Data and Plan for Analysis

In order to leverage time series analysis to answer this question, this project will investigate:

- How HVAC system operation affects energy consumption over time
- How HVAC system operation affect the collected metrics of comfort over time

Four System Aspects with relation to energy consumption, Current Questions

- Heating/Cooling
  - Data exists for hot/cold water data for building not AHU
  - Currently are focusing on the second floor of Olsson which is serviced by two specific air handling units.
    - Is there a way to separate out the energy consumption for these two systems?
    - Should we expand to a building-wide view? Floor?
    - Is looking at consumption on an AHU level a valid perspective?
- Fans
  - We have supply flow air and fan status but we need a methodology of connecting this to data to energy usage, or just generally a method to understand fan energy consumption.
- Pumps
  - Evaluate whether we have useful data which will help us understand pump energy consumption
- Additional helpful system context?
- Walkthrough: http://icoweb.fm.virginia.edu/anyglass/pubdisplay/UVa/Customers/LinkLab0202/Home.gdfx
  - Is above the most relevant/useful source of information on system operation?

Current Data

For each air handling unit we have:

- Temperature data (deg F):
  - RA-T; Return Air
  - SA-T; Supply Air
  - PH-T; Pre-Heat Air
  - MA-T; Mixed Air
- Fans (logical on/off, Variable Frequency Drive perecntage):
  - R-FN; Return Fan
  - S-FN; Supply Fan
- Humidity:
  - RA-H; Return Air (% rel. humidity)
- Ducts:
  - EXH-D; Exhaust (%, open? documentation unclear)
  - OA-D; Outside Air (%, open? documentation unclear)
- Heating/Cooling:
  - **PH-V; Pre-Heat Valve (% Open)**

    - **CHW-V; Chilled Water Valve (% Open)**

- Occupied (logical 0/1)

For each room we have:

- **HW-V; Hot Water Valve (%, open? documentation unclear)**
- SA-T; Supply Air Temperature (73.3 deg F)
- SA-F; Supply Air Flow (CFM)
- SA-F-SP; Supply Air Flow Set-Point
- ZN-T; Unconfirmed but appears to be temperature set-point (deg F)
- Temperature (deg C)
- co2 (only select rooms, PPM)
- Heating/Cooling:
    - PH-V; Pre-Heat Valve (% Open)
    - CHW-V; Chilled Water Valve (% Open)
- Occupied (logical 0/1)