

Modeling and Prediction of Energy Demand

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Motivation

Transition in the traditional energy system:

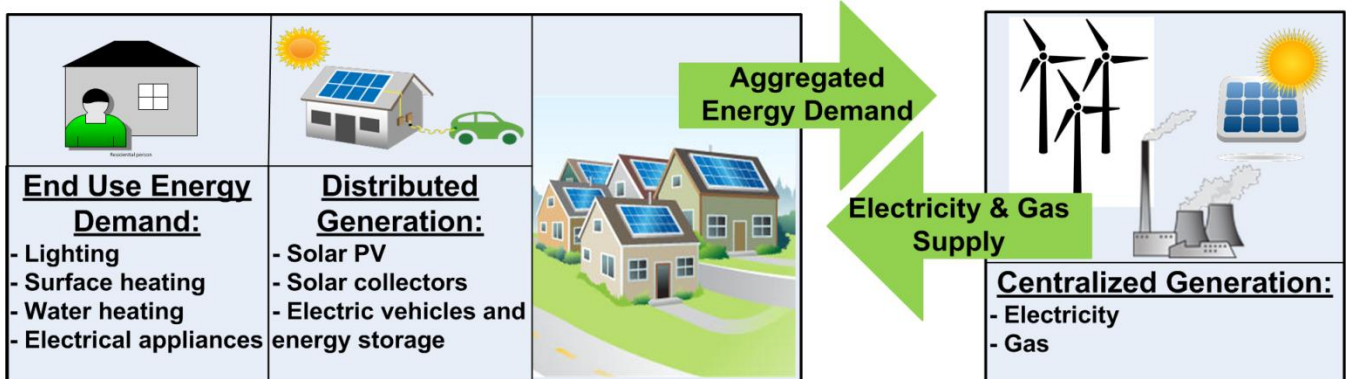
1. Integration of renewable energy sources on centralized and distributed scale.
2. Increase in the energy demand and changes in demand profile due to fast-pace growth of population and urbanization

→ **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.

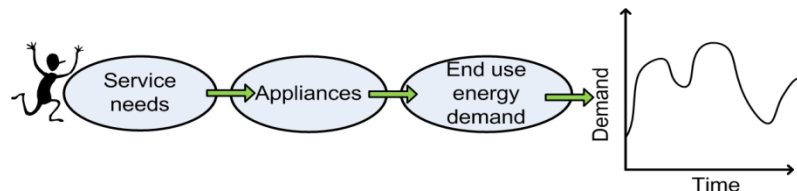
Approach

- 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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