TRANSFORMATION AGENDA FOR LOW CARBON CITIES

2013 - 2015
FP7-ENERGY-SMARTCITIES-2012

Topic ENERGY.2012.8.8.1: Strategic sustainable planning and screening of city plans

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<th>Participant no. *</th>
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<td>Gemeente Amsterdam</td>
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**Amsterdam - Energiek Zuidoost**

**Development Type:**
Urban transformation of existing mixed-use area (300ha), incl. Ajax stadium, offices, leisure, shopping, city hospital, datacenters and energy plant. Transformation of energy grids (thermal and electric) towards smart grids.

**Expected Outcome:**
Guided process with major stakeholders, leading to commitment of 202020 goals, by renewable energy production and use of latest technologies in existing building stock.

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**Copenhagen – Nordhaven**

**Development Type:**
Brownfield development port area under transition. On a long term basis room for 40k inhabitants and 40k jobs. Vision for the area is to be CO2 neutral and a green lab for new solutions in energy and building construction. The area should at the same time be sustainable socially and economically as well as environmentally.

**Expected Outcome:**
Integrated energy system incl. district heating, cooling biomass, geothermal energy production, seasonal heat storage and smart grid. Low energy buildings.

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**Hamburg – IBA / Wilhelmsburg**

**Development Type:**
Urban transformation and expansion, combining housing, industry, port, water, green and open space; one of 19 Excellent Climate neighborhoods; stepwise growth from 55,000 to 75,000 inhabitants.

**Expected Outcome:**
Guided process with 100 stakeholders; 100% renewable electricity by 2025, 100% renewables for heating & cooling by 2050.

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**Lyon – Part Dieu**

**Development Type:**
Urban transformation of a 1960ies development district close to the centre of Lyon. This is the 2nd business district of France covering 500,000 m² (40,000 work places, 2,500 residents; commercial and logistics areas included).

**Expected Outcome:**
Construction of 1 Mio. m² of additional floor space and renovation of 40% of existing building stock (offices, commercial, residential). Upgrading and extension of the heating and cooling district infrastructure.

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**Genoa – Mela Verde**

**Development Type:**
Port area - Brownfield development; part of comprehensive CO₂ reduction strategy and Technology Masterplan.

**Expected Outcomes:**
Guided stakeholder process, New technology buildings, PV energy production, e-mobility.

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**Vienna – (1) Seestadt, (2) Liesing**

**Development Type:**
(1)Greenfield & Brownfield development, incl. 20k apts., 20k work places; new public transport, social & smart technical infrastructure.
(2)Urban transformation in residential, industrial & service district Liesing. Close coop. between city, energy & trans. Supplier & district management

**Expected Outcome:**
(1)State-of-the-art passive house & office space, energy production (geo-thermic, photovoltaic, bio-mass), smart grid, e-mobility & reduced car dependency.
(2)Integrated mobility concept based assessed needs incl. Car sharing, e-car,(e-)bike services and public transport.
Smart Energy Cities: meeting 2020 and 2050 targets

Energy targets set by the European Union for 2050 overcome the 20-20-20 goals, aiming at an 80% - 90% reduction in greenhouse gas emissions and a near-zero carbon energy system. These targets are as ambitious as they are necessary and will require fundamental transformation of our society. Urban areas, currently responsible for three-quarters of the global energy demand, are the logical starting point for intervention to transform urban areas into resource efficient, low carbon places. Places that use their energy in an optimal way.

Such a fundamental transformation necessitates disruptive change in planning, development and decision making. That means a change towards real integration of planning and energy and more flexible decision making processes. Cities need to combine long term strategy and vision with practical, tangible and financially robust plans for implementation in surroundings which are open to new and integrated ways of working. TRANSFORM supports cities willing to take this leap.
Hamburg – facts and figures

- City-state in Germany
- 1.8 million inhabitants, 4.3 million in the metropolitan region
- No. 2 in Germany, No. 9 in the European Union
- 3rd biggest port in Europe
- highly industrialized economic hub with over 500 industrial enterprises
Modeling the Transformation Process (1st Approach):
The Transformation’s temporal **nonlinear** Dynamics and Action Levels
TRANSFORMAgenda for Low Carbon Cities

City specific outcomes:

1. Local Transformation Agenda towards a Smart Energy City (with key elements/indicators)
2. Implementation Plan for city districts
3. Qualitative decision support models
4. Quantitative decision support models
5. Handbook for implementation plans and a transformation agenda
6. Political Memorandum of Understanding
1. **Local Transformation Agenda** for each of the participating cities

To meet the 2020 and 2050 targets, a strategic Transformation Agenda is needed for the city as a whole. The Transformation Agenda should have the flexibility to look beyond the political borders of cities to the functional ‘energy’ borders, thus including the metropolitan hinterland of the core cities.

2. **Implementation Plan for city districts**

The Transformation Agenda will be brought to the operational level in the form of an Implementation Plan, which will be drawn up for specific city districts. These districts are selected for this project under the name of ‘Smart Urban Labs’.

The generic outcomes, derived from the city specific outcomes will be the following:

3. **Qualitative decision support models**

These qualitative decision support models are concrete solutions and process interventions, including innovative business models, financial strategy, participation and governance models and adapting planning processes. These models support cities in their strive towards integrated energy planning.

4. **Quantitative decision support models**

The purpose of the quantitative decision support model is to make use of available data sets to produce information stakeholders can use for energy planning and the production of low carbon scenarios. The model assesses the quantitative impact (relative to key performance indicators) and cost of implementing measures that will improve the city’s or district’s performance in terms of carbon and energy targets.

TRANSFORM delivers a prototype of a decision support tool, with recommendations for further development of the tool, or of components of the tool.

5. **Facilitate** the decision makers with a **Handbook for their journey towards implementation plans and a transformation agenda**

We create a thorough, lived through, process handbook that helps cities step by step with a strategic transformation agenda and related implementation plan. Cities and communities throughout Europe can use this handbook, in combination with the decision support models.

6. **Political Memorandum of Understanding** – the way towards implementation

TRANSFORM will generate a strong political movement for the Smart City initiative, by the joined forces of the cities’ politicians and through the networks the cities participate in. TRANSFORM will deliver a signed Memorandum of Understanding between participating cities, committed cities and relevant industries, knowledge institutes and commercial partners on the implementation of all TRANSFORM results.
Modeling the Transformation Process (2nd Approach):

**Topography of the Transformation**: turning the city society’s status quo into low-carbon is the overcoming of obstacles (shown here as an increasing of social costs)
Example:
A linear approach...

The tool for stakeholder involvement that shows both the financial implications and the decarbonisation outcomes of regional energy efficiency investments.

reMAC is a follow-up initiative of project EUCO2 80/50 and has been developed in the METREX network for effective regional planning.

In project EUCO2 80/50, 14 metropolitan regions developed strategies in order to achieve a reduction of $CO_2$ emissions by 80% until 2050.
Ambitious Climate Protection Goals

Three parts:
- Vision 2050: Action options/alternatives for the strategic course towards a low carbon city
- Action plan 2020: Catalogue of measures to support the national goals with the greatest possible CO2 reduction impact
- Participation: Common task, dialog with stakeholders
Action fields

- **Energy supply**: low carbon heat supply, doubling windpower capacity, current storage („power to gas“), innovative gas and steam power station, smart grids, combined heat and power (CHP), load management („fluctuating renewables“), waste heat, cooperation of North Germany

- **Buildings (residential/public)**: modernising/thermal insulation, reducing heat demand, micro-cogeneration (CHP), central district heating, decentral heat grids

- **Industry and trade**: Energy efficiency, Enterprises for Resource Protection, self-commitment of industrial companies, industrial waste heat

- **Traffic and transportation**: mobility development plans/management, smart transportation (picture), ‚shared space‘, car sharing, public transportation

- **Urban development**: Integrated concept for the whole city, integrating the action fields (vs. sectoral planning), city of short distances, ‚smart city‘ (EU project), Example: Climate Model Quarters

- **Waste management**: waste separation, recycling management, source segregated recycling, integrated product design, circular economy

- **Consumption (incl. food)**: Lifestyle, ecological footprint (personal CO2-balance), health food, regional/eco-products, ecological agriculture

- **Science, research and education**: Interdisciplinary research („ClimateCampus“), Excellent cluster ‚Integrated Climate System Analysis and Prediction‘(CliSAP), Cluster: Energy and Environment Technology, Project: ‚Climate Schools‘, Example: research for renewables

- **Climate adaptation**: climate change management, dynamic risk management (flood protection, heavy rain, heat periods), modeling city climate (hotspots, fresh air corridors), landscape and open space planning in the inner city
19 Climate Model Quarters: new building/reconstruction; mitigation/adaptation, energy above-standard
Hamburg
Example: Energy Transition
Definition of the Energy Transition

Sustainable transformation of energy supply

- Abandonment of fossil energies and nuclear power
- Renewable energies
- Energy efficiency
- Climate protection
Hamburg’s Energy Transition Triad

**Energy Efficiency**
- Building efficiency
- Efficiency in firms
- Cogeneration
- Public buildings

**Smart Grids**
- Extension and conversion, smart grids
- Heat supply
- Storage integration
- Virtual power plants

**Renewable Energies**
- Wind power plants
- Biomass thermal power plants
- Photovoltaic power plants
- Solar thermal power plants
Cooperative activities and participation

Collaboration between all actors

Hamburg’s Energy Transition

Energy concept for the entire city

Energy Forum

Energy Advisory Council
Example

Hamburg 2030: General Principles for Spatial Planning

1. More City in the City
2. Fair City
3. Green and environmentally-balanced City
4. Urban Development in the economic Metropolis
5. Hamburg – future city in motion
The 6 Phases of Planning

1. Enthusiasm
2. Confusion
3. Disillusion
4. Searching for the guilty person
5. Punishment of the Innocent
6. Decoration of the not Involved
Key elements/scales

Transformation Agenda

Implementation Plan

(Self)similarity

In-depth analysis (Status-quo)

transformation

TRANSFORM