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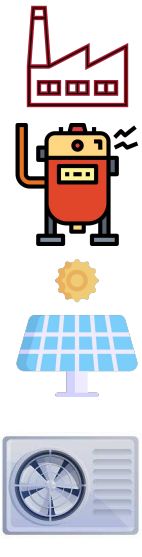
Energy price assessment

Introduction

The energy price assessment provides a review of the fuel types and their costs for the main heat production systems and primary energy sources associated with District Heating (DH) systems in Europe. Within this study, a review of heat production technologies and fuels is presented where the present, medium, and long-term energy costs for district heating networks are identified.

Heating technologies

Low-temperature and ultra-low temperature district heating networks can be fed by several heat generation sources. Heat generation sources include combustion plants (based on fossil fuel or biomass), co-generation plants (combined heat & power (CHP)), or renewable-based plants. The combination of multiple heat sources is beneficial, especially for large district heating schemes, as it allows shifting from source to source depending on specific conditions and market prices. The main technologies assessed in the RELaTED project are: (1) CHP; (2) Boiler stations; (3) Solar thermal plants; (4) and heat pump systems.



CHP – Base load, can use fossil fuels or renewable energy. One of the more efficient technologies.

Boiler station – Back-up or peak load. Can use fossil fuels, biomass, or waste heat. It is also very efficient technology.

Solar – Combined with additional heat systems. Uses renewable, solar energy. Highly seasonal.

Heat pump – Base load to back-up as supplement to renewable energy systems. Uses low-temp heat and electricity. Highly efficient.

Figure 1. Heating technologies analyzed

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Cost for Fuel

The most common fuel sources for DH were assessed. General findings conclude that costs associated with fossil fuels are extremely volatile – with oscillations between +200% - -80% occurring in the last century. Price evolutions for fossil fuels are largely related to macroeconomic conditions and geopolitical stability.

In all scenarios assessed, the price for fossil fuels will increase. The table below shows the estimated cost for the respective fuel sources in 2030. Local fuels, like biomass, are virtually stable but have a limited capacity. For these fuel sources, price variations are mainly related to local production/consumption balance.

Fuel type	Year	Cost	Cost Unit	Cost [€/MWh]
Natural gas	2030	8,6	USD/MBTU	24
Coal	2030	80	USD/t	10
Oil	2030	94	USD/barrel	46
Biomass (Pellets/Estonia)	2030	32	EUR/MWh	32
Electricity*	2030	55.85	EUR/MWh	55.85

** Cost for electricity is an average based on minimum – maximum price range.*

Table 1. *Fuel cost projections based on research conducted in the RELaTED project. The fuels costs represent the projected cost of the respective fuel costs for each fuel type in 2030.*

Conclusion

The particularities of fuel supply to Europe, with the dominancy of few suppliers, and periodical crisis implies that security of supply a critical issue when defining the primary energy mix of district heating systems. This also suggests that sources which must be imported, like most fossil fuels, are subject to macroeconomic and geopolitical conditions which influences their volatility.

Renewable energy sources can be advantageous for local DH networks but are more difficult to price. In most cases, energy costs for solar systems are linked to particular investment costs and marginal heat supply costs in each DH. In order to achieve operational economies in DH systems, heat supply costs associated to Renewable Energy Sources should be indexed to the operational costs of these systems rather than to the marginal energy cost in the system.

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