POLITECNICO DI MILANO

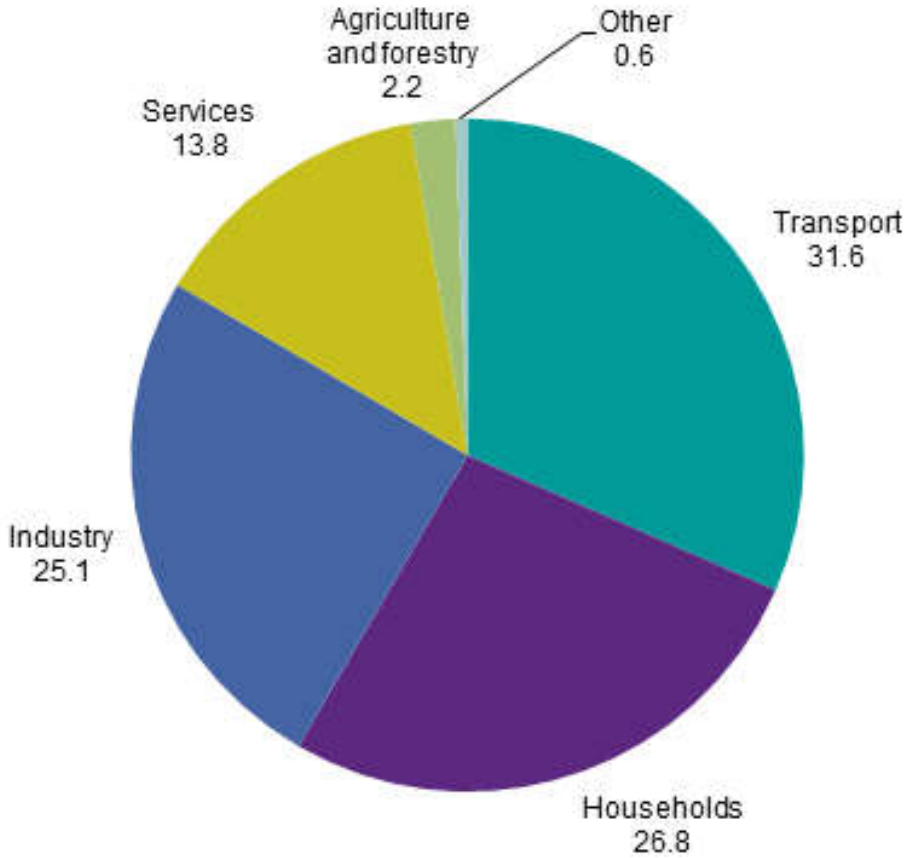
Technical Environmental System

Simulation of Building Energy Performance Via OpenStudio: An Introduction

Piacenza Campus,1st Semester 2017-2018

B. Najafi

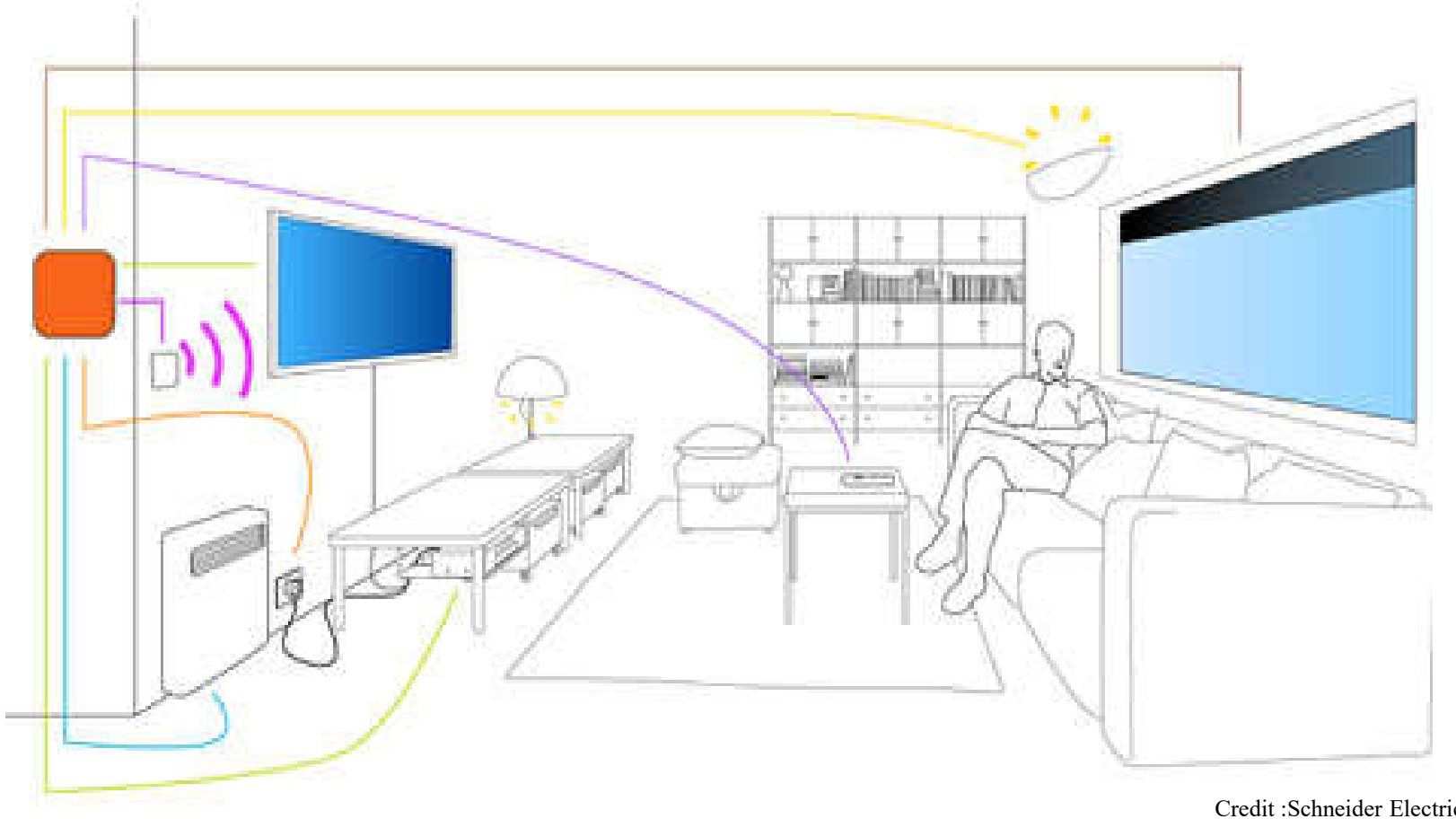
Importance of Building Energy Sector



Europe's Energy consumption by sector 2013, ref: EuroStat

Correlation with Emerging Technologies

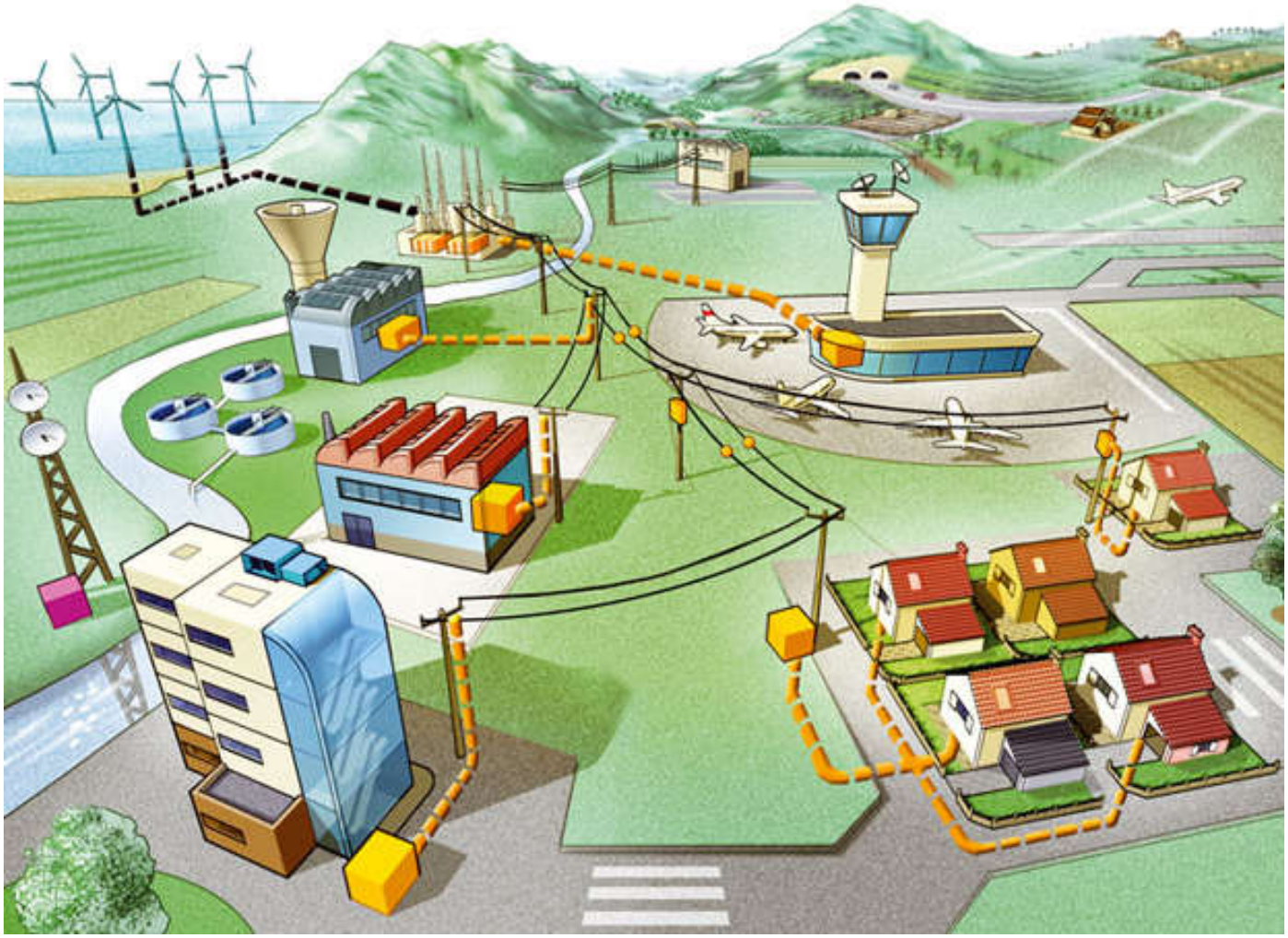
- Smart buildings can be a part of internet of things
  - ✓ Smart Homes



Credit :Schneider Electric

Correlation with Emerging Technologies

- Smart buildings can be a part of Smart grids



Credit :Schneider Electric

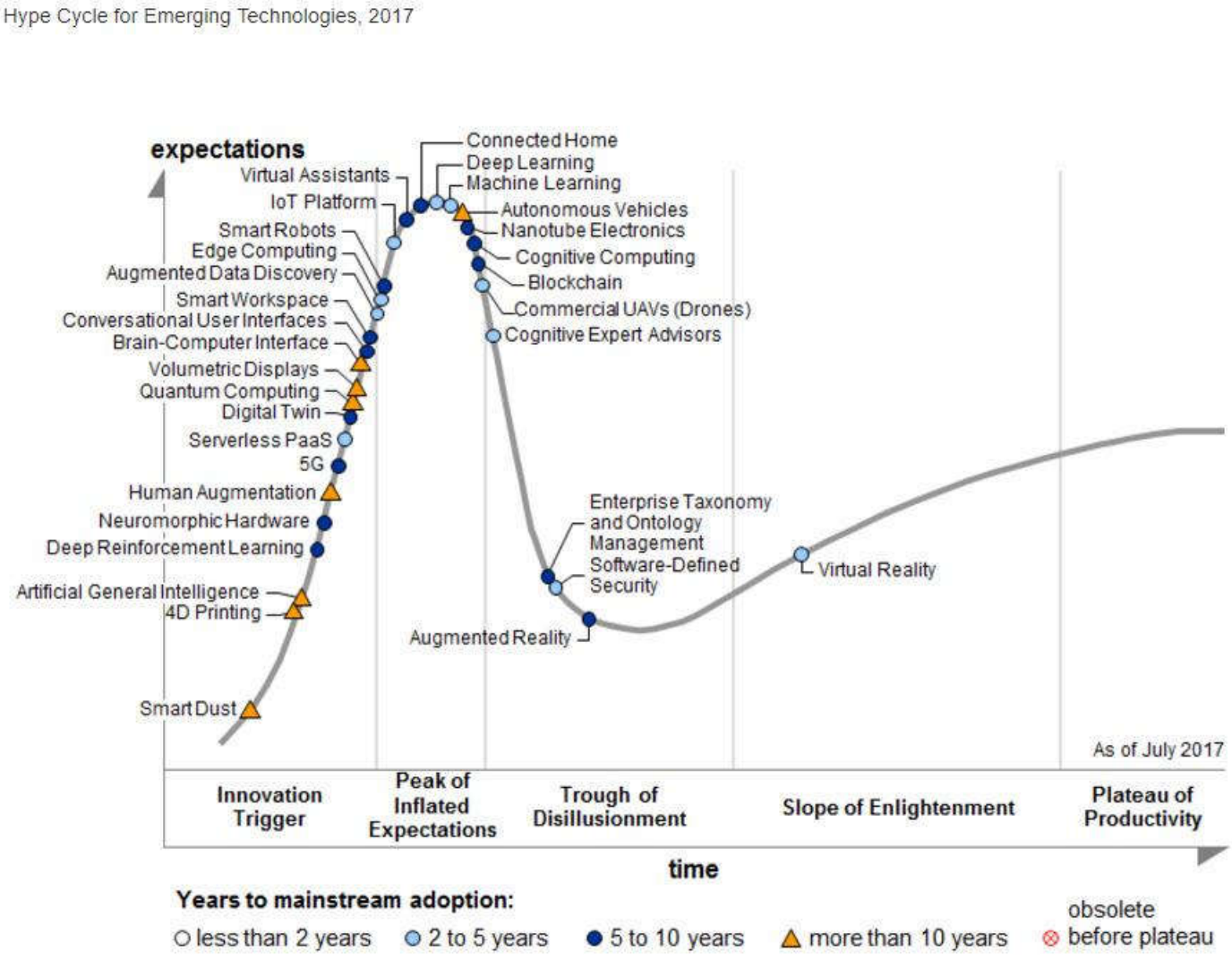
Correlation with Emerging Technologies

Gartner's diagram of emerging technologies, July 2015

Correlation with Emerging Technologies

Gartner's diagram of emerging technologies, July 2016

Correlation with Emerging Technologies



Gartner's diagram of emerging technologies, July 2017

Career Opportunities

- Current Trends
  - ✓ Energy manager
  - ✓ Energy audit expert and consultant in energy sector

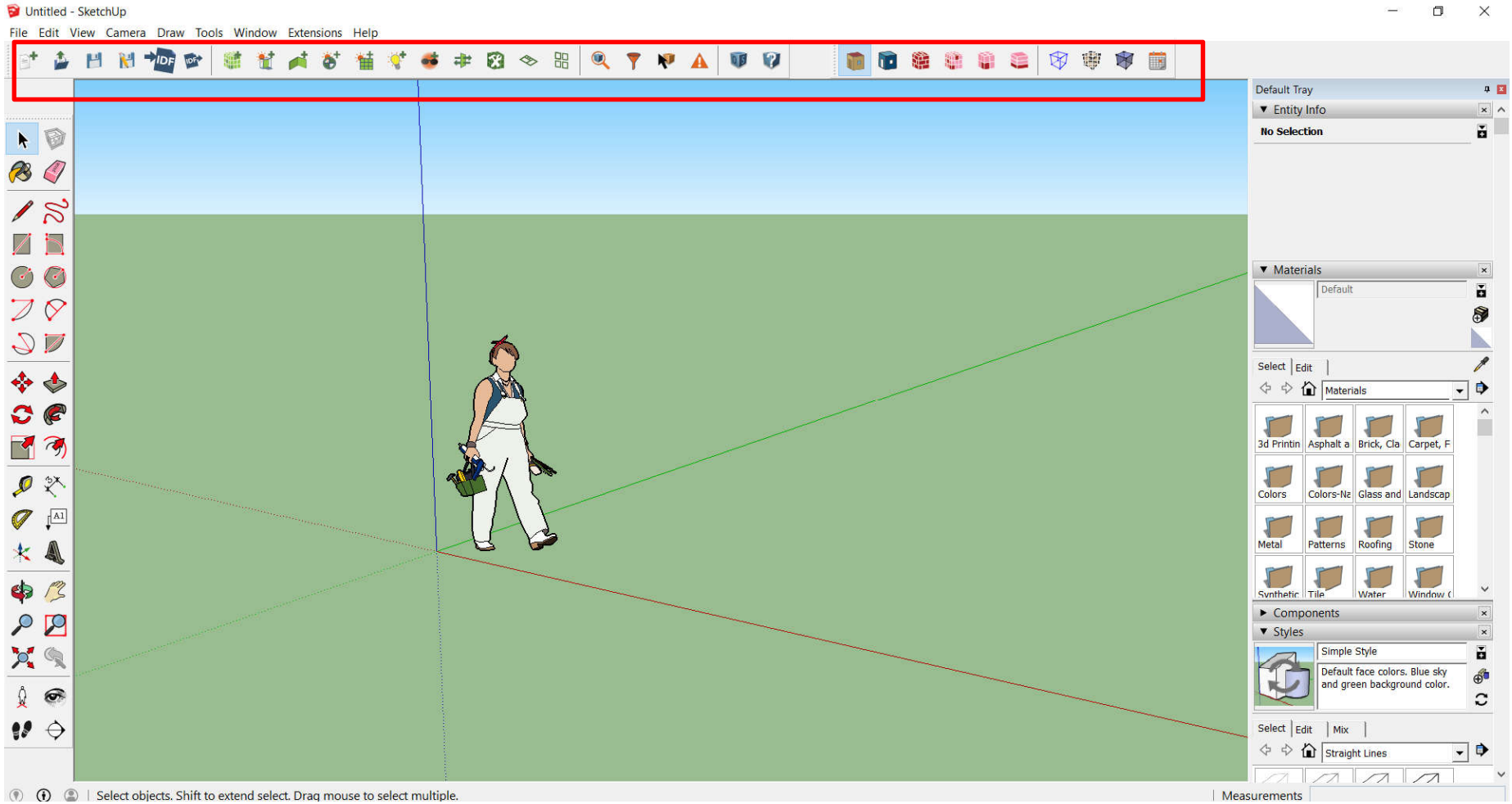
- Estimated Future Trends:
  - ✓ Energy analyst, Energy data analyst and energy data scientist

Simulation Tools

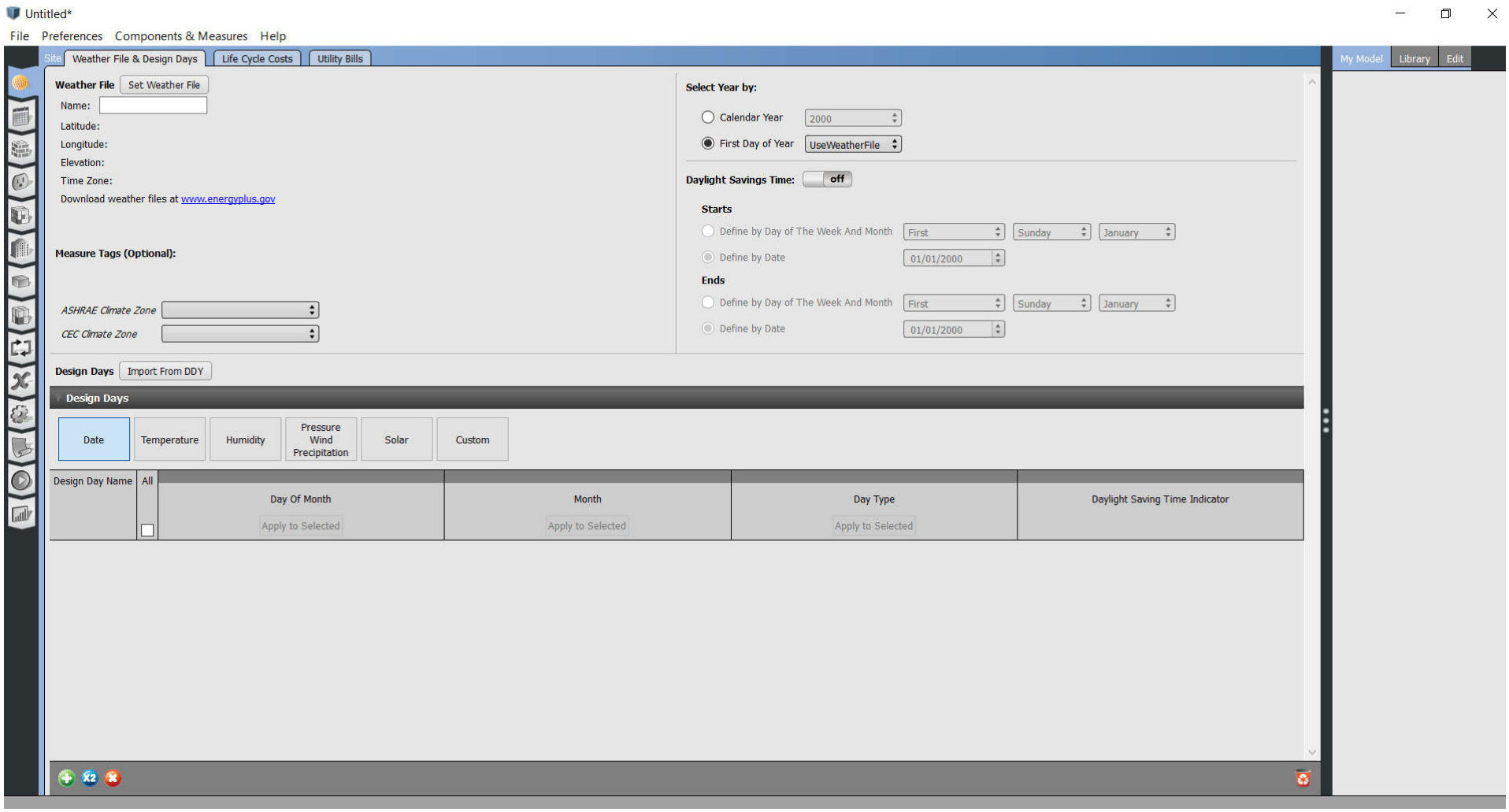
- EnergyPlus:
  - ✓Open-Souce tool developed by the Department of Energy, US
  - ✓Employed for simulating both Building performance and HVAC system
- OpenStudio interface is employed in this course
- OpenStudio creates an add-on over SketchUp, Hence the design can be made in SketchUp

- GitHub Platform utilized for submission:

SketchUp with OpenStudio Extension



OpenStudio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Components & Measures
Help
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Weather File & Design Days
Life Cycle Costs
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Weather File
Set Weather File
Name:
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Longitude:
Elevation:
Time Zone:
Download weather files at www.energyplus.gov
Measure Tags (Optional):
ASHRAE Climate Zone
CEC Climate Zone
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Pressure
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Solar
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Design Day Name
All
Day Of Month
Apply to Selected
Month
Apply to Selected
Day Type
Apply to Selected
Daylight Saving Time Indicator

Weather Data

EnergyPlus Downloads Documentation Support & Training Licensing Extras Weather Feedback Log in

Weather Data

Weather data for more than 2100 locations are now available in EnergyPlus weather format — 1042 locations in the USA, 71 locations in Canada, and more than 1000 locations in 10(other countries throughout the world. The weather data are arranged by World Meteorological Organization region and Country.

View Weather Data

Select a region below to view weather data.

- Africa (WMO Region 1)
- Asia (WMO Region 2)
- South America (WMO Region 3)
- North and Central America (WMO Region 4)
- Southwest Pacific (WMO Region 5)
- Europe (WMO Region 6)

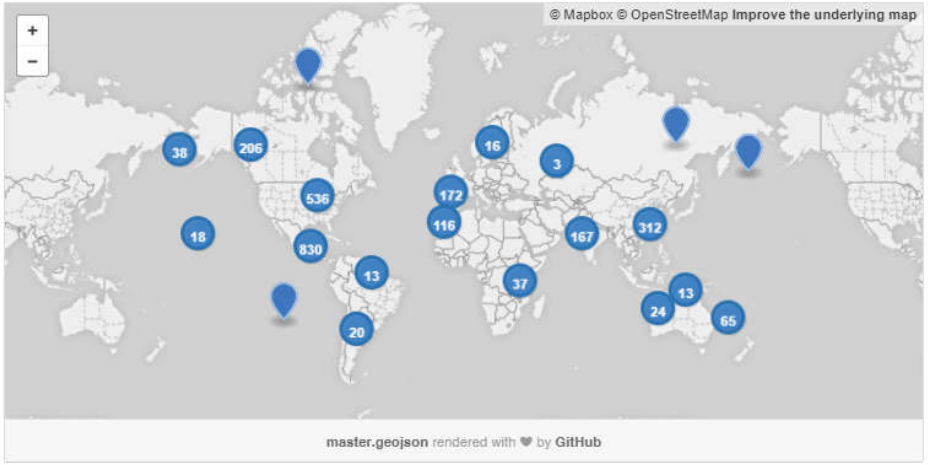
Search Weather Data

Keyword Search

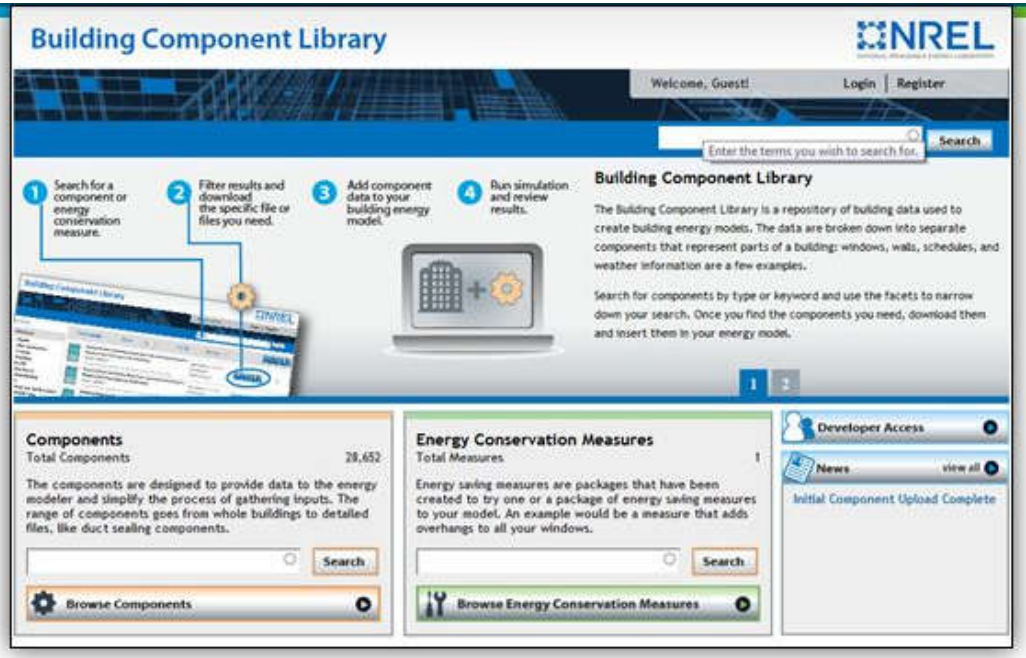
Search

Browse Weather Data

Click on the markers in the map below to access weather data.



Building Component Library



- An Internet-connected source of building energy modeling data:
  - Enables drag-and-drop modeling for **quick** technology evaluation
  - Provides **consistent**, detailed inputs to drive decision-making
  - **Searchable** readily available within applications
  - The BCL is key to OpenStudio's **extensibility**