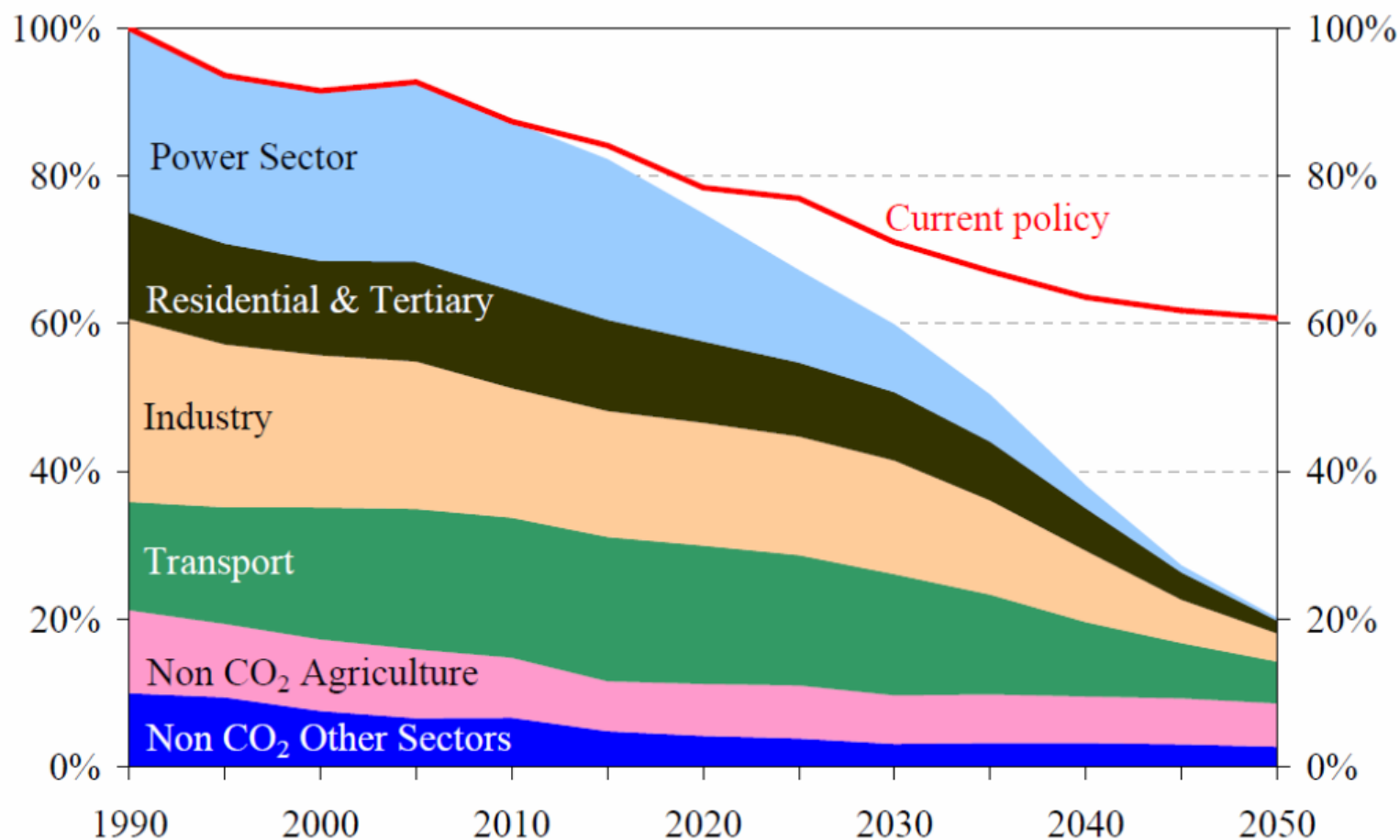# Smart Cities – the European Approach

AIT Austrian Institute of Technology

Energy Department

With the current policy the European CO_2 target for 2050 cannot be reached

EU GHG emissions towards an 80% domestic reduction (100% =1990)

Cities – a powerful lever

- 70% of total CO_2 emissions in Europe emerge in und around urban areas

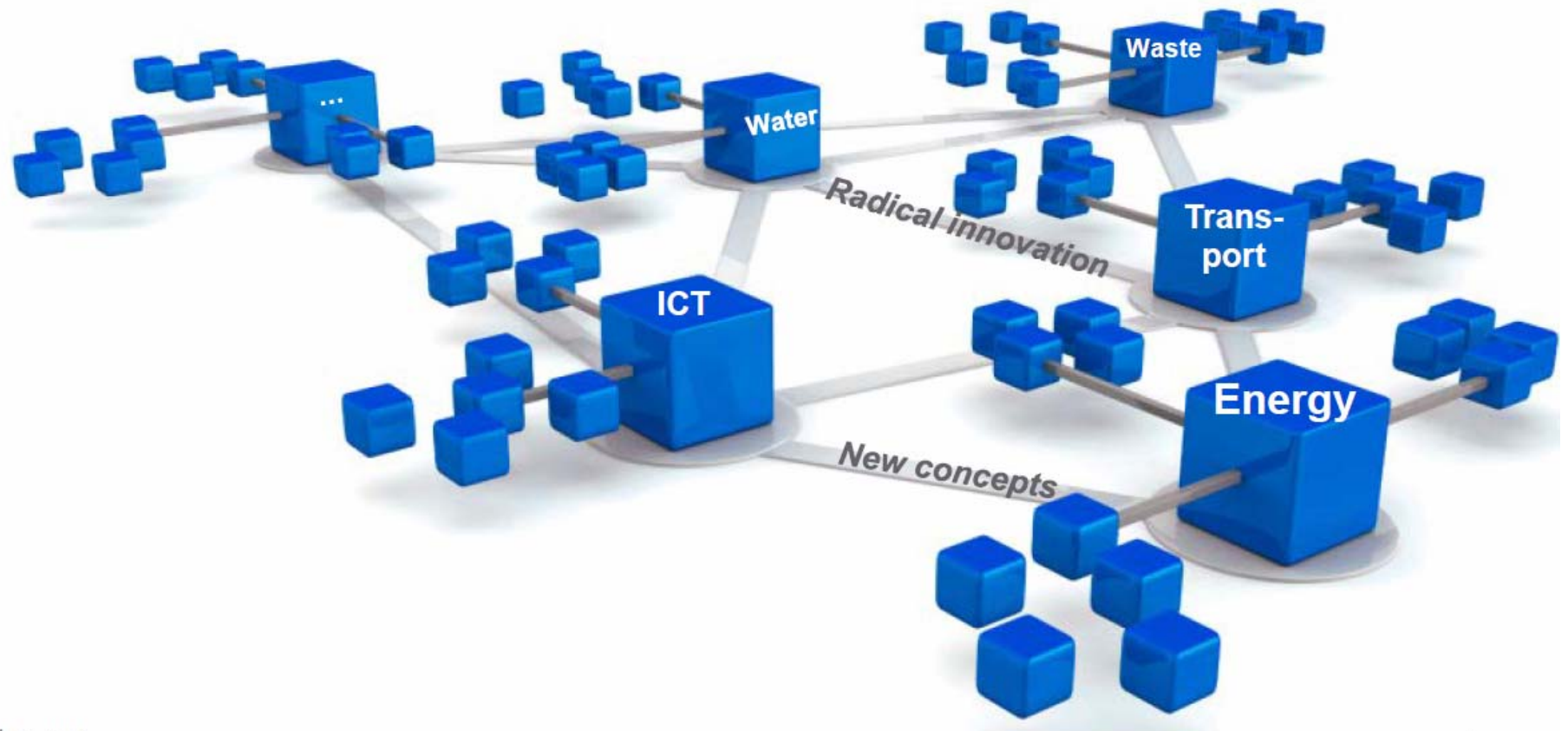- 74% of the European population lives and works in cities – with a rising trend

Klimaschädliche Gase: Deutschland hat dem IEA-Be 2012 um 2,2 Prozent erhöht. Quelle: dpa

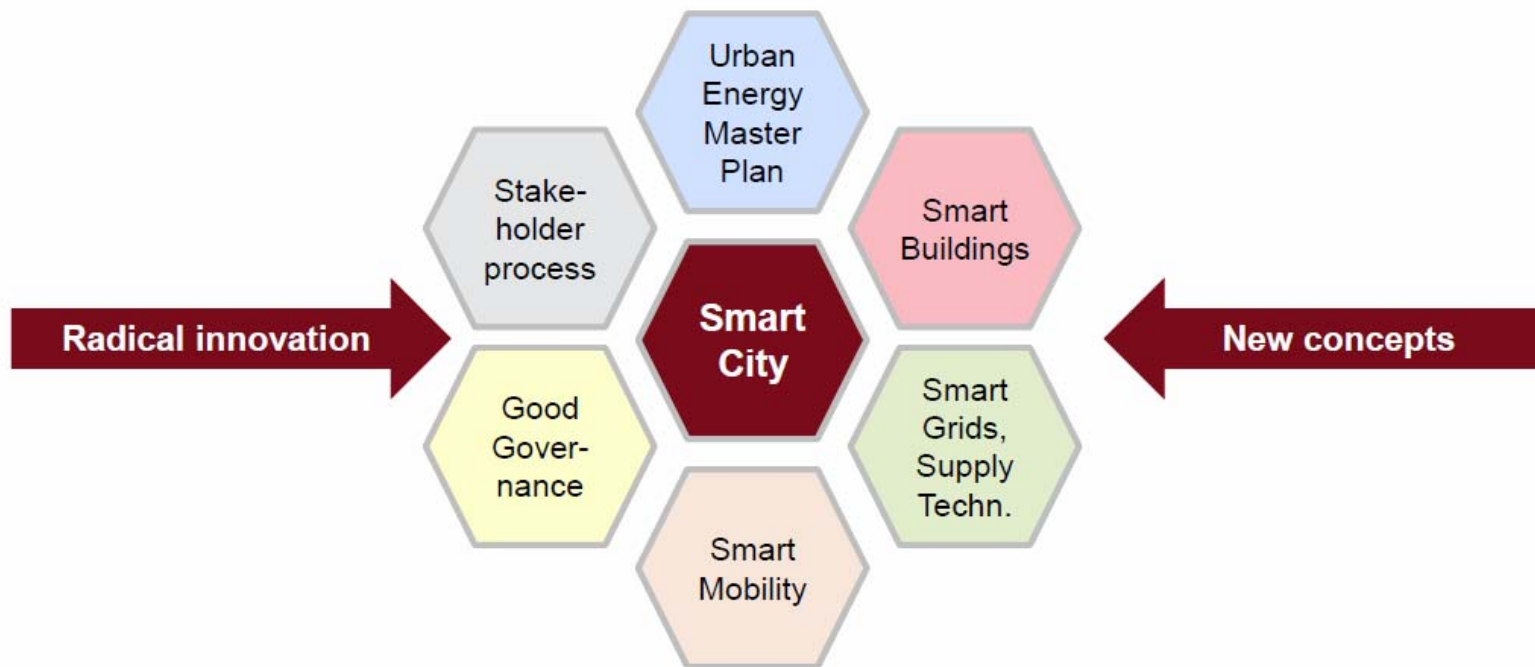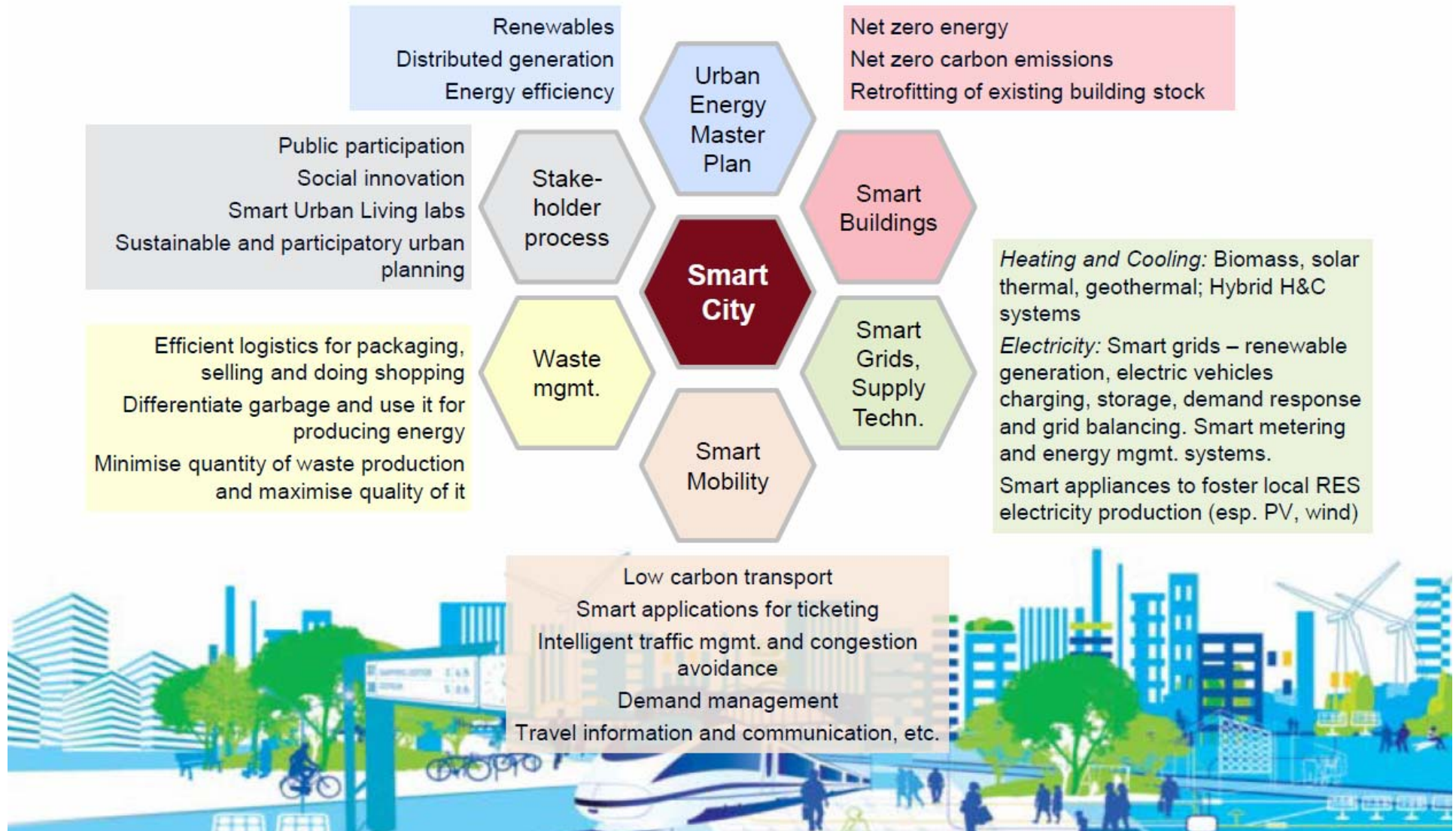- They consume 75% of the energy used in the EU

RADICAL INNOVATIONS ⇨ SMART CITY

A Smart City integrates processes, concept and technologies to improve the quality of life

Smart City – a multi-technolgy, multi-disciplinary and co-operative approach
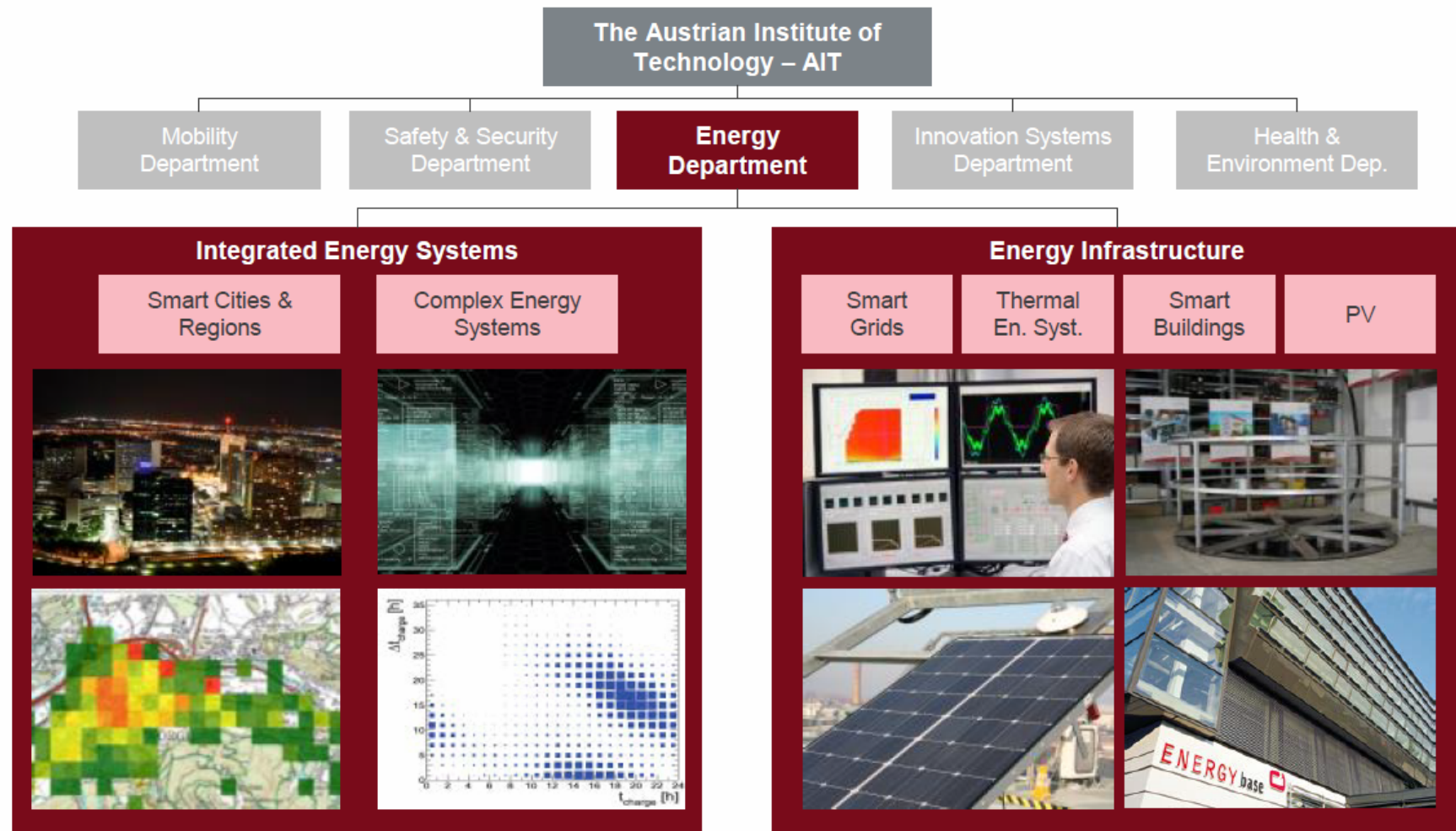
Smart City – a variety of research questions need to be addressed

Renewables
Distributed generation
Energy efficiency

Net zero energy
Net zero carbon emissions
Retrofitting of existing building stock

Public participation
Social innovation
Smart Urban Living labs
Sustainable and participatory urban planning

Urban Energy Master Plan

Stake-holder process

Smart Buildings

Smart City

Heating and Cooling: Biomass, solar thermal, geothermal; Hybrid H&C systems

Electricity: Smart grids – renewable generation, electric vehicles charging, storage, demand response and grid balancing. Smart metering and energy mgmt. systems.

Smart appliances to foster local RES electricity production (esp. PV, wind)

Efficient logistics for packaging, selling and doing shopping
Differentiate garbage and use it for producing energy
Minimise quantity of waste production and maximise quality of it

Waste mgmt.

Smart Grids, Supply Techn.

Smart Mobility

Low carbon transport
Smart applications for ticketing
Intelligent traffic mgmt. and congestion avoidance
Demand management
Travel information and communication, etc.

SMART CITY PROJECTS

The Austrian Institute of Technology is Austria's largest non-university research institute

The Austrian Institute of Technology – AIT

| Mobility Department | Safety & Security Department | **Energy Department** | Innovation Systems Department | Health & Environment Dep. |

Integrated Energy Systems

Smart Cities & Regions

Complex Energy Systems

Energy Infrastructure

Smart Grids

Thermal En. Syst.

Smart Buildings

PV

Smart City Vienna – a Stakeholder Process

Smart Energy Vision 2050	Roadmap for 2020 any beyond	Action Plan 2015

Q:\Energy\9__Projekte_GFD übergreifend\02_Oberösterreich\02 Smart City Wien\Forum 1\03_Outcome\03_Fotos\Smart Cities FIT4SET Forum 23.-24.05.2011 076.jpg

Smart Energy Vision 2050
- Qualitative
- Quantitative
  - CO2
  - Energy Efficiency
  - Renewables
  - Modal split

Roadmap for 2020 any beyond
- Scenarios
  - Business as usual
  - Low carbon
  - …
- Impact of technologies and measures

Action Plan 2015
- Measures
- Demonstration projects

TRANSFORMation Agenda for Low Carbon Cities

Vienna

Amsterdam

Copenhagen

Lyon

Hamburg

Genoa

Outcome

- SWOT analysis of all cities and their surroundings
- Transformation agenda based on SWOT, quantitative & qualitative models
- Implementation plan on district level
- "Smart Energy City Handbook" for replication
- Decision support model

04.12.2013
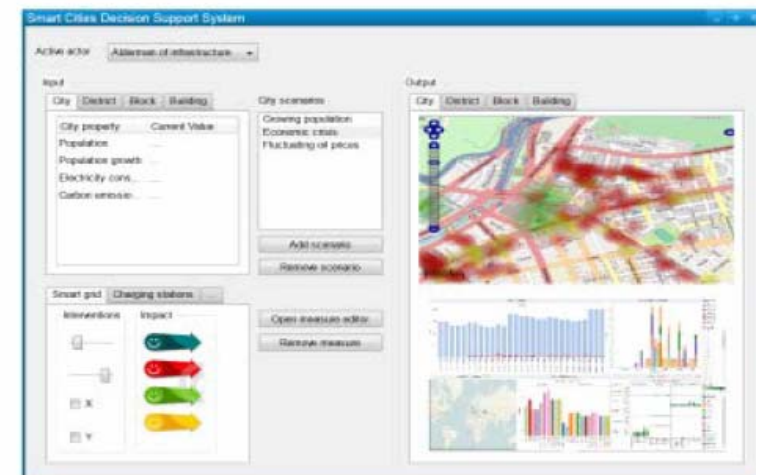
Smart City – Challenge & Chance

Different Cities – Similar Challenges !

China: Nanchang Low Carbon Action Plan

- Nanchang (Jiangxi) –national low carbon pilot city
  - Population: 2,1 mio (core city); 3,9 mio (urban region)
- Nanchang Low Carbon Action Plan
  - Status quo analysis of the city's carbon emissions
  - Implementation of the national energy & climate policies at the local level
  - Development of KPIs suitable for Nanchang
  - Development of a masterplan and ‚actions' for 2012 – 2015
  - Recommendations for existing city strategy and planning documents

- Development areas: Mei Ling, Honggutan, Hi-Tech Development Zone, Jiangxi County

Nanchang - Integrated Low Carbon City Action Plan

## Integration of Low Carbon City Measures in the Action Plan
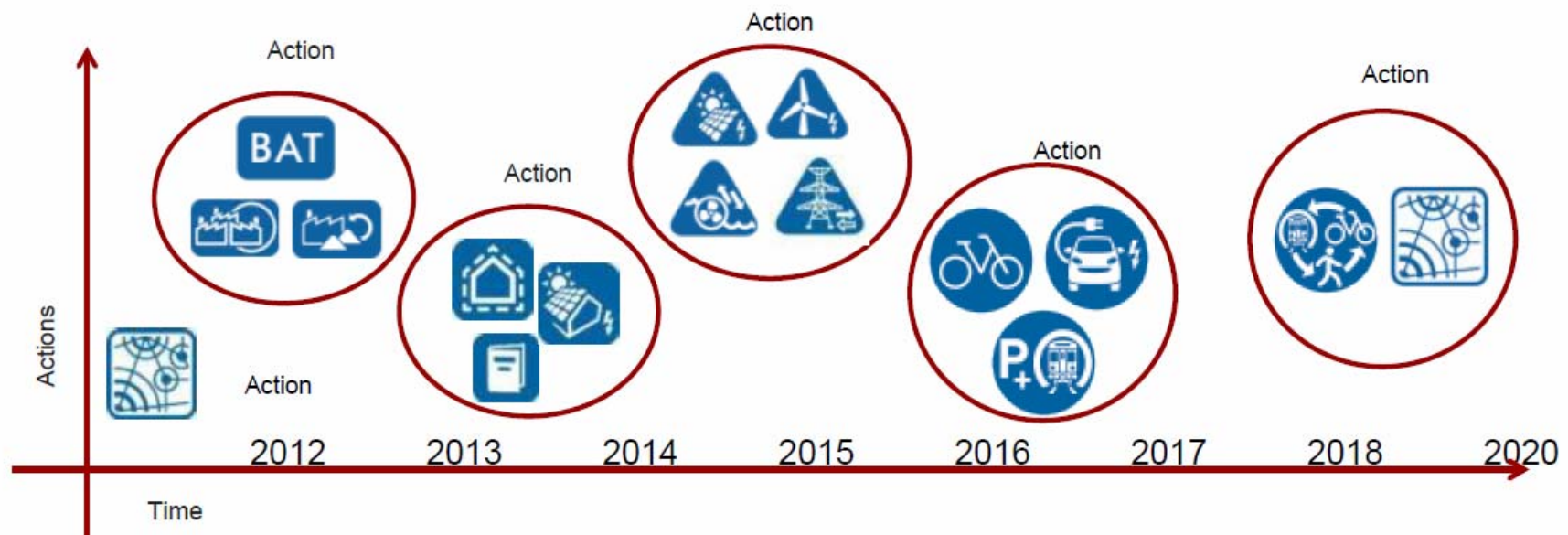
Continuity and phasing of Actions:

- Initiation phase
- Planning phase
- Implementation phase
- Monitoring and reporting phase

Nanchang Recommendations

- Linked poly-centric development of urban structure

- Efficient, coordinated, high capacity public transport network

- Appropriate functional mix

---- Bus link

○ Neighbourhood Centre

○ District Centre

● City Centre 2

● City Centre 1

● Subway catchment area for pedestrians

南 昌 市 人 民 政 府 2006.8
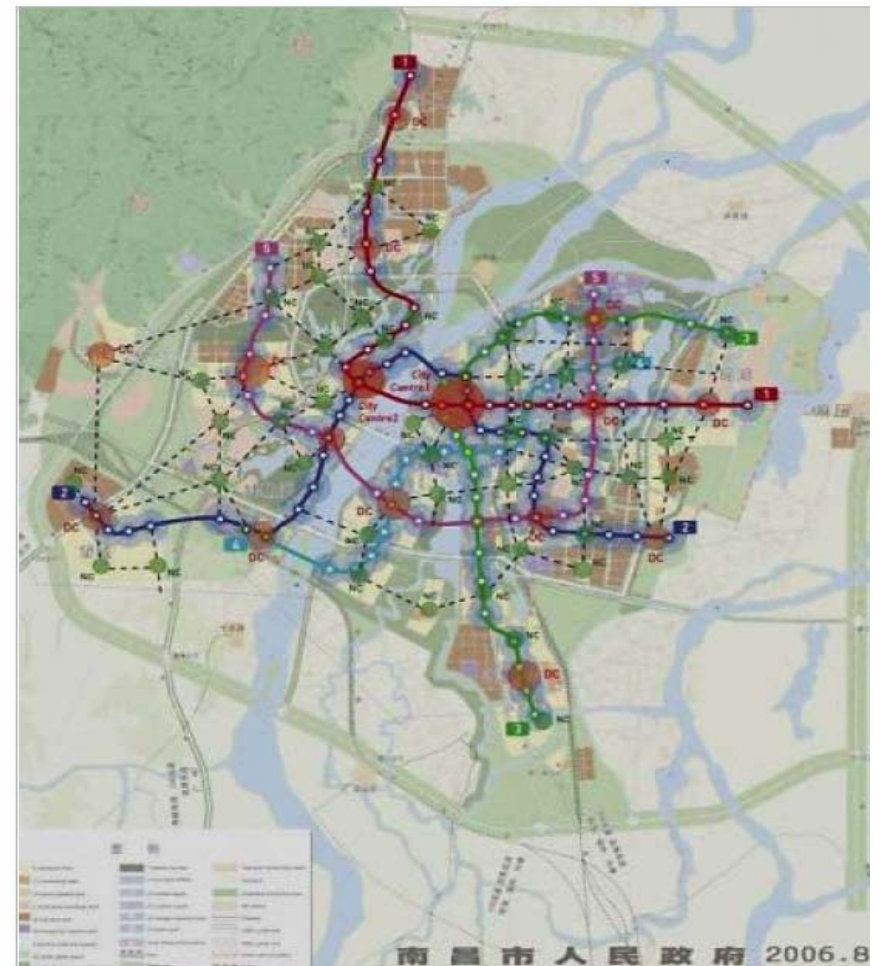
Su-Tong Ecological (Business) Park

urban design: beijing tsinghua tongheng urban planning & design institute

Su-Tong Ecological Park Energy Concept

- Implementation strategies and output benefit analysis for the Initial Area (10km^2)

- Urban Design Guides for the Su-Tong Ecological Park

- Demonstration project design briefs

- Energy design guidelines for a circular economy industrial cluster

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