A SHOWCASE PROJECT: 4TH GENERATION DISTRICT HEATING IN MOOSBURG AN DER ISAR

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Local Heating in Moosburg – Status Quo

- Moosburg: small city close to Munich / Germany
- Population: approx. 19.000
- Heat supply mostly decentralised based on fossil fuels
- Heating network is run by local utility "Bader Energie"

Network data (status quo):

- Total annual demand: 2,5 GWh/a (approx. 30 buildings)
- Grid length: approx. 2,5 km
- Heat sources:
 - Biomass-boiler operated by woodchips
 - Waste heat from local sewage treatment plant (CHP)

















Project: "District Heating 4.0" in Moosburg

Objectives:

- Expansion of the local heating grid within the "District Heating 4.0" funding programme ٠
- Development of economically sustainable supply concept with 100% renewable energies ٠



Actions:

- Detailed analysis of heat demand and renewable energy potentials in supply area ٠
- Development and assessment of varying supply scenarios ٠
- Development of an optimal supply concept and investigation of technical parameters ٠
- Economical and legal assessment of supply concept ٠











Supply Area – Heat Demand and Sources

Heat demand:

- Total heat demand in area: approx. 15 GWh/a
- School and big development area as main consumer

Heat sources:

- Biomass boiler (existing)
- Waste heat of sewage plant CHP-unit (existing)
- Solar thermal systems on roofs and open spaces (new)
- Waste heat from mechanical and chemical industry (new)



- Range of existing grid
- New Range due to planned extension of the grid
- Existing grid
- Existing heat sources
- New heat sources











Development and Assessment of Supply Scenarios

Definition of 4 supply scenarios differentiated by the heat sources used

Identification of optimal supply scenario through Multi-Criteria-Analysis:

- 1. Define and weight technical and economical evaluation criteria
- 2. Investigate scenarios and determine KPI according to the criteria defined
- 3. Evaluate the scenarios based on the investigation





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Results of Multi-Criteria-Analysis



Scenarios 1 and 3 are chosen for a more detailed investigation on technical, economical and legal aspects.









Supply Concept

- Grid operated on lowest temperature possible (80...70 °C)
- Integration of low-temperature industrial waste heat by heat pump
- High share of solar thermal feed-in generated by collectors on roofs (prosumer) and open space systems
- Seasonal storage (3000 m³) provides load shifting and maximum efficiency of solar thermal systems
- Multivalent energy system integrates decentralised heat sources
- 100% renewables and waste heat sources supply up to 300 buildings with total heat demand of approx. 9 GWh/a











Economic and Legal Evaluation

Balance of costs and revenues for 20 years taking into account investments, funding, maintenance and energy costs:

> Both scenarios are profitable due to funding and low heat generation costs of renewables



A legal assessment has been carried out to verify the concept's suitability for approval:

- > No regulatory barriers for the implementation and operation of the supply concept
- Contract formation with waste heat suppliers must be evaluated in detail regarding business model (pricing, sharing of investment costs) and legal aspects









Summary and Outlook

- Development and investigation of a concept for the transformation and extension of a local heating grid based on 100% renewable energies
- Significant CO₂ reduction in the supplied area due to efficient use of local heat sources and waste heat
- The concept proofs that heating networks based on 100% renewables are technically and economically feasible!
- The German "District Heating 4.0" funding programme is a big incentive for the implementation!

Next steps:

- Finalising the preliminary study on the concept in 2020
- > Application of funding for the implementation
- Implementation of the planned concept starting in 2021











Thank you for your attention!





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