University of Hawaii Cancer Center

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WSP

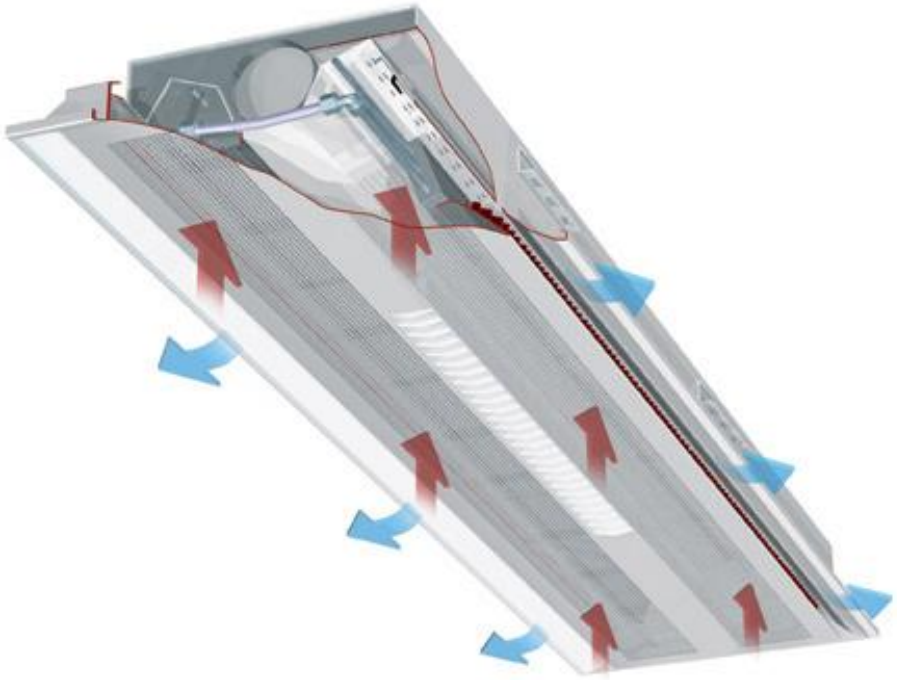
Background

- Owner – University of Hawaii
- Type of Facility
  - Location to centralize all cancer research in Hawaii
  - Only nationally recognized cancer research facility in Pacific and one of 67 nationwide.
  - Main focus is researching cancers that affect Hawaii and the Pacific Rim
- Size: Two buildings with a total of 150,000 sqft
  - Building A is the wet lab with General Labs, BSL-3 Lab and Freezer Room
  - Building B is dry lab with demonstration kitchen, seminar room, exercise facility, conference rooms and offices
- Schedule – Design started in 4th quarter of 2009 and Construction was scheduled to be complete in 2nd quarter of 2013
- Budget – $120 million

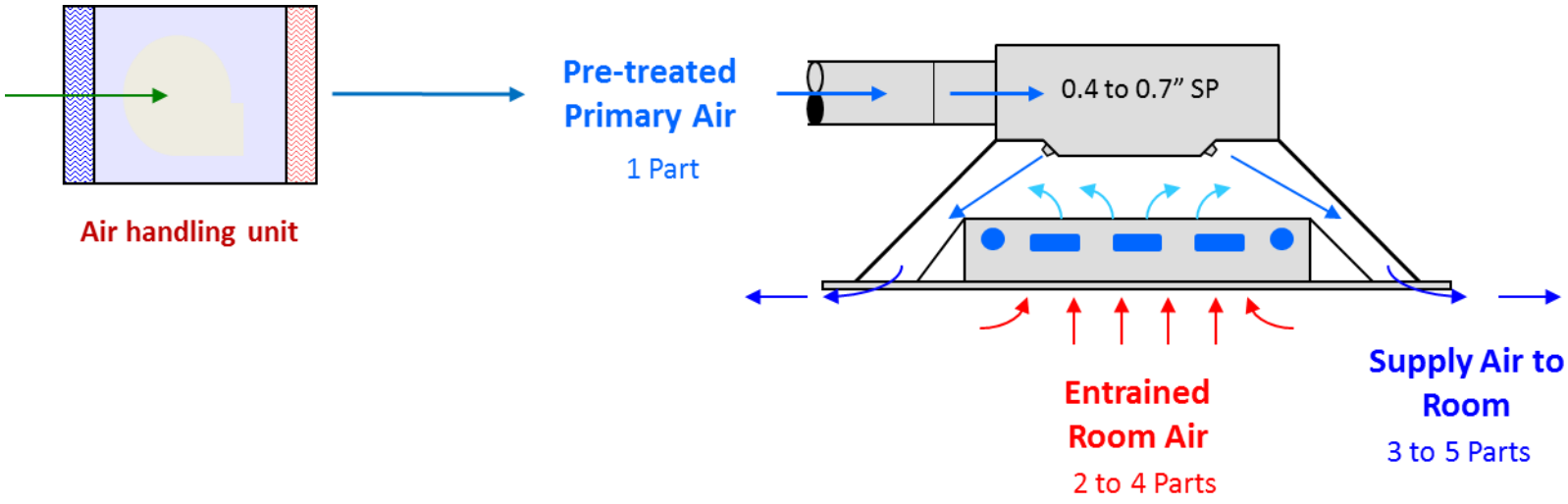
Features of Mechanical System

- Project was design build so contractors were on board early to get pricing established and to assist on design alternatives to reduce costs and start construction earlier in design phase (late DD)
- Active chilled beams used for sensible cooling in most areas
- Lab fume hood exhaust equipment with VAV exhaust system to reduce the volume of air delivered to the labs during periods of low usage
- Direct evaporative cooling to precondition the 100% outside air supplied to the wet lab building with run around loop
- Reheat water from the condenser water system
- All the building air systems located at the penthouse to maximize the efficiency of the building program areas
- Low face velocities at main AHU's, below 400 fpm
- Essential system serving building are N+1

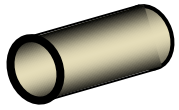
Active Chilled Beams



What are Chilled Beams?



Benefit of Chilled Beams



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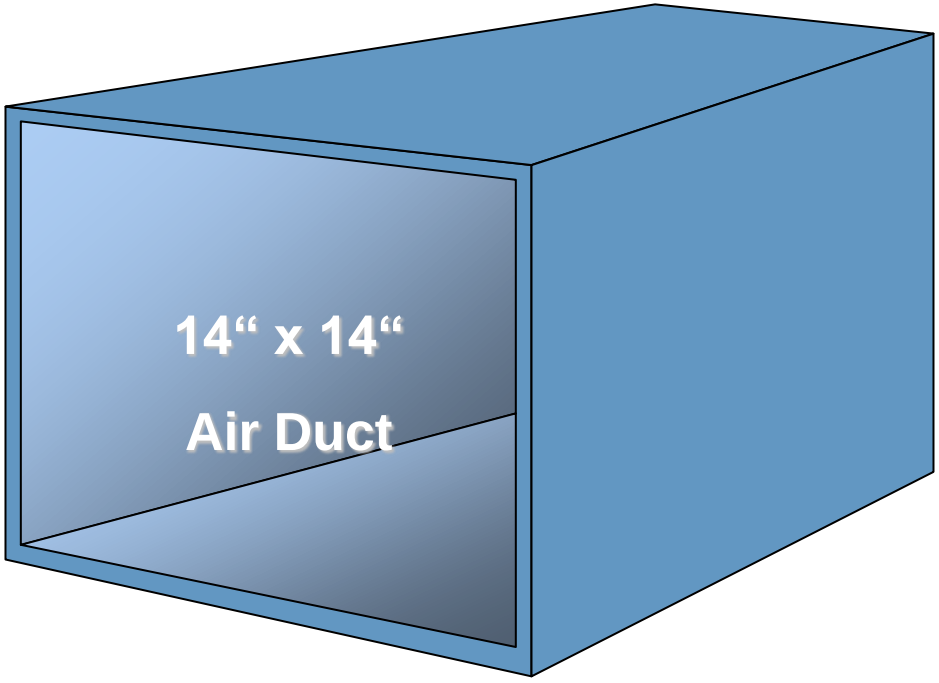
Water Pipe

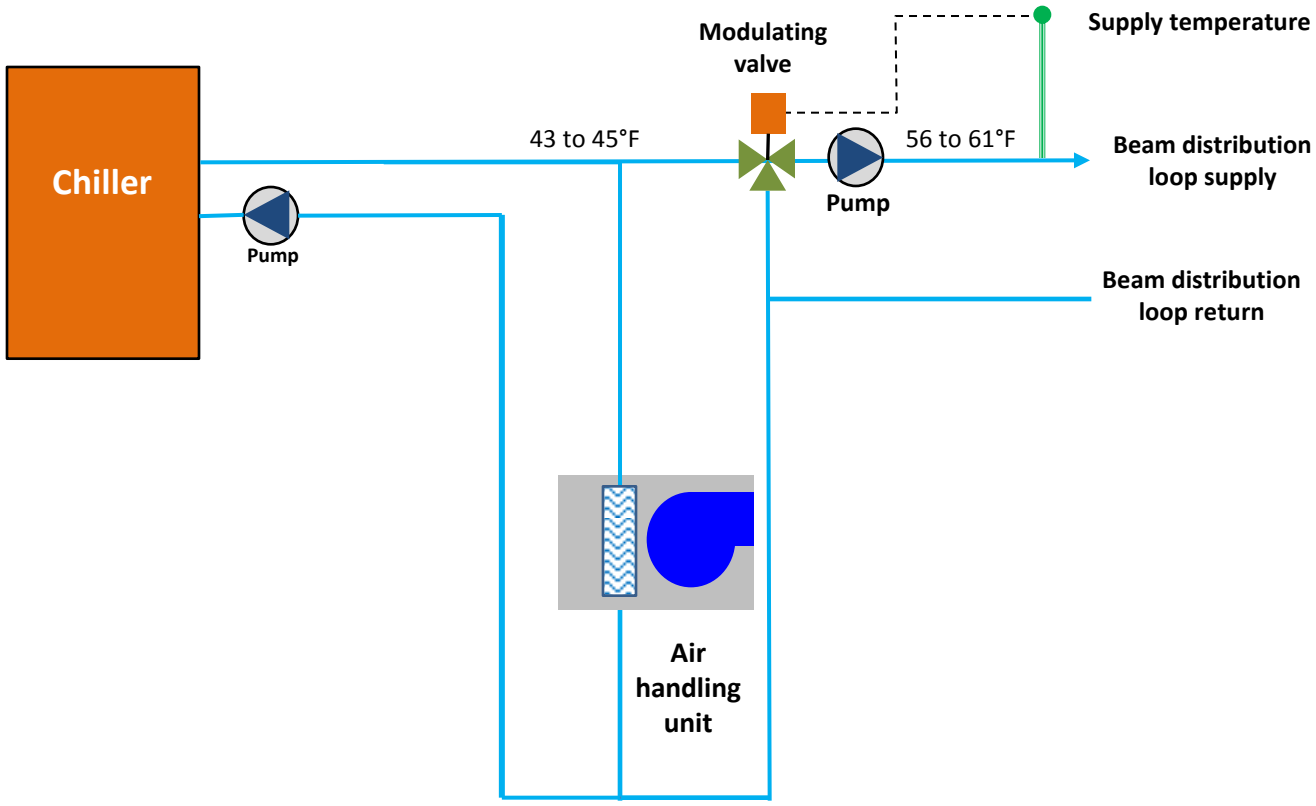


Cost to transport with water

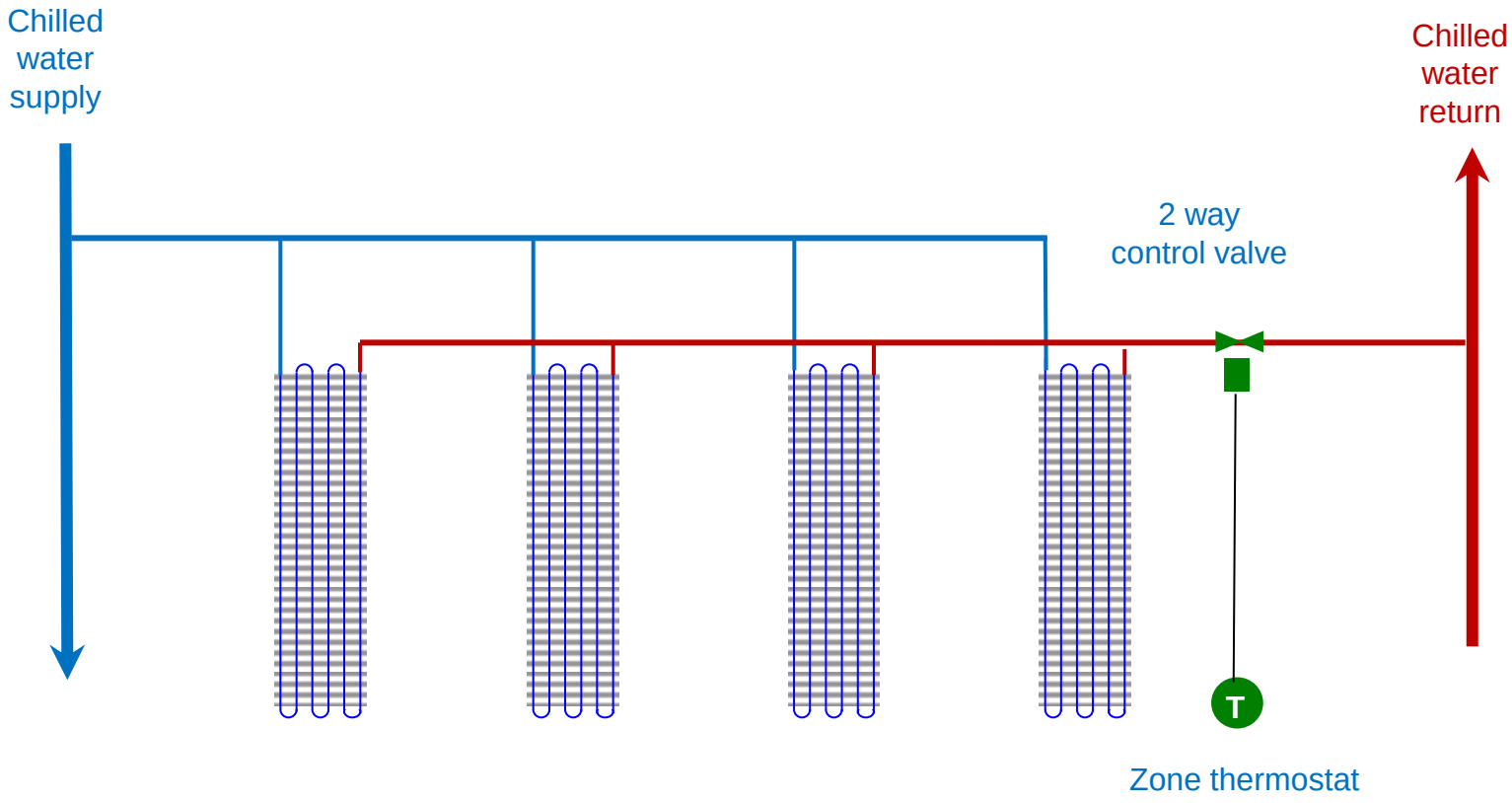
15 to 20% that of air

Chilled Water Supply

Open Loop, Shared Chiller Configuration



Temperature Control and Zoning



Biggest Design Challenge

Condensation

Biggest Potential Issue with Chilled Beams Especially Here in Hawai'i

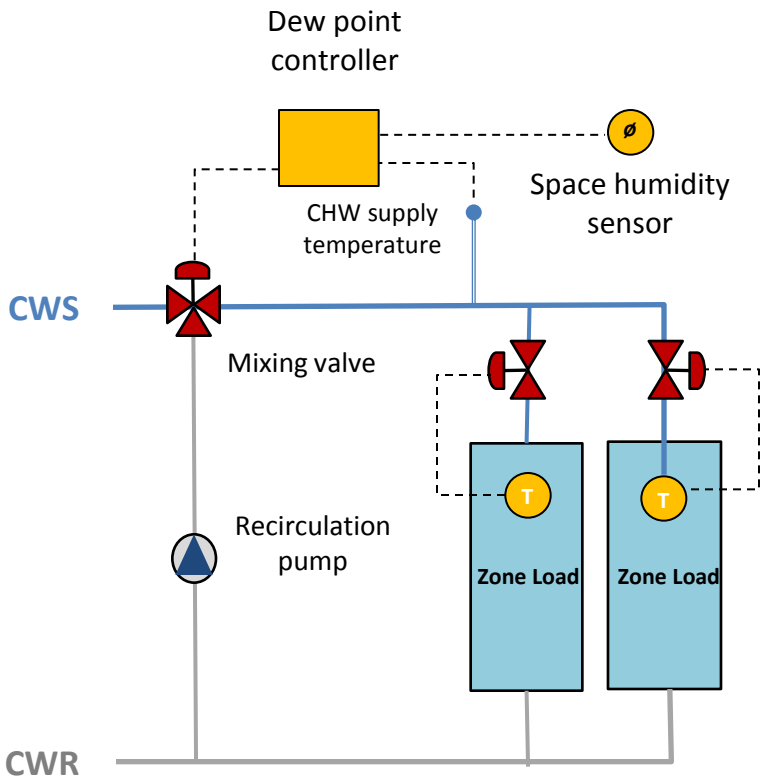
Condensation Prevention Tips

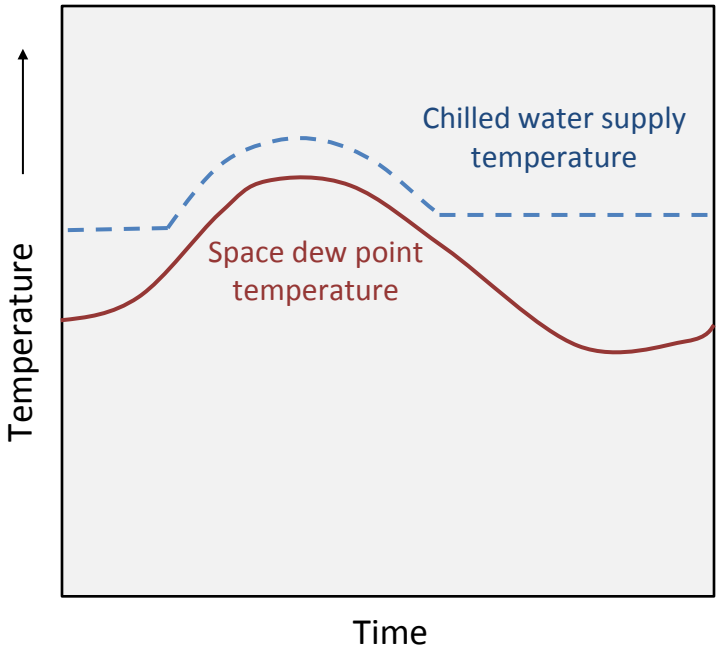
for chilled beam systems

- Interlock that shuts off the chilled water flow when AHU is off.
- Chilled Water Reset Strategy: works best for a relatively tight building and used at Cancer Center.
- Chilled Water Discontinuation: this is only recommended where operable windows are used.
- During start up, chilled water flow should not commence until space dew point temperature has been restored.
- Do not locate chilled beams in areas with high latent load concentration.

Condensation Prevention

Chilled water temperature modulation





Chilled Beam Applications

Where to Use Them

- *Anywhere* you can control the indoor humidity with limited latent cooling
  - Laboratories
  - Office buildings
  - Call centers
  - Educational facilities
  - Government facilities
  - Health care facilities
- Ideal Applications
  - Applications with limited plenum space
  - Spaces where sensible cooling dominates

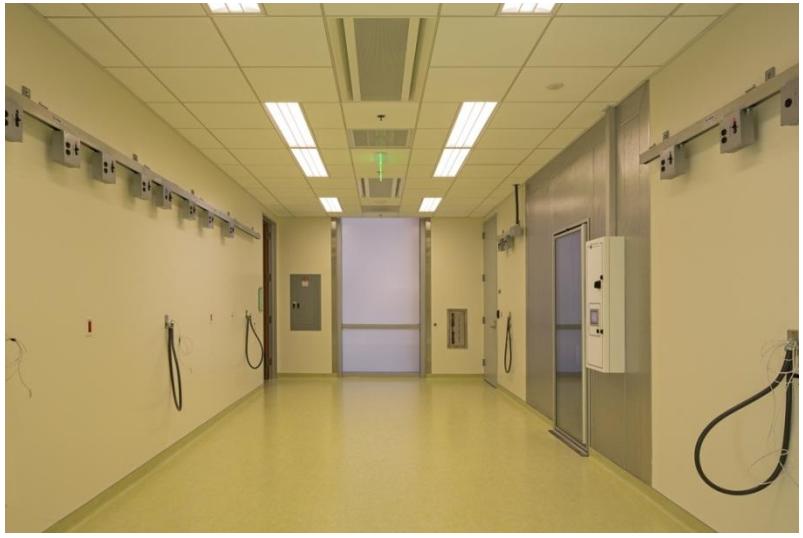
Where Not to Use Them

- Spaces where indoor humidity *cannot* be controlled
  - Kitchen areas
  - Bathrooms
  - Gymnasium
  - Other areas with low sensible heat ratios

Use Them with Caution

- Rooms with operable windows
- Entrance lobbies/atriums

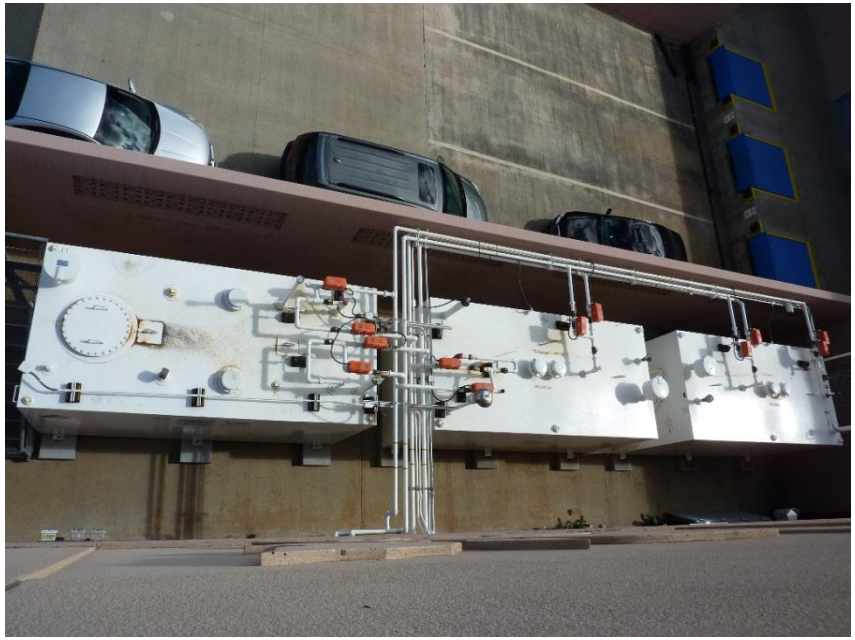
Active Beam Installation Images



Chiller Room Images

Auxiliary Mechanical Bldg Images

Misc. Mech Images



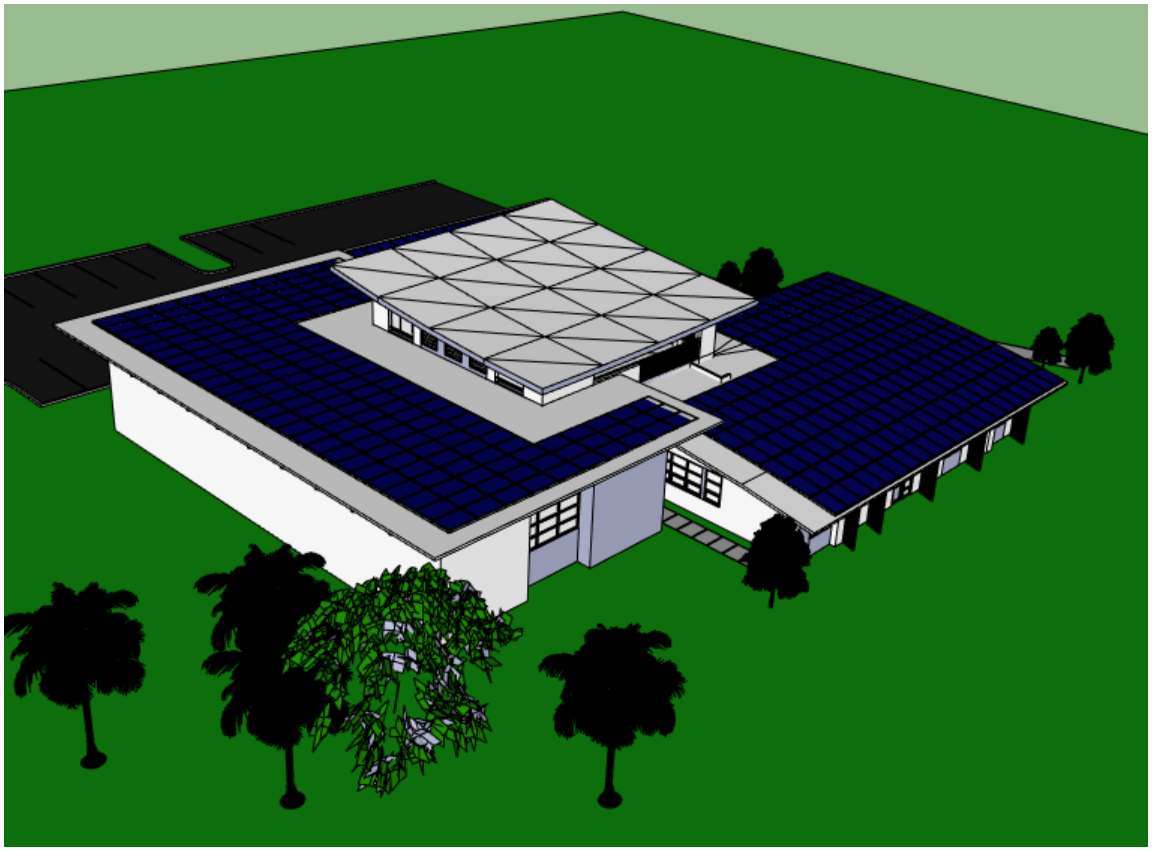
Project Highlights

- LEED Gold Certification, JABSOM building was only LEED certified and that was after a couple points were bought.
- 30% energy reduction of baseline
- $16 million under budget which allowed the team to build the shell of the expansion.
- Finish 3 months ahead of schedule.

America Samoa Power Authority

New Net Zero 10,000 sqft office building to house ASPA staff that is being built to replace previous structure that was demolished in a typhoon.

America Samoa Power Authority



- Anticipated to be LEED Gold
- PV capacity 110kW DC
- Anticipated PV Power Generation through PV's, 147.2 MWhr/yr
- Anticipated Power Consumption 99.9 MWhr/yr
- Biggest key to success is to get users on board to operate equipment per design when it comes to scheduling and setpoint

Questions

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