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

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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?

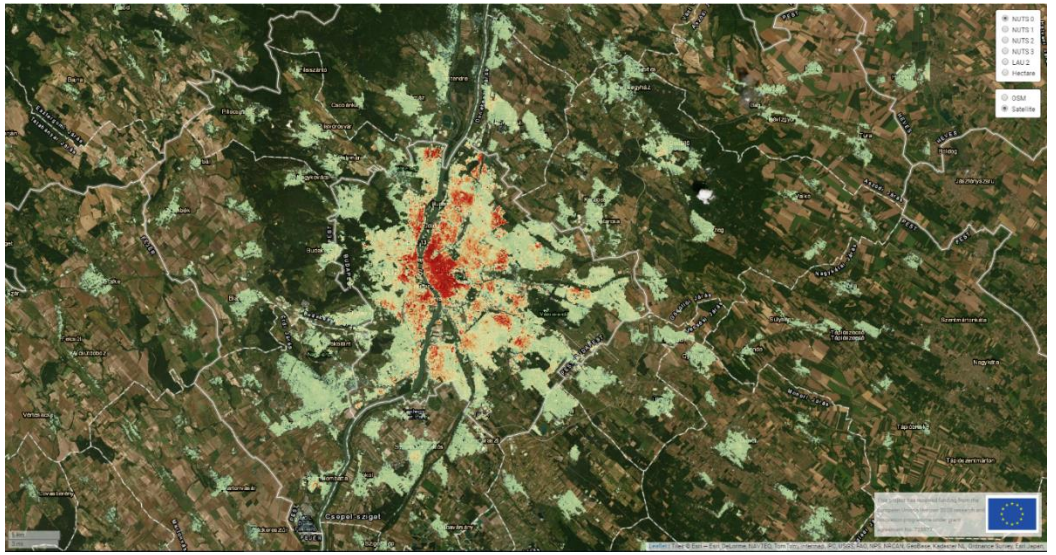
From a macroeconomic perspective, many countries currently have

- 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:

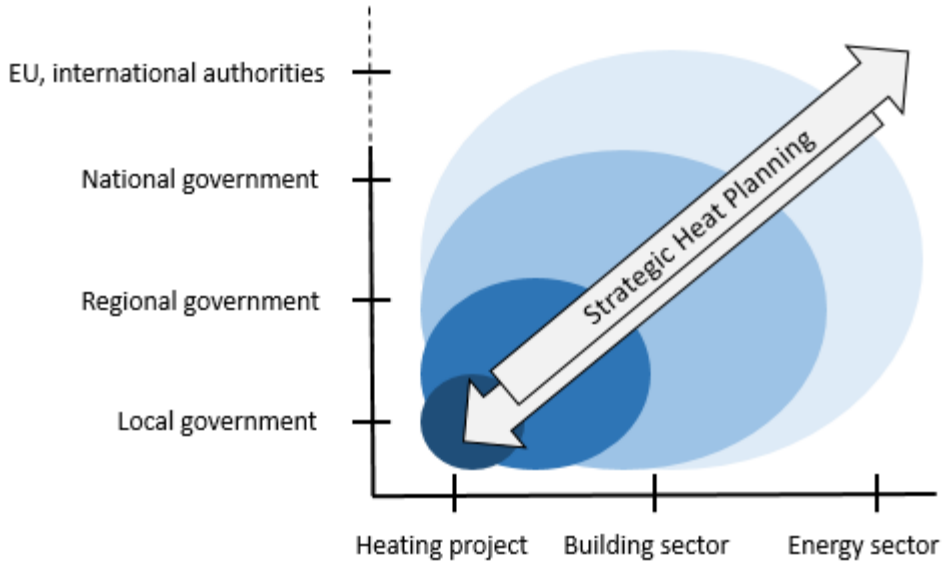
> ***§ 1. The aim of the law is to promote the most socioeconomic, comprising environment friendly, use of energy for the heating of buildings and supply of hot water and within this framework to decrease the energy supply's dependence on fossil fuels.[4]***

Translation: Djørup, S. The institutionalisation of zero transaction cost theory: a case study in Danish district heating regulation. *Evolutionary and Institutional Economics Review* (2020). https://doi.org/10.1007/s40844-020-00164-3

How district heating?

What are the regulatory challenges?

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



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:

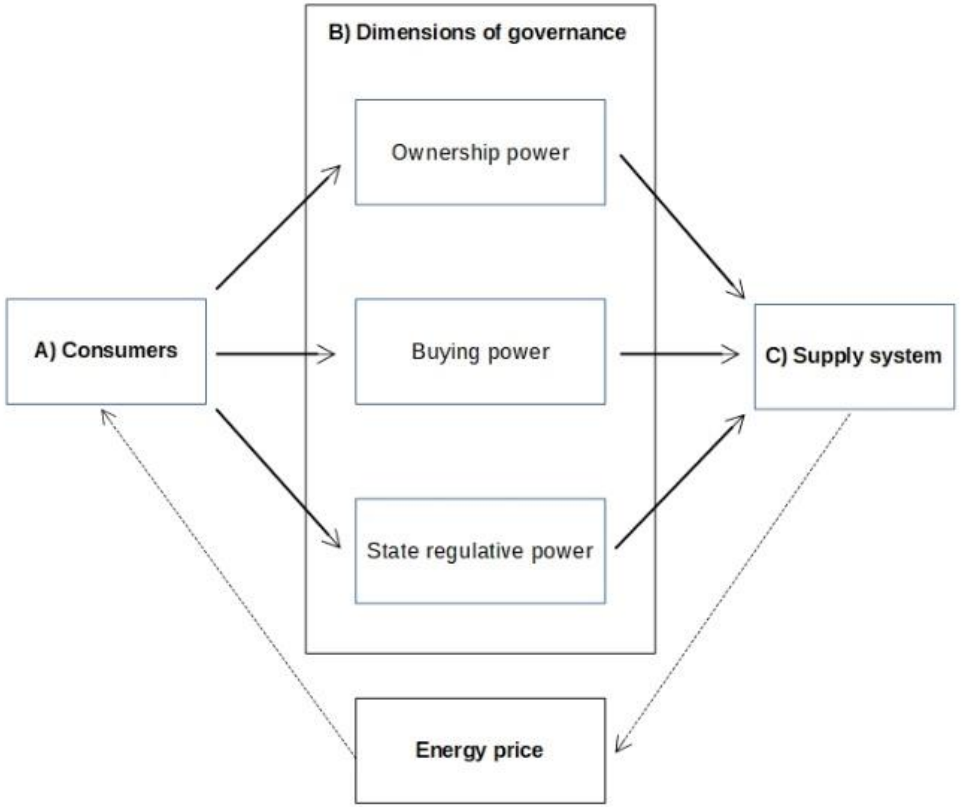
- High upfront capital costs necessitate a long-term investment perspective
- Associated risks
- Access to capital

The regulative challenge – Society's perspective

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

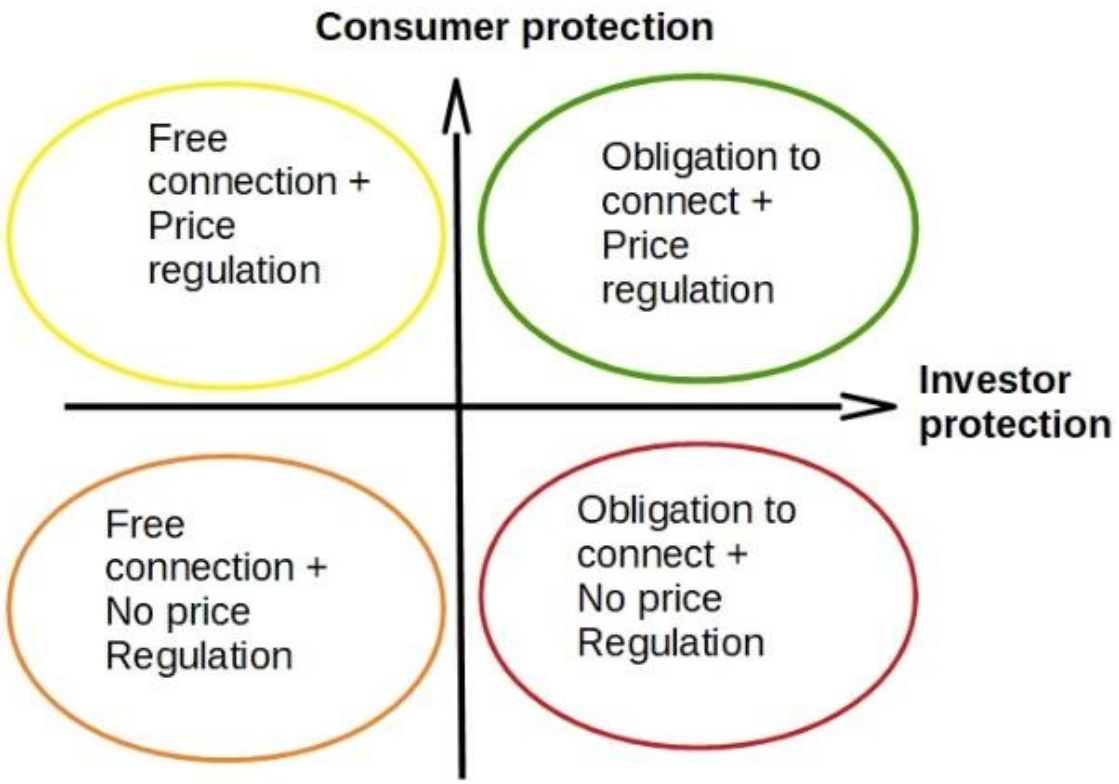
- Consumer acceptance and protection
- The ability to support long term strategic energy planning

Three basic forms of regulative strategies



Hvelplund, F., Djørup, S., 2019. Consumer ownership , natural monopolies and transition to 100 % renewable energy systems. Energy 181, 440–449. https://doi.org/10.1016/j.energy.2019.05.058

Consumer vs Investor protection



The price-ownership matrix – framework for considering regulative strategies

OWNERSHIP REGULATION

PRICE REGULATION

	Consumer ownership	Public ownership	Private commercial ownership
True costs	Good experiences in DK		
Price cap			
No price regulation			

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

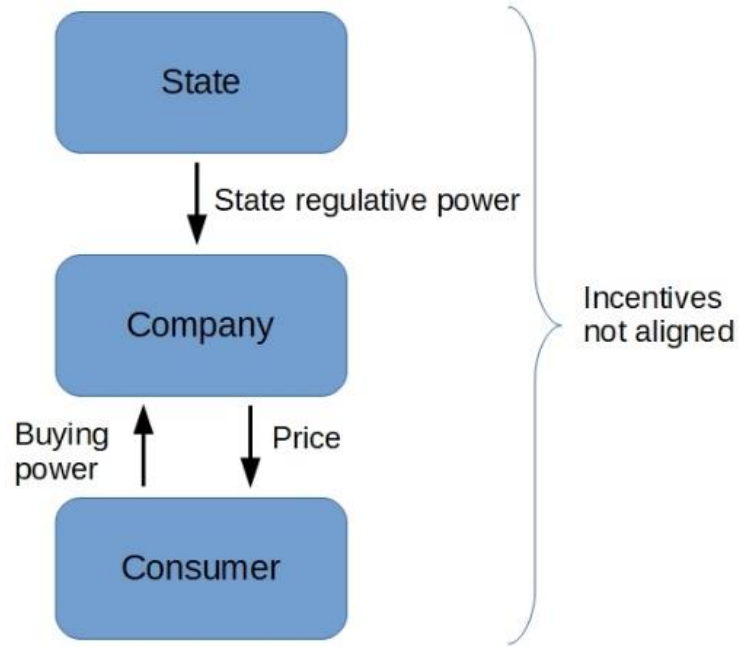
Can be difficult to regulate if the interests of the regulated are not sufficiently aligned with intention of the regulator.

Difficult and costly for regulator to monitor true costs

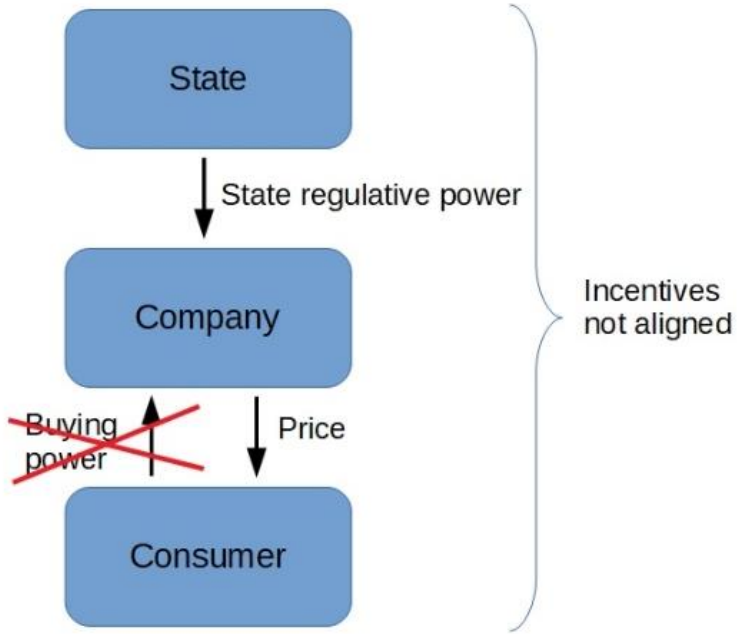
OWNERSHIP

Due to these challenges the ownership structure is an important part of the regulation

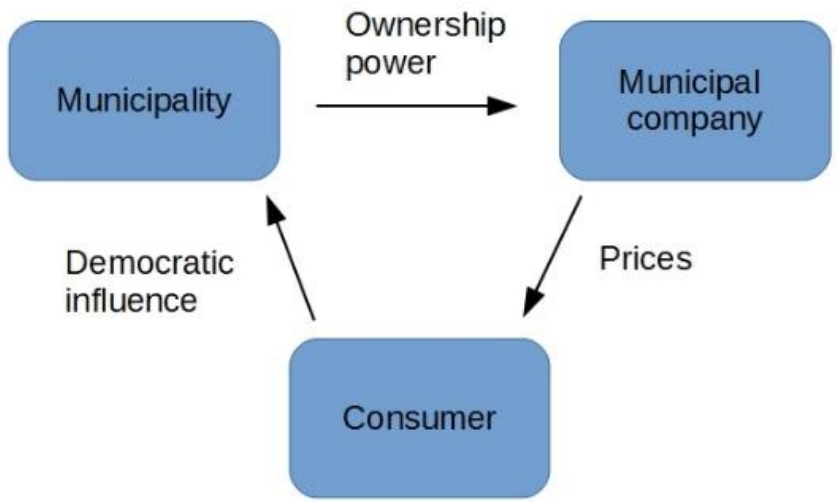
Traditional regulation in a market economy



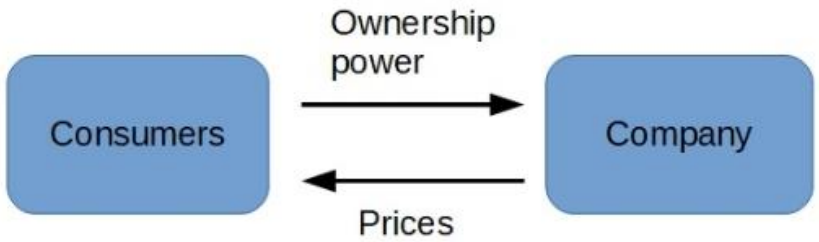
Traditional regulation in a market economy – The monopoly challenge



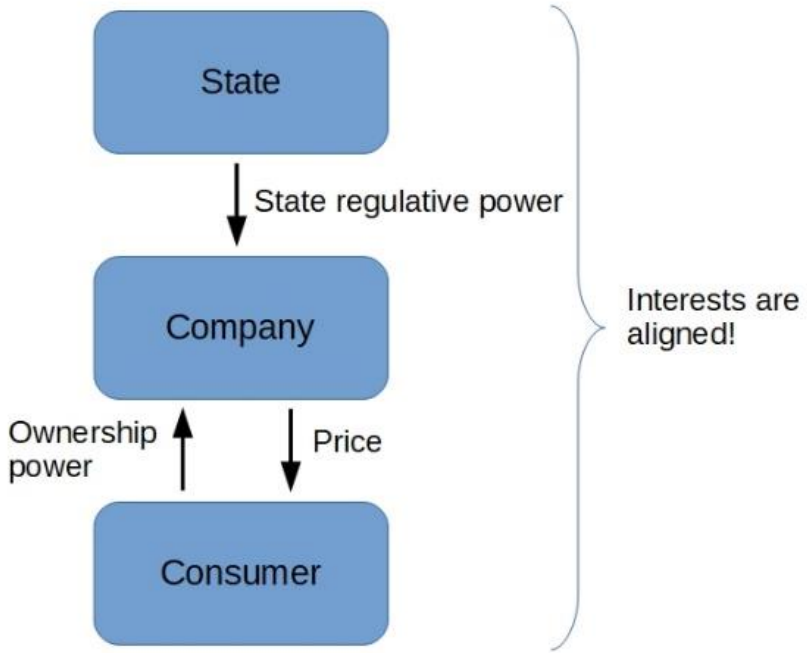
Example of ownership construction: Local public ownership



Example of ownership construction: Consumer ownership



The strength of consumer ownership



Some more examples from 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 2050. 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 as a matter 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 guidebook by AAU/IRENA

The ownership factor matters – Experience from Denmark

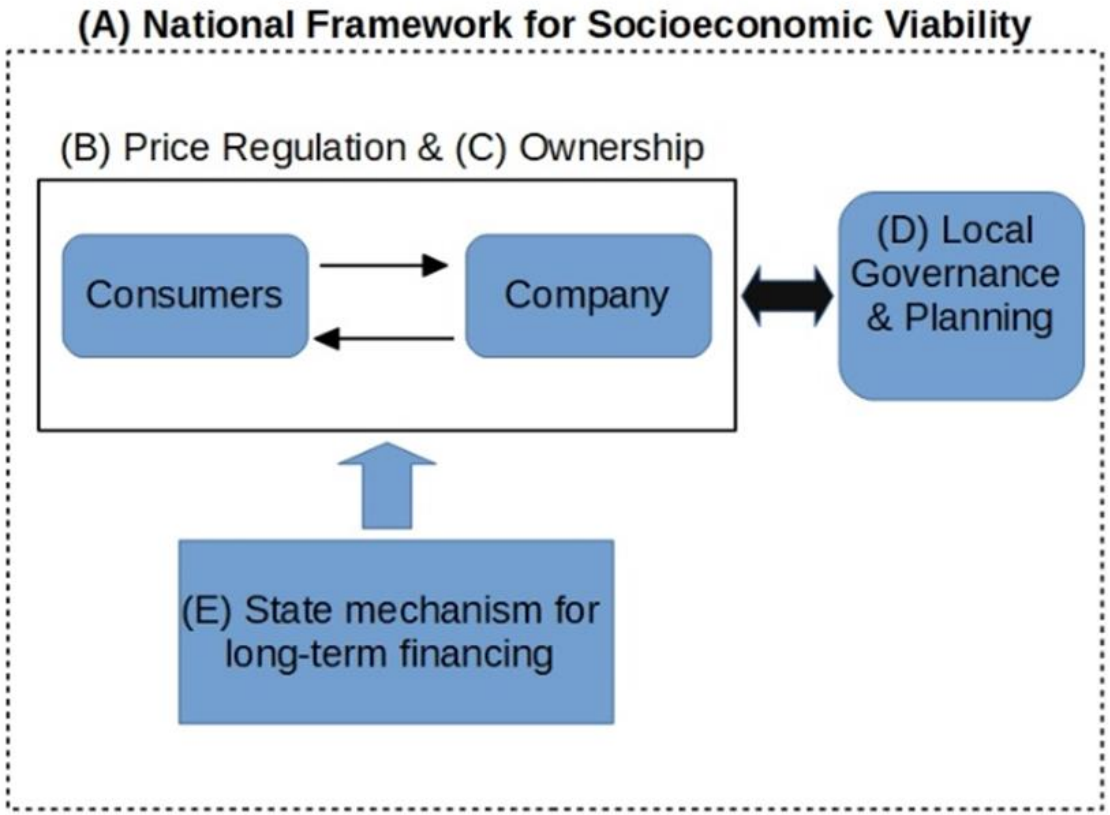
Table 1: DH consumer prices for DH companies owned or previously owned by the transnational energy company E.ON (Danish Kroner per year)

Name of DH company	DH price: 15 Dec. 2013	DH price: 18 Dec. 2012	Change in DH price	Change in ownership
Hjortekær	37,090	37,096	–6	No. Privately owned
Annebergparken	31,793	31,803	–10	No. Privately owned
Ørslev-Terslev Kraftvarmeforsyning	31,041	31,005	36	No. Privately owned
Slagslunde Kraftvarmeværk	25,614	30,205	–4.591	Yes. Consumer group buys DH supply
Præstø Fjernvarme	23,573	21,329	2.244	No. Privately owned
Lendemarke Varmeforsyning	18,971	13,151	5.820	No. Privately owned
Skævinge Fjernvarmeforsyning	17,178	27,901	–10.724	Yes. Municipality buys DH supply.
Frederikssund Kraftvarme	17,653	17,653	0	No. Privately owned
Gørløse Fjernvarme	16,338	35,125	–18.788	Yes. Municipality buys DH supply.

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

Open access publication: Ole Odgaard & Søren Djørup (2020) "Review of price regulation regimes for district heating", International Journal of Sustainable Energy Planning and Management. DOI: https://doi.org/10.5278/ijsepm.3824

Enabling framework for district heating



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

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