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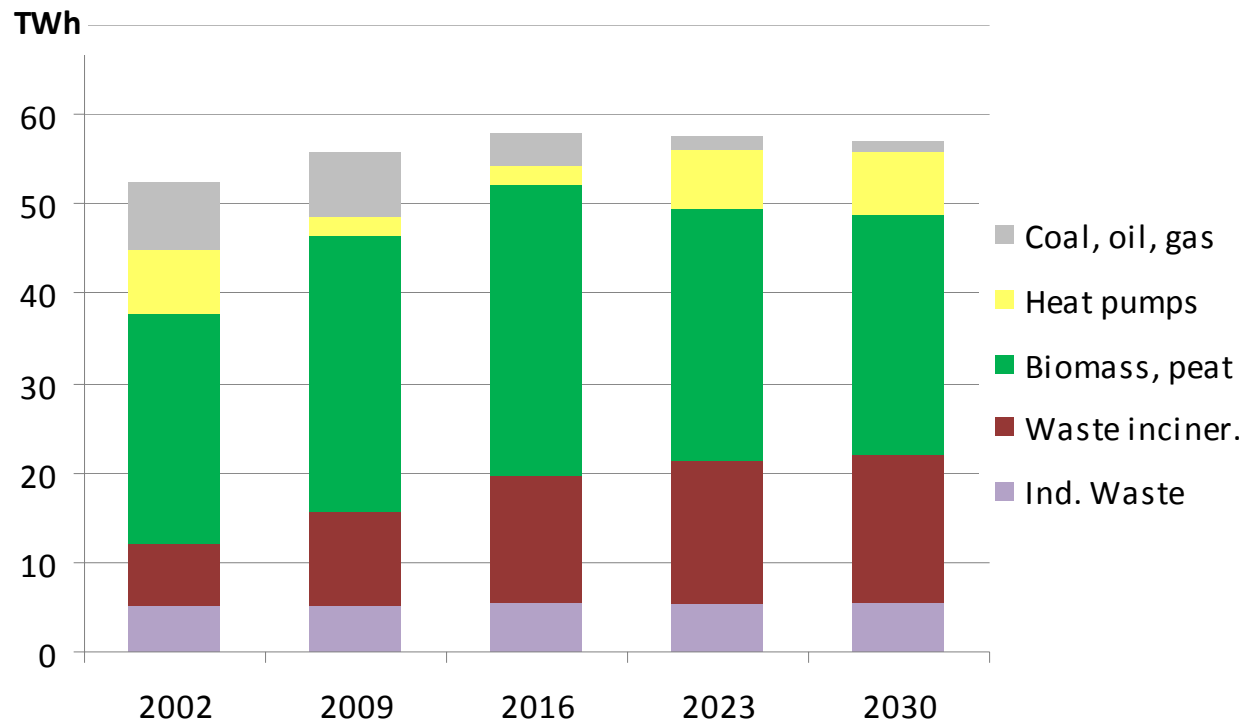
Profu

District heating:

*The importance of cost-
correct price*

– an analysis based on Swedish
data

District heating production in Sweden in the scenario with all three EU 20 % goals



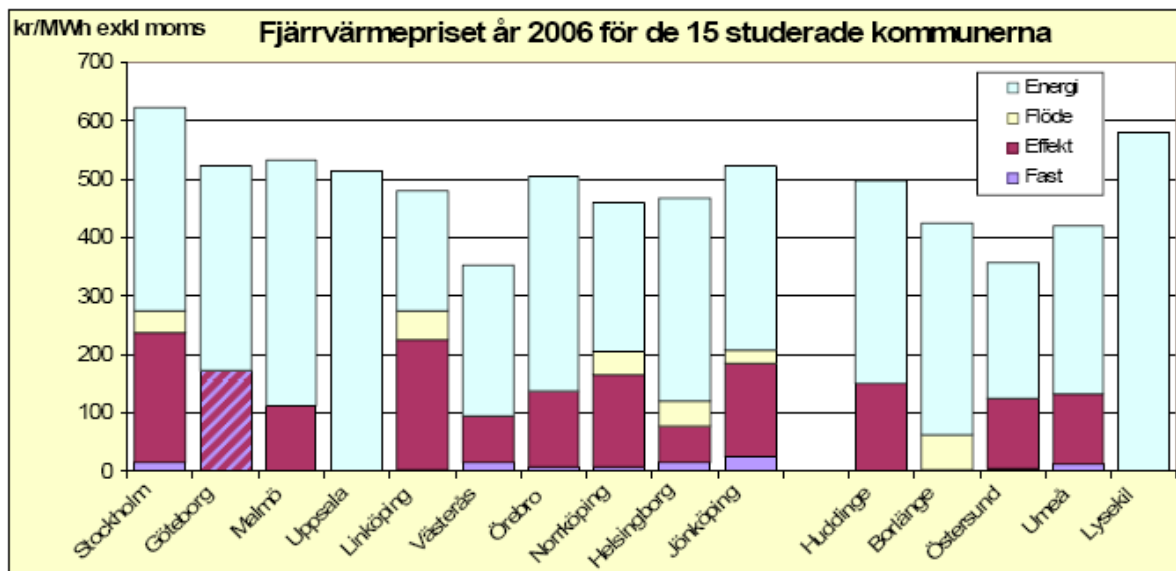
District heating – the importance of cost-correct price

- How much of the district heating price consists of the (variable) energy fee?
- How big are the variable district heating production costs (marginal costs)?
- Comparison of variable income and variable cost
- The seasonal differences in marginal costs
- Potential consequences if the tariffs are not cost-correct

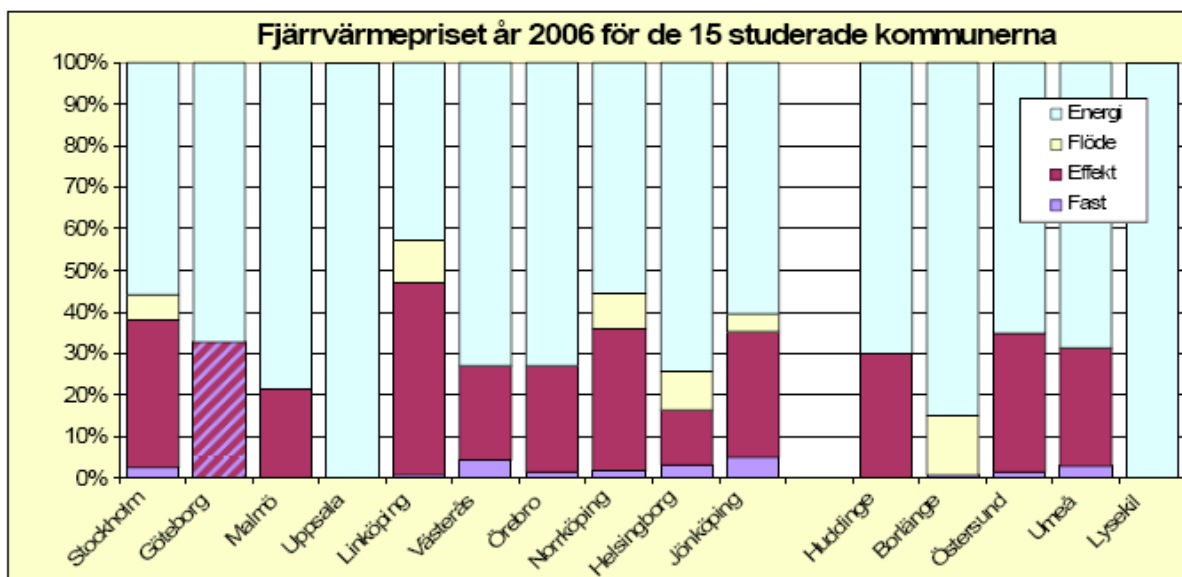
Conclusions

- The marginal cost of district heating production is a good reflection of how costs for the district heating company are influenced by changes in district heating demand.
- The variable costs (= marginal costs) amounts to 105 % of the district heating price's (variable) energy fee (as an average) => The energy fee reflects marginal costs very well
- The marginal costs show great differences between different seasons => The price should be differentiated
- District heating prices should be considerably more season differentiated than now
- If the price does not reflect costs it could encourage suboptimal customer behaviour

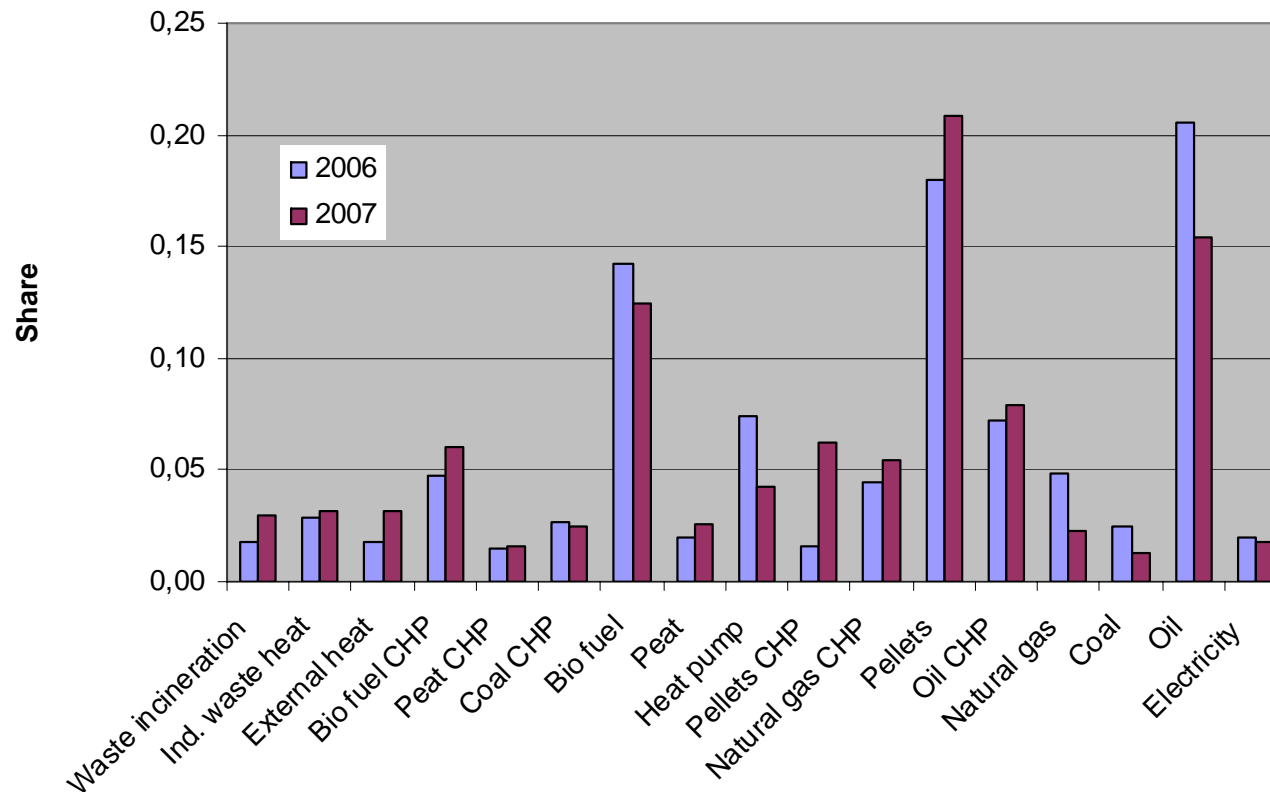
NEP: District heating – variable income and variable costs – Oslo March 2009



Källa: EKAN 2006



District heating in Sweden – marginal production mix



The marginal cost for district heating (production + distribution loss) amounts to **370 SEK/MWh**. This is a weighted average for all district heating systems in Sweden

Comparison of variable income and variable costs (marginal costs)

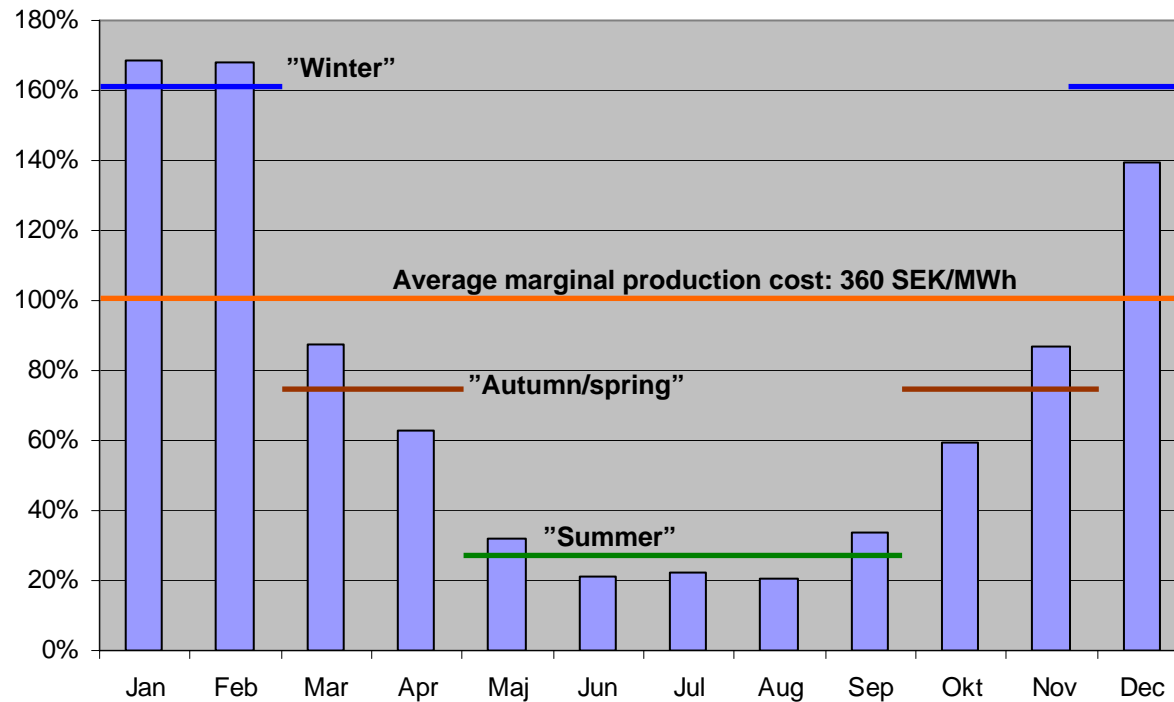
- The variable price amounts to 70 % of the total district heating price (as an average)
- The variable costs amounts to 105 % of the district heating price's (variable) energy fee (as an average)
- => The energy fee reflects marginal costs very well
- However, marginal costs varies a lot between different systems and different seasons
- In some cases the capacity fee is also related to energy consumption

Examples of possible negative consequences if the variable share of the tariff is "too big"

- More energy savings than economically optimal
- Too large introduction of solar heating and heat pumps in buildings heated by district heating
- The specific district heating price may have to be increased to cover costs
- "Why is the variable price high if you claim that the district heating consists of waste heat?"

If the variable share of the tariff is "too small" you would also get negative consequences

District heating in Sweden – cost of the marginal production month by month 2006



The marginal cost for district heating production in Sweden varies dramatically between seasons

- Three typical season levels:
 - *Winter: 160 % of yearly average*
 - *Autumn/spring: 75 % of yearly average*
 - *Summer: 30 % of yearly average*
- Tariffs with seasonal differentiation of the energy fee is applied in 60 % of the studied municipalities
- The municipalities that apply seasonal differentiation use two seasons
- Typical season differentiation is small

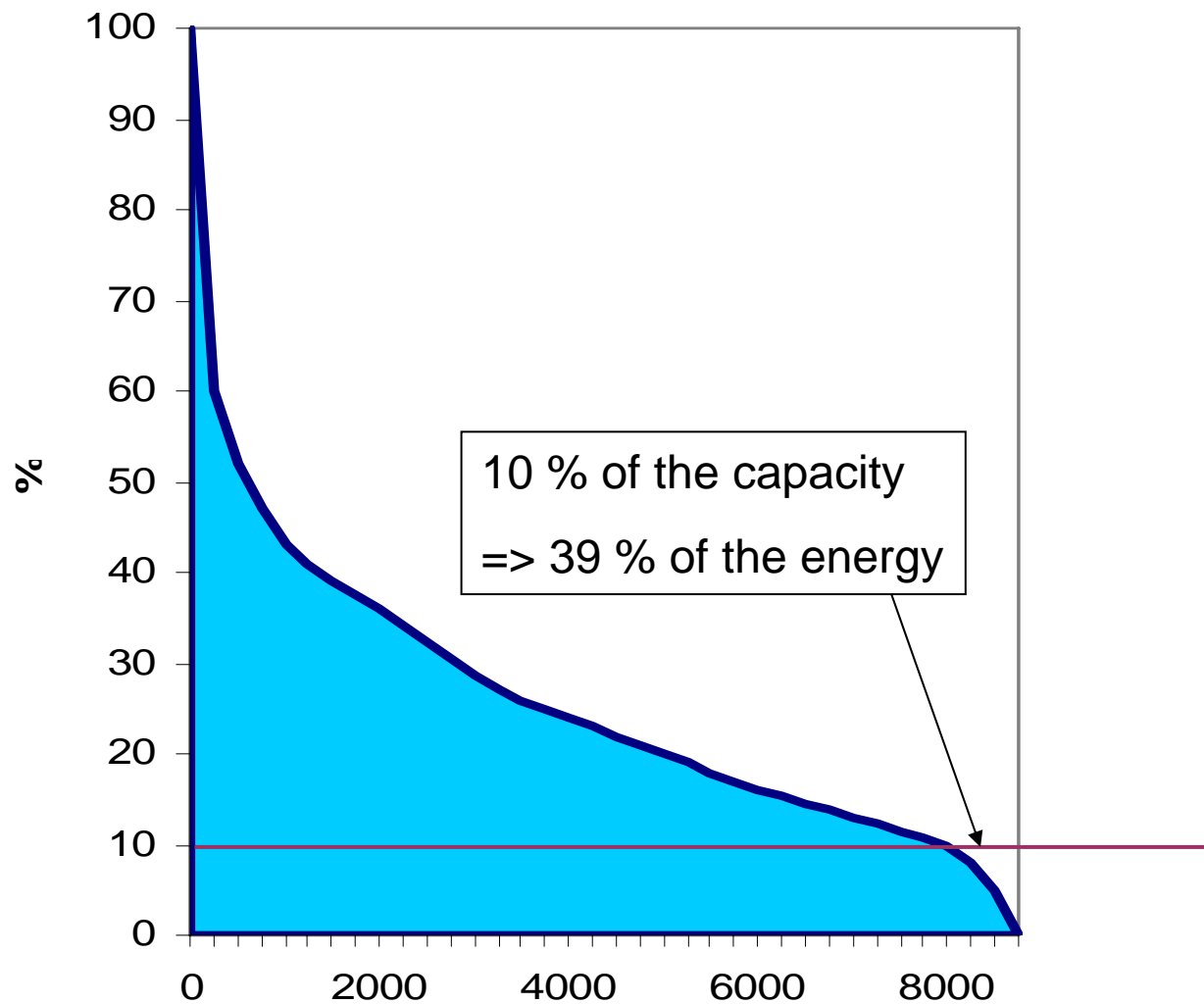
The tariff's energy fee should be considerably more season differentiated than today to be cost-correct.

District heating is competing on the heating market – four principal cases

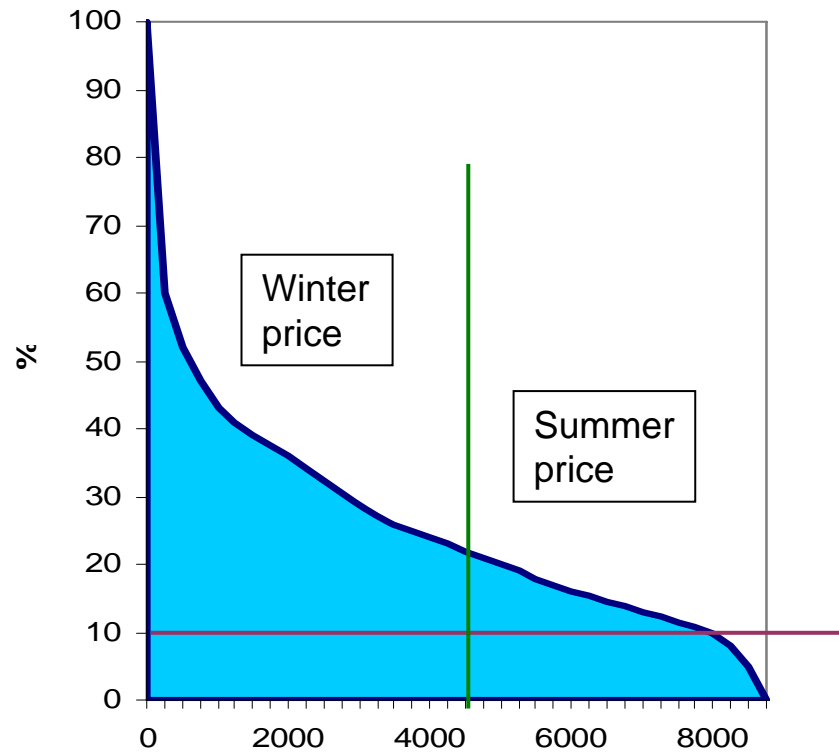
1. Existing district heating, conversion of the total heating demand to another energy carrier and another energy conversion alternative
2. Existing district heating, conversion of a fraction of the heating demand to another energy carrier and another energy conversion alternative
3. Presently heated by another energy carrier and another energy conversion alternative, conversion to district heating
4. New building, all alternatives starting from scratch, district heating is one of the options.

For the second case the structure of the district heating tariff influences the competitiveness. For the other cases the total cost decides.

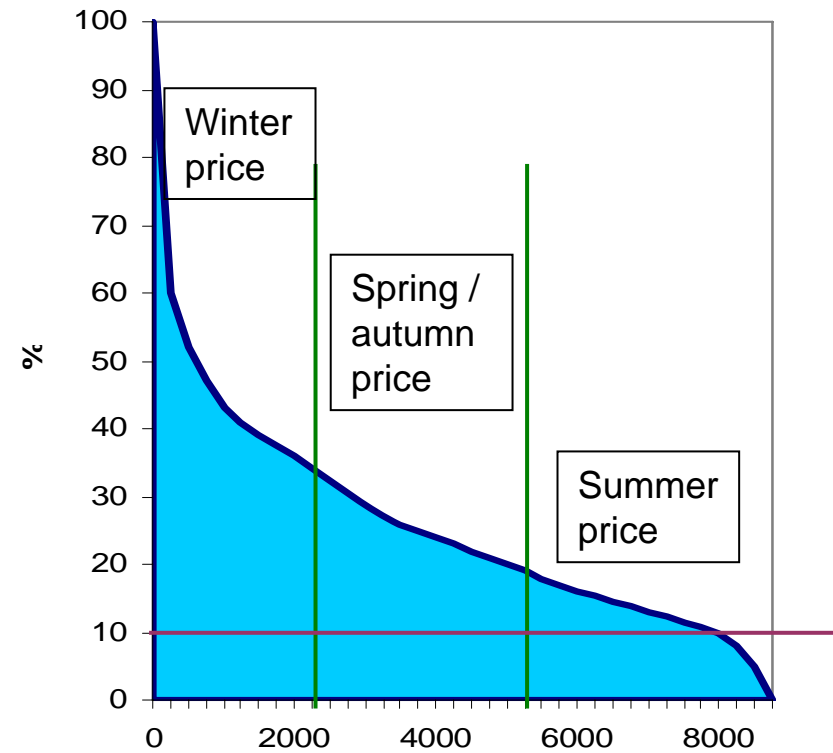
Typical load duration curve for heating of a building



Two seasons variable price



Three seasons variable price



Cost impact of reduced district heating delivery – two price models

- 100 % variable price: $530 \times 75 = 40\,000$ SEK/yr
- 70 % variable price, three seasons differentiated: $580 \times 19 + 290 \times 26 + 100 \times 30 = 22\,000$ SEK/yr
- ✓ District heating production costs decrease by approximately 22 000 SEK/yr
- ✓ District heating income decrease by 22 000 – 40 000 SEK/yr

A multi family house with 193 MWh/yr heating demand is assumed.
Both price models result in the same total cost for 100 % heating of the house