ASHRAE TECHNOLOGY AWARDS

Oregon State Hospital

Junction City

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Affiliated Engineers, Inc.

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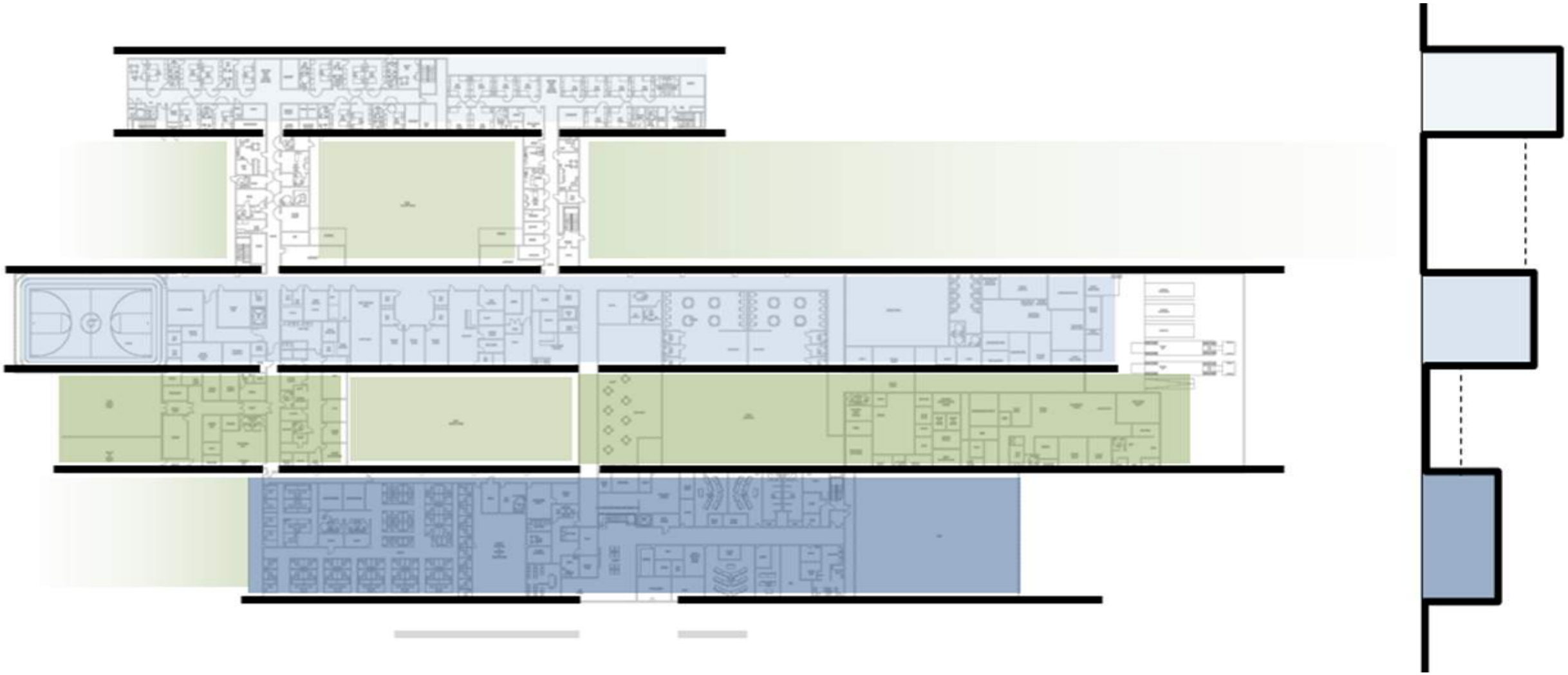
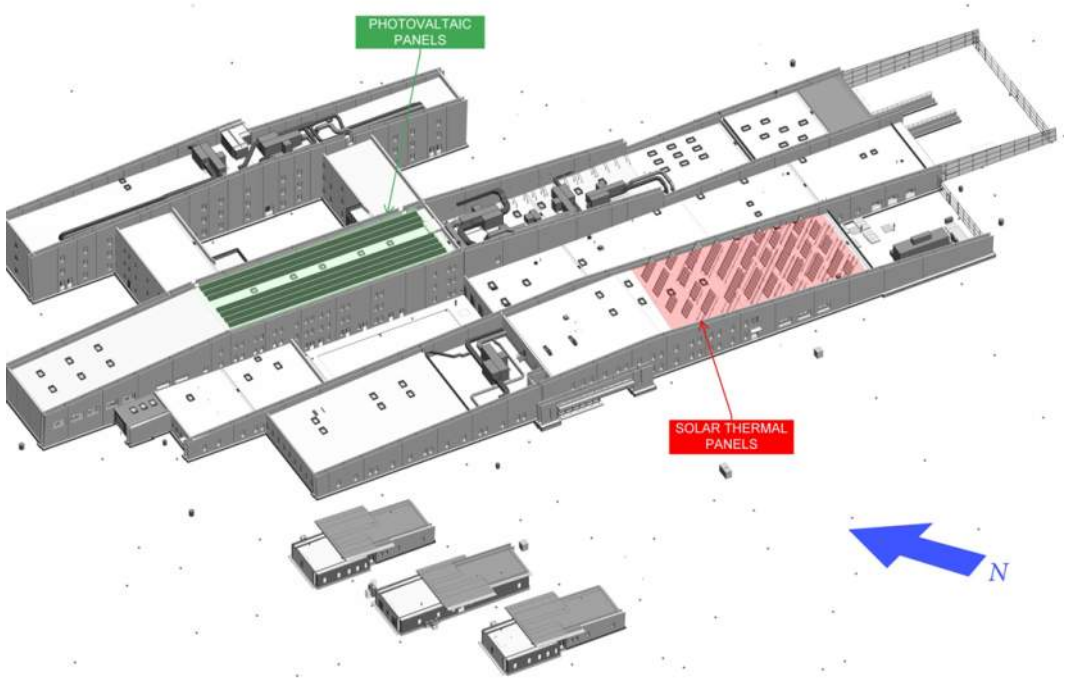
Oregon State Hospital - Junction City

Oregon State Hospital Junction City



Energy Design Factors

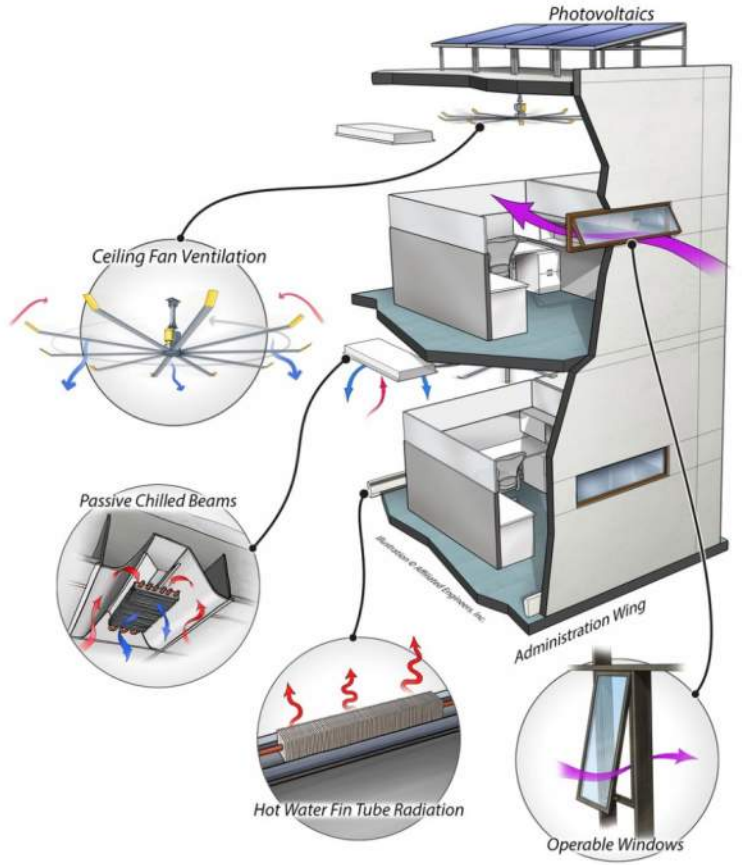
- 223,000 GSF Psychiatric Hospital, Occupied Jan 2015
- Must meet code using an energy model but also prove it with measurements
- Code mandates 1.5% of construction $ for solar
- High water table
- Large acreage



HVAC Sustainability Features

- Code variances: 2 ACH with 100% OA in patient rooms via chilled beams
- Ventilation & lighting shut-off when unoccupied
- 100% OA AHUs, heat wheels, low pressure drop
- Admin and Gym: natural ventilation, night time pre-cooling, ceiling fans

Natural Ventilation

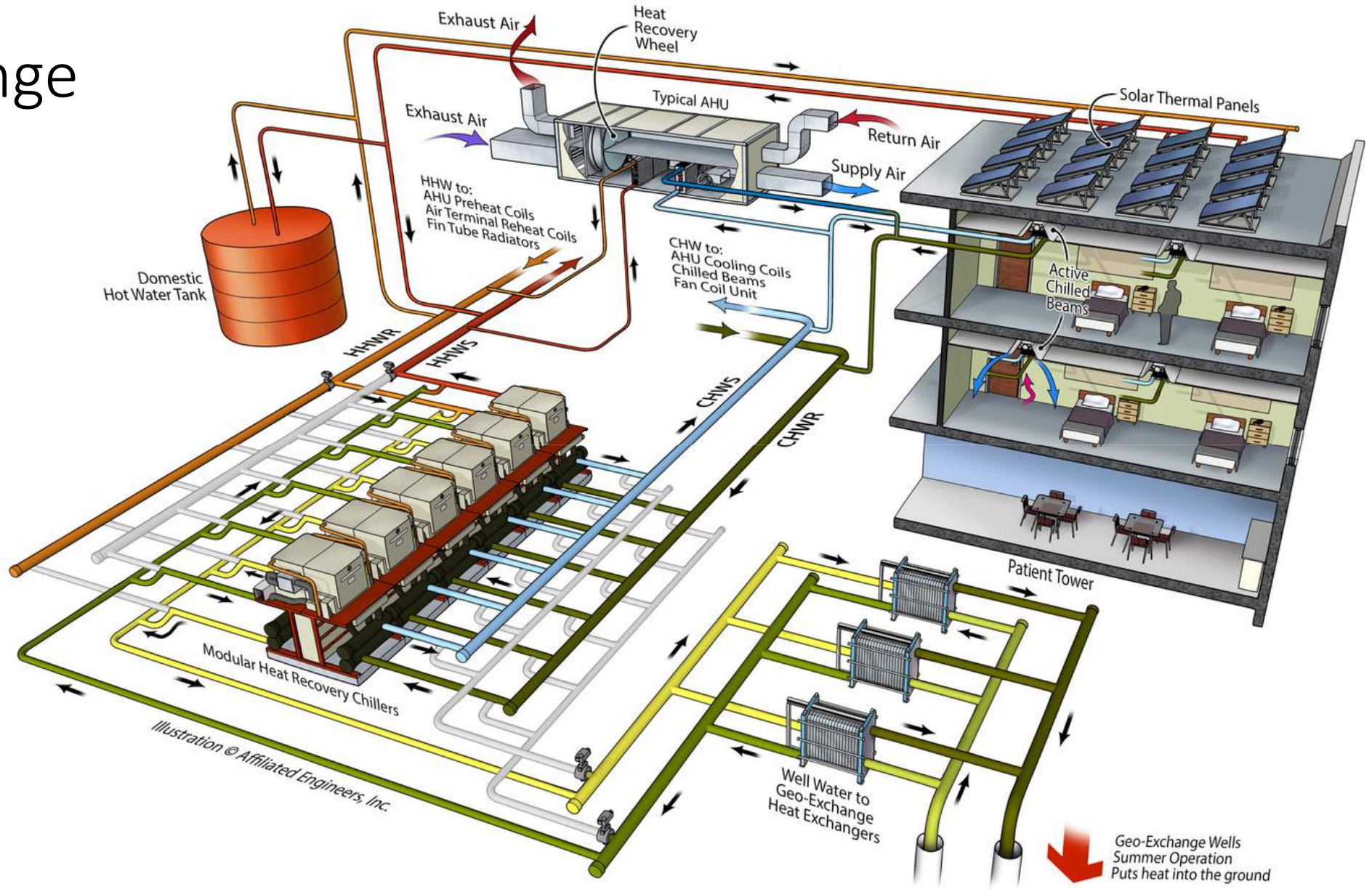


More HVAC Sustainability Features

- Solar thermal & PV
- Chilled beams in all areas
- Heat recovery chillers
- Geo-exchange (no boilers, chillers, cooling towers, or propane tank)

Open Loop Wells

Geo-Exchange



Heat Recovery Chillers

Geo-Exchange vs Conventional System Cost

Geo Cost Adds

- Open loop wells
- Heat recovery chillers
- Heat exchangers

Geo Cost Deducts

- Chillers
- Cooling towers
- Boilers
- Propane tank

- First Cost Difference = ~$0

Chilled Beams vs. Conventional VAV

Lower energy consumption

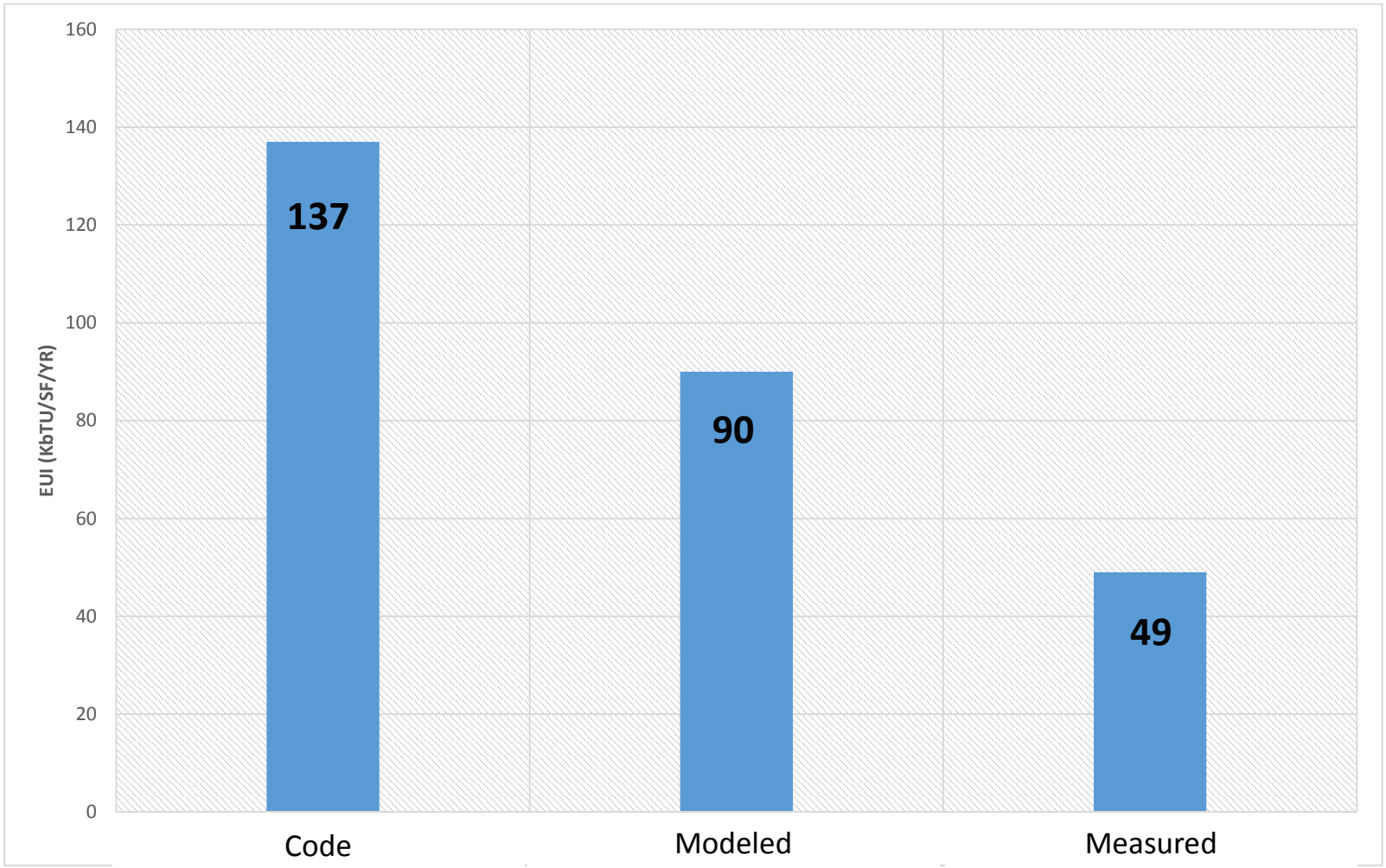
- 2 ACH vs 6 ACH
- Reduced AHU & EF fan motor energy
- Increased COP of chiller (60F LWT)

Cost effective

- Reduced space requirements - smaller AHU sizes
- Smaller ductwork → 6” floor to floor savings & reduced shaft sizes
- *Contractor & estimator education required*

First Cost Difference = ~$0

Code, Modeled & Measured EUI



(ASHRAE 90.1 2010)

Greenhouse Gas Emissions

- HVAC greenhouse gas emissions
  - 0.4 million lbs CO2 per year
- Why so low?
  - All electric building
  - Bonneville Power Administration (90% hydro, 5% nuclear)
- Potential for ZNE (site energy) with more PV

Grand Coulee Dam

Questions?