

IEA DHC Annex TS1

Low Temperature District Heating for Future Energy Systems



On community scale low temperature district heating offers new possibilities for greater energy efficiency and lower fossil energy consumption. Especially in connection with buildings that require only low supply temperatures for space heating. The utilisation of lower temperatures reduces transportation losses in pipelines and can increase the overall efficiency of the total energy chains used in district heating (DH). To optimise the exergy efficiency of community supply systems the so-called LowEx approach (LowExergy) can be utilised. Simplified the physical property “exergy” can be described as a product of energy and “energy quality”. The higher the temperature of a heat flow is above the temperature of the surroundings (reference temperature), the higher the energy quality. Based on this statement the LowEx approach entails matching the quality levels of energy supply and demand in order to optimise the utilisation of high-value energy resources, such as combustible fuels, and minimising energy losses and irreversible dissipation (internal losses).

The IEA DHC Annex TS1 aims to identify holistic and innovative approaches to communal low temperature heat supply by using district heating. It is a framework that promotes the discussion of future but also existing heating networks with an international group of experts. The goal is to obtain a common development direction for the wide application of low temperature district heating systems in the near future. District cooling can also be integrated into the activities but is not the focus. The gathered research which is going to be collected within this Annex should contribute to establishing DH as a significant factor for the development of 100% renewable energy based communal energy systems in practice. By connecting the demand side (community/building stock) and the generation side (different energy sources which are suitable to be fed in the DH grids), this technology provides benefits and challenges at various levels. The activities are strongly targeted at DH technologies and the economic boundary conditions of this field of technology.



To increase the impact of IEA DHC Annex TS1, a close collaboration with other IEA Annexes and related activities is to be established to introduce a bi-directional exchange of information. On the one hand, information about already existing activities shall be collected and assessed by the experts of Annex TS1. On the other hand, other activities shall be supported with information about low temperature district heating systems and the results from Annex TS1. The IEA DHC Annex TS1 is part of IEA DHC Annex X, and thus benefits directly from results developed within Annex X. Furthermore the unrestricted exchange of experience and information with the IEA DHC Annex X projects is ensured.

In addition to the realization of these objectives the research initiative serves as a platform for the international exchange of experiences and networking. In the context of described activities, a guidebook especially designed for planners and decision makers will be developed. IEA DHC Annex TS1, the first Task-shared Annex in IEA DHC history, allows member countries and sponsors to link national research to benefit from international developments. Currently 12 research institutions from 12 countries are involved.



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