

A Systematic Review of Business Strategies Which Can Make District Heating a Platform for Sustainable Development of Other Sectors

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Abstract : Sustainable development includes many challenges related to energy use, such as (1) developing flexibility on the demand side of the electricity systems due to an increased share of intermittent electricity sources (e.g., wind and solar power), (2) overcoming economic challenges related to an increased share of renewable energy in the transport sector, (3) increasing efficiency of the biomass use, (4) increasing utilization of industrial excess heat (e.g., approximately two thirds of the energy currently used in EU is lost in the form of excess and waste heat). The European Commission has been recognized DH technology as of essential importance to reach sustainability. Flexibility in the fuel mix, and possibilities of industrial waste heat utilization, combined heat, and power (CHP) production and energy recovery through waste incineration, are only some of the benefits which characterize DH technology. The aim of this study is to provide an overview of the possible business strategies which would enable DH to have an important role in future sustainable energy systems. The methodology used in this study is a systematic literature review. The study includes a systematic approach where DH is seen as a part of an integrated system that consists of transport, industrial-, and electricity sectors as well. The DH technology can play a decisive role in overcoming the sustainability challenges related to our energy use. The introduction of biofuels in the transport sector can be facilitated by integrating biofuel and DH production in local DH systems. This would enable the development of local biofuel supply chains and reduce biofuel production costs. In this way, DH can also promote the development of biofuel production technologies that are not yet developed. Converting energy for running the industrial processes from fossil fuels and electricity to DH (above all biomass and waste-based DH) and delivering excess heat from industrial processes to the local DH systems would make the industry less dependent on fossil fuels and fossil fuel-based electricity, as well as the increasing energy efficiency of the industrial sector and reduce production costs. The electricity sector would also benefit from these measures. Reducing the electricity use in the industry sector while at the same time increasing the CHP production in the local DH systems would (1) replace fossil-based electricity production with electricity in biomass- or waste-fueled CHP plants and reduce the capacity requirements from the national electricity grid (i.e., it would reduce the pressure on the bottlenecks in the grid). Furthermore, by operating their central controlled heat pumps and CHP plants depending on the intermittent electricity production variation, the DH companies may enable an increased share of intermittent electricity production in the national electricity grid.

Keywords : energy system, district heating, sustainable business strategies, sustainable development

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