This factsheet presents generalized information and figures on heat networks for the built environment also known as district heating. In district heating homes, non-residential buildings and other enclaves such as universities, are heated by a central heat source via a underground network of heat water pipes. In terms of number of end users with district heating in the Netherlands, the number of households with district heating is much larger than the number of other end users (ECN, 2017; 2015). District heating consist of main heat sources(s), back-up boilers(y), a primary heat transport pipeline, substations and a distribution network including connections to the buildings. Inside a building a heat delivery kit (with heat exchanger) is installed in order to transfer hot water to the central heating system inside the building. This factsheet considers all components of the heat networks. It does not include heat losses of the main heat sources) and heat losses of the heating systems inside the buildings. Costs in the costs section are excluding costs of the main heat source.

Main heat sources that can be used for large scale high temperature heat networks are:
- CHP plant (fired gas, coal, municipal solid waste or biomass)
- Heat-plants (heat only boilers) fired with biomass, natural gas or other fuels
- Industrial waste heat sources
- Other renewable sources (e.g. geothermal)

A small scale network consists of a heat source (currently mostly natural gas fired CHP) and a distribution network including connections to the end users, which can also consist of non-residential buildings. Heat from the heat source typically has a temperature of 100-130 °C (steam or water under pressure). Heat delivered to consumers has a temperature of 90 °C and the return flow to heat source has a temperature of 70 °C (ECN, 2017).

As a result of technical progress, the costs for heat networks are decreasing. In the Netherlands, the number of large scale district heating systems is increasing. These systems typically have a heat generation capacity of at least 100 MJ per hour (zone heating in the Netherlands). The heat networks of the larger cities are much more extensive. Main examples are Amsterdam, The Hague and Rotterdam. A smaller scale heat network can be found in many larger residential areas and small scale heat networks exist in many rural areas.

In 2015, there were 70 large scale district heating systems in the Netherlands. Some of these systems are managed by relevant municipalities. In the other cases, these systems are managed by companies. For some years, the costs for the smaller scale heat networks decreased. For larger scale heat networks, the investments costs have been decreasing in the last 10 years. The costs for the heat delivery system (distribution network) have been decreasing in the last 5 years. The investments costs for these systems continue to be a larger share of the total investments costs. In the last 10 years, the investments costs for these systems have been decreasing.

**Costs**

- **Investment costs**: These costs are calculated on the basis of costs for small scale heat networks (zones heating). The investments costs are calculated on the basis of a cost model (Vesti and Stedelijk, 2017). The investments costs are calculated on the basis of a cost model (Vesti and Stedelijk, 2017).
- **Operational costs**: These costs are calculated on the basis of costs for small scale heat networks (zones heating). The operational costs are calculated on the basis of a cost model (Vesti and Stedelijk, 2017).
### Energy In- and Outputs

#### Energy Carriers (per unit of main output)

| Heat losses explanation | Energy losses associated with the network losses are given here. Losses associated with the heat production are not included as they belong to the heat source.
|-------------------------|---------------------------------------------------------------------------------------------------------------|

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### Material Flows (Optional)

#### Material Flows Explanation

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### Emissions (Non-fuel/energy-related emissions or emissions reductions (e.g. CCS))

#### Emissions Explanation

An electric pump is required in order to transport heat from the source through the heat distribution network (ECN, 2011). The required amount of pump energy in GJe per GJth is given above.

#### References and Sources

- PBL/VESTA (2017). Model examples/validatievoorbeelden VESTA
- Ecofys (2015). De systeemloosjes van warmte voor woningen
- ECN (2011). Reiswarmtebedarf: Potentieelen, besparing, alternatieven

### Energy In- and Outputs

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### Other

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#### References and Sources

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