

Plenary Keynote: Sven Werner

The four generations of district cooling - a categorization of the development in district cooling from origin to future prospect

Abstract

Research into new advanced district heating concepts has increased since the first four generations of district heating were defined in 2014. This definition created a common framework for research and industry alike, and pointed to potential futures for district heating which could benefit from low-temperature heating in buildings. The fully developed fourth-generation district heating includes the cross-sectoral integration into the smart energy system. This paper defines four generations of district cooling to make a similar useful framework for district cooling. The first generation being pipeline refrigeration systems that were first introduced in the late 19th century, the second generation being mainly based on large compression chillers and cold water as distribution fluid, the third generation having a more diversified cold supply such as natural cooling, and the fourth generation combining cooling with other energy sectors sometimes into a renewable energy-based smart energy systems context, including combined heating and cooling.

Reference

P.A. Østergaard, S. Werner, A. Dyrelund, H. Lund, A. Arabkoohsar, P. Sorknæs, O. Gudmundsson, J.E. Thorsen, B.V. Mathiesen: "The four generations of district cooling - A categorization of the development in district cooling from origin to future prospect", *Energy* vol. 253, August 2022