District Energy in the City of Gothenburg

- Business models

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Our responsibility

- Ecology
- Economy
- Security of supply
Gazing into the future

Important developments:
- Smart Energy Networks
- Energy efficiency
- Business models
R&D – in order to be at the forefront

**Research**
- Collaboration with Chalmers University
- Research foundation
- Trade organisation research

**Strategic development projects**
- CELSIUS
- Electricity
- Riksbyggen Positive Footprint Housing
- HSB Living Lab
- FED
CELSIUS background

- One tool for reaching the energy efficiency targets
- Replicability of district heating / cooling concepts
- Roll-out of smart DH and DC by presenting ‘best practice’
- Total budget MEUR 26, EU Contribution MEUR 14
CELSIUS

• 5 partner cities: Gothenburg, London with Islington Borough, Genoa, Cologne, Rotterdam
• 20 renowned partners
• 4 years: April 2013 – December 2017
• 10 new Demonstrators + 20 existing
• Goal of 50 CELSIUS Member Cities
• Knowledge transfer
• Legislation and policy work
• A growing network with the addition of CELSIUS City Supporters
# Challenges for DH in Sweden

<table>
<thead>
<tr>
<th>Reduced demand</th>
<th>Changed customer requirements</th>
<th>Rule changes</th>
<th>Cost structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Energy efficiency in existing buildings</td>
<td>1. The customers wants to be able to influence their heating costs</td>
<td>1. Pricing rules and customer terms</td>
<td>1. Substantial fixed costs</td>
</tr>
<tr>
<td>2. New buildings have very low heat demand</td>
<td>2. Customers want DH with specific climate and environmental properties</td>
<td>2. Conditions for waste heat supplier access</td>
<td>2. Large reinvestment needs, mostly within distribution systems</td>
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<tr>
<td>3. Less remaining potential for conversion to district heating</td>
<td>3. Lack of confidence among customers</td>
<td>3. Instruments and EU-directives without regard to the conditions for DH</td>
<td>3. Fuel costs – increased chip prices and reduced reception fees for waste</td>
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<tr>
<td>4. Increasingly efficient heat pumps</td>
<td>4. Questioned environmental and climate benefits</td>
<td>4. The municipality law might limit the possibilities of supplying services</td>
<td>4. High revenue demand from the owner might result in reduced competitiveness</td>
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<tr>
<td>5. A warmer climate</td>
<td></td>
<td></td>
<td>5. Low electricity prices, lower income for combined heat and power (CHP)</td>
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<tr>
<td>6. Hard to find new profitable markets for DH companies</td>
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</tbody>
</table>

Source: CELSIUS WP6, based on business case document for district heating (Rydén, Sandoff et al. 2013)
1. Value proposition to customers
2. Strategic endurance and competitiveness
3. Infrastructure and resources
4. Economy

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Possible added values

The 5 levels of Energy Service Agreements offered by Göteborg Energi.

• Energy efficiency Services - comfort agreements to supervision
• Other products in combination (EV charging infrastructure, DC, Optofiber etc)?
Key factors for success in Gothenburg

- Environmental concern and political pressure
- Taxation on fossil fuels
- Low cost heat (Industrial waste heat, and waste fuels)
- Long term investment policy – multiple years for new connections
- Long term supply contracts
- Several price models, and seasonally adjusted price levels
DH is a local business

- Specific waste heat supply
- Logistics and presence of waste fuels
- Market size and segments
- Competition

=> But cooperation between cities is possible regarding technology and business models etc
Generating value for CELSIUS Member Cities

1. CELSIUS Toolbox/wiki
2. CELSIUS Demonstrators
3. Workshops and webinars
4. Expert group
5. Network—Legislation, collaboration
Welcome to the CELSIUS Toolbox! - A district heating and cooling resource

The CELSIUS Toolbox strives to be a source of knowledge and inspiration for cities interested in developing district heating and cooling solutions. It addresses cities which are just beginning to implement small-scale district heating and cooling networks as well as cities with large established systems endeavoring for even smarter and more efficient solutions.

The CELSIUS Toolbox consists of five elements. To navigate the CELSIUS Toolbox, choose one of four options:

1. Go directly to the element of your interest

   **CELSIUS Roadmap**
   - a holistic perspective when developing DH/C systems

   **Technical Toolbox**
   - technical information on developing DH/C systems

   **Social Toolbox**
   - social and economic aspects of DH/C development

   **Demonstrators**
   - new and existing CELSIUS demonstration projects

   **CELSIUS Cities**
   - CELSIUS Cities and upcoming CELSIUS events
CELSIUS-demonstrators

Categories
- Sustainable production
- Storage
- Infrastructure
- System integration
- End-user

Examples
- Waste heat recovery, river cooling
- Heat hub, short-term storage in buildings
- Small, large network
- Integrate systems, municipalities
- Climate agreements, DH to white goods

http://celsiuscity.eu/demonstrator/
Thank you!

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