April 6 at 2 pm

Cohort Space, Building 3, Nobel Street, Skolkovo Innovation Center

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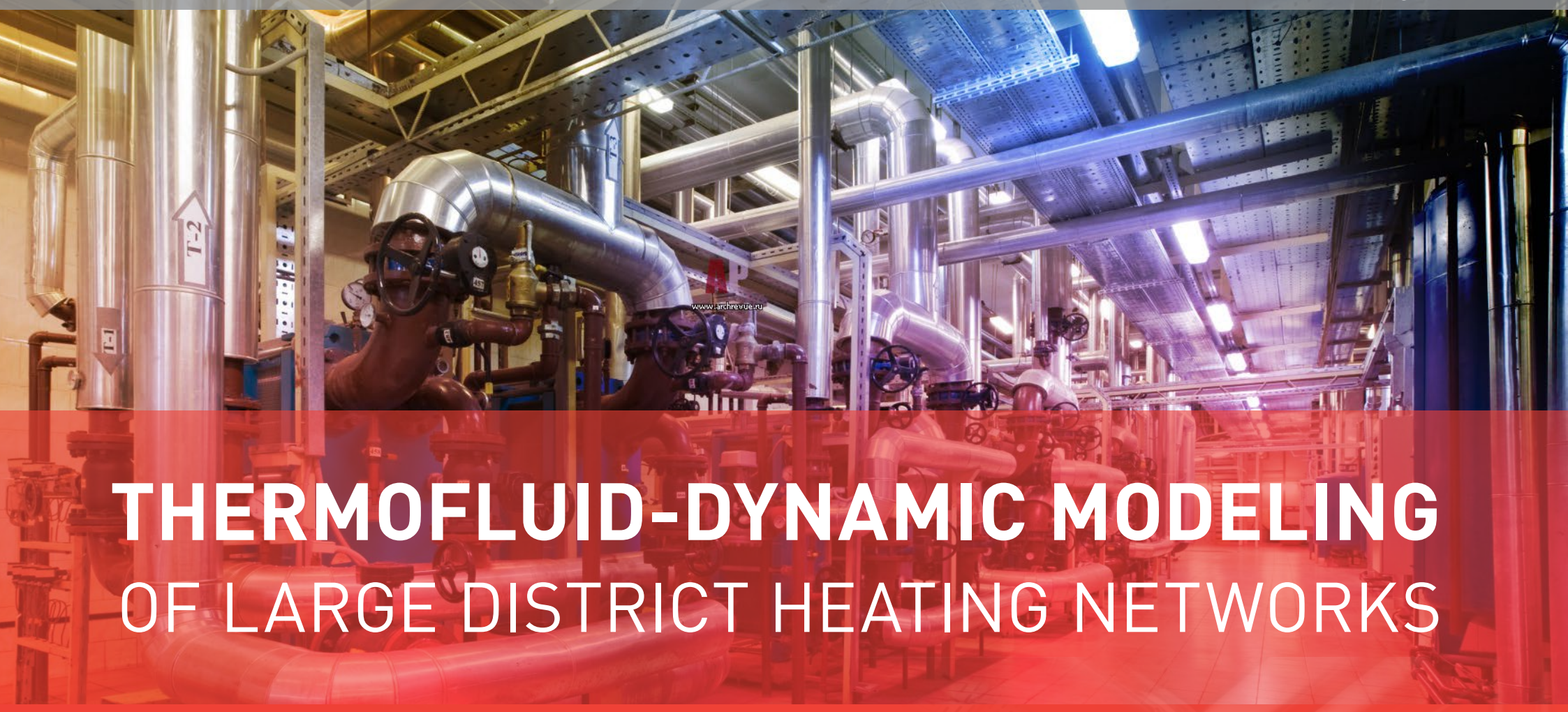
The workshop will be held in English



THERMOFLUID-DYNAMIC MODELING OF LARGE DISTRICT HEATING NETWORKS

Lecturer:

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District heating networks are important infrastructures for the implementation of efficient methods to provide heating and domestic hot water to buildings located in urban areas. Modern district heating networks may involve the use of waste heat, renewable sources and heat from cogeneration thermal storage systems. In addition, management is operated through advanced ICT solutions able to minimize the global primary energy consumption and increase end user awareness.

This work aims at presenting a detailed simulation approach that can be applied to large district heating networks. The transient operation of the largest district heating network in Italy, the Turin district heating network, is analyzed. The thermal request of the users is obtained from temperature and mass flow rate measurements at the thermal substations. Thermo-fluid dynamic simulation of the network allows one obtaining the corresponding thermal load profiles at the various thermal plants. Results show that a peak request is caused by the temperature reduction in the entire system due to the reduced request at night. The shape and amplitude of the peak at the plant is completely different than that at the users because of the advection transport of water in the network and the thermal losses.

Using this simulation approach it is possible to optimize the thermal request profiles of the buildings in order to minimize the effects of the morning peaks. This can be achieved through installation of storage units or direct exploitation of the thermal capacities of the buildings and the network. Results of various simulations and applications to the real network are shown. Potential applications to networks with different characteristics, such as low temperature district heating or networks managed acting on the supply temperature, are also discussed. The proposed simulation approach is shown to represent a versatile and important tool for the implementation of advanced management to district heating systems.

If you have any questions or require further information, please contact **Victoria Godunova at v.godunova@skoltech.ru**