Modelica Conference - Presentation
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Title: Template-based District Thermal Energy System Models for URBANopt with Modelica
Authors: Nicholas Long, Amy Allen, Antione Gautier, Yanfei Li
Abstract:

The Department of Energy has been developing an urban analysis software development kit utilizing OpenStudio/EnergyPlus as well as various other 3rd party engines (e.g., Ditto, OpenDSS, REopt, etc.) to evaluate grid impact. In parallel, an effort has been underway to enable more advanced district energy system (DES) analysis using Modelica. This presentation will discuss the development and initial results of a) new component models for DES analyses, b) the development of a templating framework, and c) dynamically generating district energy system topologies and buildings from a GeoJSON file. The newly developed components support a myriad of system configurations including 1st, 4th, and 5th generation DES. The templating framework allows a user to specify at a higher level the desired configurations of central plant equipment, energy transfer stations, topology layout, and building models to be ‘stitched’ together, ultimately scaffolding an entire Modelica project that is simulatable. The principal objective of the Modelica-based DES tool is to allow engineers and designers to effectively evaluate the impact of various topologies and components during the design phases of urban projects.