Energy Demand Prediction

Urban System Engineering

Sub-department of Environmental Technology

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Motivation

Transition in the traditional energy system:

1. Integration of renewable energy sources on centralized and distributed scale.
2. Increase in the energy demand and changes in demand profile due to fast-pace growth of population and urbanization

→ Challenge: efficient and effective use of various energy sources to match the supply and demand

➤ Detailed knowledge about energy demand profile and predicting its future variations is useful for energy managers and urban planners.

Approach

➤ Bottom-up approach: starting from the individual buildings, and scaling up to larger clusters of buildings, up to a district and city level.

➤ Characterizing energy demand, considering:
1. Temporal variations: daily, weekly, seasonal, and yearly patterns
2. Building characteristics, number of inhabitants and socio-economic conditions of the inhabitants

➤ Disaggregating electricity and gas demand based on various service needs of different consumers

➤ Forecasting energy demand profile based on different usage categories.
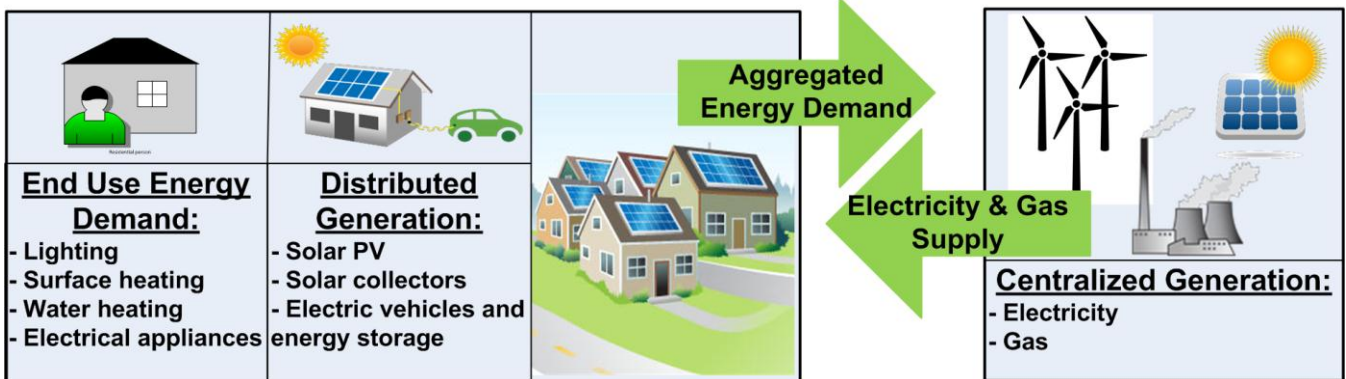
Objective

We aim to develop a model for characterizing and forecasting energy demand in the urban environment in detailed spatial and temporal resolution, including the service needs and the resulting end use energy demand.
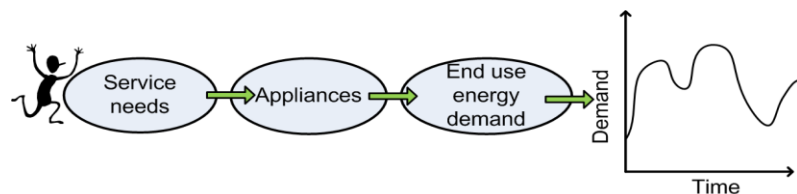
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