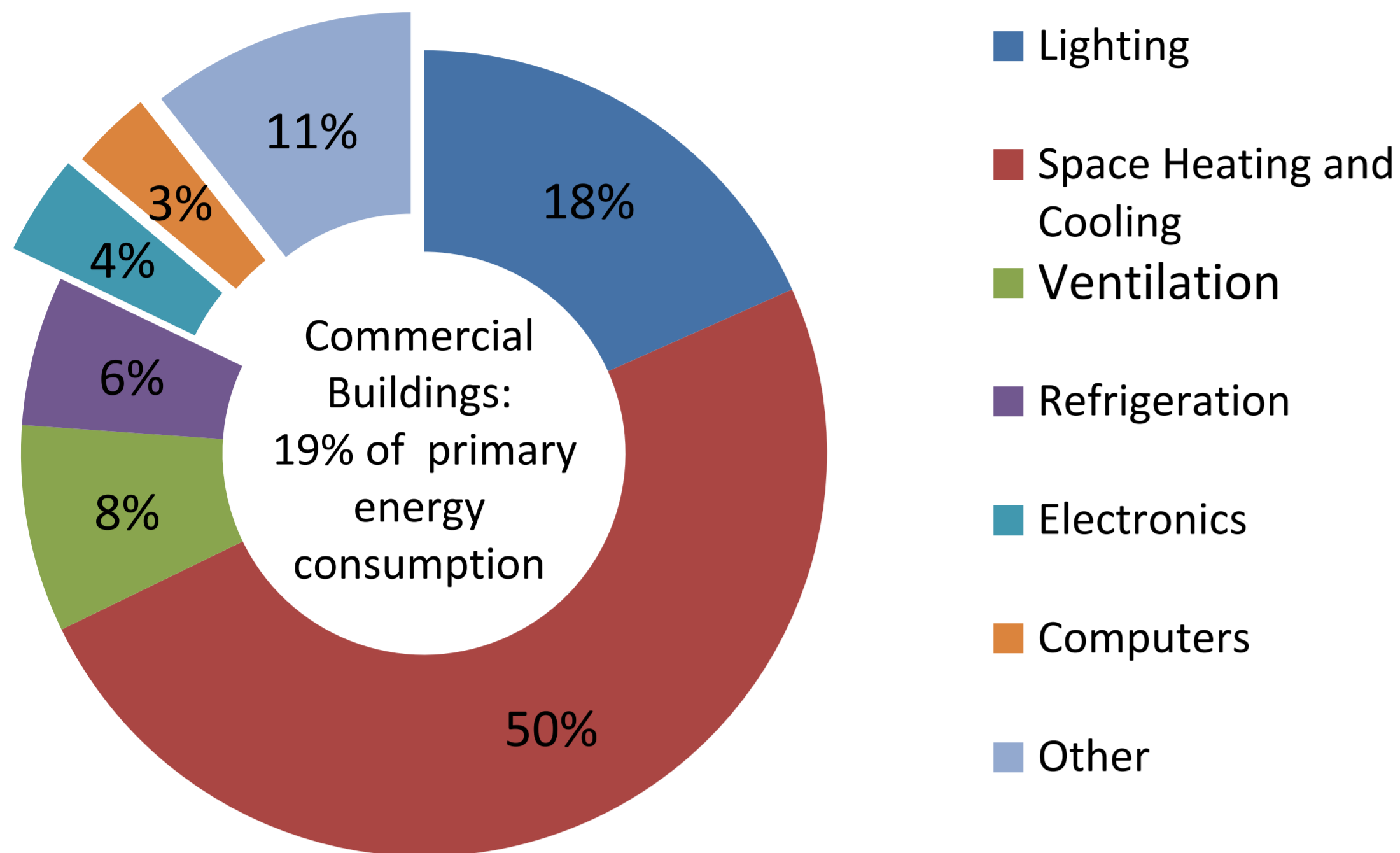


## INTRODUCTION

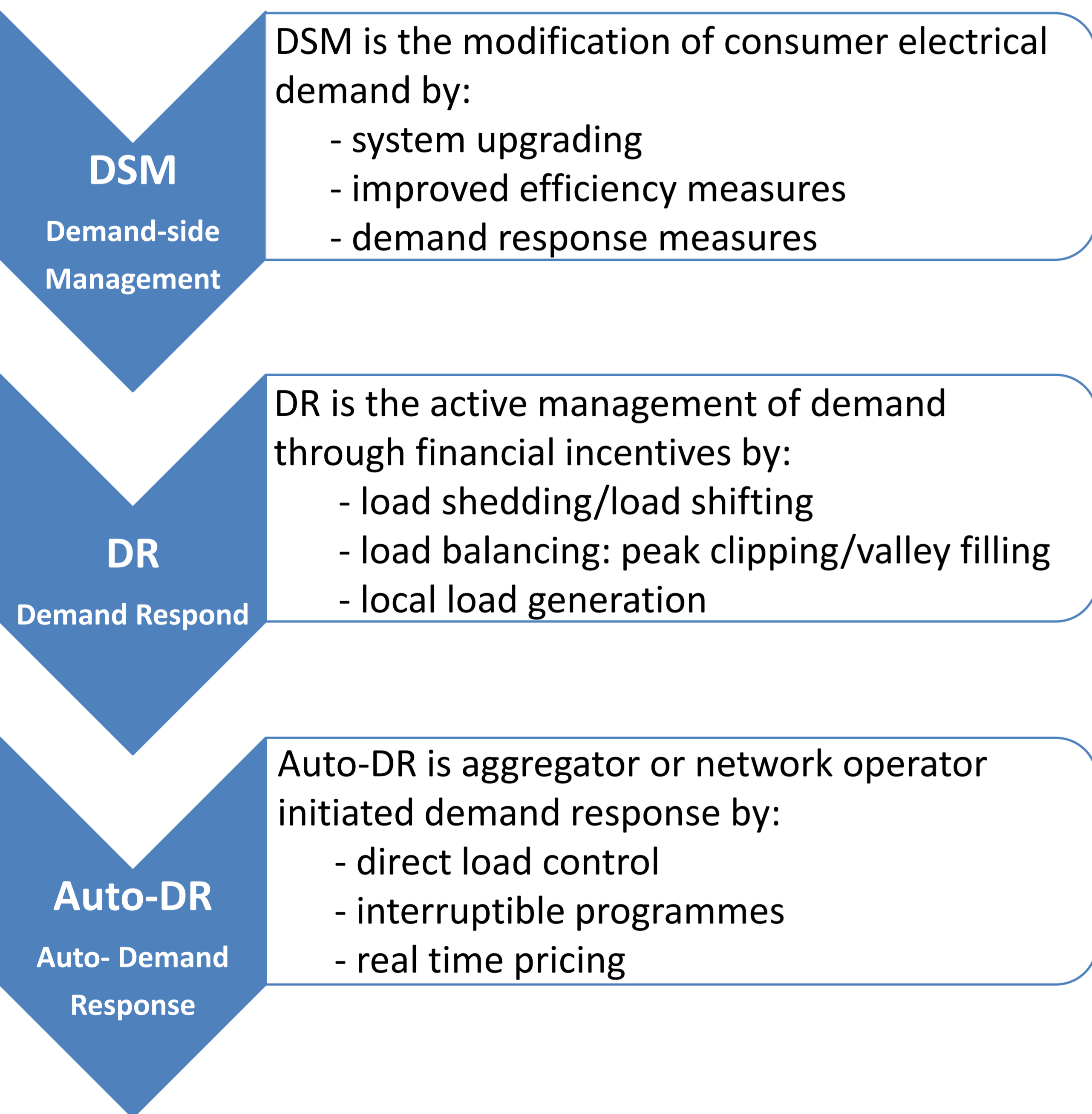
### Commercial Buildings Electricity Consumption in US by End Use



Commercial Buildings Electricity Consumption by End Use [Buildings Energy Data Book, US Dept. of Energy, 2010]

Characteristics of Commercial Buildings that make them ideal for Auto-DR implementation include:

- Building Energy Management System (BEMS)
- HVAC system flexibility
- Scheduled Occupancy

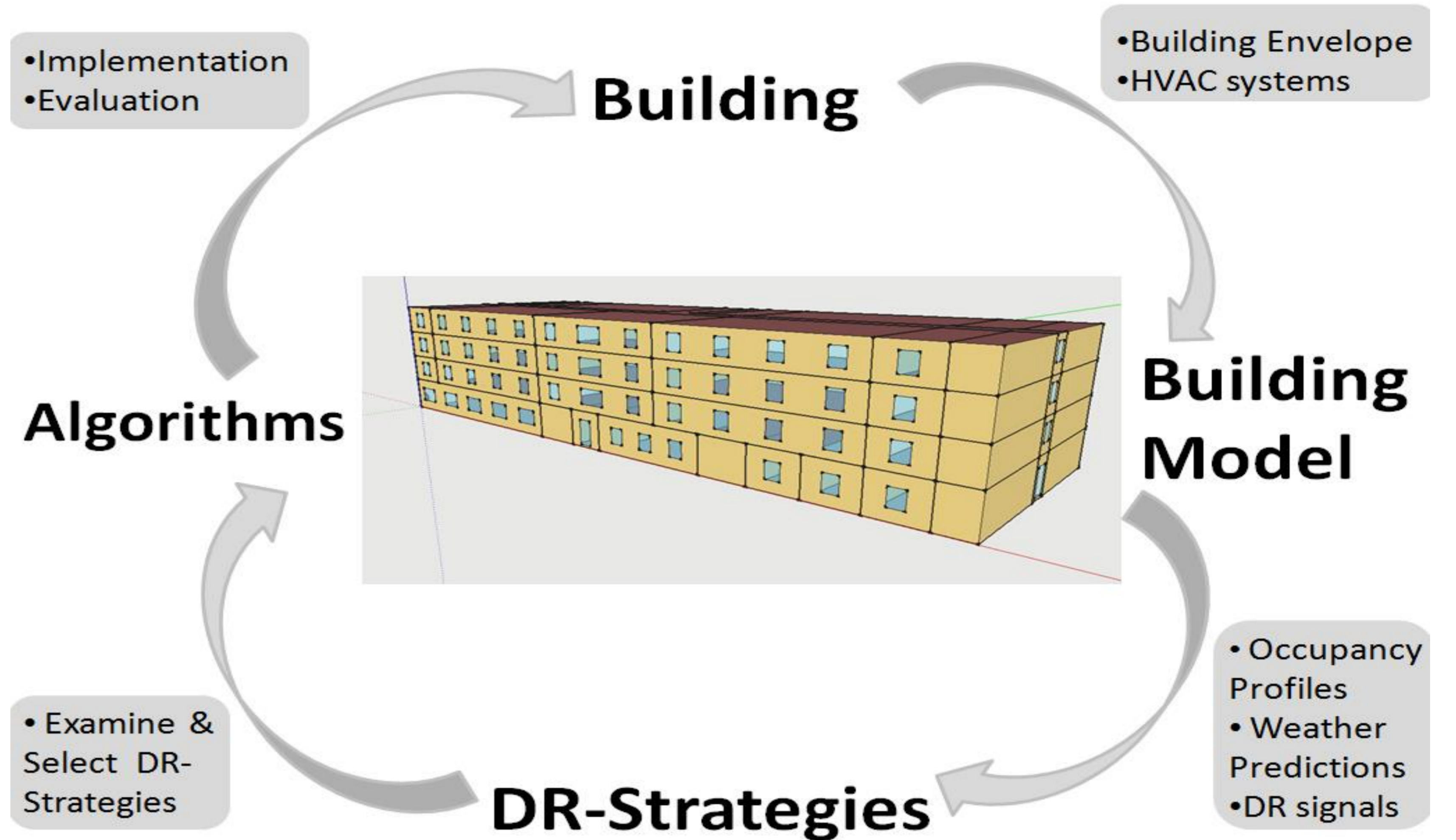


## OBJECTIVES

Can DR algorithms for Auto-DR measures be effectively applied in commercial buildings?

- Investigate the automation capabilities of different Demand Response (DR) programmes.
- Develop simulation models of commercial buildings to assess occupant space comfort to different DR strategies and optimize the most suitable DR strategies.

## METHODOLOGY

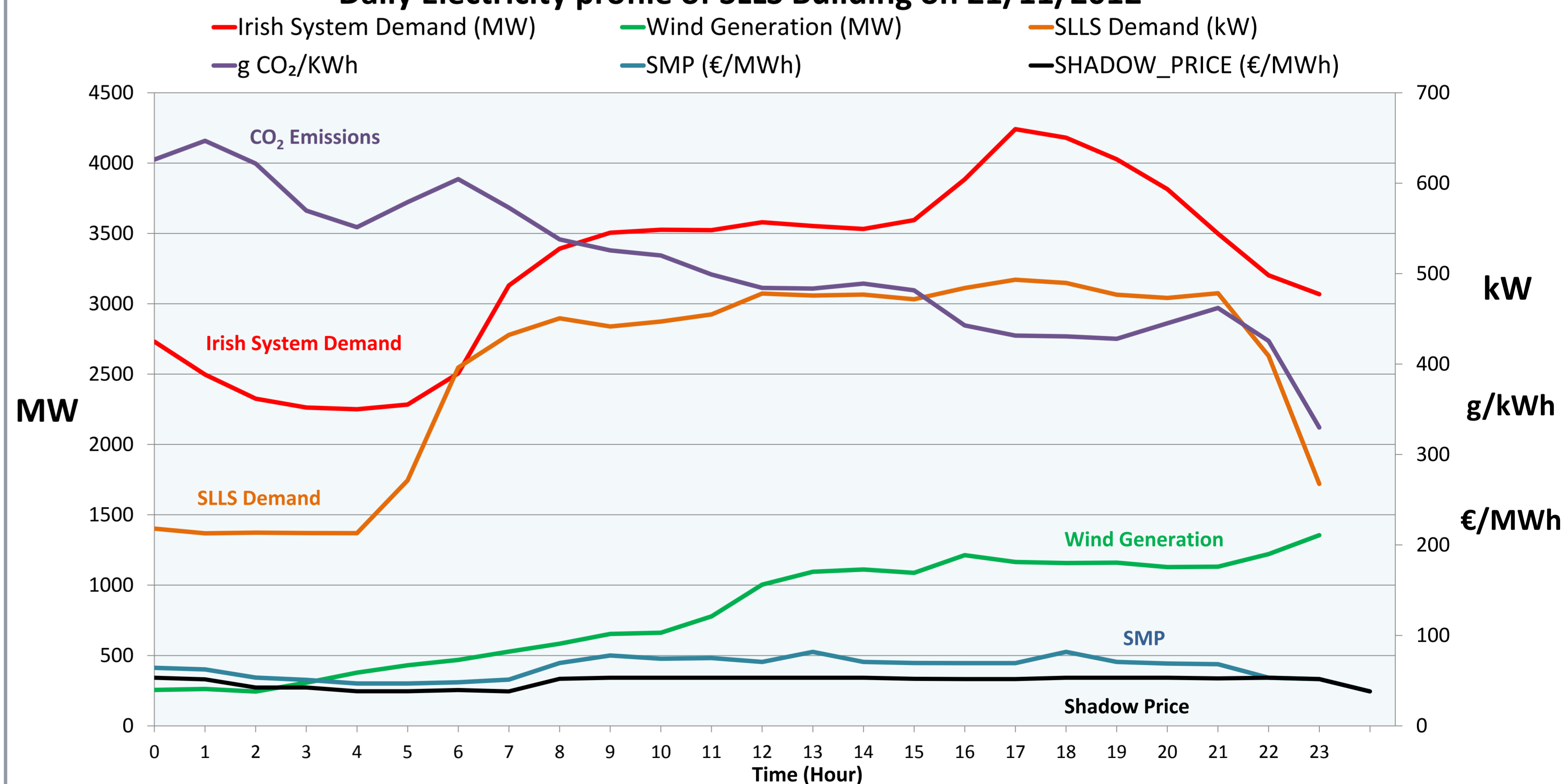


## TEST BUILDING



- UCD Sports Centre (Student Leisure & Learning Centre - SLLS Bldg.), opened 2012
  - 11,100 m<sup>2</sup> floor area
  - Key Features:
    - Offices, Retail
    - Gym
    - 50 m Swimming Pool
    - Cinema
    - Debating Chamber
    - Meeting/Activity Rooms
- HVAC Plant**
- Plant Equipment
    - 2 CHP Plant (thermally driven)
      - 506 kW thermal
      - 400 kW electrical
    - 2 Gas Boilers (1,146 kW)
    - Air Cooled Chiller (865kW)
  - Delivery Equipment
    - 8 Air Handling Units
    - 3 Air Conditioning Split Units
    - Underfloor Heating

### Daily Electricity profile of SLLS Building on 21/11/2012



\*Data from Eirgrid & SEMO

## FUTURE WORK

- Develop a DR model of SLLS Building using EnergyPlus.
- Optimize different Auto-DR strategies.
- Develop effective Auto-DR algorithms.
- Evaluate algorithms by testing on UCD SLLS building.

## ACKNOWLEDGEMENT

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