

Best Practice

Renewable energies in heating networks

The integration of renewable energies in heating networks based on examples in Germany

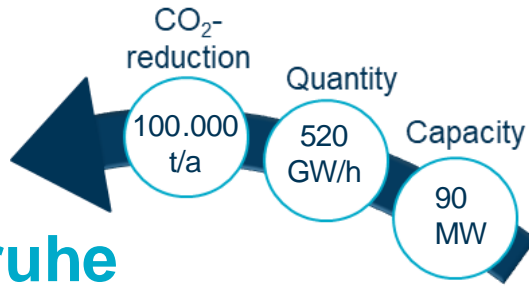


This project has received funding from the EU's Horizon 2020 programme under grant agreement no 101033706.



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MiRo, Karlsruhe

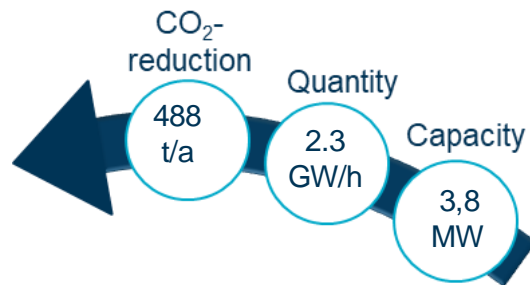
Miro is an oil refinery in Karlsruhe. In 2005, together with Stadtwerke Karlsruhe (the local utility), this company made it possible to connect the waste heat from the refineries to the existing district heating system. The waste heat can provide 90 MW or 520 GWh of heat per year, which means a CO₂ reduction of 100,000 tonnes per year.



Image source: <https://www.kea-bw.de/news/10-jahre-fernwaerme-aus-der-raffinerie-miro>

Year of realisation	2005
Sector	Refinery
Total costs	54 million euros
Heat capacity	90 MW
Heat quantity	520 GWh/a
Saved CO₂	100,000 t/a
Existing heating network?	Yes ✓
Mesh size	180 km
Heat share	55 %
Initiator	Karlsruhe public utilities
Distinction	Baden-Württemberg Environmental Award
Contact person	Yvonne Schönemann: schoenem@miro-ka.de





EWP Stadtwerke Potsdam

Stadtwerke Potsdam's 160 km district heating network supplies 60% of the residents. Up to 17 % of the heat is generated by solar collectors. The remaining heat is generated by combined heat and power plants, some of which also use biogas as an energy source. The solar thermal system is operated using district heating water. Thanks to this system, 488 CO₂ per year can be saved with a heat quantity of 2.3 GWh. The investment were round about 2.4 million euros.

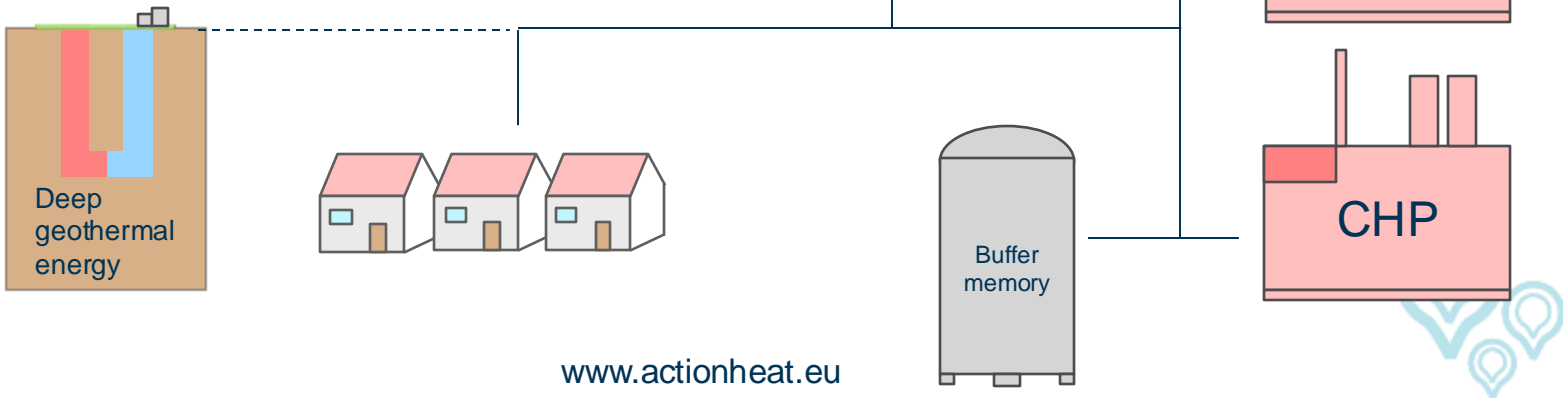
A geothermal plant is planned in order to increase the proportion of renewable energies in the district heating network.

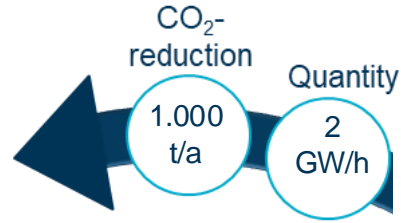
Year of realisation	2019
Sector	Solar thermal energy
Total costs	2.4 million euros investment costs of the municipal utilities + subsidies
Heat capacity	3.8 MW
Heat quantity	2.3 GWh/a
Saved CO₂	488 t/a
Existing heating network?	Yes ✓
Mesh size	160 km
Heat share	17 % Solar thermal energy in summer 1.5 % Solar thermal energy in winter
Initiator	Potsdam public utilities
Contact person	Public utilities: info@stadtwerke-potsdam.de



<https://www.ritter-xl-solar.de/anwendungen/waermenetze/stadtwerke-potsdam/>

EWP Stadtwerke Potsdam



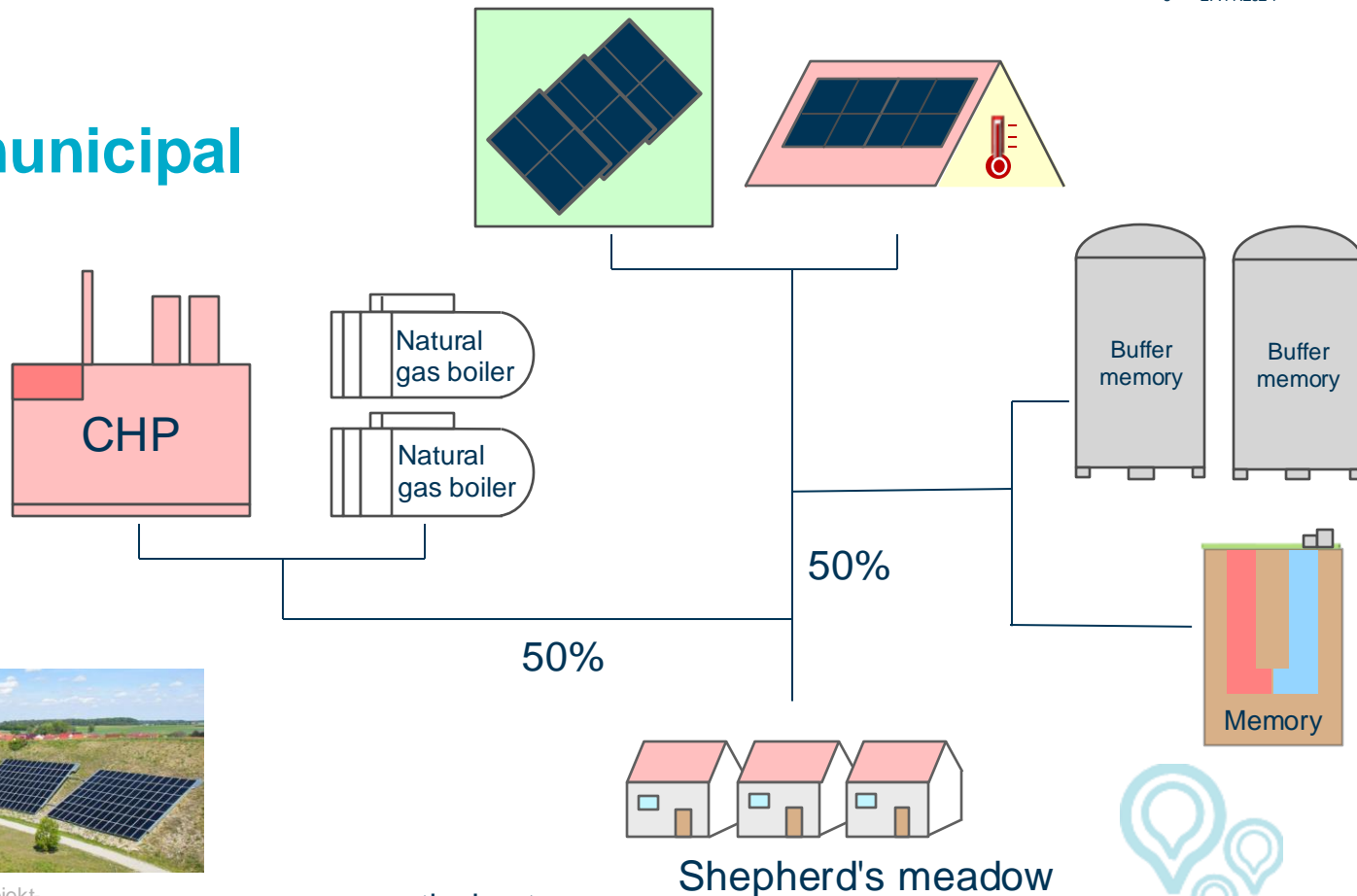


Crailsheim municipal utilities

Thanks to the Crailsheim solar thermal project, half of the Hirtenwiese residential area can be supplied with solar thermal energy. The required solar roofs and collectors were installed by 2012, generating 2 GWh of heat per year. A geothermal probe storage tank was installed for the surplus heat in summer. In addition, two natural gas boilers and a combined heat and power plant are also available. The 8 million euro solar energy system leads to CO₂ savings of 1,000 tonnes of CO₂ per year.

Year of realisation	2012
Sector	Solar thermal energy, geothermal probe storage
Total costs	8 million euros
Heat quantity	2 GWh/a
Saved CO₂	approx. 1,000 t/a
Heat share	50 % solar thermal energy
Initiator	Crailsheim municipal utilities
Distinction	Solarbundesliga of the "medium-sized cities": 1st place (2008), 2nd place (2010), 3rd place (2011) RES Champions League: 1st place (2011) STADTWERKE AWARD (2015)
Contact person	Eva Reu: eva.reu@stw-crailsheim.de

Crailsheim municipal utilities



<https://www.stw-crailsheim.de/ueber-uns/projekt-solarthermie/>



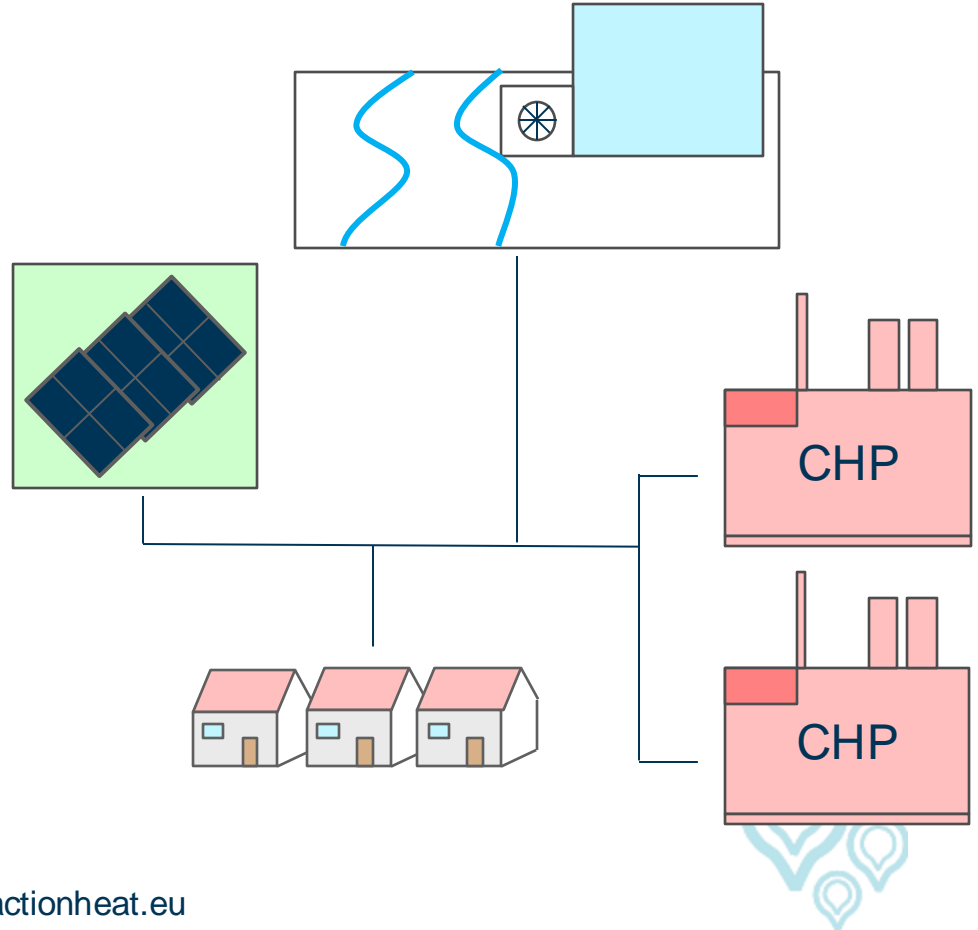
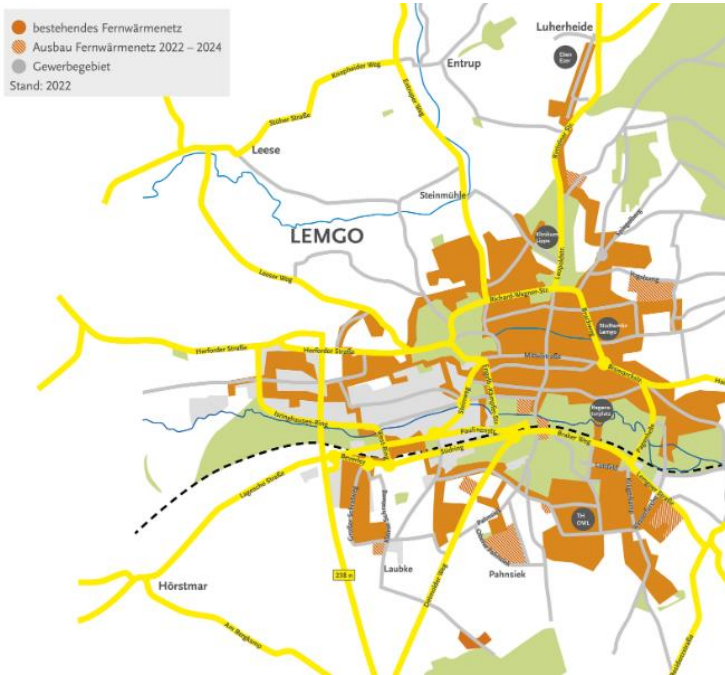
Lemgo municipal utilities

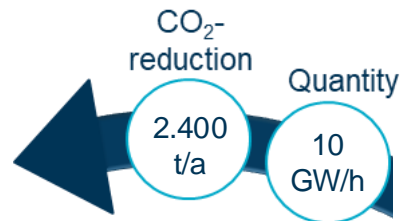
Stadtwerke has been generating heat in combined heat and power plants since 1963. In 2019, the heat supply was expanded with renewable energy (RE). On the one hand, heat is generated from treated wastewater and river water using heat pumps and, on the other, with solar thermal energy. The annual amount of heat from renewable energy is 6 GWh, of which 3.5 GWh comes from solar thermal energy. The existing heating network was expanded at a cost of EUR 2 million. Investments totalling approx. 13 million euros were necessary.

Year of realisation	2022
Sector	Solar thermal energy, heat pump, CHP with CHP
Total costs	11 million euros for investments 2 million euros for grid expansion
Heat quantity	6 GWh/a from RE 3.5 GWh/a from solar thermal energy
Existing heating network?	Yes ✓
Mesh size	60 km
Heat share	20 % EE
Initiator	Lemgo municipal utilities
Contact person	Daniel Steube: daniel.steube@stadtwerke-lemgo.de



Lemgo municipal utilities





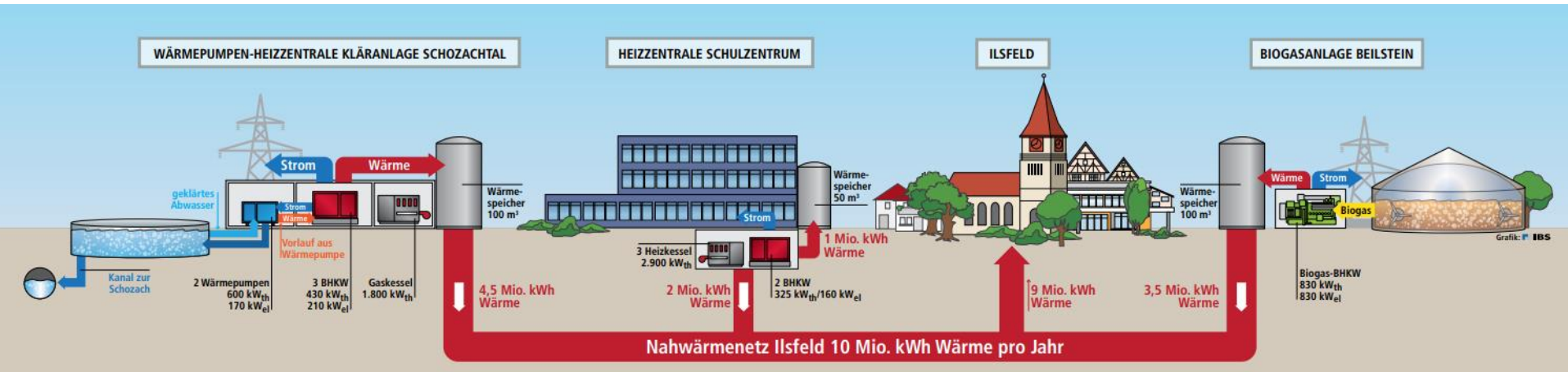
Municipality of Ilsfeld

The 32 km long local heating network in Ilsfeld was built in 2013 and has a heat output of 10 GWh per year. Of this, 90% comes from renewable energies generated by the Beilstein biogas plant and the Schozachtal sewage treatment plant heat pump heating centre. Thanks to the high proportion of RE, emissions of 2,400 tonnes of CO₂ can be avoided each year. The local heating supply costs a total of 8.69 million euros, of which 3 million euros were subsidised by the European Regional Development Fund.

Year of realisation	From 2013
Sector	Biogas, waste water heat pump
Total costs	8.69 million euros Grant of EUR 3 million from the European Regional Development Fund (ERDF)
Heat quantity	10 GWh/a
Saved CO₂	2,400 t/a
Mesh size	32 km
Heat share	90 % RE, of which 45 % Waste water 35 % biogas
Initiator	Municipality of Lemgo
Distinction	"Place full of energy" (2019)
Contact person	Thomas Gessler: thomas.gessler@ilsfeld.de

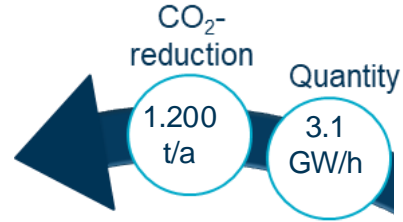


Municipality of Ilsfeld



https://www.ilsfeld.de/resources/ecics_1563.pdf





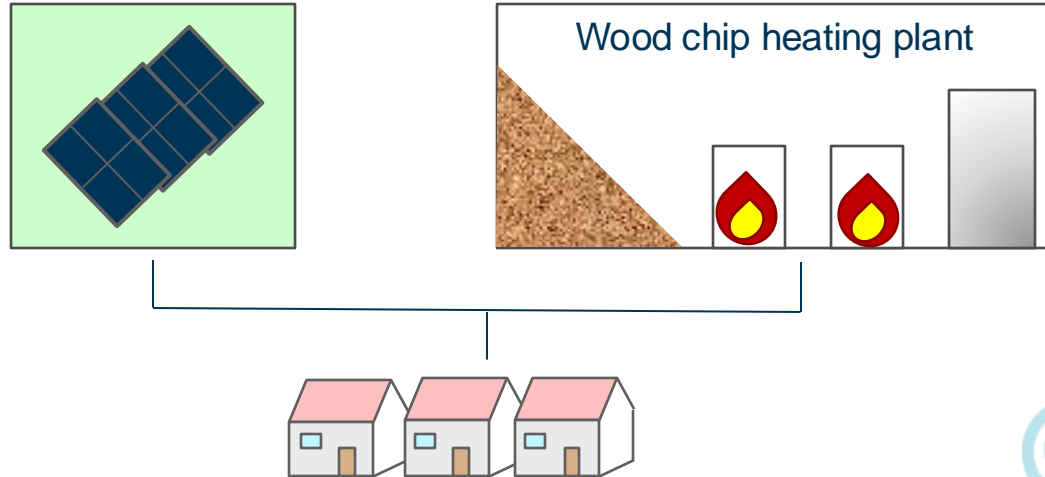
Public utilities Neuerkirch-Külz

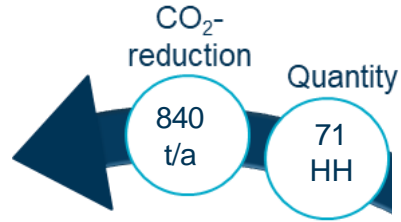
In Neuerkirch-Külz, the 6-kilometre-long district heating network has been operated exclusively with renewable energy in the form of woodchips and solar thermal energy since 2016. The two wood chip boilers have an output of 1,260 kW. The solar collectors with a surface area of 1,400 m² provide 650,000 kWh of heat per year. 3.1 GWh of heat flows through the network each year, which corresponds to a saving of more than 1,200 tonnes of CO₂. This project is financed and subsidised by German state-owned investment and development bank (KfW) and the state of Rhineland-Palatinate.

Year of realisation	2016
Sector	Wood chips, solar thermal energy
Heat quantity	3.1 GWh/a
Saved CO₂	More than 1,200 t/a
Existing heating network?	No X
Mesh size	6 km
Heat share	100% EE
Initiator	Public utilities Neuerkirch-Külz
Contact person	Mayor Volker Wichter: wichter.vo@freenet.de



Public utilities Neuerkirch-Külz





NATURSTROM and dme-consult, Moosach

A 1,067 m² ground-mounted solar thermal system, a 390 kW biomass boiler and two biomass boilers with 530 kW ensure the heat supply for the 71 households in Moosach to date. A 100 m³ buffer tank temporarily stores the surplus heat from the solar thermal system. In addition, care is taken to ensure that the boiler fuel comes from a maximum distance of 40 kilometres. With this concept, the municipality of Moosach saves 840 tonnes of CO₂ per year and was awarded the 2019 Energy Prize.

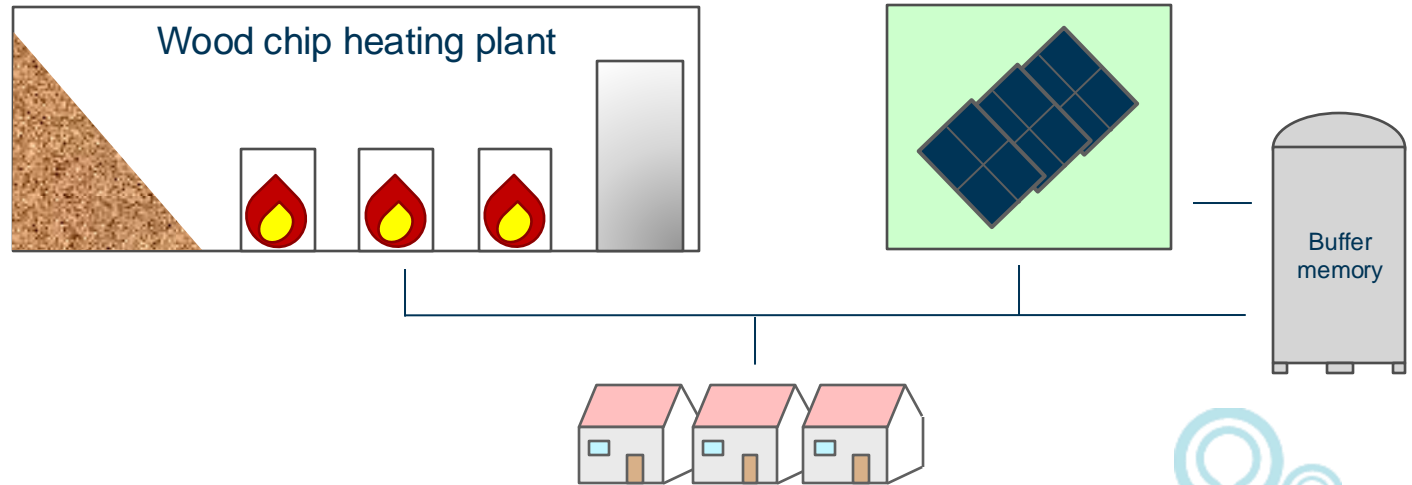
Year of realisation	2019
Sector	Solar thermal energy, wood chips
Heat quantity	71 households, up to 120 possible
Saved CO₂	840 t/a
Mesh size	4.8 km
Heat share	100 % EE
Initiator	Community of Moosach
Distinction	Energy Award 2019
Contact person	Willi Mirus: willi.mirus@gmx.de



NATURSTROM and dme-consult, Moosach



<https://www.naturstrom.de/ueberuns/presse/newsdetail/ausgezeichnete-nahwaerme-moosacher-nahwaermenetz-gewinnt-energiepreis-2019>



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