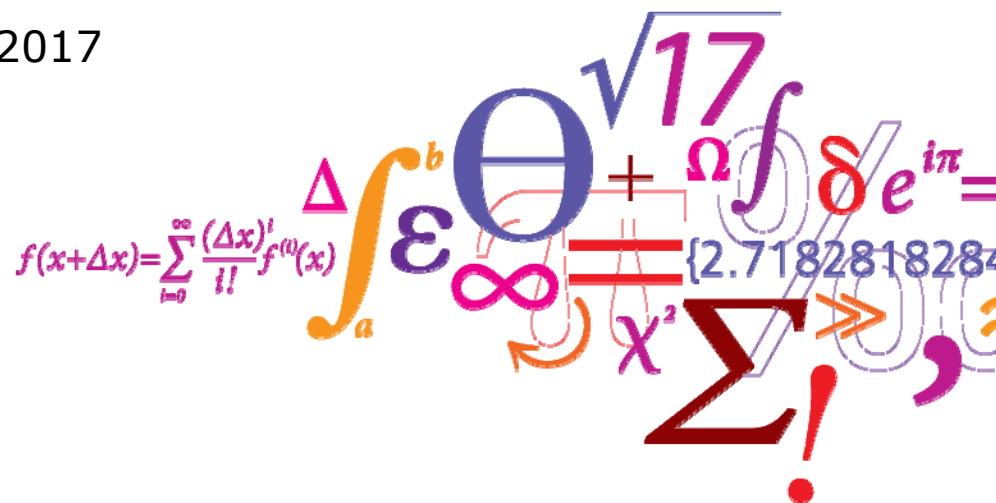


The Danish district heating regulation model in a comparative perspective

4DH conference, Copenhagen Sept. 2017

Marie Münster
Senior Research
System Analysis

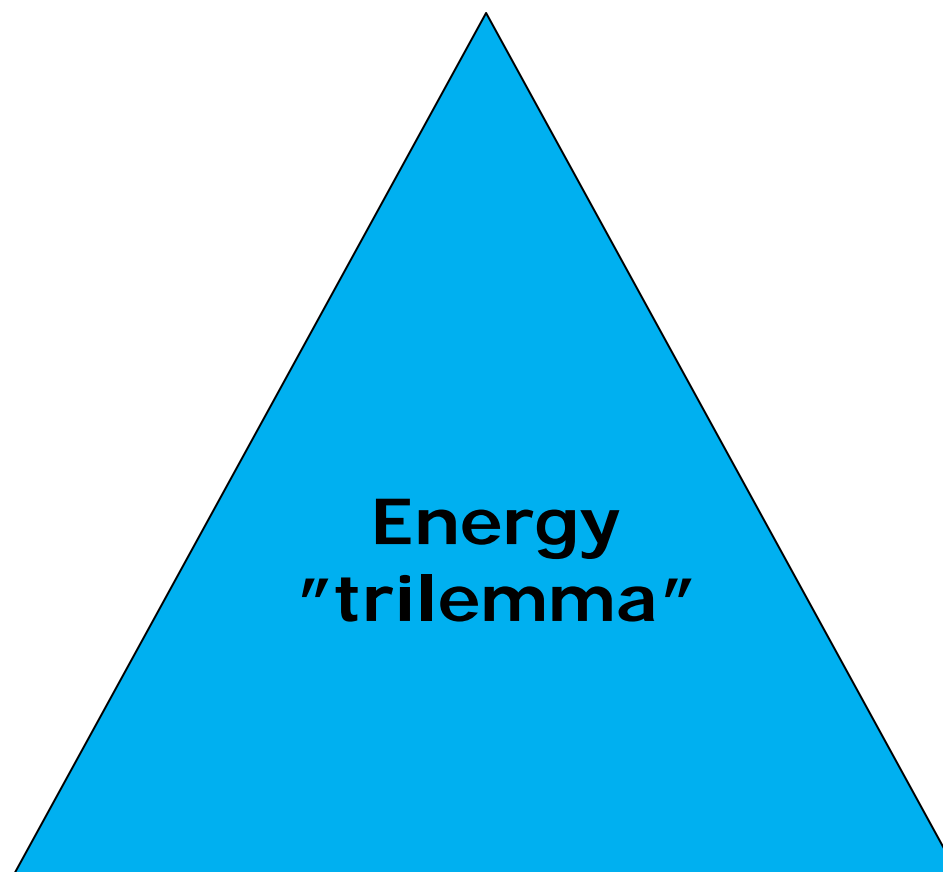


Agenda

- Danish district heating
- Regulatory pillars
- Examples from Sweden and Germany
- Conclusions

Cost

- Socio-economic costs
- No "energy poverty"



Environmental sustainability

- Low or no environmental damage

Safety and security

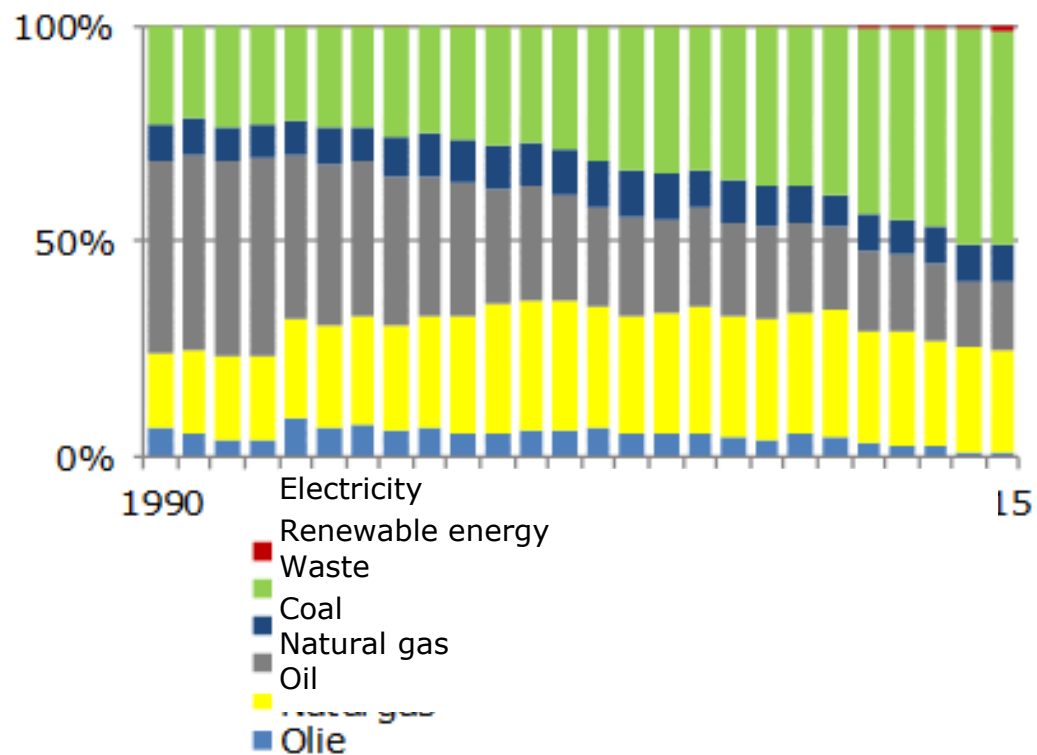
- Supply of heat
- Supply of electricity
- Always.....

District heating in Denmark

Covering ~60% of households and ~50% of heat demand

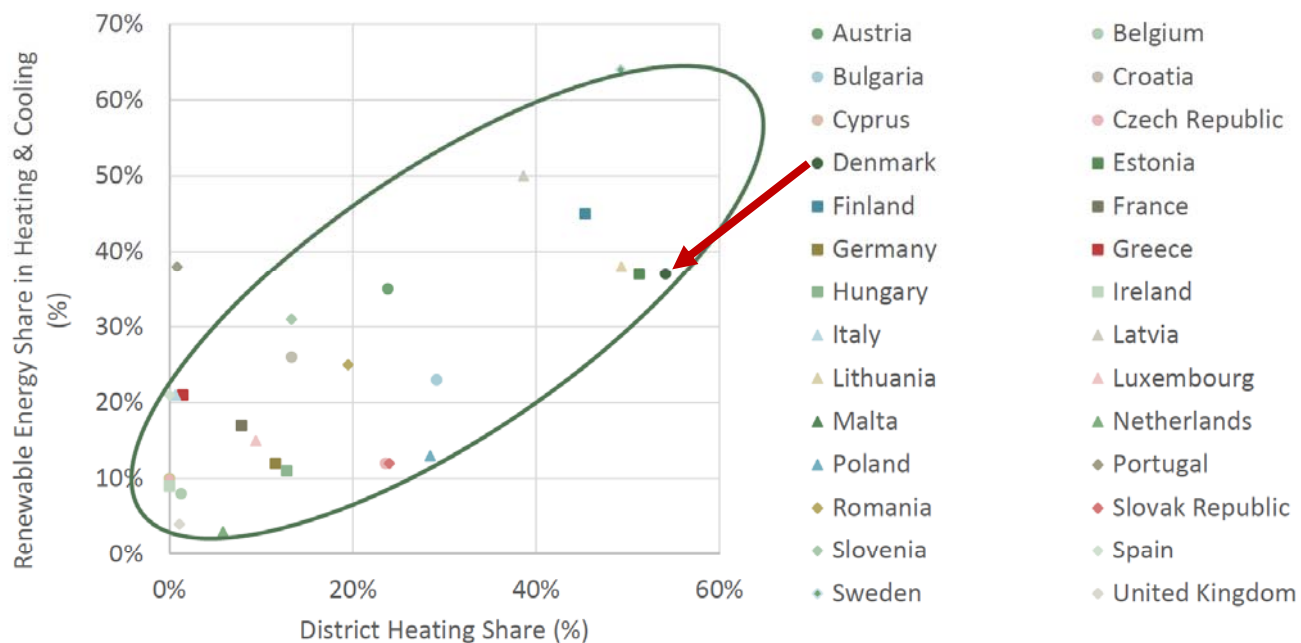
High security of supply

Fuel consumption in district heating production



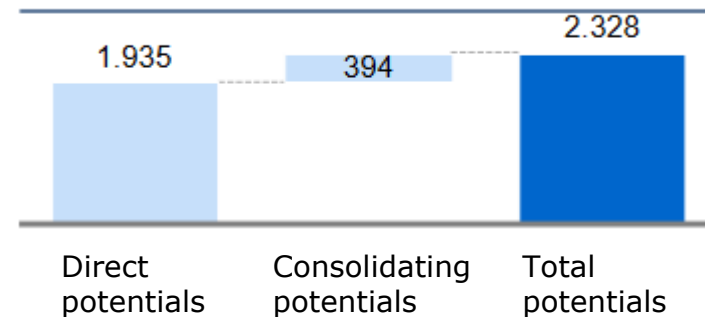
District heating in EU

Correlation between renewable energy in the entire heating sector and district heating

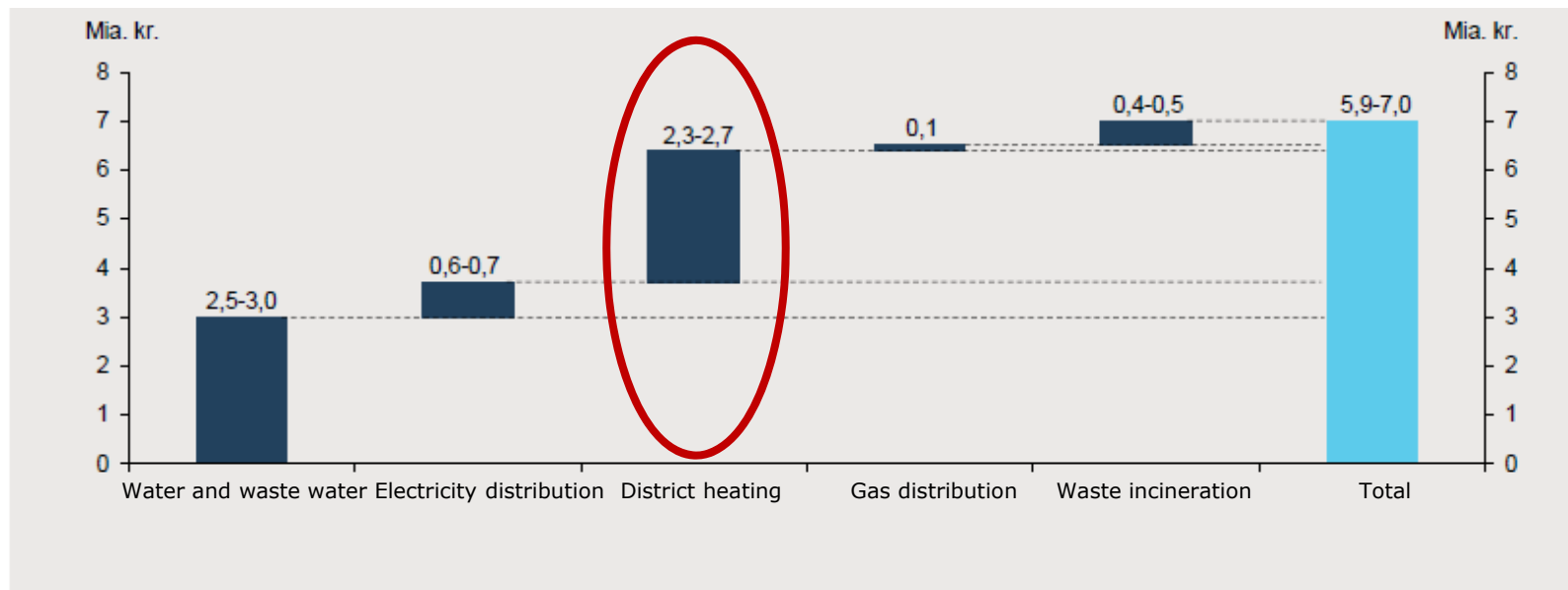


Potentials for efficiency improvement

District heating potentials for efficiency DTU
DKKm

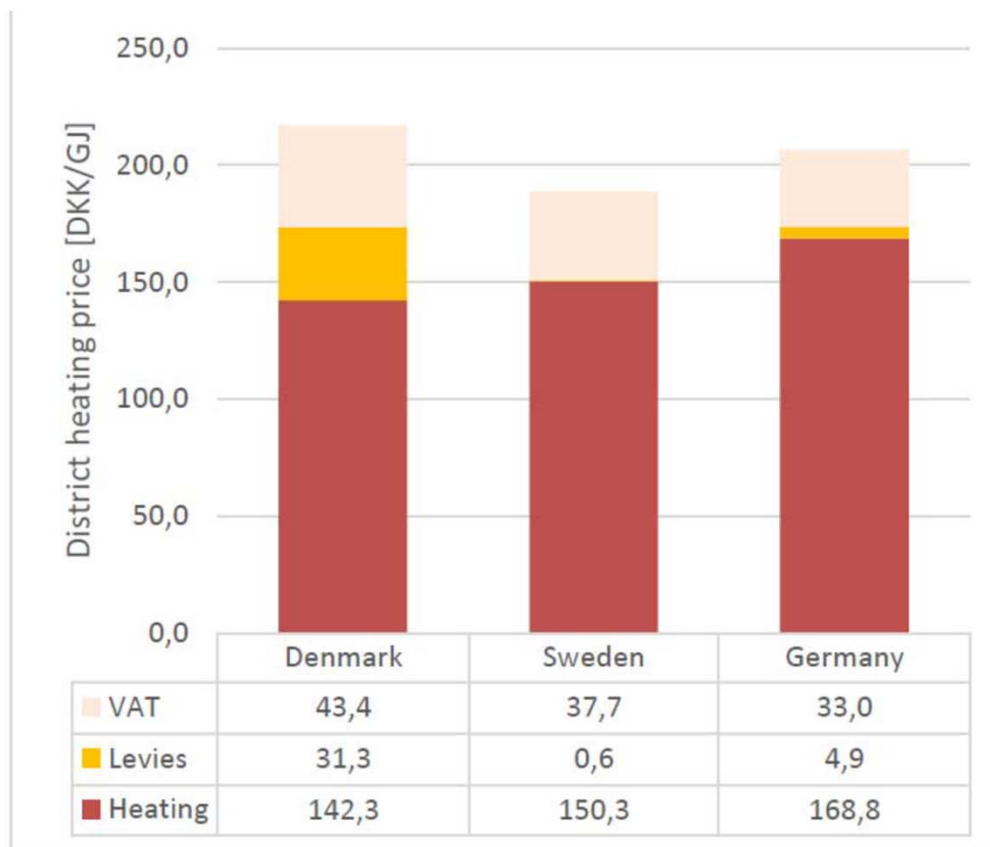


Large potentials for efficiency improvements in the supply sector



Kilde: McKinsey & Company og Struensee & Co.: *Forsyningssektorens effektiviserings-potentiale*, 2016.

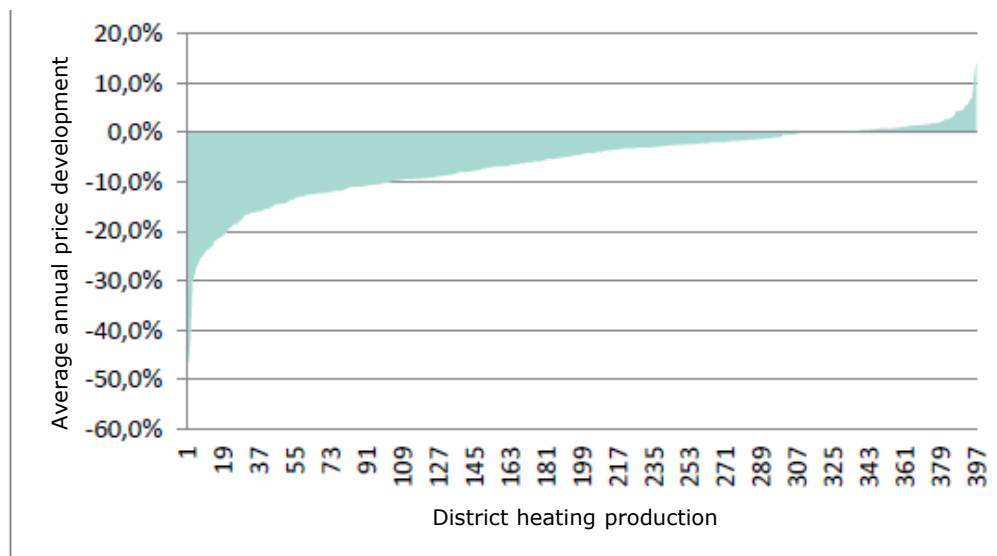
Status - District heating prices



Kilde: EA - Energianalyse 2015: "Comparison of district heating prices in Denmark, Sweden and Germany"

District heating price development

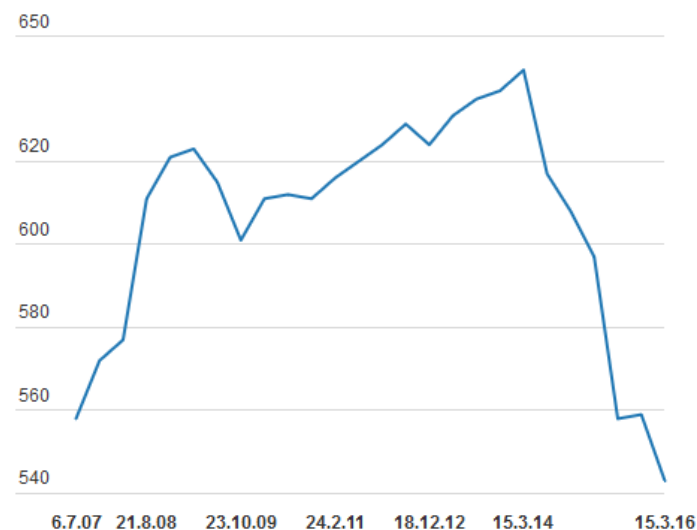
Figure 3: annual average price development in percent for a standard household, sorted by size in the period December 2013 to December 2016



Kilde: De gennemsnitlige årlige prisændringer er beregnet på baggrund af fjernvarmeforsyningernes prisanmeldelser gældende pr. december 2013 (anmeldt i 2012/13), og fjernvarmeforsyningernes prisanmeldelser gældende pr. december 2016 (anmeldt i 2015/16). Figuren viser prisændringer for 397 af 405 forsyninger i prisstatistikken for dec. 2016. 8 af værkerne fra 2016-statistikken har ikke priser i 2013-statistikken, hvilket fx kan skyldes, at selskabet er nyt i prisstatistikken. De gennemsnitlige årlige prisændringer er beregnet vha. geometrisk gennemsnit.

Anm.: Der anvendes en standardbolig på 130 kvm. med et årligt varmeforbrug på 18,1 MWh.

Average price for a MWh heat from district heating (DKK)

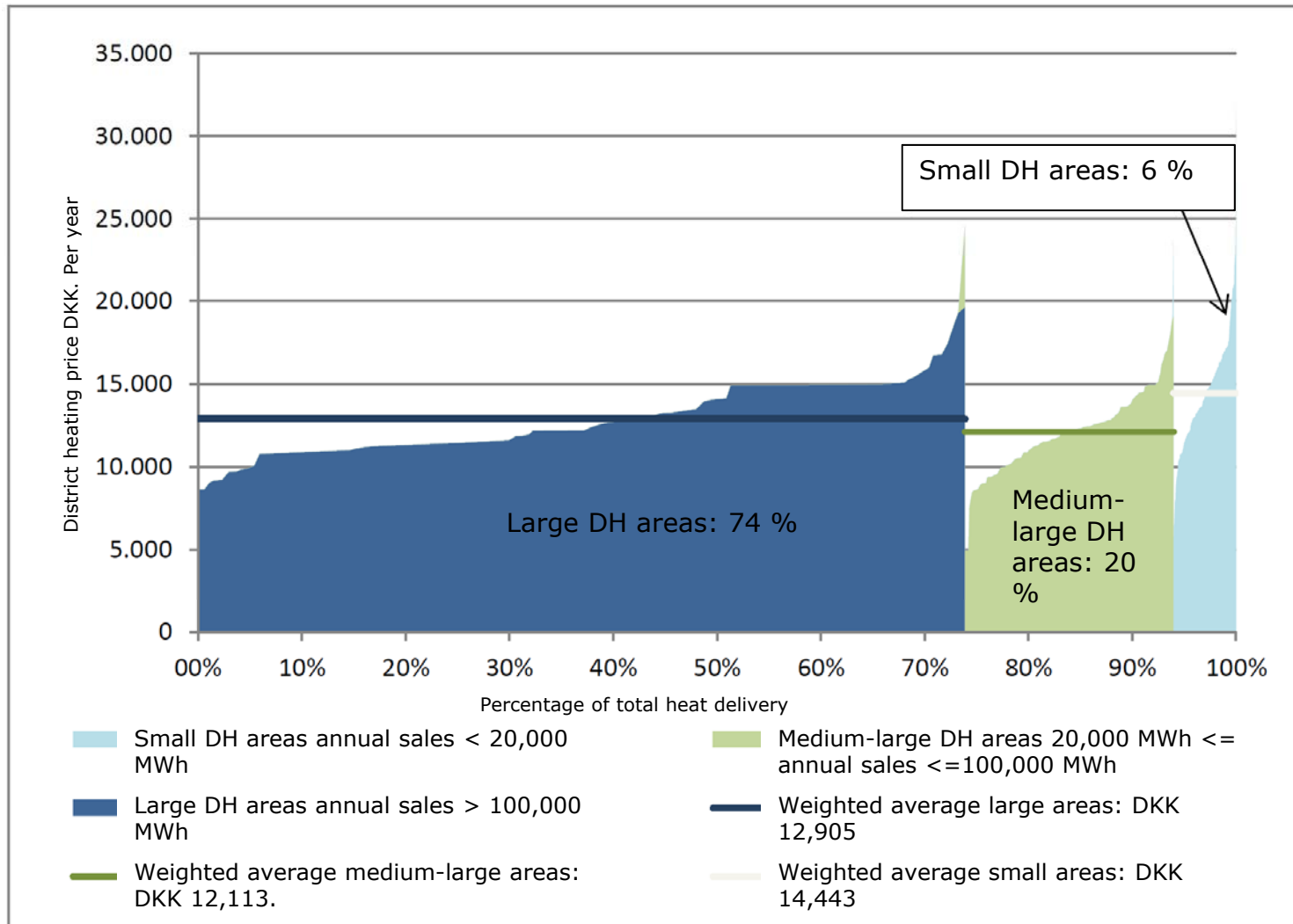


Kilde: [Energitilsynet Hent data](#)

http://energiwatch.dk/secure/Energinyt/Politik_Markeder/article8966501.ece

District heating price distribution

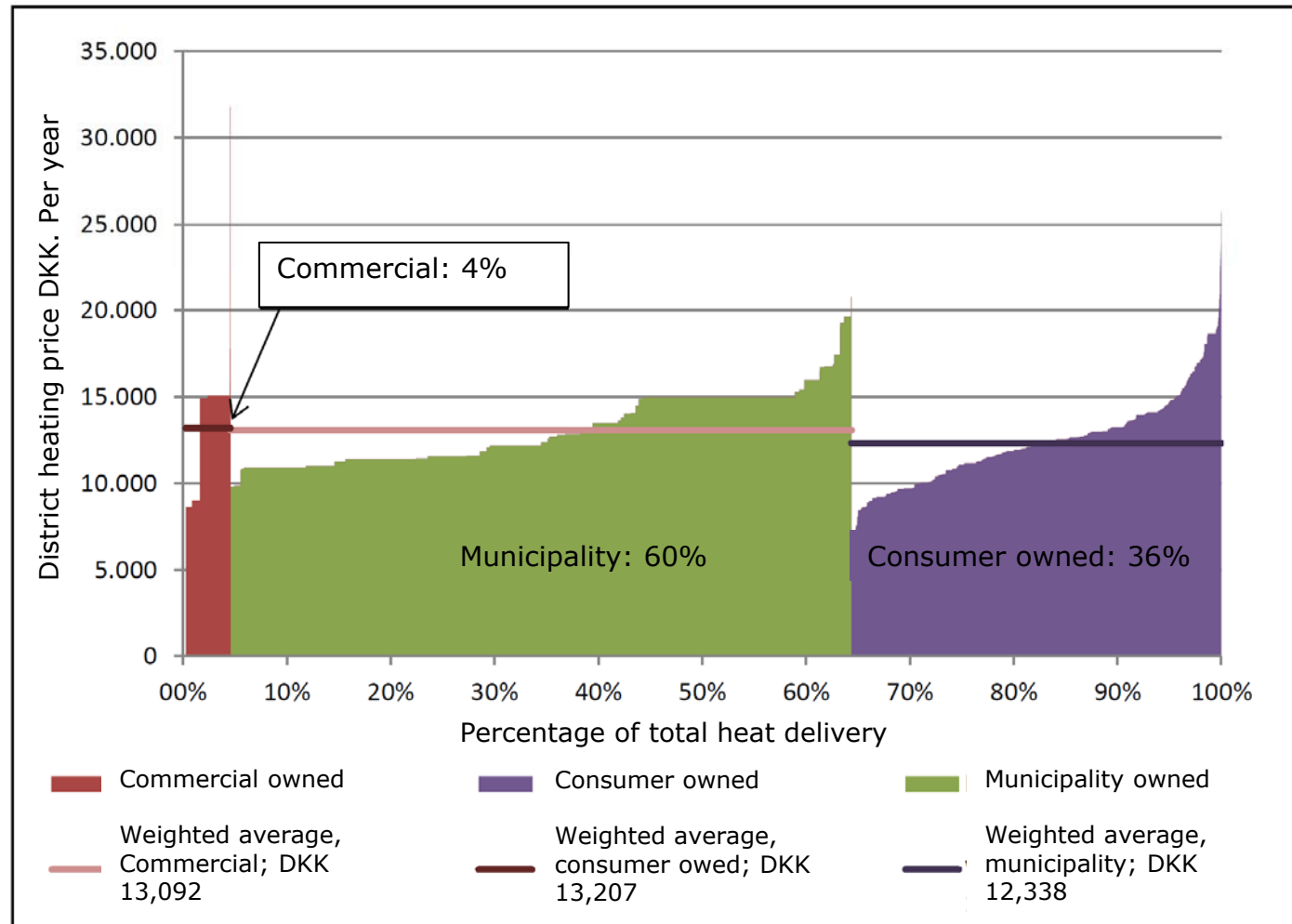
Figure 1. District heating price divided into size of areas, august 2016



<http://energitilsynet.dk/varme/statistik/fjernvarmestatistik/december-2016/>

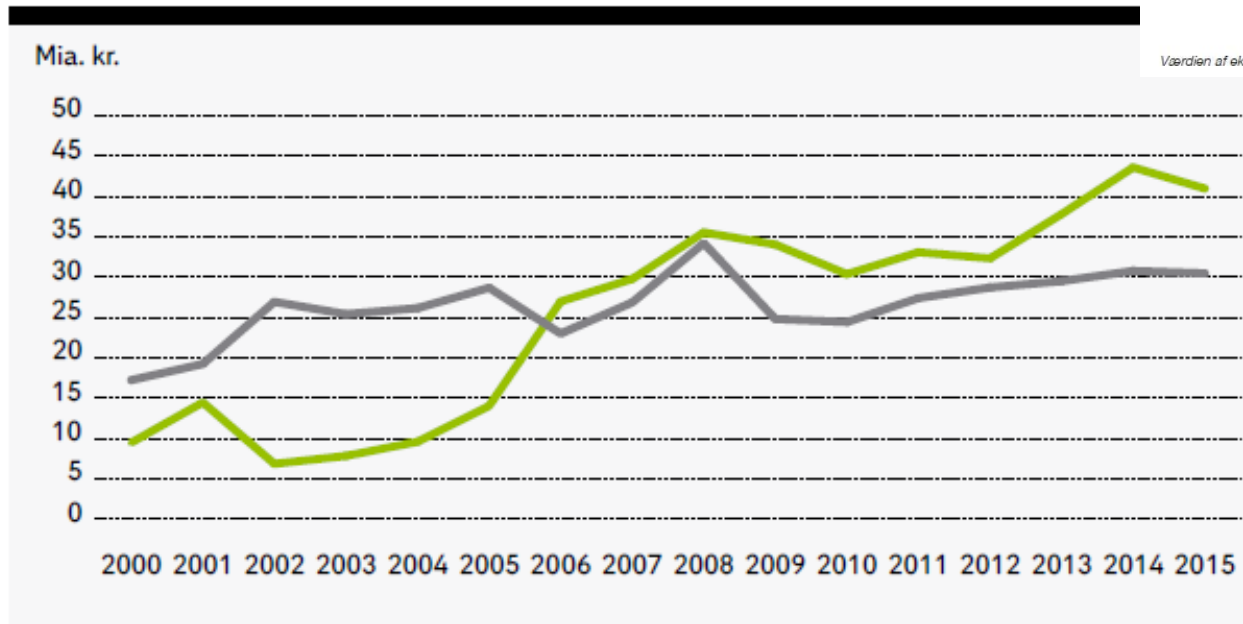
District heating price distribution

Figure 1. District heating price divided into ownership, august 2016



<http://energitilsynet.dk/varme/statistik/fjernvarmestatistik/december-2016/>

Danish export of green and other energy technologies



■ Export of green energy technologies

■ Export of other energy technologies

Eksport af Energiteknologi 2015, Energistyrelsen, Dansk Energi, Dansk Industri



Export in 2016

Værdien af eksporten i de tre sektorer i 2016. Kilder: Damvad; Cowi; Axcelfuture.

<https://www.danskaffaldsforening.dk/publikationer/rapport/vi-forsyner-danmark-visioner-for-forsyningssektoren>

The pillars of Danish DH regulation

1) Zoning - determined by lowest "socio-economic" cost

- Mandatory connection and dedication possible

2) Non profit

- Break-even principle
- Reduction in subsidy of municipality if DH grid/plant is sold

3) Fuel and CHP commitment

4) Cheap loans

- Interest free "Savings" and municipality loans

Other factors

- Cooperative movement and municipality planning for energy and water supply

Supply strategy

1) Zoning

- Nullification of mandatory connection and dedication
 - Need for a high connection rate to optimize efficiency

2) Non profit

- Profit based regulation instead of the break-even principle
 - Possibility for earning profits
 - Incentive for privatization
- Minimizing the reductions of municipality subsidies at sales
 - Another incentive for privatization/consolidation

3) Fuel and CHP commitment

- Nullification of fuel and CHP commitment
 - Would lead to biomass heat-only boilers
 - Less CHP and solar heating

4) Cheap loans

- New loans must be commercial

Decided changes

1) Zoning

- Analysis of ending mandatory connection/dedication

2) Non profit

- Municipalities cannot take out any profit
- Individual benchmarking with decreasing prices
 - very difficult for DH due to diversity
 - worst case loss of license?

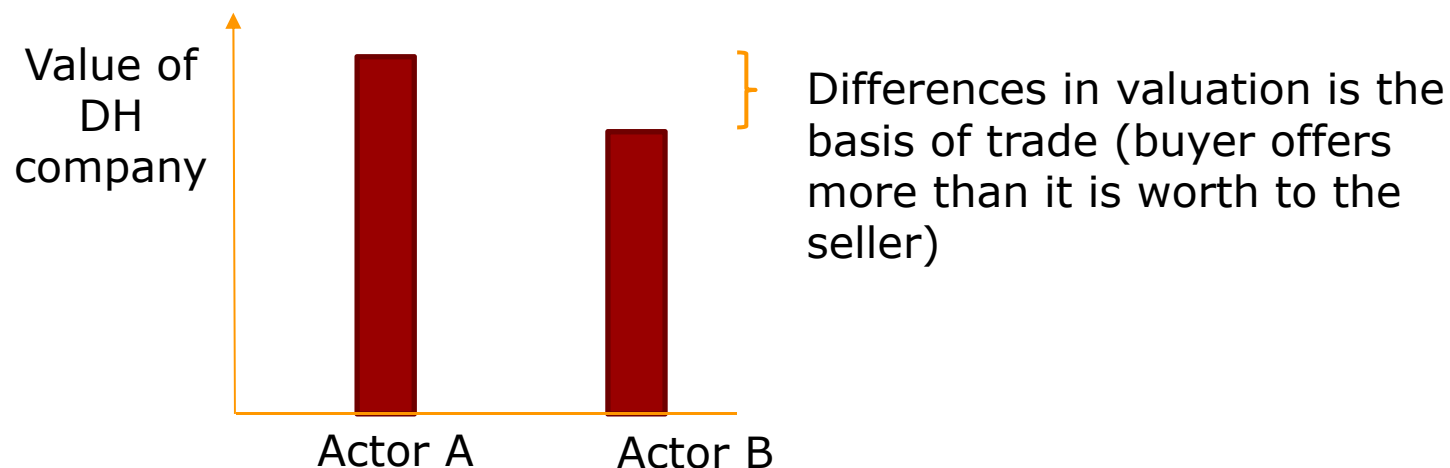
3) Fuel and CHP commitment

- Nullification is being analysed

4) Cheap loans

- Monetary reserves by the municipality is forbidden

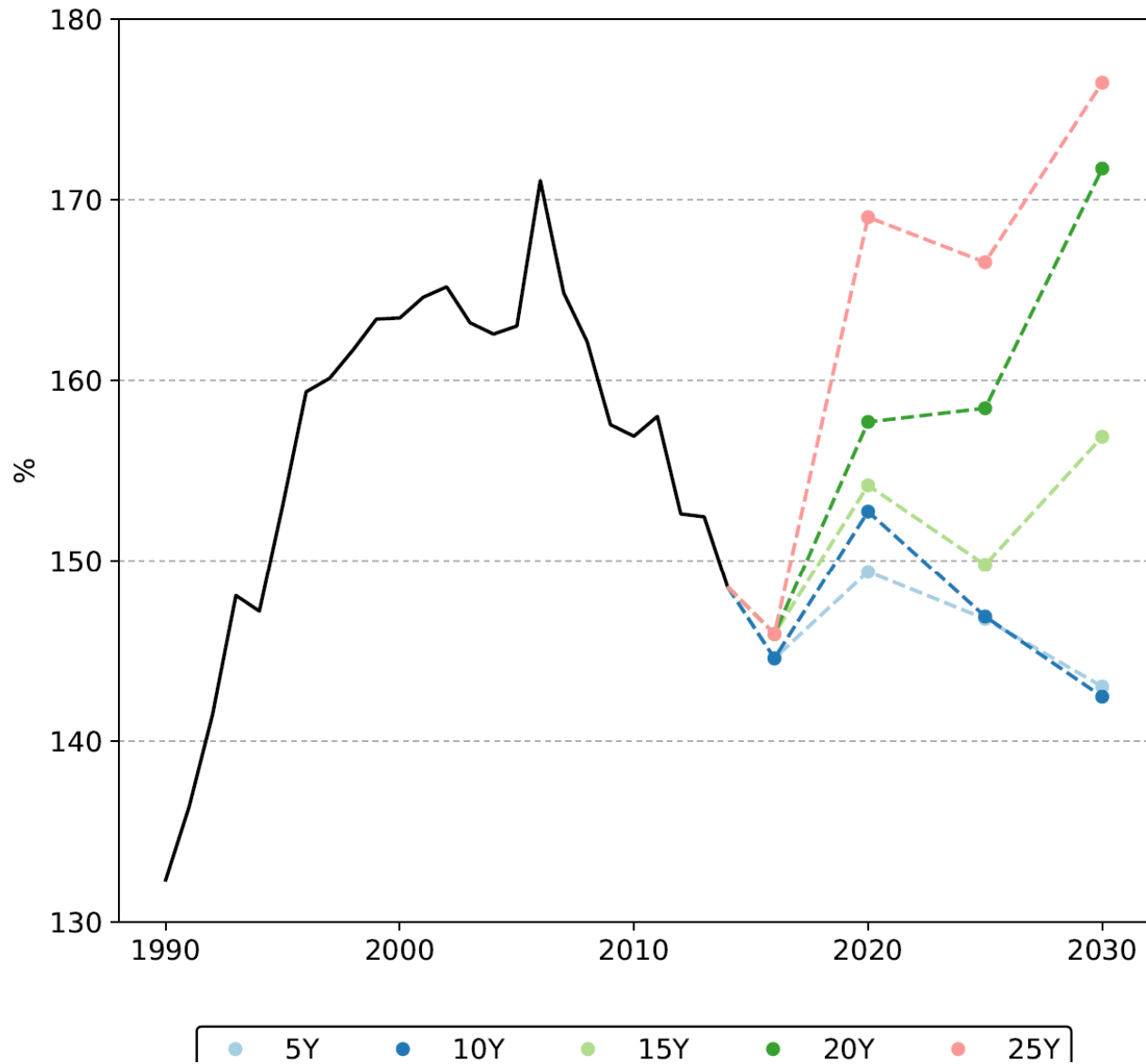
Conditions for privatisation



What can cause differences in valuation?

1. Different **incentives** (profit-focused administration in the private sector can lead to improved efficiency and therefore increased value)
2. Different **rules** (regulation determines the opportunities and costs for the DH system and therefore also the value)
3. Different **power relations** (according to the *Interest group hypothesis* (Muren, 2011) municipality-owned companies cannot charge as much for heat as private or large companies, because the consumers, who are the local inhabitants, have direct power over municipalities but not over the large companies)

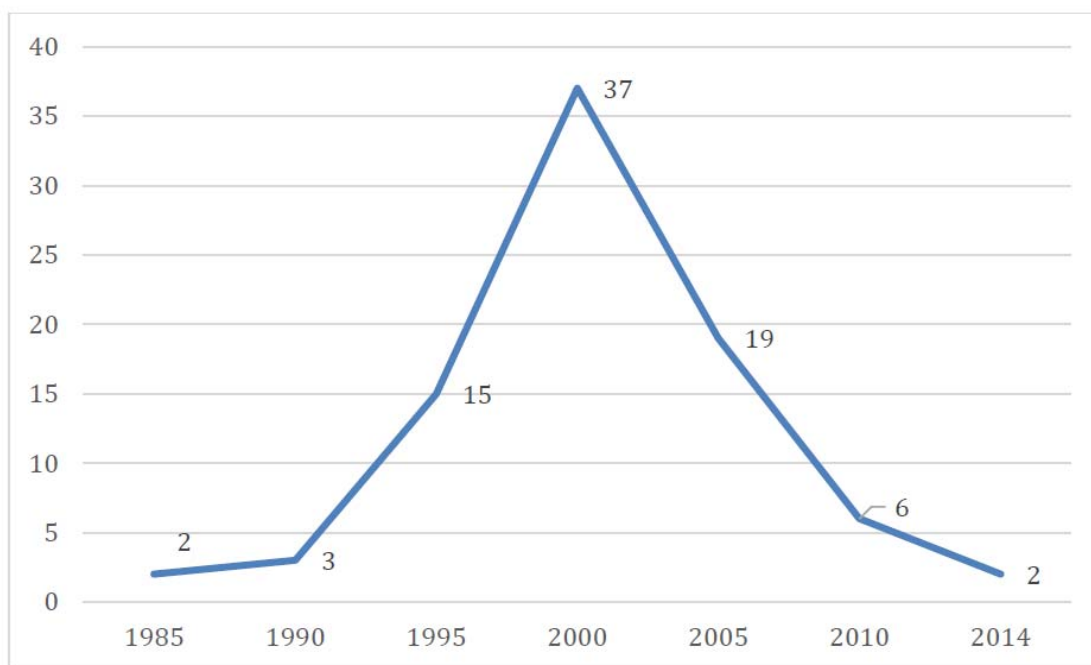
Investment horizon and efficiency



<http://www.danskfjernvarme.dk/groen-energi/analyser/080817-investeringshorisontens-indflydelse-paa-fjernvarmesektoren>

Sweden Regulation and sales

The effect of price regulation on sales of municipality owned DH system can be visualized by the Swedish example:
In 1996 DH pricing was deregulated together with the electricity market:



Figur 3. Antal sålda kommunala fjärrvärmerørelse, intervaller om fem år
DTU Management Engineering, Danmarks Tekniske Universitet

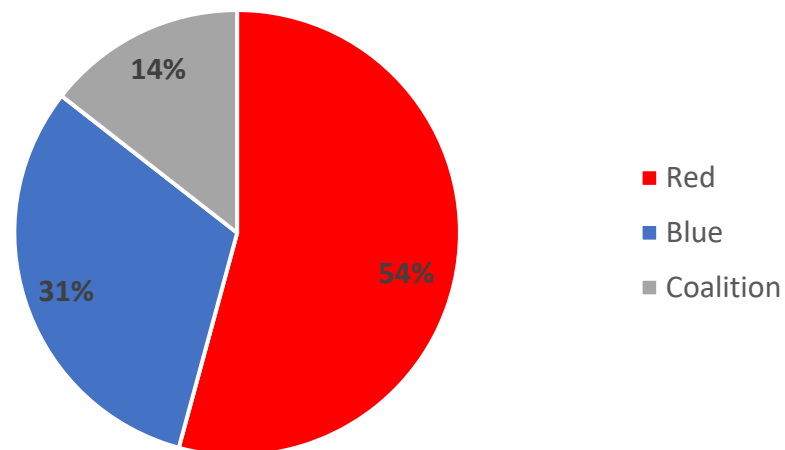
Number of sales of municipal DH companies in Sweden – 5 year intervals. Source: Magnusson 2015 - Ägarförändringar på den svenska fjärrvärmemarknaden – en översikt över förvärv och avyttringar 1990-2014

Though the sales started already during 1990-1995 (15 sales), it peaked as the deregulation came in place in 1996. 13. Sept 2017

Sweden

Political colours and sales

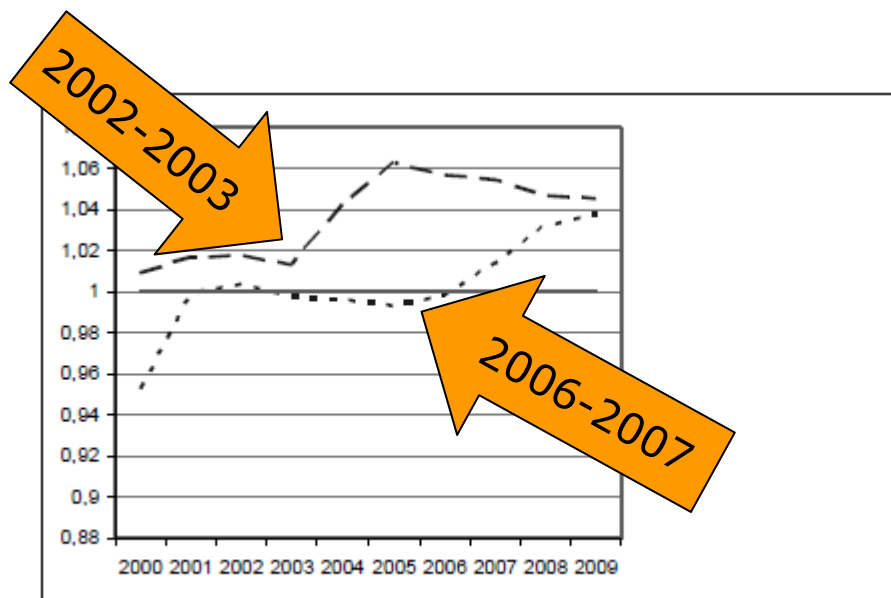
Political orientation of selling municipalities



Kilde: Magnusson 2015 - Ägarförändringar på den svenska fjärrvärmemarknaden – en översikt över förvärv och avyttringar 1990-2014

Sweden Consolidating prices

- Increases in price occurs just after sales

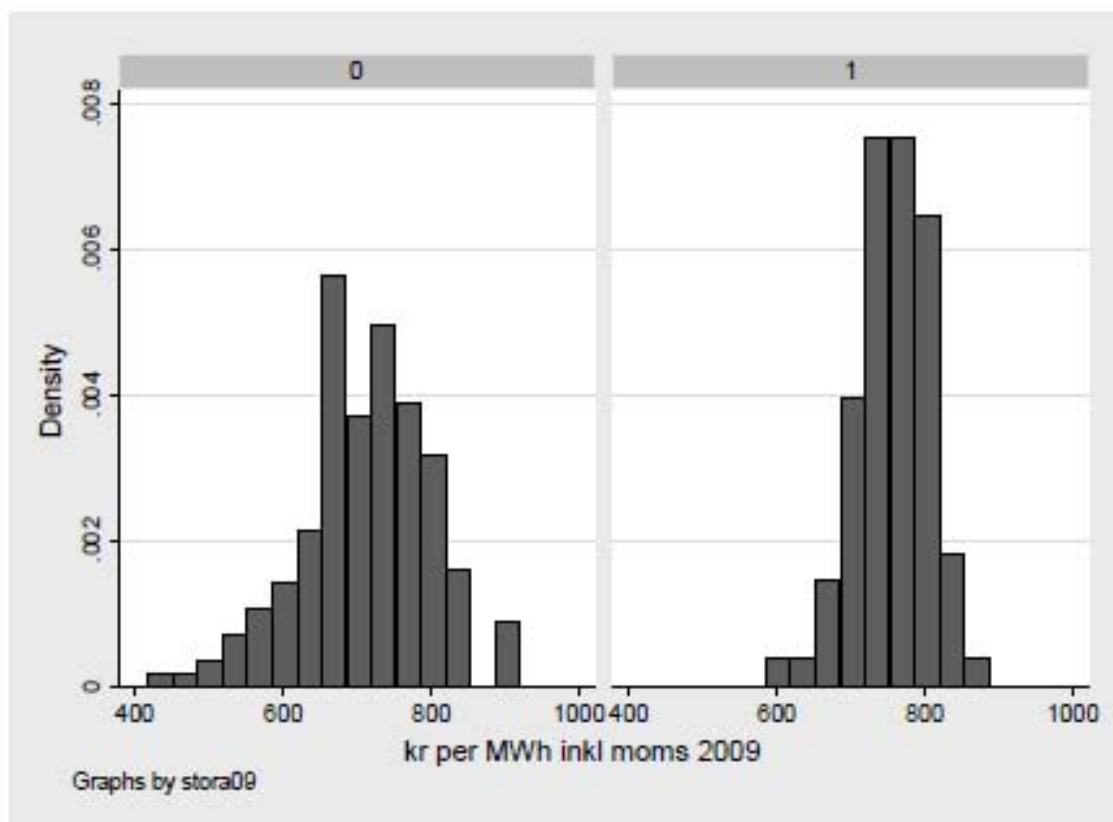


Price development in reference to other companies after a take over of a district heating company by a larger company.

Kilde: Muren 2011 - Exploatering eller reglering av naturliga monopol?

Sweden

Size and prices



Price distribution for small vs large DH companies in 2009.

Source: Muren 2011 - Exploatering eller reglering av naturliga monopol?

Though large companies have efficiency gains compared to small, they still have higher consumer prices...

Sweden

Re-communalisation

- In Sweden 21 municipalities has retained ownership of the local district heating plant (as of 2015)
- Potential reasons (Magnusson 2015):
 - Control with local energy supply and climate change mitigation.
 - Reaction to the privatisation
 - Municipalities observed lower than expected risk at the liberalised power market

Sweden

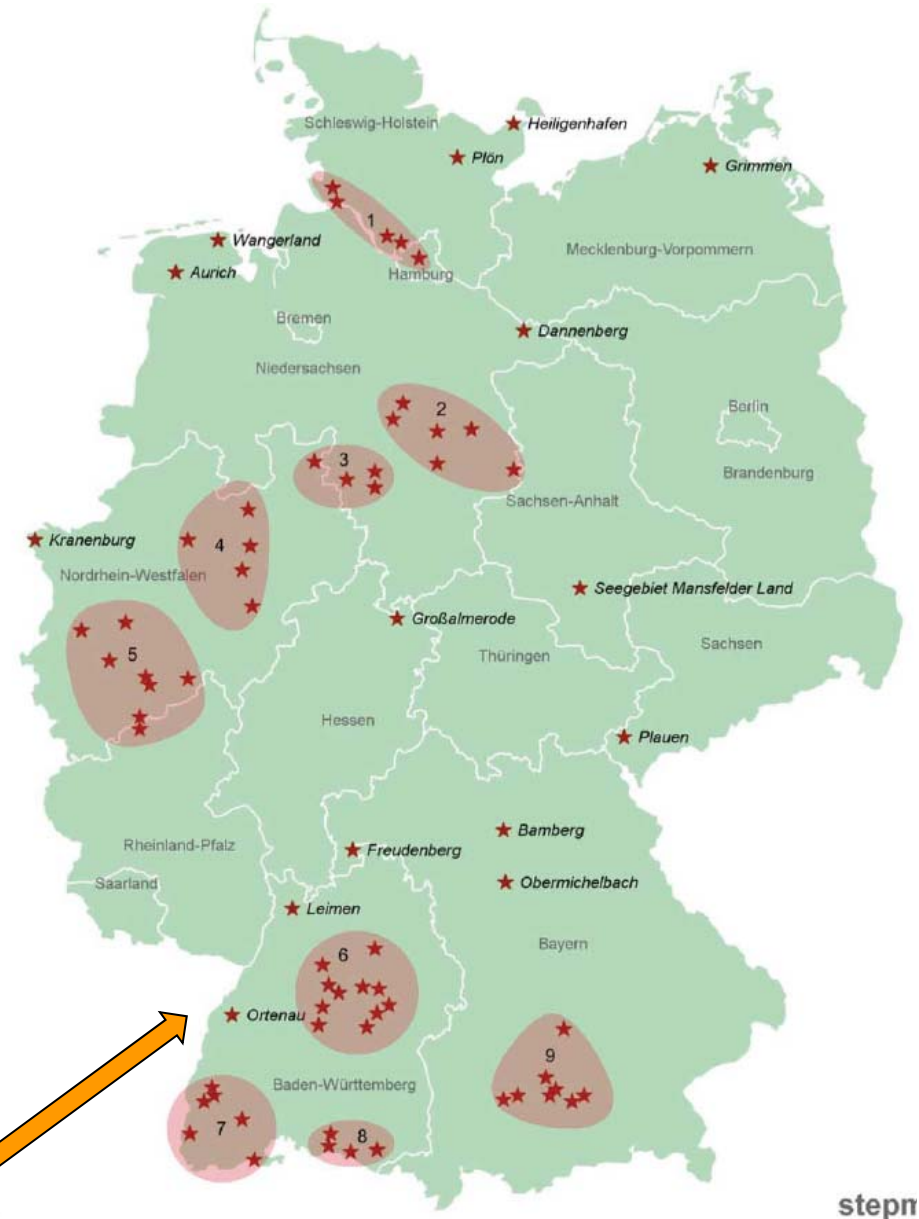
Conclusions

- Consolidating happened after price regulation
- Larger DH companies have higher prices
- Re-communalisation is happening

Germany

Re-communalisation

- Privatization end 1980s – early 2000s
 - esp. energy
 - Pressure from European internal market
 - Neoliberal thinking in main stream parties
- New established 'Stadtwerke' municipal energy utilities
 - 2005-2014: about 120
- Concession taken by municipal utilities: >200
- Example: in 2009, 50 Stadtwerke bought 'Thüga AG' (5th largest German energy supply company)
- Strong driver: positive experience in neighboring municipalities (Schönau and Schwäbisch Hall)



Germany

Negative experiences with privatization

- Decreased ability to act and decide of the public authority
- Hidden additional costs in contract management
- Lower wages for employees (social payment necessary) – no regional-economic benefit
- Increased costs for customers
- Quality of service (Libbe 2012, 22)
- Risk for public authority, questioning the economy
- High effort, loss of control, reduced flexibility, reduced quality (Grabow/Schneider 2009 17-18, 33-37)
- Transaction costs due to administrative interfaces and tendering processes
- Long-term contracts: contractual lock-in

- Grabow, Busso; Schneider, Stefan 2009: PPP-Projekte in Deutschland 2009. Erfahrungen, Verbreitung, Perspektiven. Ergebnisbericht. Berlin: Deutsches Institut für Urbanistik.

- Libbe, Jens 2012: Rekommunalisierung. Empirische Belege und Einordnung in den ökonomischen und rechtlichen Bezugsrahmen. In: Verwaltung & Management. Zeitschrift für moderne Verwaltung 18,1, S. 21-33

Germany

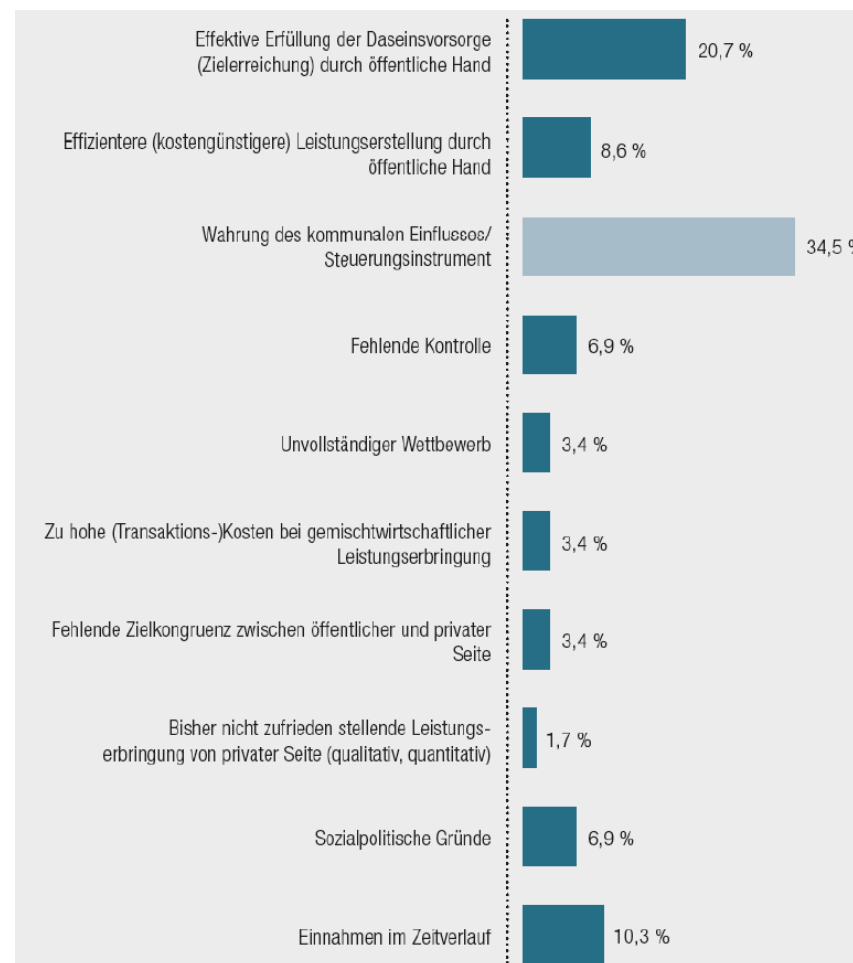
Reasons pro re-communalisation

- Occasions/opportunities to take back the public service under municipal control (empowering regional economy and local community)
 - Changing normative guiding principles: mobilisation of the public in direct-democratic processes
 - Renewables increased decentralization: empowering local organisations (cities and municipalities)
 - Low interest rates
 - With renewable energies new financial incentives
-
- Art.28 Abs.2 Grundgesetz: right of municipal self-government, public service task

Germany

Reasons for Re-communalisation

1. 34.5% - keeping municipal influence / control instrument
2. 20.7% - effective provision of public goods
3. 10.3% - income over time
4. 8.6% - more efficient (cheaper) service provision by public authority
5. 6.9% - socio-political reasons
- 6.9% - lack of control
- ...



Germany

Experience

Bundeskartellamt – Federal Cartel Office 2011: Statement on Re-communalisation:

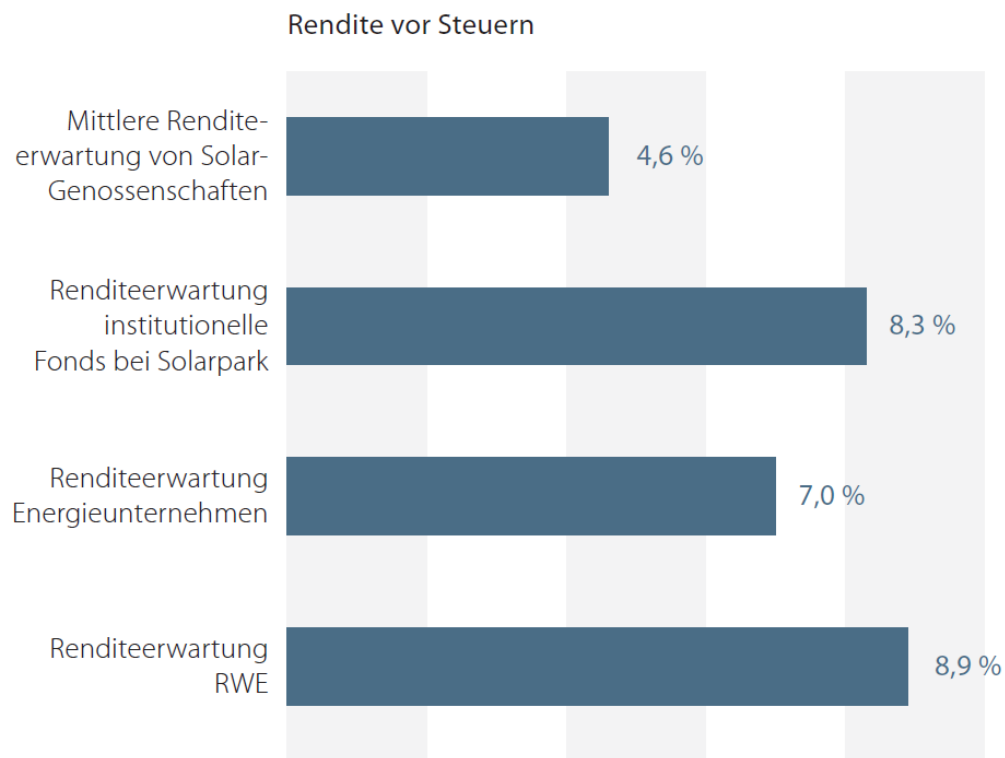
- Positive evaluation of re-communalisation in energy supply
- Suitable to reduce the dominant position of the large energy supply companies and by that improving the market structure and stimulate competition (BKartA 2011, S. 1).
- Müller-Kirchenbauer/Leprich 2013: study on performance of distribution networks, S. 103
- No indications from official investigations that small distribution network utilities are less efficient than big ones

Germany Cooperatives

Die Renditeerwartung beim Eigenkapital bei der Bürgerenergie halb so hoch wie bei RWE

Expected return on investment are significantly lower in cooperatives

About half compared to RWE



Quelle: Leuphana Universität Lüneburg
Infografik: infotext-berlin.de



Germany

Conclusions

- Municipalities took over energy supply again due to negative experiences
- Public engagement partly brought the initial impulse
- Main reason: Decision taking in questions of energy supply away from nuclear and lignite (Vattenfall in Berlin and Hamburg)
- Window of opportunity due to many expiring concession contracts
- Re-communalization wave partly slowed down due to fiscal problems / dept cap in many municipalities

Overall conclusion

Municipalities and cooperatives have a major role in contributing to:

- Cheap, green and secure supply of district heating

Changing regulation may hamper this

Re-communalization is happening in neighbor countries

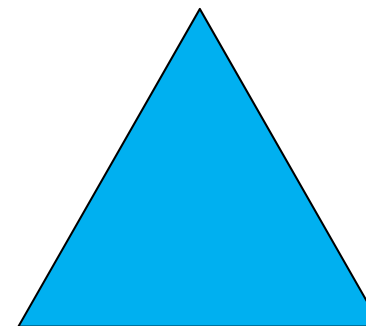
Big \neq cheap

Private \neq green

Supply security is not measured today

Further research needed:

- The potential role of cooperatives/ consumer-owned utilities in DK and abroad?



The End

Thanks to

- Daniel Møller Sneum, Emilie Rosenlund Soysal, Ole Jess Olsen, Frauke Wiese, Rasmus Bramstoft

Questions and comments?

- maem@dtu.dk

More information on the future district heating can be found on:

www.4dh.eu

www.progressheat.eu