

The role of low temperature district heating for realising heat transition

Tekn. Dr. Dietrich Schmidt, Head of Thermal Energy System Technology Department, Fraunhofer IEE, Kassel/Germany



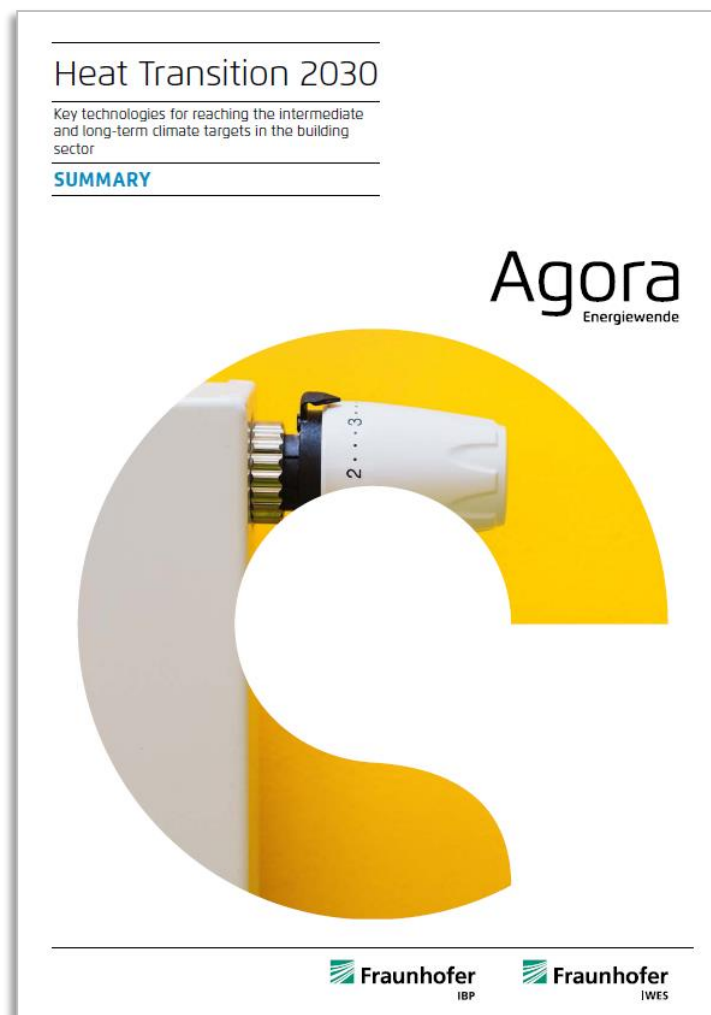
Challenges for the realisation of the „Energy Transition“

- Cities and buildings are main consumer of (heating) energy
- New buildings are constructed as “small power plants”
- Retrofit rates need to be increased for a more efficient use of energy
- Developments are focussing on the **community / district level**



Realising energy transition

Agora: Heat Transition 2030 (2017)



Three main pillars for the German Heat Transition 2030

- Increase energy efficiency, reduce consumption by about 40%
- Implementation of heat pumps, about five to six million are needed.
- Expand district heating grids from 10% to 23%

Solutions for urban districts

Innovative heat supply on a community level

„Low temperature district heating is a key technology for an efficient integration of renewable energy sources and waste heat in our energy systems.“

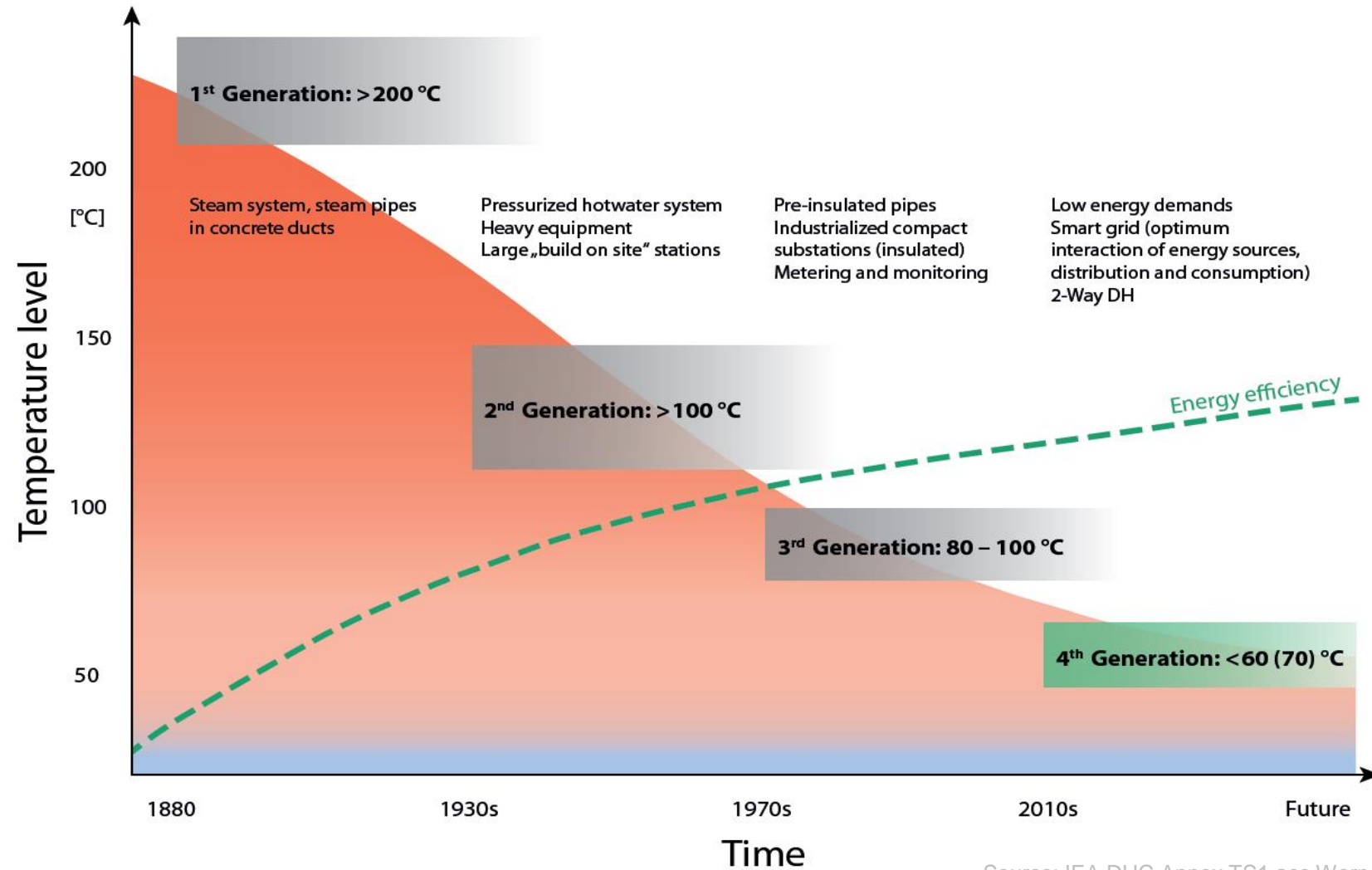
IEA DHC Annex TS1



IEA DHC



Low temperature district heating



Source: IEA DHC Annex TS1 acc Werner and Fredriksen 2014

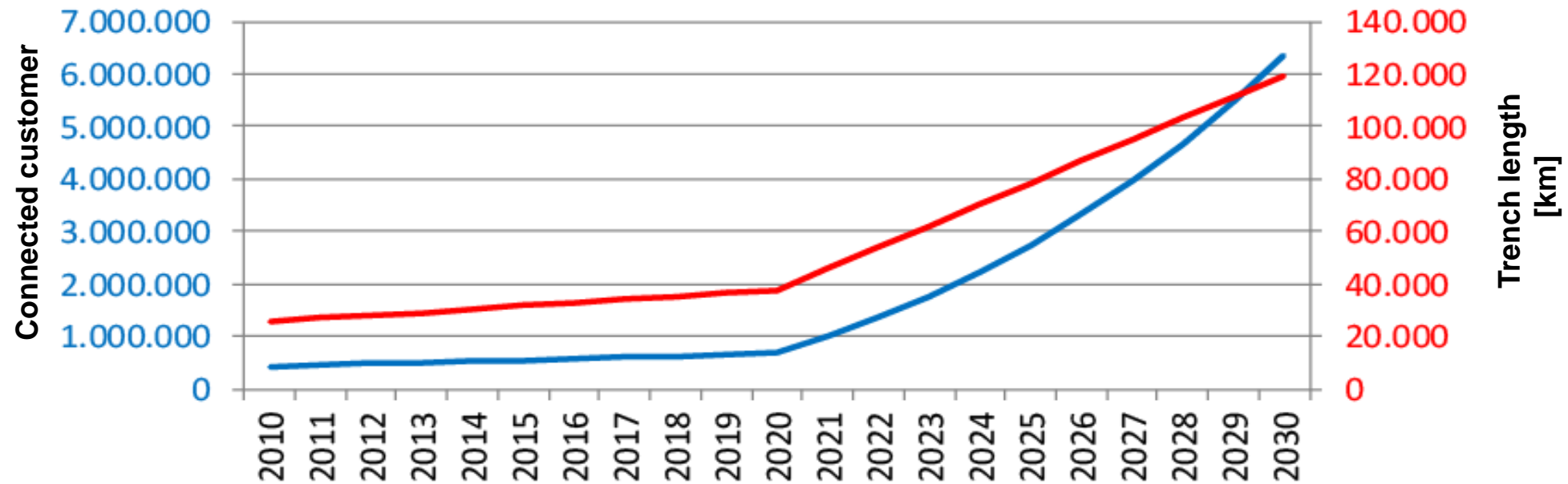
Why is there a need for action?

- In Germany a minor part of heat demand is covered by district heating networks
⇒ low public awareness
- Innovations in DH are increasingly important, due to necessary decarbonization of the heating sector by e.g. the use of renewables or waste heat
- New technologies and supply strategies are required for e.g. the expansion, the transformation of the (existing) networks and sector coupling
- Examples for successful implementation of DH in Germany and especially in the Nordic countries are available

Needed expansion of district heating grids

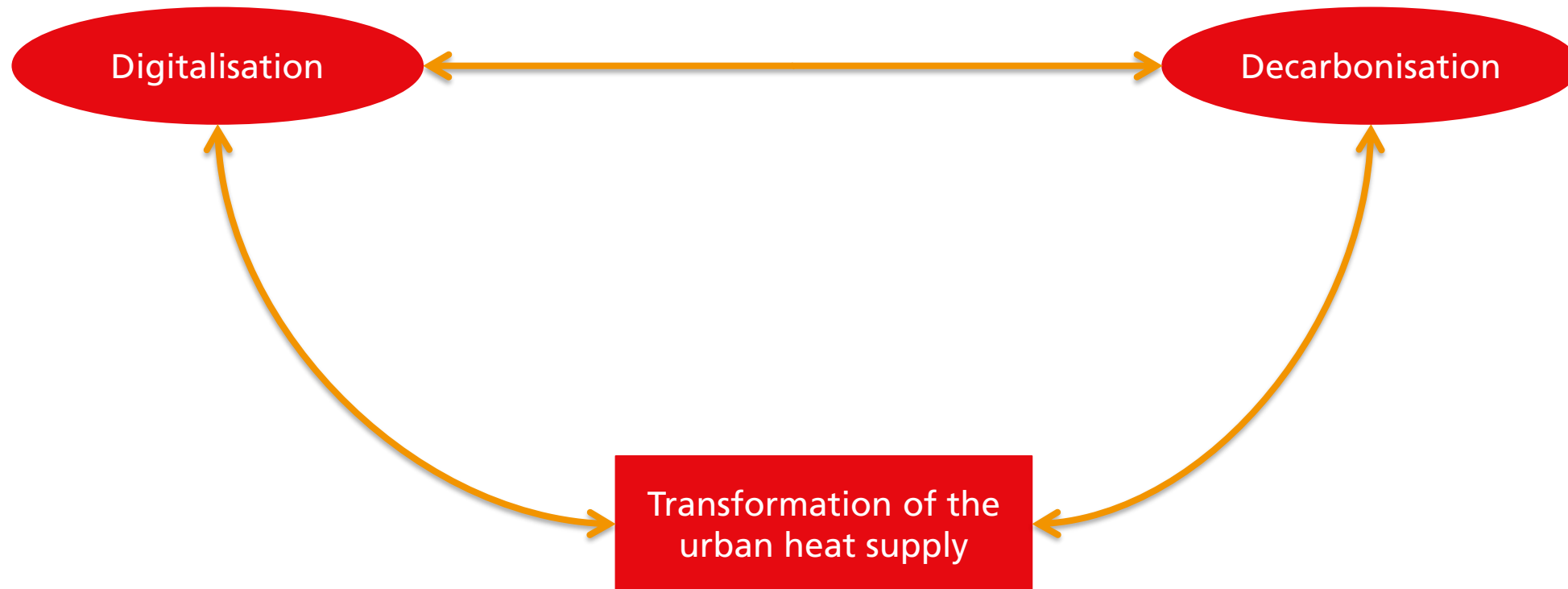
- Expansion of district heating systems need to happen until 2030.
- Within 12 years district heating grids need to be expanded from 11 % to 37 % final energy use. This is a **factor 6 to 7** compared to todays developments.

Market development district heating until 2030



Source: Transformationspfade im Wärmesektor, IEE 2019

Identification of new challenges for the transition of heat supply



Examples from an international co-operation activity

Implementation of **low temperature** district heating systems

- 176 Cases are identified / analysed
- many examples of **concepts of regional energy transition**
- market ready technology
- economic benefits for lower temperatures identified

e.g. cost reduction gradients of 0.5 €/MWh·K are identified.

→ For 30°C lower system temperatures a cost reduction potential of 14 billion Euro/a is possible in Europe

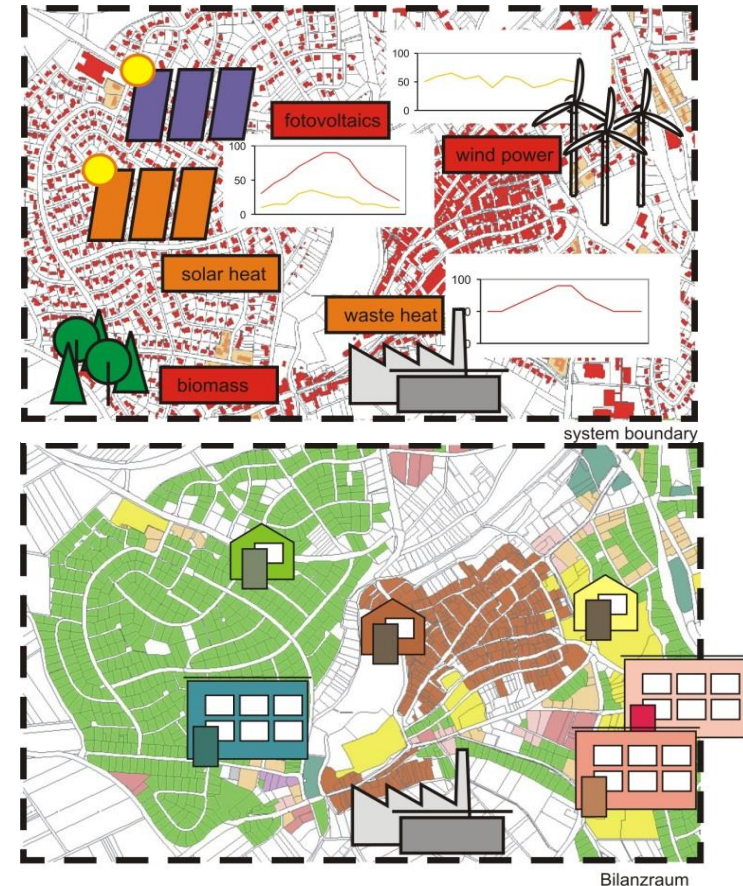


IEA DHC
IEA DHC Annex TS2

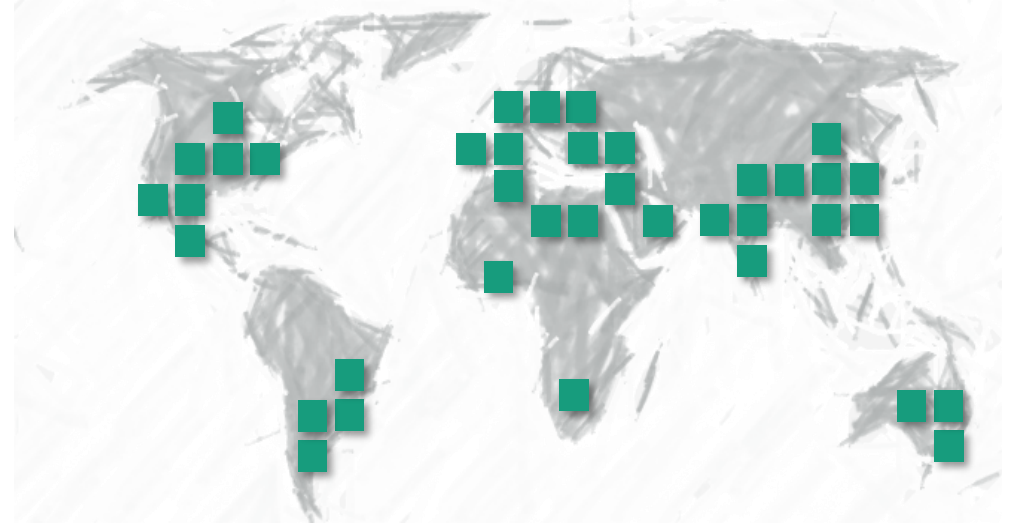


Conclusions

- **The technology is there!**
Large variety of cases and system configuration show flexibility in implementation under various conditions
- **Lower temperatures** in existing units to harvest benefits of renewable energy sources
- For the integration of multiple heat sources **digitalization** is needed
- **Electricity** from fluctuating and renewable sources will be our future primary energy source
⇒ integration of heat pumps



Contact



Tekn. Dr. Dietrich Schmidt



Head of Thermal Energy System Technology Department

Fraunhofer Institute for Energy Economics and Energy System Technology IEE

e-Mail: dietrich.schmidt@iee.fraunhofer.de

phone: +49 175 35 65 972

<http://www.iee.fraunhofer.de>