

## Indpasning af solvarme i kraftvarme

### Solar heating panels don't compromise CHP but benefit both consumers and power producers in an open decentralized electricity market



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Energinet.dk controls main energy grids in Denmark. Energinet.dk is established as a merger between Eltra, Elkraft System, Elkraft Transmission and Gastra. Two subsidiaries, Eltransmission.dk A/S and Gastransmission.dk A/S were established at the same time.

**Main responsibilities**  
Together, Energinet.dk and its two subsidiaries have two main responsibilities:

- Transmission system operation, i.e. responsibility for efficient and reliable energy supply and for a competitive energy market.
- Ownership, operation and development of the main electricity and gas transmission grids.

In July 2005 the Danish Minister for Transportation and Energy asked Energinet.dk to establish a report on integration of solar heating in combined heat and power systems with district heating (CHP). The question was:

*"Energinet.dk will in cooperation with relevant parties establish a general*

*analysis which shall enlighten how solar heating can be integrated in CHP. The analysis shall expose technical possibilities, economic consequences and influences on power plants production. The report should be finished in the spring 2006."*

This analysis which is now almost finished shows some interesting and surprising results:

- In a fixed tariff system as we had until last year, solar heating panels traditionally lead to overproduction of heat in summertime and compromises the economy of CHP both for the consumers, the power producers and the society.
- The fixed tariff system had come to its limits due to overproduction of electricity from wind power and heat-required CHP power.
- The transition to an open market for electricity requires a lot of flexibility in production to be able price-signal responses.
- The analyses of the power systems in Western Denmark with a lot of wind generated power shows that more renewable energy in the heat market actually stabilises the power system by reducing the heat-required CHP power.

- This additional flexibility allows the CHP plants to balance the wind generated power in a more economic way.

Some of the preconditions for these benefits are:

- The CHP plants must have accumulating tanks for heat supply (weekly storage or optionally season storage depending on the area of solar panels).
- The solar panels must be established at CHP plant level or regional in the district heating grid.
- Individual solar heating panels compromise the function and comfort of other consumers in the district heating system by reducing summer load if not all consumers have 100% summer supply from solar panels.
- Large solar heating plants have much higher efficiency and much lower installation and maintenance costs than individual systems.

The overall conclusion is:

Both the heat consumers, the power producers, the society and the environment benefit from solar heating panels in CHP areas with a lot of renewable energy from wind generated power, if production of electricity is based on an open market for electricity where the key for success is flexibility and capability to react on price signals.

