Ownership structure, financing, and regulation: Experience and innovative approaches

IRENA Webinar, May 14, 2020

Søren Djørup, AAU. Email: djoerup@plan.aau.dk, Twitter: @sorendjorup
Outline

- Why & When District Heating? A macro-perspective
- Where District Heating? Basic national planning principle
- How District Heating? Ownership, prices and finance
The Macroeconomic Conditions for District Heating

Is it costly for society to build up district heating infrastructures?

From a macroeconomic perspective, many countries currently have

- Low interest rates
- No shortages of labour
- Imports of fuels
- A CO2 crisis
- Air pollution problems in cities

These are very good conditions for developing and expanding the district heating sector!
Where District Heating?

- National procedure for identifying socioeconomic viable district heating areas.
- For example, using the European framework for comprehensive assessment of heating and cooling
  - Supported by available tools and reports (Eg. Heat Roadmap Europe / Peta4, Hotmaps, Thermos, and others).
- On this basis, establish designated areas for district heating systems through zoning policies.
Creating the basis for district heating

A national regulatory frame for the heating sector.

- Plays an important role for creating the basis for a district heating economy.
- As an overall national frame, the role of the heat supply act is to outline the societal purpose of district heating systems.

Example - the Danish Heat Supply Act:

§ 1. The aim of the law is to promote the most socioeconomic, comprising environment friendly, use of energy for the heating of buildings and supply of hot water and within this framework to decrease the energy supply’s dependence on fossil fuels.4

How district heating?

What are the regulatory challenges?

This presentation focuses on **Ownership & Price Regulation for a monopoly supply**

![Diagram showing the overlap of government levels and sector planning]

SOURCE: Figure from forthcoming guidebook by AAU/IRENA
The regulative challenge – Company perspective

From a company perspective, the regulation of district heating systems must address:

- High upfront capital costs necessitates a long term investment perspective
- Associated risks
- Access to capital
The regulative challenge – Society’s perspective

From a societal perspective, the regulation of district heating systems must be able to deliver:

- Consumer acceptance and protection
- The ability to support long-term strategic energy planning
Three basic forms of regulative strategies

Consumer vs Investor protection

- Free connection + Price regulation
- Obligation to connect + Price regulation
- Free connection + No price Regulation
- Obligation to connect + No price Regulation
The price-ownership matrix – framework for considering regulative strategies

<table>
<thead>
<tr>
<th>PRICE REGULATION</th>
<th>Consumer ownership</th>
<th>Public ownership</th>
<th>Private commercial ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>True costs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price cap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No price regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Good experiences in DK
Price regulation – Price cap principle

PRICE CAP
Using state regulative power to determine a regulative price that seeks a compromise between investors demands for return and the society’s need for price control of the monopoly

BENEFITS
Potentially attracts new investors as a return is allowed

CHALLENGES
It is difficult for regulator to monitor company costs – and thereby difficult to determine/regulate a ‘fair price’
Price regulation – True cost principle

TRUE COST PRICING
Ensures that profits cannot be transferred out of the company – profit is either re-invested in the system or payed back to consumers

BENEFITS
Keeps prices low – thus promotes consumer acceptance.
Ensures capital for maintaining and improving grid.

CHALLENGES
Can be difficult to regulate if the interests of the regulated are not sufficiently aligned with intention of the regulator.
Difficult and costly for regulator to monitor true costs

OWNERSHIP
Due to these challenges the ownership structure is an important part of the regulation
Traditional regulation in a market economy
Traditional regulation in a market economy – The monopoly challenge
Example of ownership construction: Local public ownership
Example of ownership construction: Consumer ownership
The strength of consumer ownership

State

State regulatory power

Company

Ownership power

Price

Consumer

Interests are aligned!
Some more examples from forthcoming AAU/IRENA Guidebook

**BOX 11: SOME EXAMPLES OF OWNERSHIP MODELS**

- In Aalborg (Denmark), the district heating utility belongs to the municipality and also owns the thermal grid and is responsible for delivering heat. Having purchased the main heat production unit from a private energy company, the municipality-owned utility has embarked on implementing a green energy strategy by 2030. Its intermediate target for 2028 is to have fossil free heat production which effectively means to replace the coal-fired cogeneration unit.

- The City of Hamburg (Germany) decided to take back control of the district heating system after selling it to a private energy company. The local government, prompted by public support in the form of city politics, initiated discussions with the private vendor, which ended in buying back the energy production plants and the distribution network. The principal reason for this was decarbonising the heating sector of the city and contribute to the German Energy Transition Policy (Energiewende). Since September 2019 the newly founded municipal company has been in charge of the district heating system and controls approximately 80% of the heating sector within the city's limits. The aim for transition includes the replacement of coal and the introduction of waste heat and renewable heat sources.

- The city of Viborg (Denmark) stands out as an interesting case for the consumer-owned heat distributor, which actively promotes the use of new energy efficient technologies to supply heat to its customers as a part of transitioning to low temperature district heating. On the ground that merging heat production and distribution would allow for investments in decentralised renewable heat sources, which would otherwise have led to conflict with a separate entity's interests, the utility company persuaded the City Council to sell its stake in the municipality-owned CHP plant.

- In Lendava (Slovenia), the DH system is managed by a private company (Petrol), which owns the network (pipelines) and geothermal energy production (geothermal production well, reinjection well), as well as the boilers for peak loads coverage. The municipality is responsible for organising the tender for identifying the district heating operator. With regards to pricing, the Slovenian Energy Agency has set the regulation of district heating prices.

*SOURCE: From forthcoming guidebook by AAU/IRENA*
# The ownership factor matters – Experience from Denmark

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hjortekær</td>
<td>37,090</td>
<td>37,096</td>
<td>-6</td>
<td>No. Privately owned</td>
</tr>
<tr>
<td>Annebergparken</td>
<td>31,793</td>
<td>31,803</td>
<td>-10</td>
<td>No. Privately owned</td>
</tr>
<tr>
<td>Ørslev-Terslev</td>
<td>31,041</td>
<td>31,005</td>
<td>36</td>
<td>No. Privately owned</td>
</tr>
<tr>
<td>Kraftvarmeforsyning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slagslunde Kraftvarmeværk</td>
<td>25,614</td>
<td>30,205</td>
<td>-4.591</td>
<td>Yes. Consumer group buys DH supply</td>
</tr>
<tr>
<td>Præstø Fjernvarme</td>
<td>23,573</td>
<td>21,329</td>
<td>2.244</td>
<td>No. Privately owned</td>
</tr>
<tr>
<td>Lendemarke Varmeforsyning</td>
<td>18,971</td>
<td>13,151</td>
<td>5.820</td>
<td>No. Privately owned</td>
</tr>
<tr>
<td>Skævinge Fjernvarmeforsyning</td>
<td>17,178</td>
<td>27,901</td>
<td>-10.724</td>
<td>Yes. Municipality buys DH supply.</td>
</tr>
<tr>
<td>Frederikssund Kraftvarme</td>
<td>17,653</td>
<td>17,653</td>
<td>0</td>
<td>No. Privately owned</td>
</tr>
</tbody>
</table>

*Consumer prices are listed for a typical house (130 m², 18.1 MWh heat consumption). 1 Euro ~ 7.5 Danish Kroner.*

*Forthcoming open access publication: Ole Odgaard & Søren Djørup (2020) “Review of price regulation regimes for district heating”, International Journal of Sustainable Energy Planning and Management (In review)*
Enabling framework for district heating systems

(A) National Framework for Socioeconomic Viability

(B) Price Regulation & (C) Ownership

Consumers → Company

(D) Local Governance & Planning

(E) State mechanism for long-term financing
Summing up

- Historical necessity and opportunity for district heating
- Expansions should be based on socioeconomic assessments
- Regulatory measures should address:
  - Consumer acceptance and protection (low returns on investments)
  - Access to capital & risk management
  - Company & ownership structures that enable long term planning
References

Contact:
Email: djoerup@plan.aau.dk
Twitter: @sorendjorup

Some references in English:


[5] The forthcoming publication from IRENA/AAU!
