

Tom McDermott, PNNL

Commercial Buildings in Transactive System Simulations

Commercial buildings consume about 35% of end-use electricity in the United States, almost as much as residential buildings. In order to participate effectively in transactive systems, a commercial building owner/operator needs to know the same information that a researcher needs to construct a simulation model of that building. This is a barrier to participation of commercial buildings as a responsive element of a transactive energy system or to the application of transactive energy systems in the building energy management system.

To date, EnergyPlus has been widely used to model buildings, but that software was designed to evaluate energy efficiency, without system dynamics and no response to grid voltage. Further, most building owner/operators lack the resources to build custom EnergyPlus models. These limitations inhibit the usefulness of EnergyPlus models in the design, modeling, simulation and deployment of transactive energy systems.

This presentation will describe two approaches to improve the modeling of buildings and lower the barrier for their participation in transactive energy systems. First, a streamlined model building approach that starts with eQuest, which is more accessible to industry than EnergyPlus, will be described. Second, a Modelica-based dynamic model of the HVAC system and other loads that is more accurate for transactive system simulation will be presented.