

Energy Colloquium

Combined Cooling, Heat and Power Systems Operation Planning & Design: Mixed Integer Non-Linear Programming

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Technology**

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Skolkovo Innovation Center

Technopark, Building 3, Room 402



ABSTRACT:

Combined Cooling, Heat and Power (CCHP) generation is an effective way to reduce primary energy consumption and carbon dioxide emissions. Such systems make rational use of primary energy generating simultaneously heat, electric/mechanical power and refrigeration effect. Several types of prime movers are suitable for cogenerative applications, ranging from micro turbines to gas-steam turbine combined cycles. They can have more than one independent operative variable, highly nonlinear performance curves describing their off-design behavior, limitations or penalizations affecting their start-up/shut-down operations. The CCHP units may also depend on ambient temperature and may be integrated with heat pumps, renewable energy sources as well as heat and cooling load storage. In addition, national incentive policies come into play (e.g. European Union). Due to the large number of decision variables and the necessity of determining trade-off solutions, the operation planning of CCHP plants with several units, as well as the design of such systems, requires the development of specific optimization tools. The Seminar will give an overview of how these challenges have been tackled developing a Mixed Integer Linear Programming (MILP) model by means of piecewise linearization and heuristic decomposition of Non-Linear problems. The presented work has been mainly carried on by a joint effort of Politecnico di Milano Groups of Energy CONversion Systems - GECOS and Operations Research.

Non-Skoltech attendees should request access to the building in advance by sending their passport details to energy.colloquium@skoltech.ru

Colloquium schedule and information on how to get to the colloquium can be found at <http://www.skoltech.ru/en/energy-colloquium/>