

IEA SHC TASK 55 „Towards the Integration of Large SHC Systems into DHC Networks“

Task Duration: 4 Years; Task Start: 01.09.2016

1. Task Focus:

- a. Characteristics of solar thermal systems for DHC >0.5 MW up to GW systems
- b. Technical and economic specifications of district heating networks which are relevant for the integration of solar thermal systems and hybrid technologies (large scale storages, industrial waste heat, heat pumps, etc.)
- c. Analyses of system components and their integration: system temperature requirements, optimization of hydraulic systems, interdependences between large collector fields and seasonal storages, control strategies, self-learning controls, large collector field performances, assessment and design of large seasonal storages (>50.000 m³), system performance guarantees, system ratings and certificates
- d. Modular design of large SDH/SDC systems including hybrid technologies (large scale storages, industrial waste heat, heat pumps, etc.)
- e. Up-scaling potential of existing medium/large SDH/SDC systems to up to GWth systems
- f. Economic requirements of large SDH/SDC systems, market analyses of global and country developments

2. Task Objectives:

- a. Description of low cost and high performance large-sized SDH/SDC systems, their main components, hybrid technologies (large scale storages, industrial waste heat, heat pumps, etc.) and guidelines for their construction
- b. Simulation of the integration of large seasonal storages, hybrid technologies and large collector arrays into different district heating networks
- c. Description of crucial components of modular conception and construction of SDH/SDC systems
- d. Elaboration of business and financing calculation models
- e. Validation of measurement methods of tests on field collector performances and singular collector tests in the laboratory
- f. Country reports, license requirements, feasibility studies and a database on large SDH/SDC systems in established and new markets
- g. Expert and industry workshops and presentations to communicate task findings
- h. Cooperation on a moderate level with the IEA Technology Collaboration Programme on District Heating and Cooling including Combined Heat and Power (IEA DHC), focusing SDH/SDC network designs and analyses

3. Subtasks:

Subtask A: Network Analyses and Integration (Lead AIT, Austria)

- A-D1 Economic analyses of overall DHC network supply strategies, transition strategies, heat demand and energy price scenarios
- A-D2 Assessment of technical requirements of existing and newly integrated large scale SDH/SDC
- A-D3 Analyses of DHC network hydraulics and evaluation of hybrid technologies and possible supply points for large ST plants
- A-D4 Overall DHC network control strategies and algorithm for increasing ST fraction

Subtask B: Components Testing, System Monitoring and Quality Assurance (Lead SUNRAIN, China)

- B-D1 In-situ collector tests
- B-D2 Further development of validated performance guarantees for key components
- B-D3 Automated monitoring and failure detection of key components
- B-D4 Control strategies and self-learning controls of key components
- B-D5 Integration of solar ratings and certification procedures

Subtask C Design of the Solar Thermal System and of Hybrid Technologies (Lead PlanEnergi, Denmark)

- C-D1 Simulation and design of collector array units within large systems
- C-D2 Assessment and design of large scale seasonal storages
- C-D3 Optimized hydraulics and piping in large solar systems
- C-D4 Modular conception and construction

Subtask D: Promotion and Economic Aspects of Solar Thermal and Hybrid Technologies (Lead TECNALIA, Spain)

- D-D1 Business Models of Solar Thermal and Hybrid Technologies
- D-D2 Beneficial and challenging environments for SDH/SDC systems including hybrid technologies (large scale storages, industrial waste heat, heat pumps, etc.) in new and existing markets
- D-D3 Identification and preparation of large SDH/SDC systems in a database
- D-D4 Promotion and dissemination of SDH/SDC and hybrid technologies in new markets
- D-D5 Evaluation of divers global market development and country reports
- D-D6 Dissemination of expertise through education and training

4. Cooperation with IEA DHC

The IEA Technology Collaboration Programme on District Heating and Cooling including Combined Heat and Power (IEA DHC) officially cooperates with Task 55 of the IEA Technology Collaboration Programme on Solar Heating and Cooling (IEA SHC). The SHC Task 55 will integrate input provided by IEA DHC in its publications and communication, and receive reviews for Subtask A and additional information from the IEA DHC.