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Thermal waste recovery by thermal energy storage and by heat energy transportation over long distance

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Industrial activities have a huge potential for waste heat recycling. Recovery of heat and cold including low temperature is a very important strategy for improved energy efficiency in industry. Heat and cold recovery technologies are instrumental for intra-plant optimization and inter-plant integration to enable cascade use of heat (or cold) between cross-sectorial plants in industrial parks and with district heating/cooling networks. In spite of its high potential, industrial waste heat is currently underutilized. This may be due, on one hand, to the technical and economic difficulties in applying conventional heat recovery methods and, on the other, the temporary or geographical mismatch between the energy released and its heat demand. Thermal energy storage is a technology which can solve the existing mismatch by recovering the thermal waste and storing it for a later use. The heat energy often needs to be transported because the supply of heat is usually located apart from the demand. However, how to efficiently transport the heat energy over long distance is a real challenge. At the same time, there is a great deal of low-grade and middle-grade heat energies, such as solar energy, geothermal energy and waste heat from industries and power plants, kept unused due to the relatively low thermal grade and long distance to the user sites. Therefore, developing efficient methods to overcome the transportation problems of the low-grade and middle-grade heat over long distance would contribute significantly to the reduction in energy consumption. The case study presented focuses on the possibility of heat waste recovery by thermal energy storage technology and by a new heat transportation concept over long distances.

Biography

Lingai Luo is a Research Director of French National Center for Scientific Research at the Laboratory of Thermal Science and Energy, Nantes (LTEN), France. She is mainly engaged in the intensification of heat and mass transfer and shape optimization in different energy components, systems and processes. She is the author of 2 books and over 100 journal articles. She is the Head of a research group of LTEN "Transfers in Fluids et Energy Systems" and was the Head of Laboratory of Design Optimization and Environmental Engineering (LOCIE) of CNRS and University of Savoy, France. She was the Cofounder and Coordinator of Sino-French Collaboratory for Environmental and Process Engineering and is the Head of Sino-French Laboratory for Sustainable Energy of French CNRS and Chinese Academy of Sciences. She is also an invited Professor at 5 Chinese universities/institutions and Leuphana University at Lüneburg, Germany. She is a Subject Editor of Elsevier journal *Energy* and Member of Editorial Board of *Renewable Energy* and Associate Editor of *Frontiers of Mechanical Engineering and of Frontiers in Built Environment*.

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