

Large Scale Solar Thermal

Requirements, opportunities, integration into DH-networks

1 Solar thermal systems & operating modes

- Ground mounted solar collectors
- Roof mounted solar collectors
- **Most common collector types on the market:**
 - Flat plate collectors
 - Evacuated tube collectors

2 Characteristics of the heat medium

- SDH-Heat medium \neq district heating water
- Heat is exchanged at the heating station / storage tank via heat exchangers
- Or heat is exchanged at the top of evacuated tube-collectors operating with indirect flow

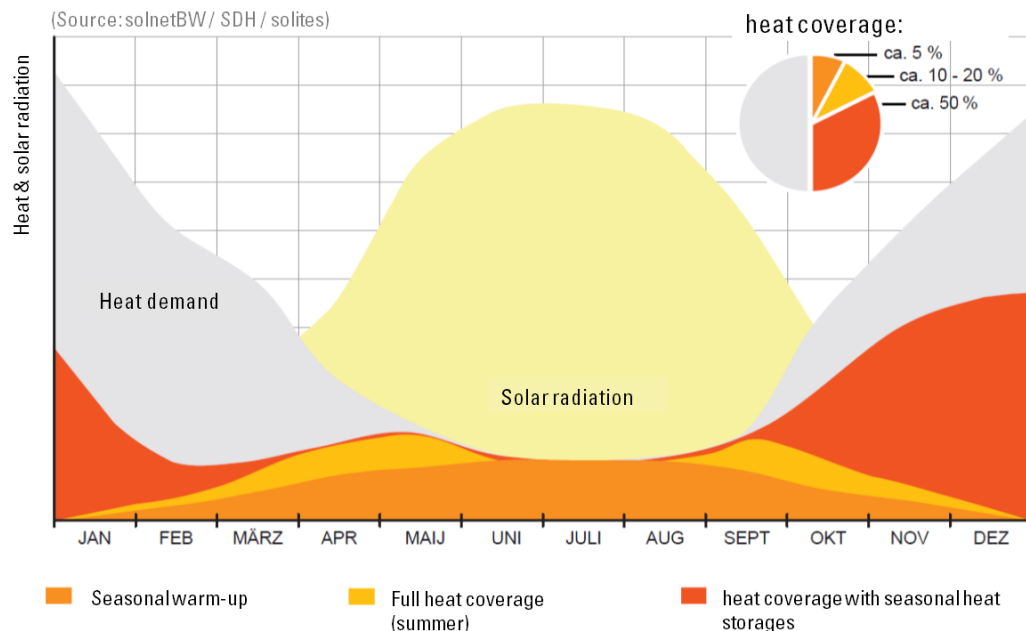
Characteristics:

- High temperature stability
- Low viscosity (due to heat capacity)
- High heat capacity
- Environmental compatibility
- Corrosion protection (demineralised water etc.)
- Frost protection (usually mixture of water and alcohol used; e.g Propylene Glycol)

3 Increasing annual solar coverage through storages

- **No determined reference values!** (cover ratio needs to be estimated for each specific project)
- For instance, SDH-plant can approx. reach between 30-60 % of the annual demand of domestic hot water preparation (**complete coverage in summer**)

- Seasonal storage can increase the annual solar cover ratio – e.g. by boosting stored water e.g. with a heat pump in transition periods



Source: Mathilde Kolbe 2018. [1]

Key points & questions regarding investment costs & economic efficiency of a SDH-project:

- Analyzing heat demand & dimension of the plant
- Storage size / seasonal storage needed (if, which other heat source e.g. heat pump will be needed?)
- Required landsize & price need to be evaluated with legal issues and construction law
- Which solar thermal system is needed? / Which temperature level is necessary?
- What are the existing structures of heat generation? What will be the future solar feed-in scenario?
- piping expenses
- How much should be the estimated solar thermal heat coverage / annual duration?
- What are the energy savings by other integrated/existing heat sources (e.g. (bio)gas / bio-mass etc.)?
- How much funding is possible?
- What are the financing costs (term, interest rate)?
- Development of energy costs within the next few years?

References

[1] Mathilde Kolbe 2018. Integration solarthermischer Großanlagen in Nah- und Fernwärme.

<https://silو.tips/download/integration-solarthermischer-groanlagen-in-nah-und-fernwrme>