



Legal strategies to enable business cases for solar district heating

Presentation at the First SDH-Conference
Malmö
10. April 2013

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Agenda and key questions:



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1. About the Hamburg Institut
 2. Where is the business case for SDH?
 3. Legal instruments to create business cases

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About the Hamburg Institut



1. Consulting in energy policy and legislation
2. Focus on heat sector
3. Host of conference on RE in District Heating Oct. 31st 2012 in Kiel
4. Current projects on new Renewable Heat Laws at state level.

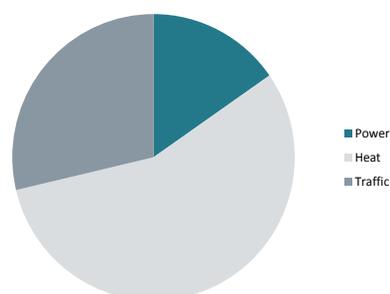
Where is the business case? (1) – Preconditions



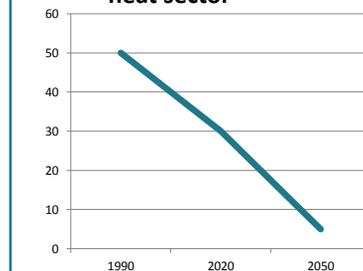
Perfect preconditions for RE heat business cases?

- High pressure to reduce carbon emissions of heating sector.
- Efficiency measures at buildings or DH systems are not sufficient.
- Multi billion dollar real estate property is at stake.

Share of sectors of end-energy (D)



Climate goals for the heat sector



Where is the business case? (2) Two paths for solution



Minimize heat energy demand



Scenario Germany (UBA: Energieziel 2050): 30 kWh/m² average energy demand of existing buildings.

Decarbonize heat supply



Scenario Denmark: stable overall heat demand until 2050, covered by 70% through DH.

Where is the business case? (3) Efficiency vs. RE heat



Efficiency measures

- Millions of individual actors (real estate owners) involved with investment decisions
- Regulations for home owners are a highly disputed political subject: Instruments are limited to incentives (scope is limited public budgets)
- Long timeframes of renovation cycles of building components (>40 years)
- Marginal costs for efficiency measures increase with depth and quality of refurbishment

District heating

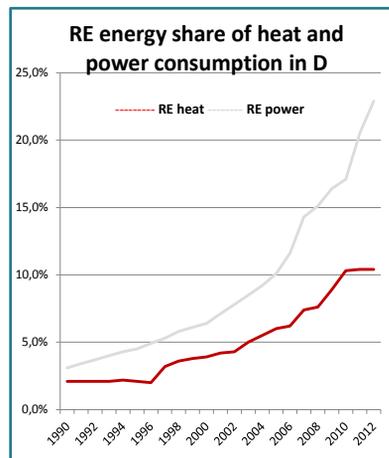
- Few actors involved in investment
- Regulation of energy companies is commonly accepted
- Shorter timeframes for replacement of central DH units (<25 years)
- Marginal costs decrease with increasing size of central RE DH unit

- **Efficiency measures alone will not be able to deliver sufficient carbon reduction.**
- **A high share of carbon reduction will have to be delivered by RE heat.**
- **Policy framework for RE heat business cases is needed to make energy turnaround cheaper and politically easier to achieve.**

Where is the business case? (4) Development of RE power vs. RE heat



- **RE power:** Successful business cases for have been created by politics (feed-in-tariff, quota, tax incentives etc.)
- **RE heat:** There is no business case for a massive rollout of SDH (outside of DK), because there is no suitable policy framework for in most countries. For example, Germany has a strong policy focus on efficiency measures and fossil CHP. RE heat growth in last years is mainly due to increase of conventional fireplaces.



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Where is the business case? (5) – Solar into new or existing DH



	Existing DH	DH for new residential areas
Number of includable buildings	High	Low
Energy demand per m ²	Usually high	Low
Energy density of supplied area	Usually high	Depends, often lower.
CO ₂ saved per substituted kWh	Depends. Often high (coal boilers or coal CHP)	Depends.
New pipeline system needed ?	Use of existing systems.	New investment.
Storage needed?	High summer heat demand in big urban DH systems.	Few efficient new homes with low heat demand.
Cost per saved t of CO ₂	Low	High
Availability of space	Difficult: in big cities mostly commercial rooftops	Easier: integrated planning
Interference with existing investments	Yes	No

- To reach significant solar share in DH, policy must focus on existing DH systems.
- This is more cost effective and environmentally more effective than concentrating on new DH systems for new urban development.

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Legal framework for SDH business cases (1): What is needed



coherent, long term RE heat policy

**Economic
instruments**

**Planning and
informative instruments**

Regulation

Legal framework for SDH business cases (2): Economic Instruments



Energy taxation

- national taxes on fossil resources
- Fix privileges for DH to minimum RE-share (example Hamburg DH charge varies for different fuels)

Subsidies per kWh

- Feed-in tariff
- Bonus systems

Subsidies for investment

- Most common instrument

Reinvestment of gains

Example Denmark:

- Ownership mostly by cooperatives
- cap on profits

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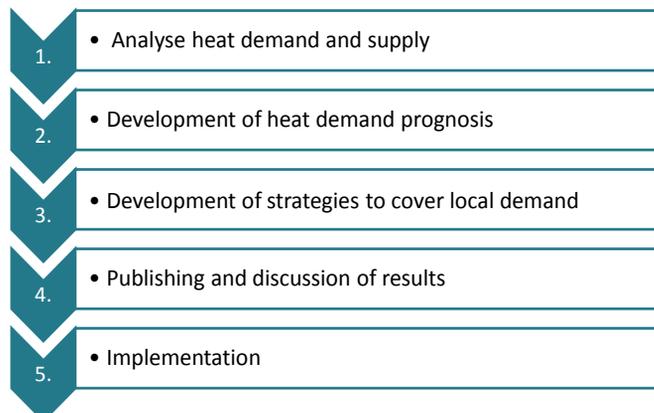
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Legal framework for SDH business cases (3) : Mandatory local heat planning (informative instrument)



Steps of heat planning



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Legal framework for SDH business cases (4): Informative instruments



Labeling of “green heat”

- **Model:** electric power-labeling (CO₂-emissions per kWh on electricity invoice); making environmental quality of DH transparent.
- **Condition:** uniform method to attribute CO₂-emissions of CHP to heat and power
- **Problem:** EU carbon trade law provides binding calculation method for CHP-plants >20 MW. DH associations want to use different calculation method for green heat label. Choice of method has strong influence on the environmental value of solar DH compared to conventional CHP-DH systems.
 - Is there legal space for differing method outside EU-carbon trade law?
 - What environmental justification is there for contradicting methods?
- **What is needed:** For a green heat label, the calculation method has to be uncontested, particularly by environmental NGOs (no suspicion of “greenwashing”).

Legal framework for SDH business cases (5): Regulatory instruments



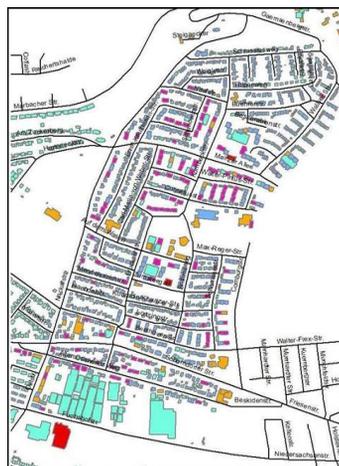
Challenge: Set rules to improve environmental performance of DH without deteriorating competitiveness of DH with conventional heating.

Possible legal instruments

- **Mandatory minimum RE share** for DH operators (existing and new DH)
 - Example of Thuringia Energy Ministry law proposal
 - Alternatively equivalent max. specific carbon emissions for DH operators
 - Increasing duties over long time frame
- Priority access** for low carbon heat (including heat from third parties) Proposed in the draft EEDirective but cancelled
- Feed-in-tariff** for RE heat fed into DH systems?
- Mandatory connection and use** for residents of DH systems that meet specified environmental and customer protection standards (example: Thuringia law proposal)

The new world? DH systems as open local heat platforms.

- DH system operator collects heat from different sources:
 - Centralized RE
 - Decentral solar thermal
 - Small CHP
 - Residual heat from industry, commerce (e.g. IT), craft (e.g. bakeries), waste water etc.
 - Surplus local RE power to heat
- Single buyer approach oder Third party acces?



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Summary



Summary

- DH is needed more than ever for the energy turnaround in Europe.
- There is a vast potential for SDH business cases due to climate goals for heating.
- Policies are so far focusing on efficiency measures at buildings and on CHP rather than on RE heat.
- Realistic and reliable paths for renovation of buildings and DH systems are necessary. Over ambitious efficiency scenarios are inefficient, unrealistic and would lead to de-investment in DH.
- European and national policies (outside of DK) so far are not sufficient to create dynamic business cases for SDH beyond pilot projects.
- A coherent long-term framework has to be set up to create SDH business cases:
 - Economic instruments to improve competitiveness of SDH
 - Planning instruments (heat planning)
 - Information (heat labeling)
 - Regulatory instruments: max. CO₂-standards, min. RE share, mandatory connection and use.
- SDH should not focus on new DH-systems. It is cheaper to introduce RE in existing systems that run on fossil fuels, particularly on coal. The environmental benefit of SDH is bigger in such existing systems than in new developed areas.
- DH systems could be transformed to open heat platforms with possibilities of access for different heat sources.

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Thank you for your attention!

Questions, please!

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Current situation (4): Business Cases for SDH



Key findings of SDH-project working papers concerning markets, success factors and obstacles (Dalenbäck et al.):

- By far the most projects are implemented in Denmark. In all other countries, there is no real market visible, only few projects are implemented as demonstrators/pilots
- Almost all surveyed projects needed public subsidies
- Costs per kWh for solar heat (without subsidies) differ between projects from 0,04 Euro (DK) to 0,26 Euro (D)
- Connection of solar heating plants to existing DH systems is cheaper than buildup of entire new solar DH system
 - large scale ground solar plants connected to existing DH in DK: 4 ct/kWh
 - large rooftop plants with net metering connected to existing DH in Vislanda, SV: 10 ct/kWh
 - buildup of entire new solar DH systems, Neckarsulm, D: 19 ct/kWh; Crailsheim, D: 26 ct/kWh
- Large regional supply of RE power is favorable to SDH business case: Example of DK

Legal framework for SDH business cases (1): Status quo in most countries



Absence of a coherent, long term RE heat policy

Economic instruments

- (limited) direct or indirect public subsidies
- low taxes on fossil heat in most countries
- No feed in tariffs or bonus-systems

Planning and informative instruments

- No strategic heat planning (natural gas competing with DH)
- No transparency on carbon emissions, no labeling of RES-share or CO2 emissions

Regulation

- No binding RE quota or CO2-standard for DH operators
- No Third-Party-Access for low-carbon heat
- Little mandatory connection and use
- Little regulation for DH system operators

Current situation (2): DH is needed, but conditions partly deteriorate



DILEMMA

Retrofitting decreases DH demand per m² - with high fixed cost for DH-system.



DH is needed for carbon reduction goals:

- CHP in DH as heat storage (existing system + new storages) = backup for wind- and solar power production
- Use of „surplus“ RE-power to produce heat in DH-systems

Sichere Rahmenbedingungen für langfristige, kapitalintensive Investitionen in neue KWK, Netze und Wärmespeicher nötig.