Barriers for district heating as a source of flexibility for the electricity system - DTU Orbit (06/10/2019)

**Barriers for district heating as a source of flexibility for the electricity system**

The Scandinavian countries Denmark, Norway and Sweden currently deploy large amounts of variable renewable energy (VRE) sources, especially wind power. This calls for additional flexibility in the power market. The right coupling to the underlying national and local district heating (DH) markets can generate large amounts of flexibility. However, regulatory barriers and different energy market designs may hinder the potential benefits from system integration, and lower the potential that can be realized. The Scandinavian countries have a large extension of DH with a good potential for providing flexibility services to the electricity market. We survey and discuss regulatory barriers and drivers for exploiting this potential for flexibility. Combined heat and power (CHP) is widely integrated in the power market, but it is threatened by low electricity prices due to the increasing amounts of wind power. Power-to-heat technologies, electric boilers and heat pumps are blocked by high tariffs and taxes. A calculation of the heat costs of different DH technologies demonstrates that, under the present price and tax conditions in Denmark and Sweden, CHP and power-to-heat are unable to compete with heat-only boilers that use tax-free biomass.