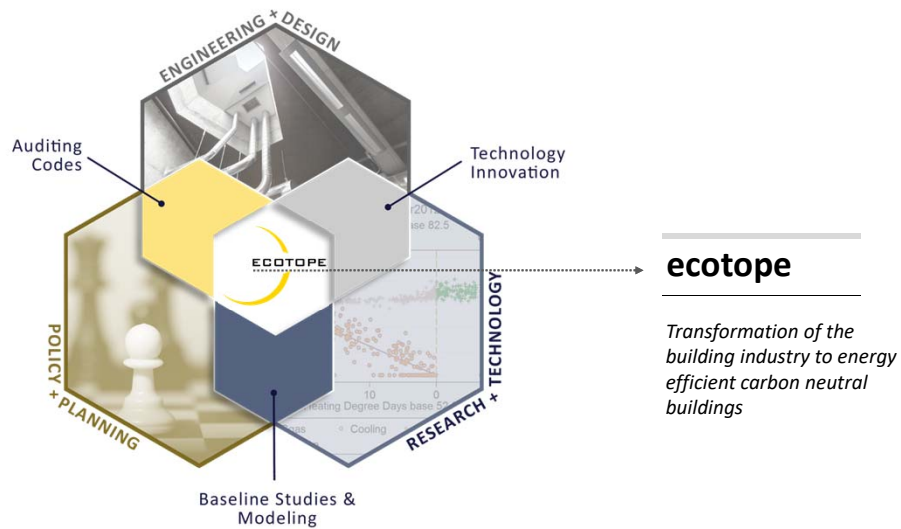
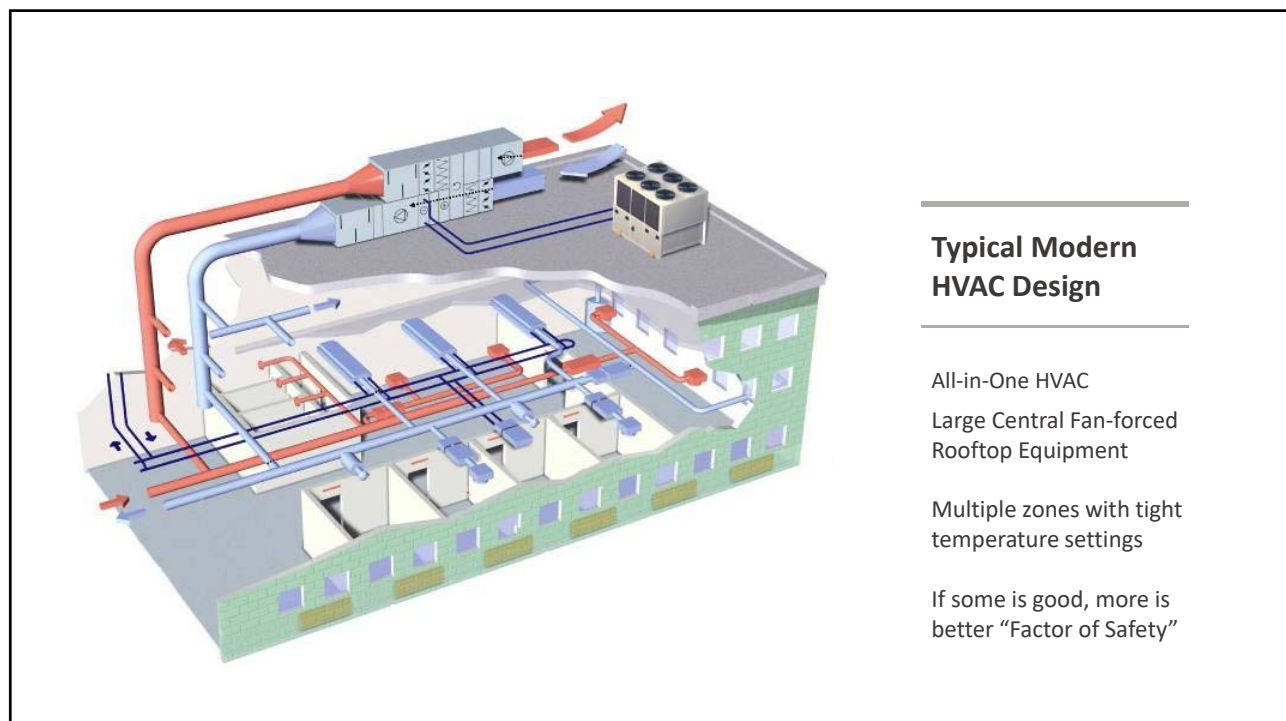
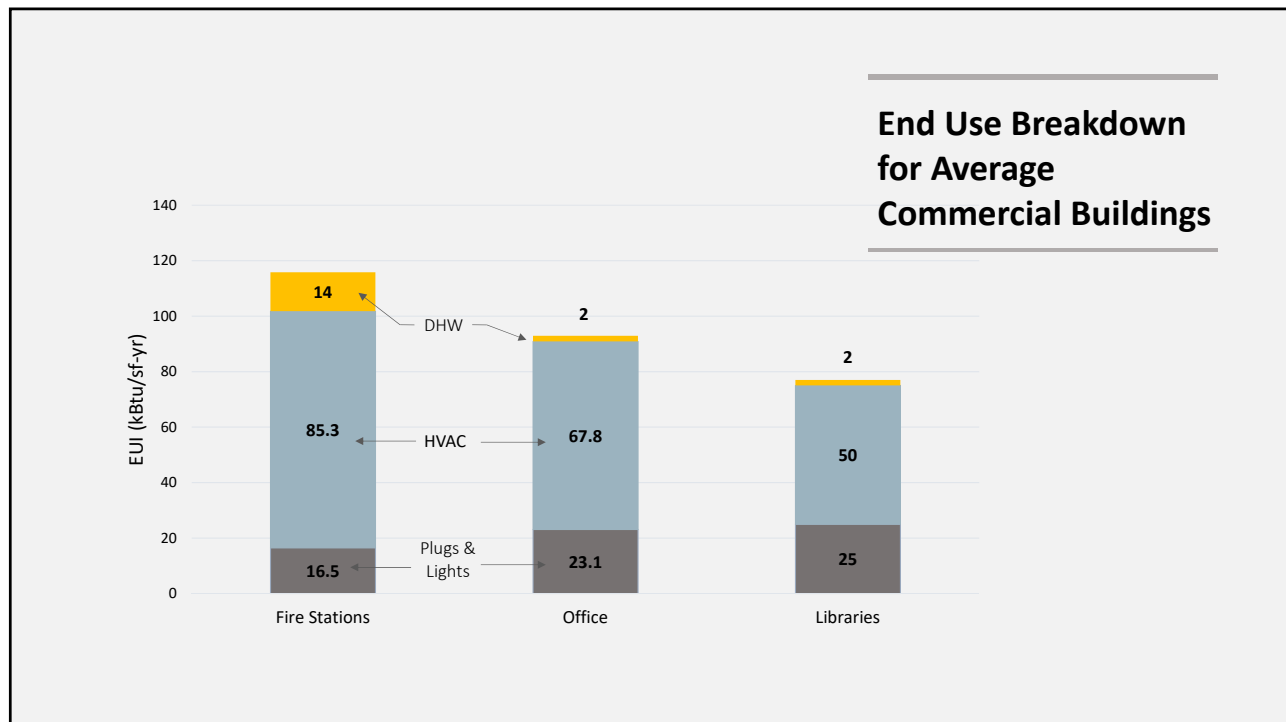


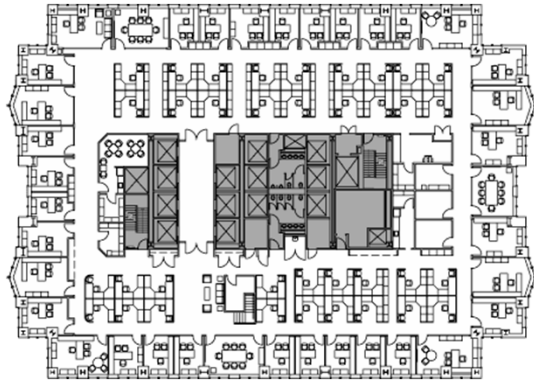


Design for Off: Key Mechanical Design Strategies for Low Energy buildings

Jonathan Heller, P.E., LEED AP
President







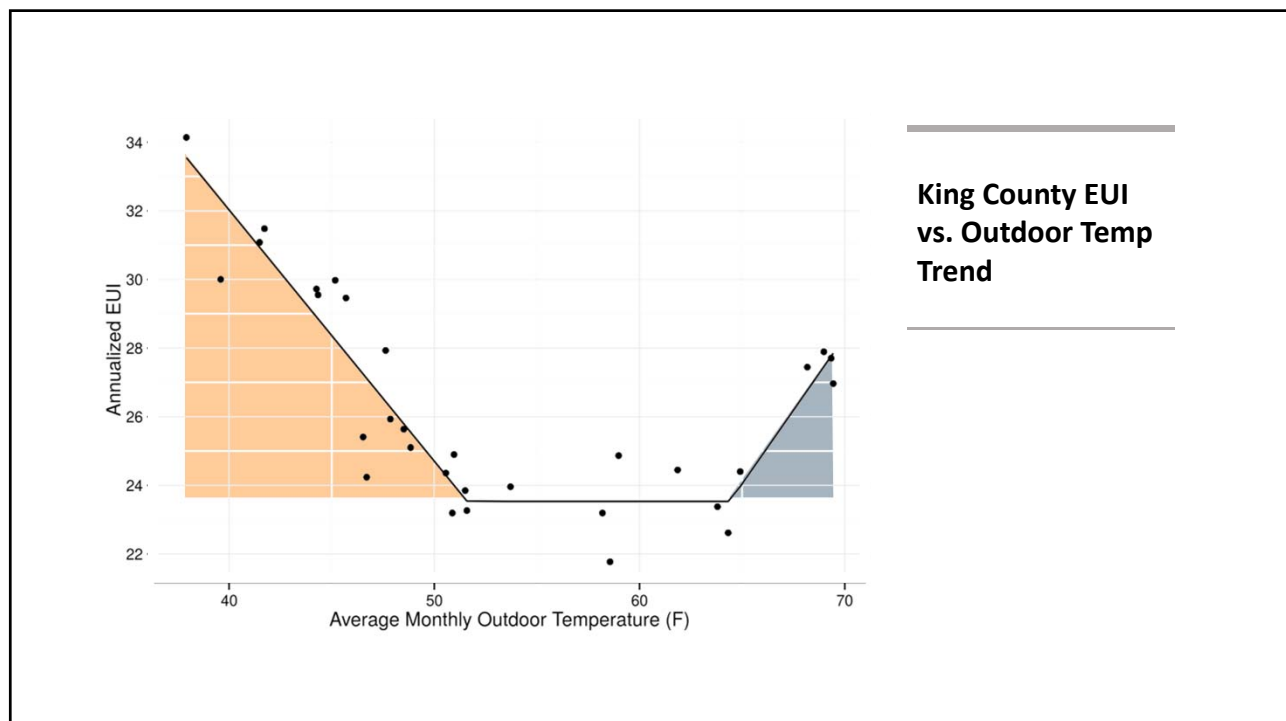
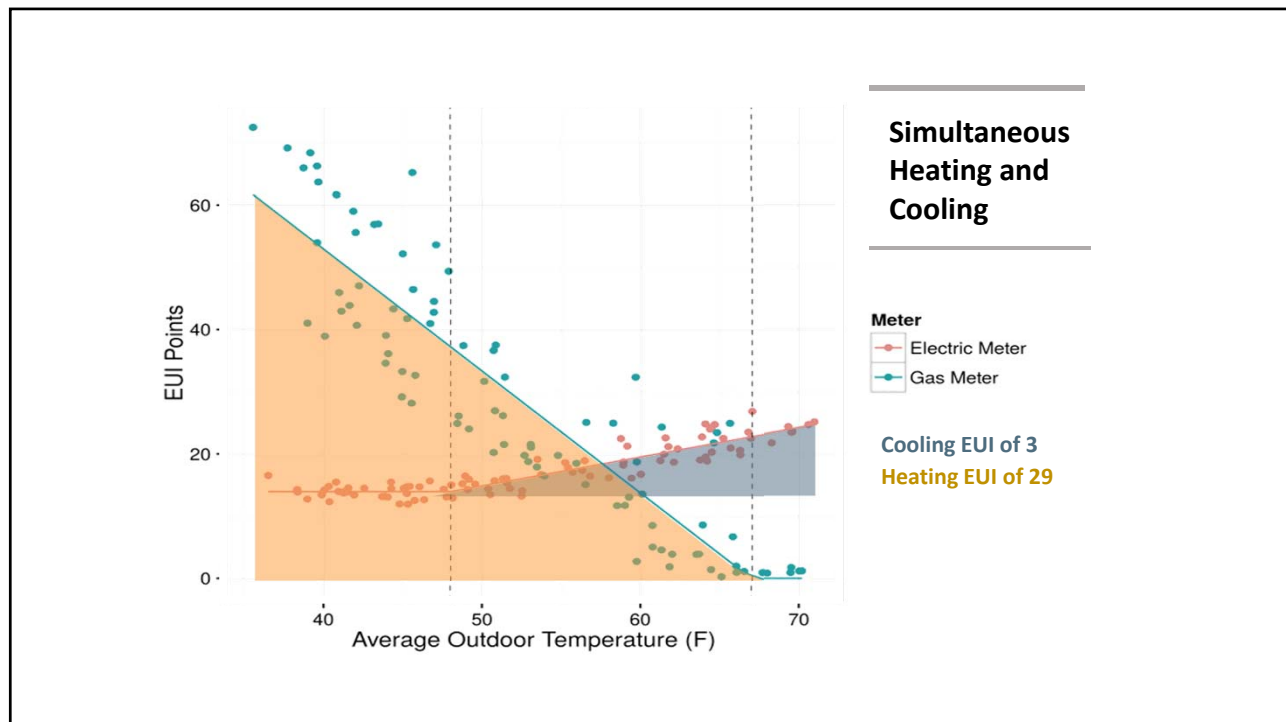
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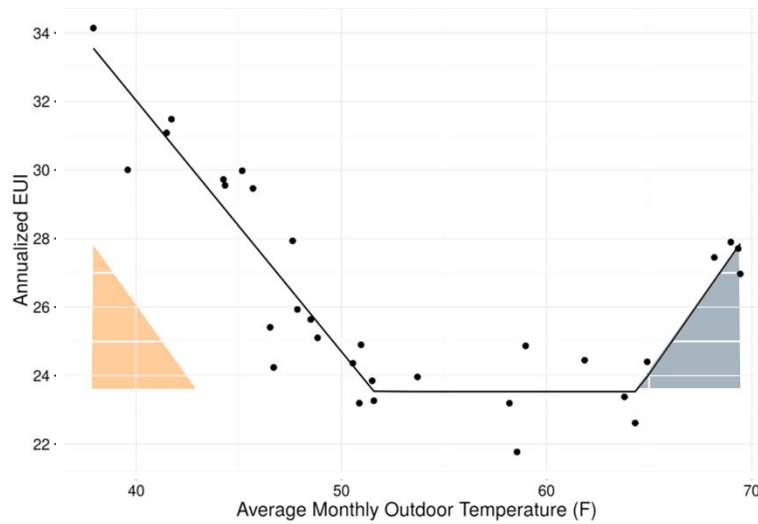
Perimeter Offices,
Poor Insulation,
High Gains



NOW:

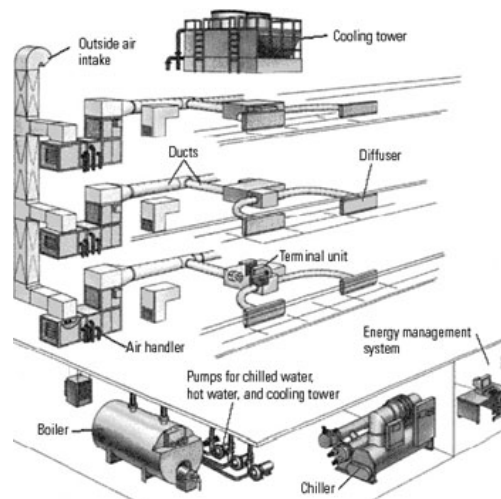
Open Office
Floor Plans,
Well-insulated,
Low Gains





**EUI vs. Outdoor
Temp Trend with
Super-Insulation**

**01. Move away
from large
central HVAC
systems**

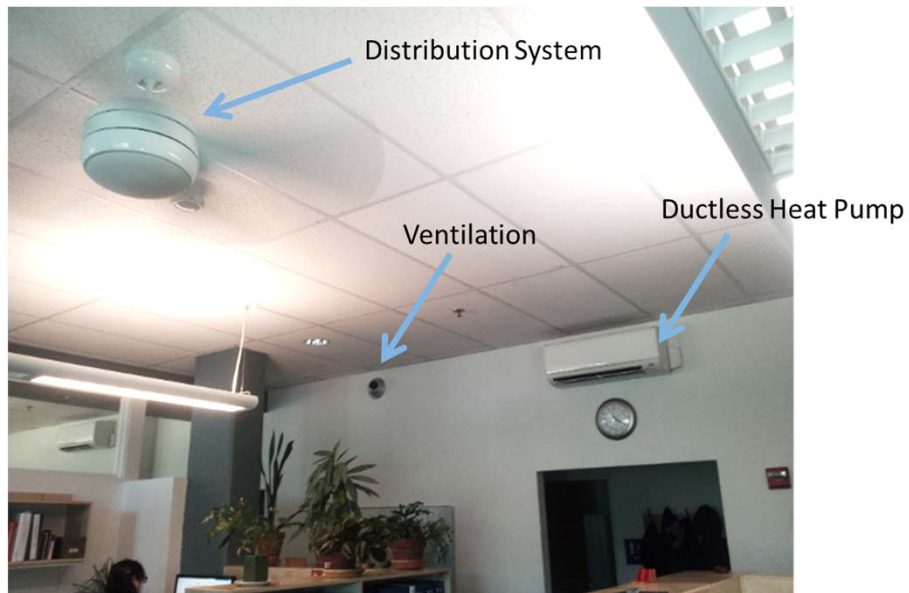


... toward
smaller zonal
systems

.....



**02. Move away
from all-in-one
HVAC systems**



**... toward
dedicated
ventilation
systems**

2. Right-Sized Mechanical Systems



**Believe (Do) the
Load Calculations**



Case Study:
Kettleson Library
Sitka, AK



New Carbon Neutral Library

	PRE	POST
Glazing	Single	Triple
Insulation	Mostly Uninsulated	Super-Insulated
Heating	Oil Boiler	VRF Heat Pump
Distribution	Big Fan Systems	Radiant Floor
Ventilation	Outside Air	Heat Recovery
Water Heat	Electric	Heat Pump
Lighting	Florescent	LED
EUI	99	32
CO2 Emissions	72,000 lbs/yr	0

Kettleson by the Numbers

Design For Off

1. Separate Ventilation from Heating and Cooling
2. Zonal: Turn Off Heating and Cooling Equipment When not in Use
3. Right-Size Equipment

Questions?

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