Low Temperature District Heating for Future Energy Systems

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IEA DHC|CHP

INTERNATIONAL ENERGY AGENCY IMPLEMENTING AGREEMENT ON
District Heating and Cooling including Combined Heat and Power

iea Energy Technology Network

Challenges in the energy sector

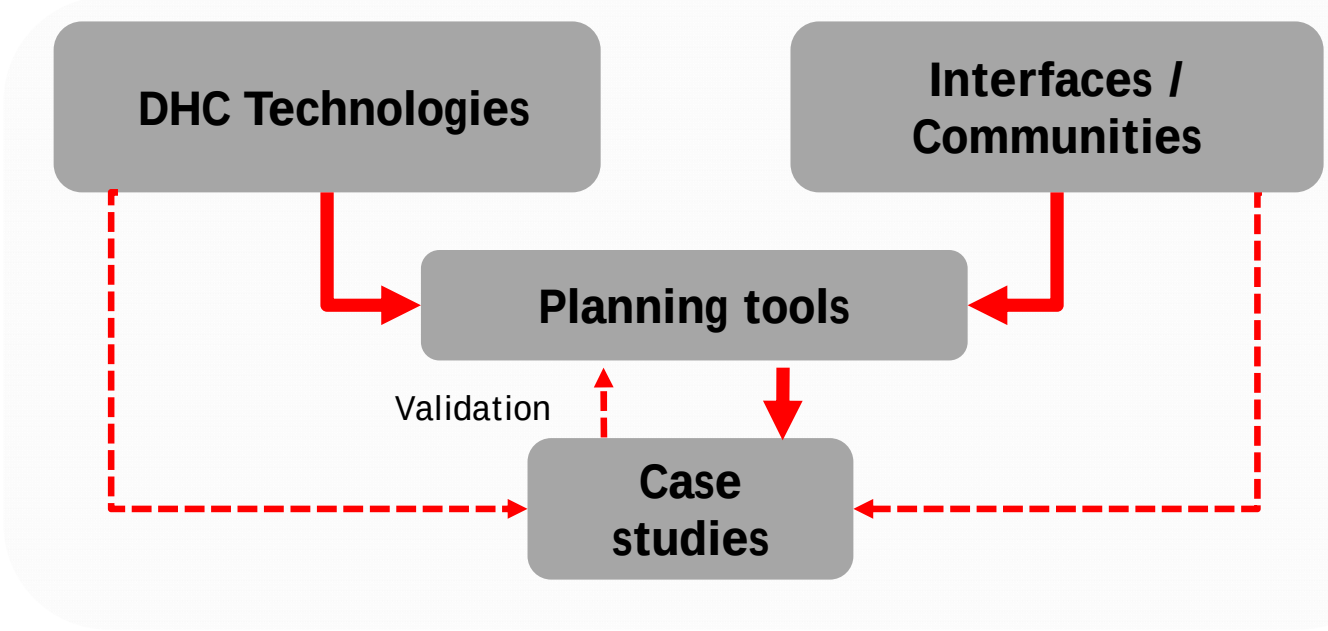
- Buildings/cities are main users of energy
- New buildings shall be developed as small power stations!
- Retrofit rates need to be increased!
- Developments are focusing more and more on a community level.

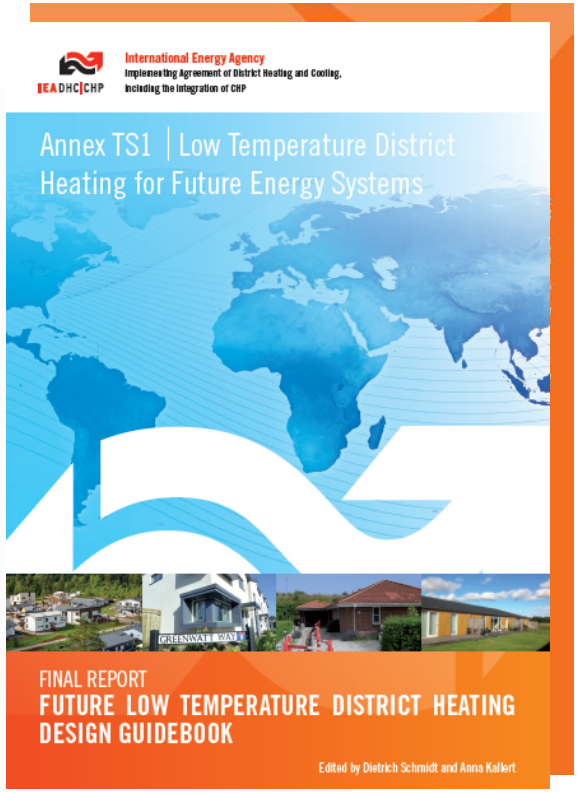
Objectives of IEA DHC Annex TS1

The objective is to **demonstrate** and **validate** the potential of low temperature district heating as one of the most cost efficient technology solution to achieve 100% renewable and GHG emission-free energy systems on a community level.

⇒ **DHC is an enabling technology** to increase the integration of renewable and waste energy for heating and cooling
(Solar thermal, Biomass CHP, HP to use excess wind power)

The IEA DHC Annex TS1



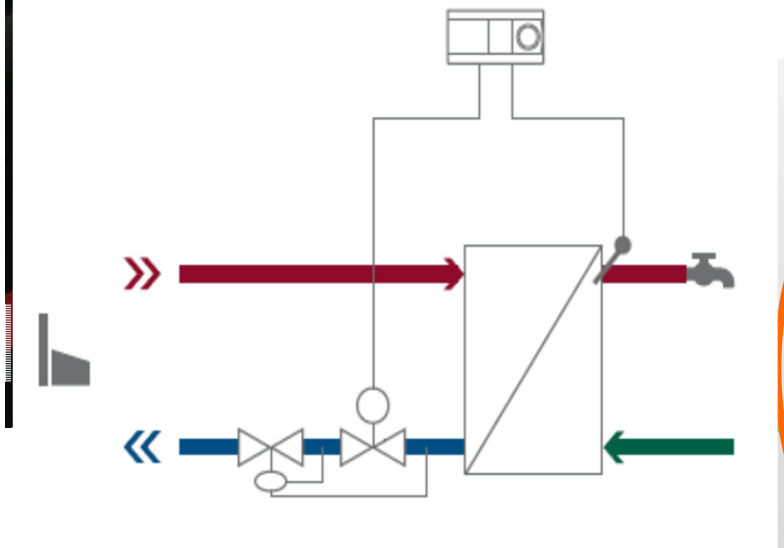


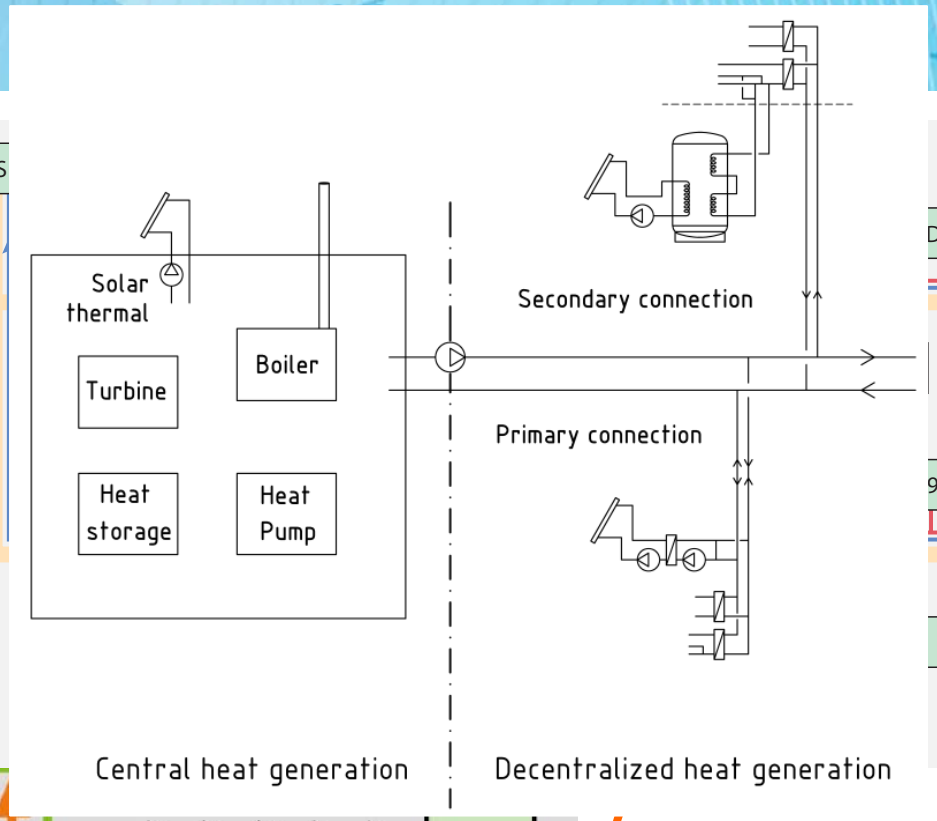
Outcome:

Future Low Temperature District Heating Design Guidebook

for key people in communities (*will be published in November 2017 / approx. 80 pages*)

Low Temperature District Heating Technologies

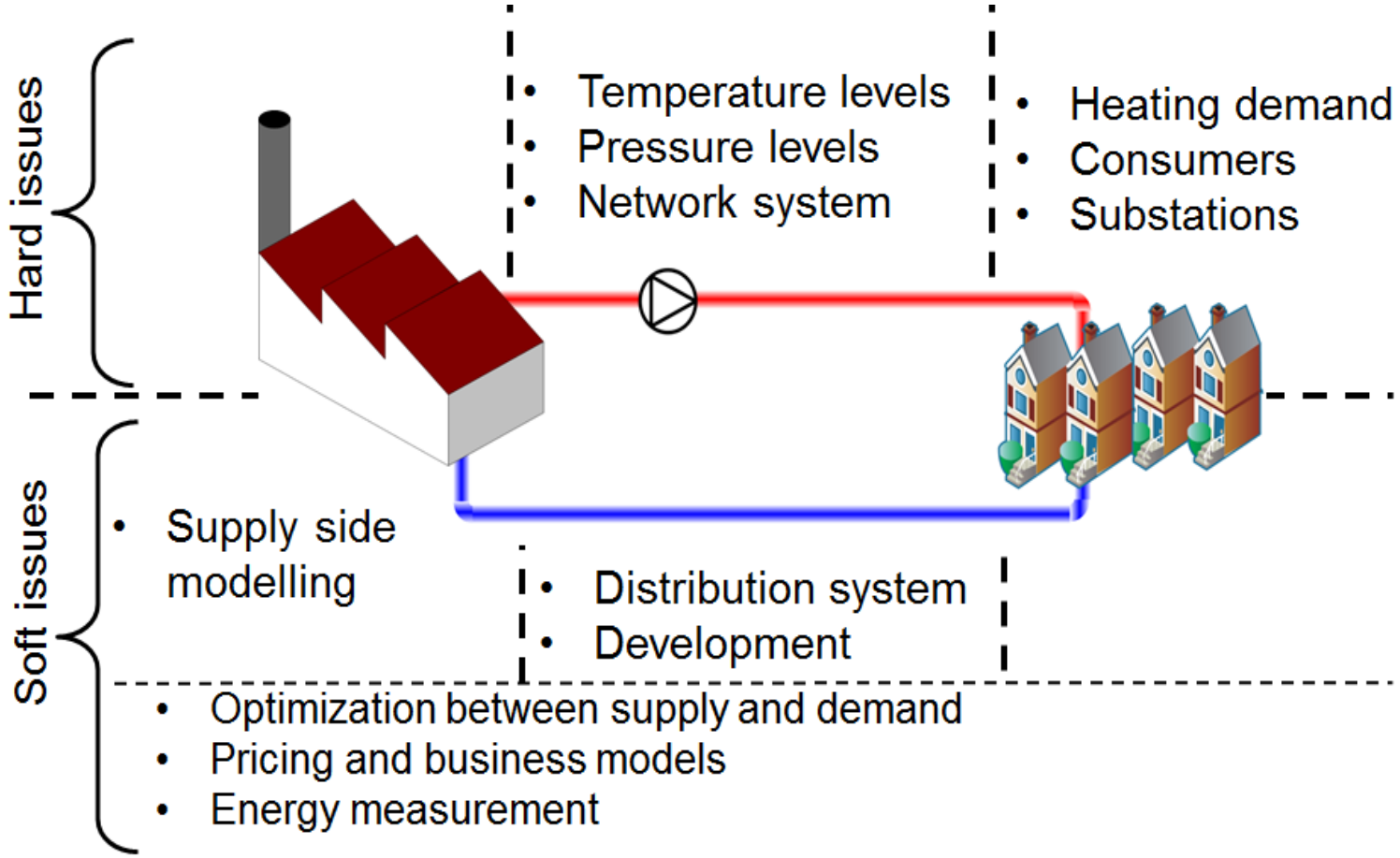




Building systems

Supply systems

Interfaces: actors and boundaries



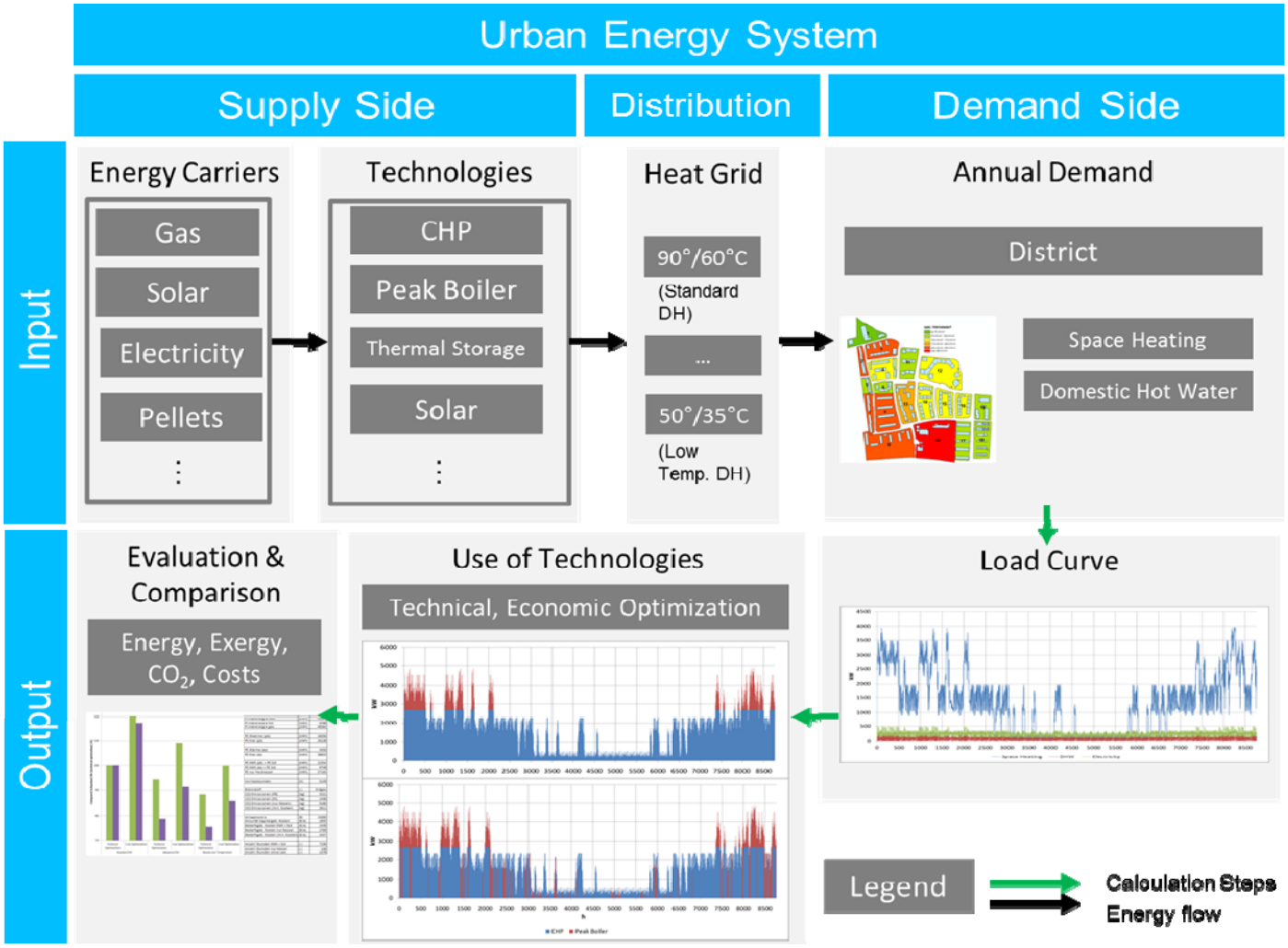
Methods and Planning Tools

Energy System Models		
EnergyPLAN	KOPTI	LowEx-CAT
SIMUL_E.NET	TIMES Local	
Thermodynamic Models		
HeatNET	LowEx-CAT	NET Local
SIMUL_E.NET	spHeat	Termis
Others		
District ECA	EME Forecast	Exergy Pass Online

Classification categogies:

- analytical approach,
- target audience,
- level of detail (geographical scope, time horizon),
- model type (simulation, optimization),
- demand sectors,
- final energy consumption
- solution variables (energy / costs)

Easy District Analysis (EDA) – A Simplified Tool



Example: Hyvinkää (FI)

- Improving the competitiveness of district heating in small houses (LCC)
- Design criteria for new small houses according to 2012- and 2021 regulations
- Solutions for new 2012- and 2021 small house districts
- New business and pricing models

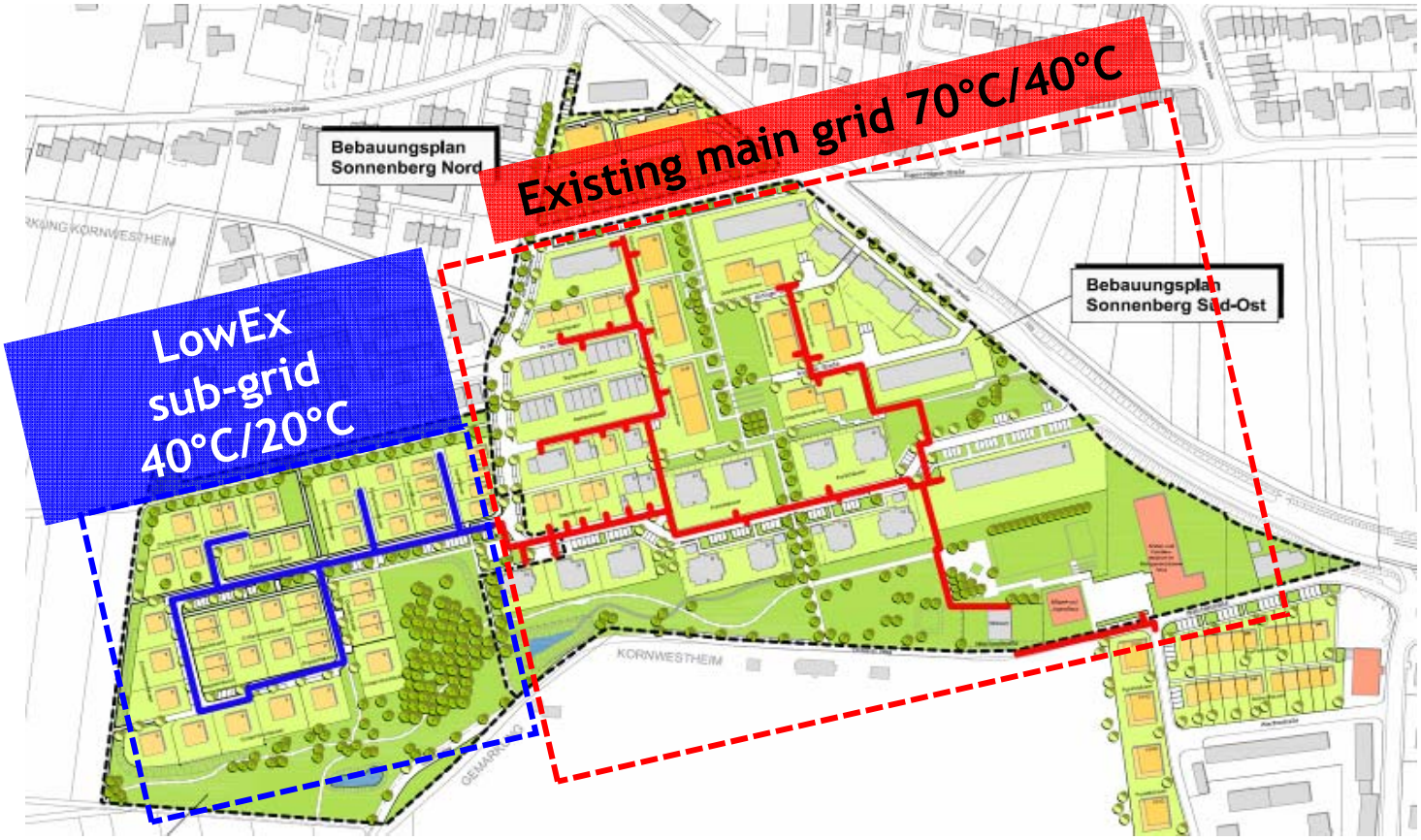
Source: VTT/Espoo

Example: Lystrup (DK)

- Lowering of the grid temperatures for existing buildings Hydraulic and thermal simulations
- Realisation and monitoring
- Low energy houses with low temperature radiators

Source: DTU Lyngby / COWI

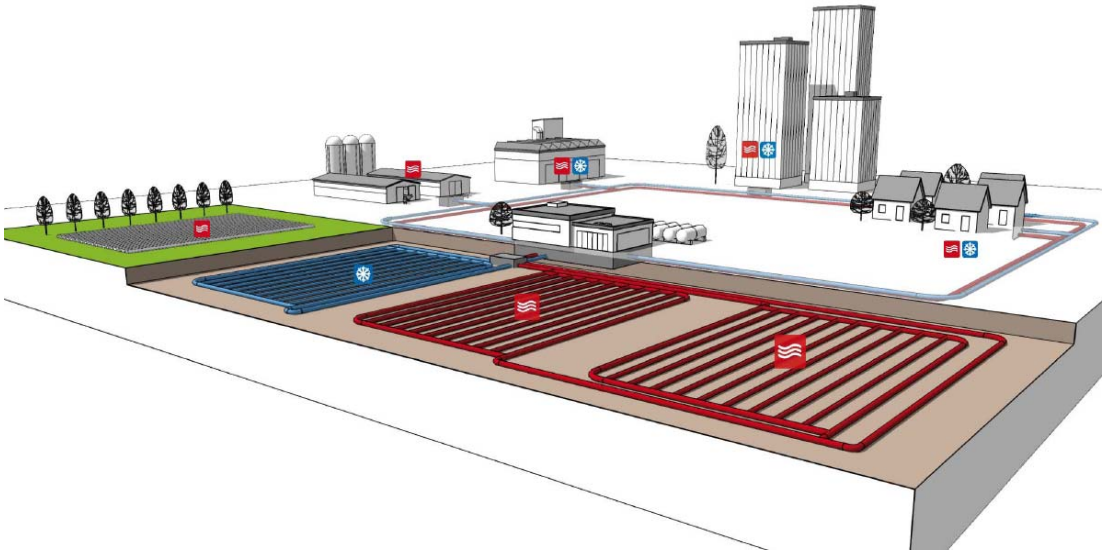
Example: Ludwigsburg (GER)



- Grid extention as low temperature DH
- Decentralised heat storages inside the buildings
- New buidlings in Passive House standard

Source: HfT Stuttgart

Example: Wüstenrot (GER)



- Heat demand supplied via heat pumps combined with agrothermal collectors
- Integration of different users
- Decentral DHW-preparation

Source: HfT Stuttgart

Example: Kassel (GER)

- Low temperature DH with ground coupled HP and solar collectors
- Decentral DHW-preparation
- Solution for new housung areas
- New business and pricing models

Source: IBP, UniK, SWKs & City of Kassel

Brochure of Case Studies

The DHC Annex TS1 participants

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IEA DHC Annex TS1:

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Thank you for your attention!

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