Public Regulation of District Heating Companies in a Smart Energy System

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What kind of regulation do we need?

The role for DH in a smart energy system includes the tasks of

- Integrating ‘excess wind power’
- Deliver flexible back-up capacity to the electricity system
What kind of regulation do we need?

We would thus like fourth generation district heating to deliver an infrastructure to the system which consists of:

1) Heat pumps
2) CHP units
What kind of regulation do we need?

Three main priorities for the public regulation is to deliver
1) An economic basis for heat pumps
2) An economic basis for the CHP units
3) Incentivise to flexible operation
Through the last 15 years
1) The use of biomass has doubled
2) The use of heat pumps has not increased

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What kind of regulation do we have?
What kind of regulation do we have?

![Graph showing the relationship between CHP (Decentralised) and DH Boiler from 1990 to 2013.](image-url)
What kind of regulation do we have?

Currently we have the situation that
1) Heat pumps are not being installed 😞
2) CHP units gets less and less hours 😞
3) The flexible operation is lost 😞
Proposal 1: Is a general tax relief on electricity the way to go?

A possible proposal would be to decrease taxes on electricity to boost investments in heat pumps. But how would that effect the overall system?
The business economic incentive
The business economic incentive

Heat cost = f(Pel)
Spot Market Effect: Increases demand for coal and imported electricity
Effects of a tax relief on electricity

Thus, we risk that the heat pump would create increased demand for technologies we don’t want – and push out the one we want.
Effects of a general tax relief on electricity

The effect of tax relief on electricity will probably be that:

1) Heat pumps will be installed 🎉
2) CHP units will get less hours 😞
3) Flexible operation is not achieved 😞
Proposal 2: A tax relief on ‘in-house’ electricity

Alternative proposal: Differentiate between internal and external electricity sources.
1) Tax relief on in-house produced electricity and
2) Keep taxing electricity demanded from the market
Effect on business economic incentives
Spot Market Effect: Only increases demand for wind power

![Graph showing supply and demand for wind power with price points at kr. 200,000 to kr. 1,200,000 and corresponding supply and demand levels in MWh.]
The three main priorities

The in-house tax relief proposal could then

1) Give plenty of hours to the heat pumps 😊
2) Give plenty of hours to the CHP units 😊
3) Deliver business economic incentive for flexible operation 😊
Advantages:
- Seems like a relatively simple, low-bureaucratic solution
- The CHP-HP combination in the mid-price level is more fuel efficient than the current boiler alternative
- Heat is cheapest when heat demand is highest
- With a heat storage, DH companies will optimise production at low and high electricity price levels

Doubts:
- More detailed calculations at the business economic level should be carried out.
- Any technical difficulties?
- How strong is the relation between wind and price?