

Smart Cities

SET Plan, European Industrial Initiative, Status

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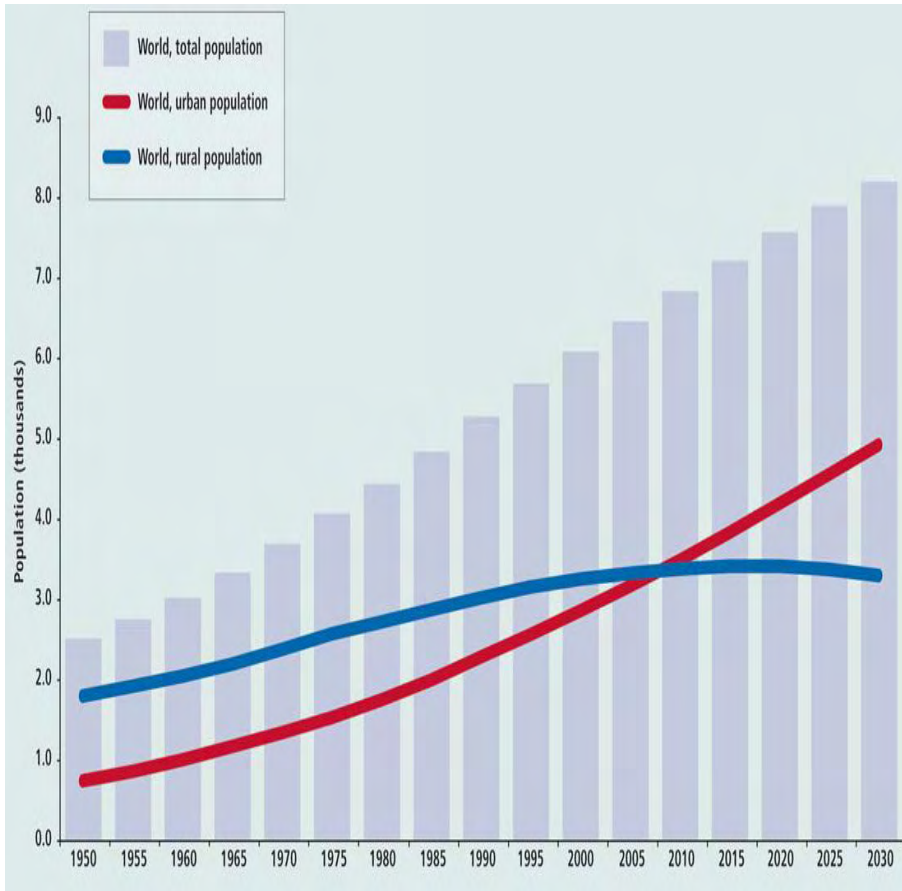
Global Challenge - Urbanization



Source: NASA

Urbanization

The Urban & Rural Population 1950 - 2030

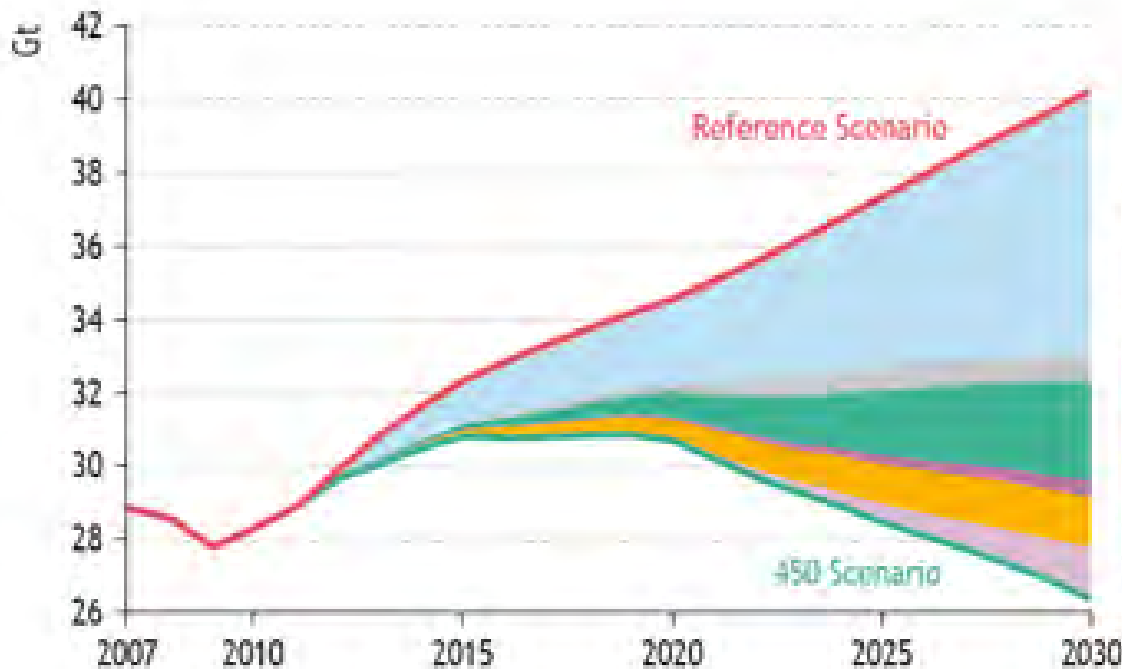


- Urbanization worldwide:
 - 2005: 3,2 billion people live in cities (49 % of humankind).
 - 2010: Urban population exceeds rural population
 - 2030: 60% (4.9 billion) of the world's population is projected to be urban
- Urbanization in Europe:
 - Majority of population lives in and around cities

Source: 2005 Revision of the UN World Urbanization Prospects report

Global challenge

World Energy Related CO₂ Emission Savings by Policy Measure in the 450 Scenario



	Abatement (Mt CO ₂)	
	2020	2030
Efficiency	2 517	7 880
End-use	2 284	7 145
Power plants	233	735
Renewables	680	2 741
Biofuels	57	429
Nuclear	493	1 380
CCS	102	1 410

In the Smart Cities Initiative of the European Union's SET-Plan (SEC(2009) 1295), the European Commission proposes

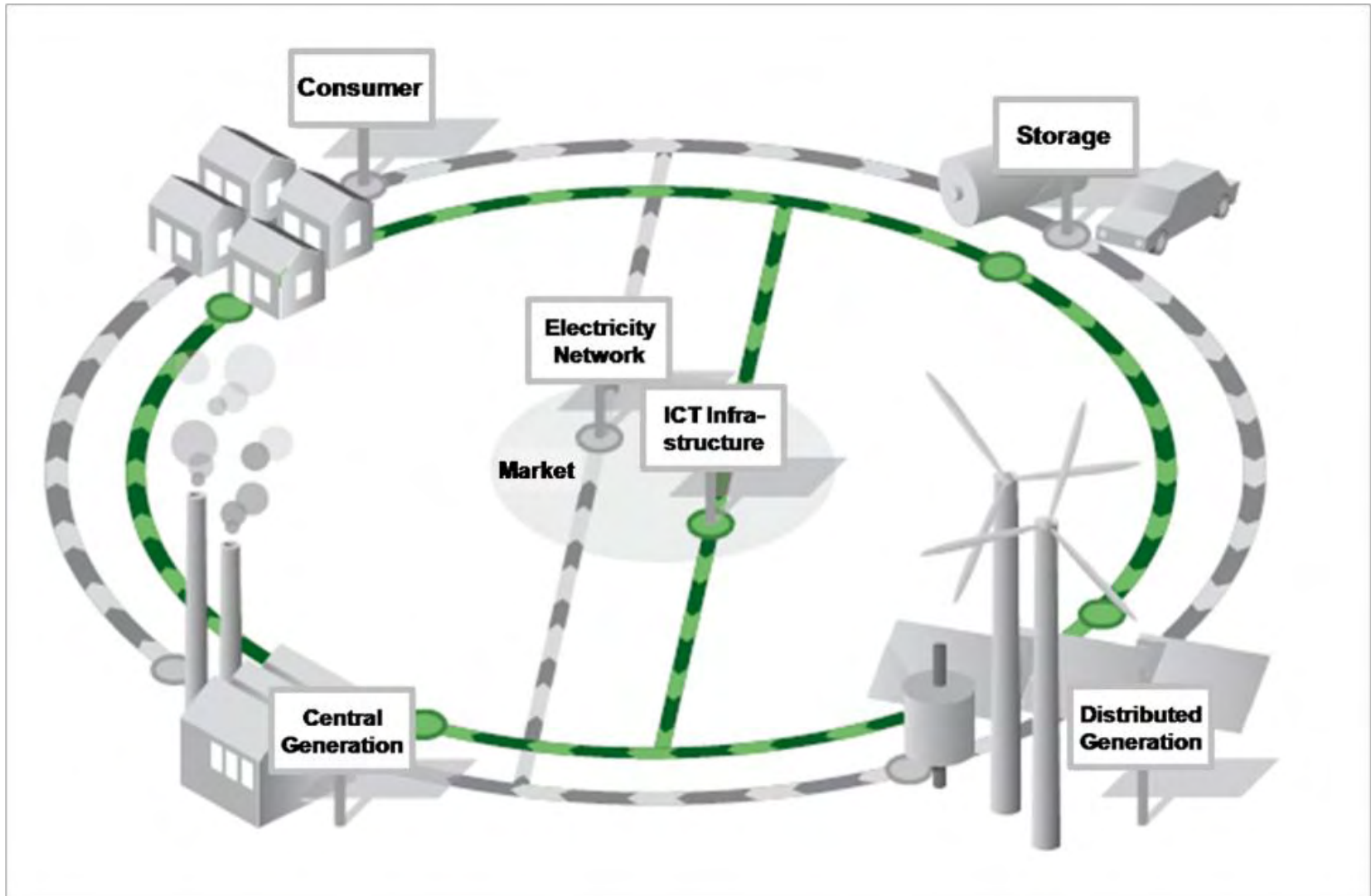
- “to progress by 2020 towards a 40 % reduction of greenhouse gas emissions through sustainable use and production of energy”, requiring
- “systemic approaches and organisational innovation, encompassing energy efficiency, low carbon technologies and the smart management of supply and demand.”

Stakeholder

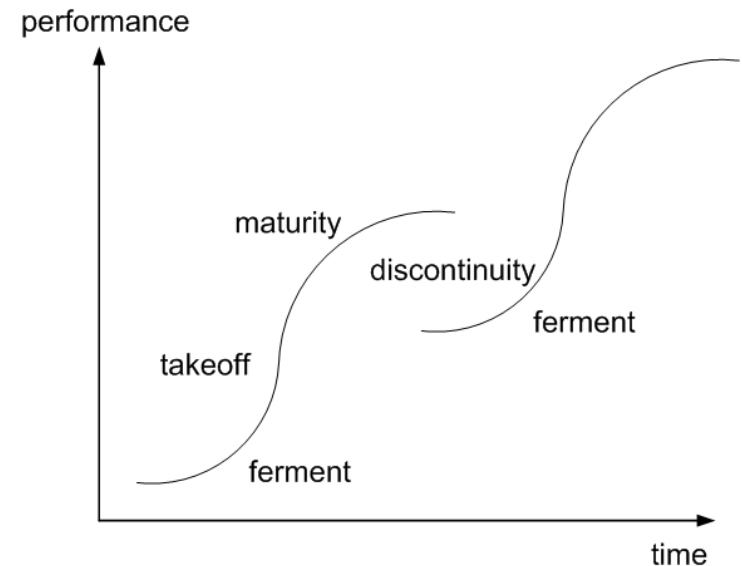
- Mayors, politicians
- City administration
- Utilities, energy service companies, grid operators (electric, thermal)
- Developers, architects, planners
- construction companies
- Component manufacturers
 - Windows, facades, HVAC components
 - On site renewables –
PV, solar thermal, heat pumps,.....
- ICT companies
- Financial Institutions
- **R&D institutes and universities**
- **Inhabitants.....**



Future Role of Buildings in Smart Cities and Smart Grids



- Smart Cities require new approaches
 - Fully integrated designed and intelligent managed energy systems
 - From a single technology perspective to multi technology perspective
 - Multi-stakeholder involvement
 - Transdisciplinary approaches
- ➔ Paradigm shifts in the sectoral innovation system required!
- ➔ Transformation of energy innovation system to gain competitive advantage for realisation of Smart Cities



Smart Cities (Energy) Technology Perspectives (1/2)

ICT & Energy Technologies are merging
Intelligent energy management on regional & city level

- Energy in Cities
 - Performance Characteristics of city areas
 - Morphology, end use mixes, building energy performance characteristics etc.

- Smart Grids
 - New methods for energy networks planning and operation
 - Smart electric grids (including energy management following European generation)
 - Smart thermal grids (heating-, low temperature heating, cooling)
 - Use of potential for shift between thermal and electric load
 - Load management for optimized power station performance
 - E-Mobility grid integration

Smart Cities (Energy) Technology Perspectives (2/2)

- Active Buildings (housing, industry,...)
 - Energy efficient, passive houses
 - Energy generation (on site renewables)
 - Active demand side node in management of the Energy system based on supply and demand profiles optimization (building to grid)

- Supply technologies
 - On-site renewables (solarthermal, PV, heat pumps, small wind,...)
 - Cascade use of resources
 - Polygeneration ...

-
- City integrated energy management
- New business modells

New Radical Innovations Need Radically New Processes

- Such radical innovations in complex systems are demanding for a change of patterns in sectoral innovation system
- Initiation of a stakeholder process combining foresight with social networks to realise a soft governance process
 - Development of a joint vision integrating all stakeholders
 - Specification of long-term targets
 - Definition of research agendas and roadmaps
 - New business models
 - Determination of demand for policy measures and financial support
 - Establishment of new networks and strategic alliances
 - From project oriented case by case cooperation to joint strategic processes
- Implementation of Living Labs

CONCERTO

Knowledge Base for New Research

- 58 communities, 22 projects
- Alessandria, Amsterdam, Barcelona, Budapest, Geneve, Hannover, Nantes, Salzburg, Sofia, Trondheim, Tulln, Zaragoza.....
- CO₂ emissions are reduced
by about 320,000 tons per year in CONCERTO cities
(equivalent to the entire population of Luxembourg switching to a CO₂
neutral electricity provider)
- About 1,500,000 m² of highly innovative buildings are currently being built
or renovated to achieve very high energy performance standards
- Monitoring data and lessons learned
- www.concertoplus.eu

Stakeholder Involvement Processes

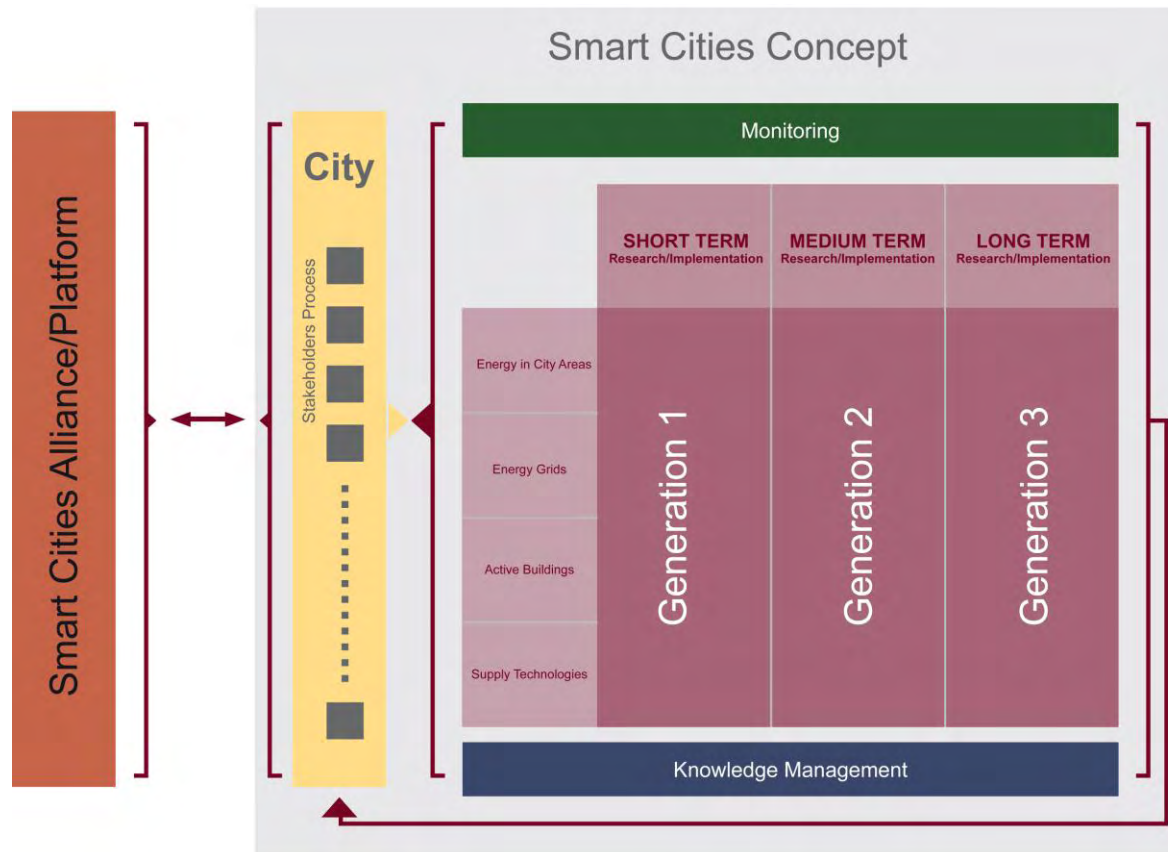
- Vision of a desirable long term future (...2050)
- Common long term Roadmap including...
- Technology needs
- Service needs
- Smart Research Agenda, Training & Education needs
- Policy needs, new processes
- New business models and new markets
- Cities and regions as Living Labs
- Demonstration, Replication, deployment
- Short term projects to longterm milestones and benchmarks
- To leadership of European Cities

- Supporting the EC by coordinating a process for strategy development
 - Identification of stakeholders
 - Ensuring stakeholder involvement through workshop
 - Organising input of European Technology Platforms
 - Bilateral exchange with CH, NL, B, ...
 - Organising input of Austrian Stakeholders
- Delivering input on research strategy
- Designing a concept for strategy implementation
- Coordinating EERA Smart Cities JP

Benefits for Austria

- Enhancing Austrian leadership and visibility in the area of Smart Cities
- Competitive advantage for Austrian industry
- Identification of supporting RTI-policy measures
- Establishing as a leading network node
- Attracting key player
- Establishing framework conditions
for efficient and effective implementation of Smart Cities

Smart City Initiative



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Zero Emission Cities of the Future

Aktuelle F&E Strategien

