Impact of Urban Weather on Energy Use

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Recent advances in multiscale coupling of models have started to provide unique insights into how interdependent processes affect one another. The effect of these processes is uniquely observable in urban environments.

These data comprise three elements:

1. High resolution, 90 m simulated weather data for 1 year at 15 min. intervals (with known gaps toward the end of each month). These files are in .csv format.
2. A mapping of individual buildings with individual IDs, their latitude/longitude location, their 2D footprint, and height. (Excel file)
3. Energy simulation output of these individual buildings, at 15 min. intervals for a whole year.

The questions that are of interest for this challenge are:

1. Are there interesting variations in the weather and building energy use data for the geographic area?
2. Which buildings in the study have their energy use impacted the most by external factors, including the weather?
3. Are there any interesting visualizations that illustrate the changing dynamics of the simulated urban environment?
4. How can the data best be divided into subsets for meaningful analysis?
5. What energy use changes can be found throughout the year per building?
6. What are the meteorology and energy use for the geographic area for the year especially during the coldest and hottest months (e.g., January and July)?

Participants are welcome to bring in additional datasets to fuse with the provided data to create meaningful insights.

Data Description

The 21 archives are data from the 21 compute nodes used for this dataset. This is simply an artifact of how the data were originally distributed in the high-performance computing environment. Only 20 contain data, each consisting of approximately 16 building simulations.

Within each node, the number given is a unique BuildingID for each building simulated. The file extensions for each building include:

- *.html—long list of (mostly) self-descriptive tables and energy analysis of assumptions or data from the building simulation.
- *mtr.csv—simulation-estimated energy use (electrical and natural gas) for every 10 min. from July 21 to December 31. See column headers for description and units.
- *final.csv—10-min. energy use and hourly simulation data (e.g., temperature and relatively humidity at different locations in the building). See column headers for description and units.
- *.err—any warnings or errors that occurred during the simulation.