These are ideas on what we need to do to generalize the DB.

To do:

* Reach out to others to get feedback
  + **Mike Pumroy** <[mpumroy@macalester.edu](mailto:mpumroy@macalester.edu)> energy manager who sent extensive spreadsheets on how done there
    - Prefers English units
    - Likes to see raw data and not just converted so would like to see actual meter readings
* Look at DB in other systems to see what did
  + See EnergyDatabaseStarSchema.pdf for one DB setup that has many items/features. Richard Goerwitz at Carleton.
  + Asked CEED if they could give us info on DB.
  + Looked through Macalester and Central spreadsheets on what stored and calculated.

Meter info

* Name
* URL/IP address (may not need for all meter types)
  + We need a value to indicate that a meter is not automatically read
* Unit
  + Should we store the unit and scaling factor? This would mean we would not need W & KW. It would also allow us to dummy up for units people want but we did not give.
  + Energy
    - Electricity
      * W, KW, megajoule (demand)
      * Wh, KWh (consumption)
    - Natural gas
      * BTU, kBTU, volume (cubic feet or meters, MCF, CCF), therm
  + Water
    - Ga, cu ft, L, CCF
  + Fuel oil
    - Ga but has equivalent energy value
  + Steam - is this energy or something else?
    - Believe need pressure, temperature and flow
    - CEED gives ga
  + Heated water
    - Can be demand (flow) or usage (volume)?
  + Chilled water
    - CEED does TonHr which is a normalized BTU/hr (1 ton hr about 12,000 BTU)
  + Not all types are compatible so need to decide how will determine which can group together.
  + We need to decide default energy units for graphs and whether people can modify them
    - Probably related to showing as common usage such as laundry loads.
    - Maybe admin set with defaults
      * Should defaults vary by region (SI vs. English units).
* Note
* Frequency to read
* Frequency that meter records data
  + Not needed for MAMAC
* GIS coordinates
* Location (see below)
* Consumption vs. generation
  + When do this need to fix graphs/compare so make sense. Now you use less if you generate less which seems backward since reverse of production.
* Draw related to meter - can vary with time
  + # people and/or # people FTE
  + Sq. feet - should we allow sq. m?
* Do we have to worry about reactive power, apparent power, power factor, Volt-amperes?
* Do we want to allow for generalization to garbage and recycling by having pounds or Kg unit?
* We should keep track of the timezone on a meter so we can properly deal with it. Most sites will likely have all meters in one timezone so maybe a site setting with one here to override.

Buildings

* Maybe separate table that linked to and developed later?
* Name
* GIS coordinates
* Notes
* Draw related to meter - can vary with time
  + # people and/or # people FTE
  + Sq. feet - should we allow sq. m?
* Description
* Picture
* Energy use associated with building
* Typical usage (residential, academic, …): CEED has primary and secondary with %
  + Look at Energy Star building labels to see if they might apply to how we label buildings but may not be good match for academics

Locations

* List of location names such as campus locations
* GIS coordinates or whatever needed to get degree heating/cooling, temperature, etc.

Conditions

* Location
  + Temperature ave for day and maybe regular readings
    - F, C
  + heating/cooling day
  + Cloudy, sunny, etc
    - see what NWS and others use
  + Wind?
* Check NWS way of presenting this
  + Should we get in real-time when needed?
* The temperature you set as the threshold for degree heating/cooling varies by location and is something the site would want to set. Can be done by a person or could probably automate.

Baseline

* See that branches work on GitHub but want to include in this update