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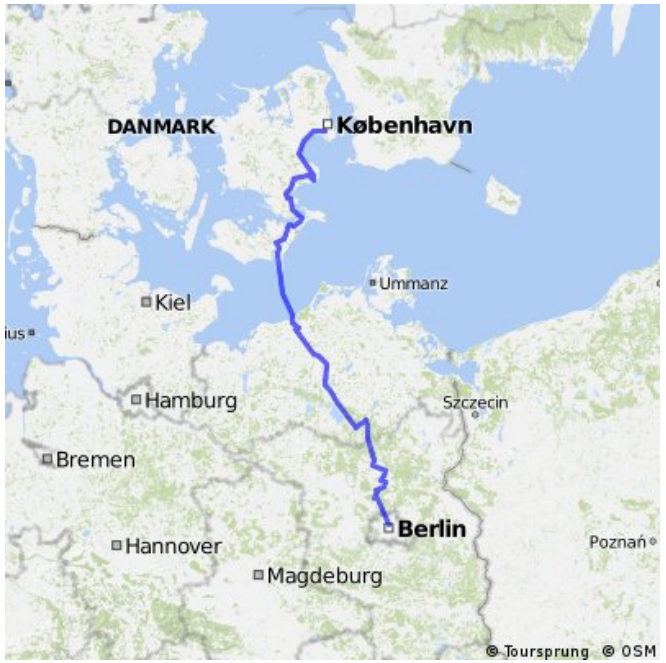


Source: bikemap.net

Comparative Perspective: Transition of urban energy systems in Denmark and Germany to decarbonize the energy sector by using Copenhagen and Berlin as an example

Workshop: “Transitions to a Low-Carbon Economy in Comparative Perspective”

UAS Spring Campus Conference,

Freie Universität Berlin,

April 02-03, 2019

Simona Rens

Agenda

- Relevance of urban areas
- Framework conditions and characteristics
- Energy transition strategy Berlin
- Energy transition strategy Copenhagen
- Side effects (benefits and challenges)
- Summary and lessons-learned

Relevance of urban areas

- Cities are the home to more than 50 % of the world‘s population
- Responsible for more than 70 % of world’s CO_2 emissions
- Municipalities are the central actors to implement 1,5°C consistent pathways and the 2030 Agenda
- Energy sector: responsible for around 38 % of CO_2 emissions
- Cases: Capitals of two green front runners Denmark (Copenhagen) and Germany (Berlin)

Framework conditions

- Climate mitigation action needed to close the gap between current emission projections and Paris Agreement compatible pathways.
- Urban energy transition strategies depend on geographic conditions, socio-economic structure, size, existing energy system and political governance structure (feasibility for mitigation and adaption).
- However, transition strategies of cities are embedded in national and regional climate and energy governance structures.

CITY OF COPENHAGEN

City Characteristics	Copenhagen	Berlin
Size (habitants)	602.481 (2017)	3.613.500 (2017)
Ownership structure of the energy system	- Public owned utility (HOFOR) - High share of cooperatives, non-profit principle for private utilities	- Transition phase (e.g. electricity grid) - Establishment of a Stadtwerk Berlin
Geography (driver: energy security)	- Coastal area - Good wind energy conditions - Lack of fossil fuels	- Continental climate - Fossil fuels in close
Share renewable energy for heating & cooling /electricity	Copenhagen: ca. 100% electricity, 50 % district heating Denmark: 50 % DH; ca. 40 % wind	Berlin: 3,5 % electricity (2016); Germany: 13 % DH; 37,8 % electricity (2018)

Decarbonisation approaches in the energy sector

Reduction of CO_2 emissions as a consequence of burning fossil fuels in power plants for the use of electricity (incl. private households, industry) and heating within the city boundaries

Stakeholders

National and local authorities, energy suppliers (owner of energy infrastructure), consumers

Measures to reach carbon neutrality

- Assessment of CO_2 emissions
- Increasing share of renewable energy,
- Reduction of the energy use,
- Increasing energy efficiency,
- Compensating (offsetting) of CO_2 emission

Berlin Energy and Climate Programme (BEK) 2030

- Based on Berlin Energy transition law (2016)
- BEK 2030 adopted in June 2017
- Minus 60 % CO_2 emission by 2030
- Climate neutral by 2050

- Concrete strategies and measures to become carbon neutral within different field of actions:
  - energy supply, economy, transport, urban development & buildings, private households & consumption
- Around 100 measures to be implemented
- Strengthen role model function of the public sector

BERLIN SPART ENERGIE

Best practice

Transition Strategy Berlin

- **Measures:**
  - Masterplan Solarcity,
  - Stadtwerk (energy utility)
  - Energy research (WindNODE),
  - Business dialogue: energy
  - Subsidy scheme for electro mobility
  - District heating as flexibility option
  - Restrcuturing heat grid
  - Explore potential for geothermal energy use

Berlin - strategy and methods

Governance:

- National: strategy embedded in national framework (Coal Phase out by 2038, Klimaschutzplan 2050)

→ The recommendations of the “Coal Commission” create a an opportunity for change (investment and innovation).

- Regional and local: increasing opportunities for public engagement, with local initiatives
- Public ownership and public participation structures are changing and increasing in Berlin (e.g. new Berlin energy utility).

Status: ambitious long-term strategy with measures for specific sectors and intermediate goals, increasing action

Copenhagen's Climate Plan

- World's first carbon neutral capital city by 2025
- Vision developed after COP15 (2009)/climate action
- Adopted in 2015
- Focus on innovative climate policy
- Copenhagen’s carbon neutrality strategy consists of emission reductions and compensation methods.

Holistic, with specific targets and initiatives four key areas:

- Energy Consumption
- Energy Production → Most important: shift to renewables
- Mobility
- City Administration Initiatives

Copenhagen - Energy
- consumption
- production
- compensate

Reduction of energy Consumption

- by residential and commercial stakeholder's
- important part, nevertheless only responsible for only 7% emission, but leads to monetary savings

Energy Production

Increase share of renewable and sustainable energy for heating and electricity

Compensation/Offsetting

production of surplus green energy to offset the emissions that will continue to be generated (e.g. example transport).

Copenhill

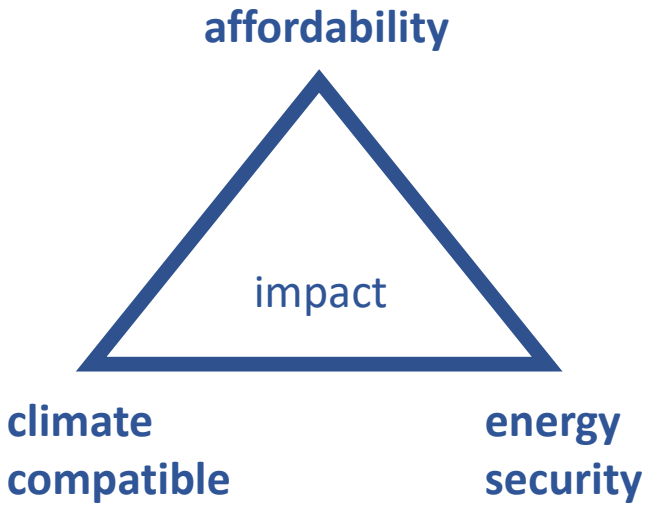
Source: visitcopenhagen

Copenhagen - strategy and methods

Governance:

- National: City strategy embedded in an ambitious national framework (100% RE electricity and no coal by 2030).
- Regional and local: high level of public engagement and participation, with local initiatives.
- The Danish energy transition has a high degree of participation (cooperatives and public energy utilities; acceptance).
- Change is understood as an opportunity, which enables innovation for green technologies and job creation.
- High level of trust in the society increases acceptance, also for new technical tools

Status: ambitious long-term strategy with sector policies and significant change, but not yet zero emissions



Berlin and Copenhagen
- impact of the energy transition

Benefits and opportunities (examples):

- Better housing standards (energy efficiency)
- Reduced energy costs
- Better air and live quality for growing urban population
- Need for innovative approaches and solutions
- Creates incentives for innovation (solutions, business models, data use etc.)
- New business opportunities, opportunity new infrastructure investments

Risks:

- Increase of energy prices (risk of energy poverty)
- Increase of rents (social exclusion)
- Acceptance: inclusive climate action that benefits all citizens equally
- Ecologic impact (resource efficiency, infrastructure development etc.)

Summary and lessons learned

Lessons learned

- A long-term vision with intermediate goals and sector benchmark can increase ambitions, awareness and create new business opportunities with planning security.
- Single solutions (e.g. technical) can increase awareness and inspire other stakeholders (authorities, companies, science and citizens etc.).
- Local authorities can best develop innovative solutions tailored to local framework condition (regulatory and communication tools).
- The decarbonistion of energy system can’t be considered separately, the broad spectrum of sustainability needs to be taken to account.

Challenges

- Approaches don‘t consider often enough cross border approaches (knowledge gaps)
- Investments in energy infrastructure are long-term investments.
- Climate strategies need to be social inclusive (acceptance crucial)
- Municipal climate plans can‘t be assessed independent from (inter-)national strategies.

Thanks and tak!

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Danish-German Energy Governace Project