

KEYNOTE - 2

MODEL-BASED CONTROL FOR IMPROVED ENERGY EFFICIENCY

Dimitrios Rovas

Technical University of Crete, Greece

The building sector contributes significantly to total energy consumption. A significant part of the energy consumed in building is used to operate climate control devices to foster comfortable conditions in building interiors. Effective control strategies, which account for weather changes, inhabitant's actions and changes of the building dynamics hold the promise of reducing the buildings' total energy consumption. Good energy performance, combined with the availability of energy through renewable energy resources, pave the way towards positive- (or net-zero-) energy buildings, where the net-energy produced (NEP) meets or exceeds the total energy demand. A model-assisted control design methodology is presented that, given a thermal simulation model capable of capturing all pertinent building dynamics, and upon a selection of a relevant cost function used to evaluate performance, generates strategies for the effective operation of all pertinent building subsystems. To evaluate the potential of the proposed methodology to generate "good" strategies, corroborating simulation and experimental results in real buildings are presented.