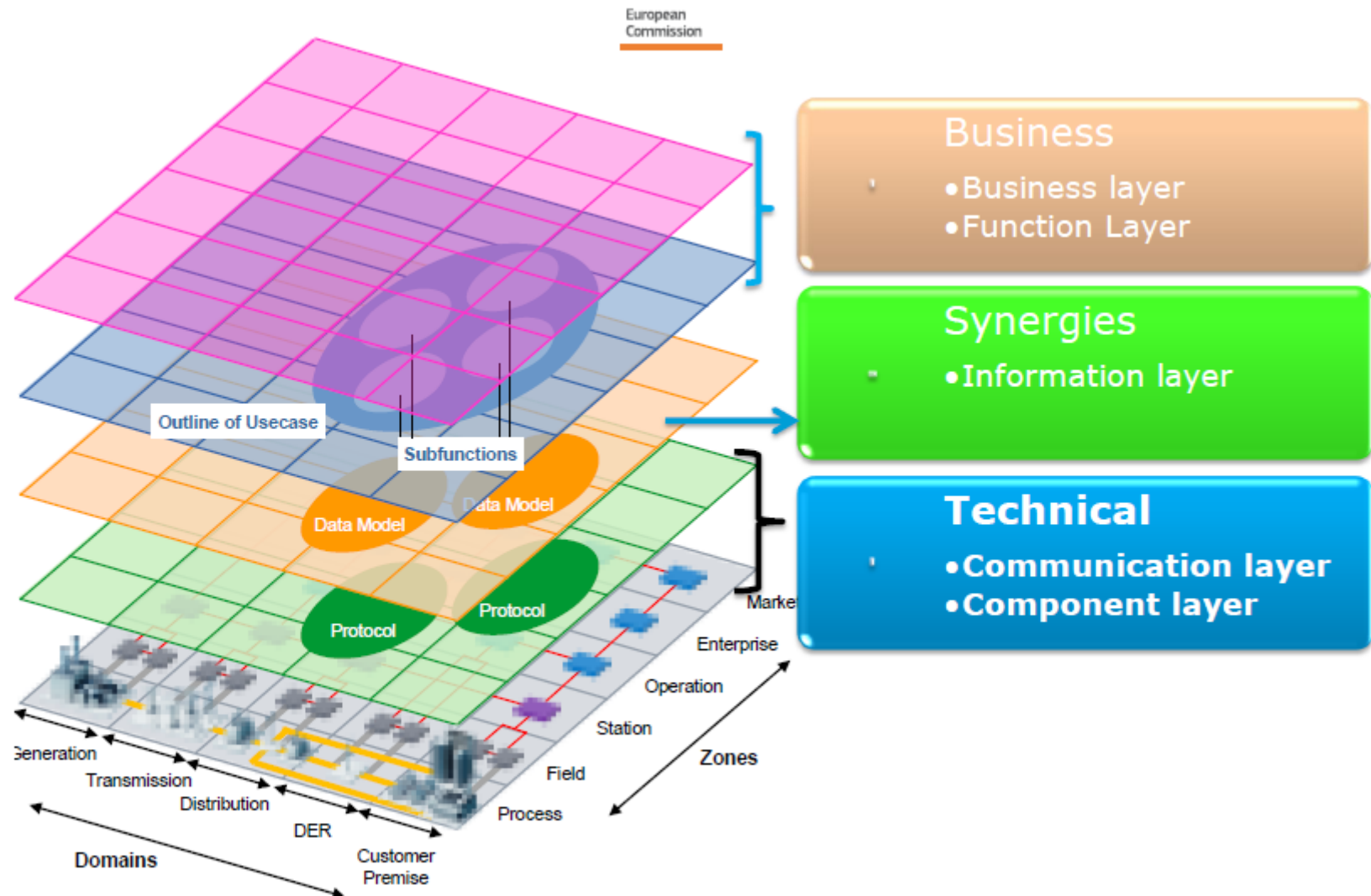


„Plug and Play“ in the Grid

# Reference Architecture

Smart Cities  
Member States Initiative

Source: M490, EU Smart Grids Task Force





# Principles of Urban Network Architecture (I)

## 1. Open architecture

- a) Built around principles of non-discrimination and equality of information
- b) Open to all forms of information flows and collaboration
- c) No discrimination on the basis of vendor choice, political or socio-economic considerations

## 2. Open access

- a) The components of an urban network should be, in principle, open to all.
- b) The overall framework of urban networks should be built in a way that ensures maximum functionality and creates a level playing for all sorts of urban business models.

(Source: Patric Driscoll, Aalborg University)

# Principles of Urban Network Architecture (II)

## 3. Transparency

- a) Ensure respect for privacy, control of personal data, and human rights
- b) Openly address people's wish for autonomy and control of their data

## 4. Fault tolerance

- a) Energy, transport, water, and waste systems need to continue to function even in disaster situations
- b) Adopt a system architecture that is constructed in parallel, rather than in series to ensure that the overall system can function in the face of lags, faults, miscommunication, incorrect information, or catastrophic events

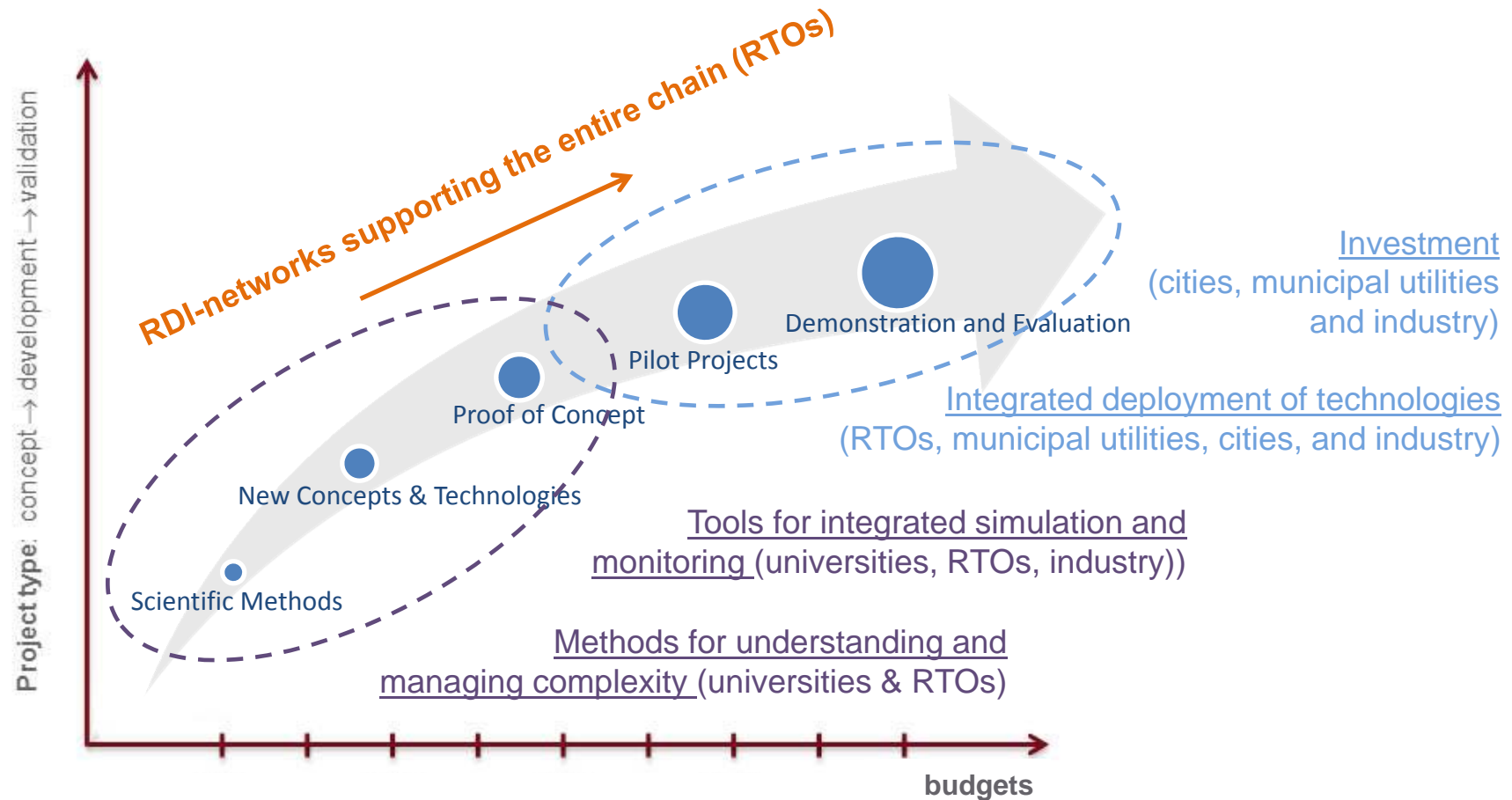
## 5. Loosely coupled systems

- a) Favour passive systems over active systems
- b) Minimise risks that arise from tightly coupled, high technology systems

(Source: Patric Driscoll, Aalborg University)

# European Policy Initiatives and Funding Schemes for RDI on Urban Issues

# Actors Driving Innovation in the Urban Field



RTO = research and technology organisation

# Policy Initiatives on European Level (I)

Smart Cities  
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- Strategic Energy Technology Plan (SET-Plan)
  - European Industrial Initiative on Smart Cities and Communities (EII SCC)
    - Currently geared at large demonstration projects funded out of H2020
    - European Smart Cities Stakeholder Platform (no funding, only moderation)
  - European Industrial Initiative on Electricity Grids (EEGI)
    - First example of active participation of Member States
  - European Energy Research Alliance Joint Programme on Smart Cities
    - In-kind contributions of 180 person years per year from more than 40 RTOs
- Smart Cities Member States Initiative
  - Currently 21 Member States + Associated Countries, no EC funding
  - Yearly joint calls planned in thematic complementarity with EII Smart Cities and Communities
- Initiatives by DG REGIO based on structural funds

# Policy Initiatives on European Level (II)

Smart Cities  
Member States Initiative

- European Innovation Partnership on Smart Cities and Communities
  - jointly coordinated by DGs ENER, MOVE, and CONNECT
  - currently mainly based on the SET-Plan Industrial Initiative Smart Cities and Communities (EII SCC)
  - focus proposed by the EC is on demonstration
  - Goal: coordination of urban related RDI initiatives in Europe
- Joint Programming Initiative Urban Europe
  - currently 16 Member States + Associated Countries
  - 2 joint calls planned for 2012 and 2013
  - thematic focus beyond energy
  - coordinated by Austria and NL ([www.jpi-urbaneurope.eu](http://www.jpi-urbaneurope.eu))

# The European Industrial Initiative on Smart Cities and Communities of the SET-Plan

## Specific Nature of SET-Plan Collaboration

- Energy – its availability and its use – can be considered one of the grand challenges of our time
- SET-Plan was launched as a first opportunity for joint programming on a European level
  - on the level of European Industrial Initiatives (success?)
  - on the level of the EERA (success story)
- Strong need for partnership and collaboration
  - among MS / AS (new ambition of EII Smart Cities)
  - between MS and EC



# The European Industrial Initiative on Smart Cities

Smart Cities  
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- Addressing technologies and solutions for
  - energy efficiency
  - integration of renewable energy sources (on-site and off-site)
  - demand side management
- Connection between CO<sub>2</sub> emissions and urbanisation  
⇒ Main challenges:
  - complexity of technological interactions
  - diversity of national administrative situations
  - subsidiarity: cities can best be supported on national level
- The EII SCC was launched in June 2011
  - a Stakeholder Platform was implemented in November 2011
  - still no strategic research agenda available
  - an EIP SCC was proposed by the EC on 10 July 2012, building on the EII SCC

# The Smart Cities Member States Initiative

# The Smart Cities Member States Initiative

- Kicked off in December 2011
- Currently 21 countries participating (MS+AS)
- Aiming at creating policy and RDI funding support on the level of the participating countries
- Working under the principle of voluntarity and variable geometry
- Endeavouring to supply integrative methods and tools for the large Smart Cities demonstration projects attempted by the EC
- Striving to support European cities in moving forward
- Meant as a vehicle for partnership with the EC and the EII on Smart Cities and Communities

# Objectives of the Smart Cities Member States Initiative

- Common vision for Smart Cities and related national and European activities
- Screening of national Smart Cities programmes and best practice projects („stock-taking“)
  - as a preparation for transnational collaboration
- Better understanding of national differences in funding and administration of cities
  - ⇒ to create a joint approach of national governments
  - ⇒ to design a unified process of contributions to the Smart Cities EII from the part of the participating countries
- Joint activities in RDI

# Proposed Outcomes of Smart Cities MS Initiative

1. Joint technology vision & SRA
2. Proposal for a roadmap of joint R&D funding
3. Streamlining of the innovation process (R=>D=>I)
4. Integration of actors & support for the needs of cities
5. Fast-track activities for funding collaboration
6. Transnational joint calls in complementarity with the  
EII Smart Cities and Communities
7. Pooling of national funding in order to support European  
cities through RDI and policy actions

# SCMSI Joint Calls (I)

## First Phase: 2013 - 2014

- Creating a common basis for future development
  - Through the **documentation, pooling, and further development of existing best practice** concepts and methods
  - Working in partnership with relevant national and EU institutions (EERA, European Commission, etc.)
  - Fostering the standardisation of smart urban transformation
  - Supporting the sharing of results among demonstration projects
  - Creating momentum through first fast-track activities
- The topics
  - Simulation tools and methods
  - Monitoring and KPIs
  - Governance and planning processes

# SCMSI Joint Calls (II)

Smart Cities  
Member States Initiative

## Second Phase: 2015 - 2018

- Jointly driving the process towards Smart Cities
  - Setting up and **financing RDI on Smart Cities in partnership with the European Commission** (ERA-NET Plus, or other innovative instruments)
  - Standards and finance mechanisms for new pilot and demo projects
  - Blueprint for a Europe wide roll out in transnational partnership among cities and with input from industry and research
  - Methods for excellent real time monitoring and analysis
- Potential topics (towards implementation)
  - Developing flagship cities
  - Engaging newcomer cities
  - Preparing tools and methods for roll-out

# Joint Programming Initiative Urban Europe



# JPI Urban Europe: Participants and Objectives

## Participants:

- 16 Member States and Associated States (in alphabetical order): Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Ireland, Italy, Malta, Netherlands, Norway, Portugal, Spain, Sweden, and Turkey
  - Portugal and Spain are observers (status: October 2012)

## Objectives:

- To establish a **world class research environment** in Europe for all “City of the Future” developments;
- Based on relevant scenarios and patterns, to **create input for radical innovation, technology development and implementation strategies**;
- To design **tools, models and concepts** for technology assessment and dissemination as well as for urban governance and urban management
- To develop **policy recommendations** for the European Union, its Member states and cities

# Focus, Work Programme, and Instruments

- The JPI Urban Europe intends to address the broad spectrum urban-related R&D from a „human centred perspective“
- Pilot Phase: 2012 - 2013, Implementation Phase: 2014 – 2020
- Themes will evolve from fundamental to more applied research over the years
- Implementation instruments:
  - Forward looking activities
  - Databases and exchange of information
  - Alignment of national R&D programmes
  - Trans-national joint calls
  - Collaborative R&D programmes of the Urban Europe Research Alliance

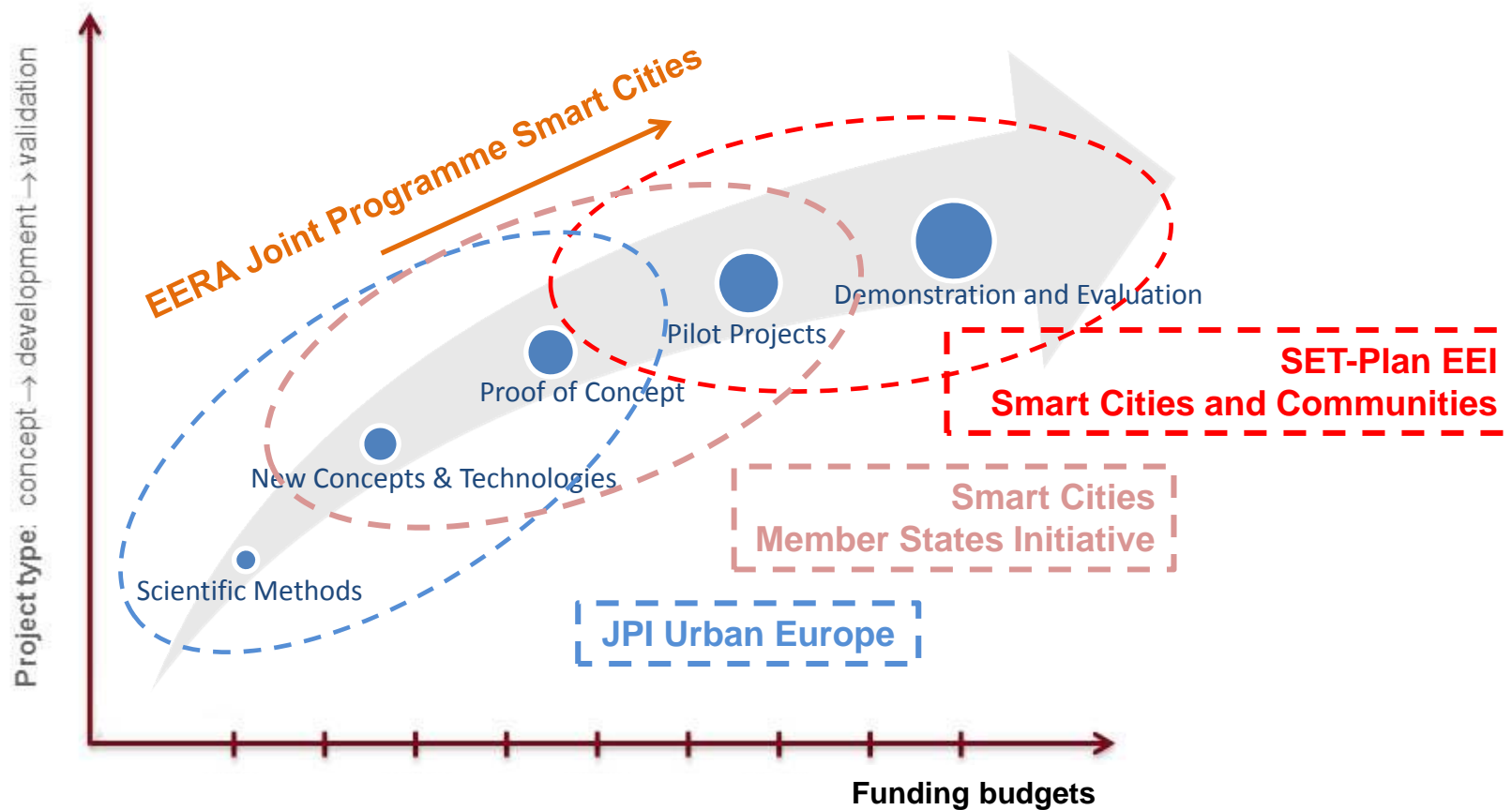
# Joint Call Themes 2012-2013

1. Urban Complexity
2. Urban Adaptability and Proficiency
3. Urban Diversity and Social Cohesion
4. Urban Technologies and Networks
5. Urban indicators and standardisations

# Urban Related RDI in Europe:

## Working together in Complementarity

# European RDI Funding in the Urban Field



# Mutual Coordination of Research Agendas

- Need for coordination is evident
- EIPs were conceived to achieve such coordination
  - Coordination ability of EIP Smart Cities and Communities will depend on representation of the relevant RDI funding groups
  - Procedures and selection mechanisms are currently unclear
- SCMSI and JPI UE could attempt coordination of joint calls in 2013 and potentially even do them together
- Requirement:
  - mapping of overlaps and complementarities in view of H2020
  - address potential funding coordination and/or collaboration

# Summary Conclusions

- Urban innovations need to be solution-oriented, requiring systems thinking, integrated approaches and management of complexity
- Urban systems require a completely new approach to energy grids as an enabling technology
  - there is an exciting potential of a field of innovation, similar to the open source movement of the worldwide web
- A variety of policy initiatives and funding schemes are in place regarding the urban theme
  - funding is available from the Framework Programme, as well as from Member States driven transnational joint calls
- Coordination among EC and MS funding schemes will open up new potentials of innovation for cities

# Thank you for your attention!

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