



ASHRAE 2017 Building Performance Analysis Conference

Building Type: Office/Warehouse
Total Floor Area: 57,834 ft²
Location: Virginia

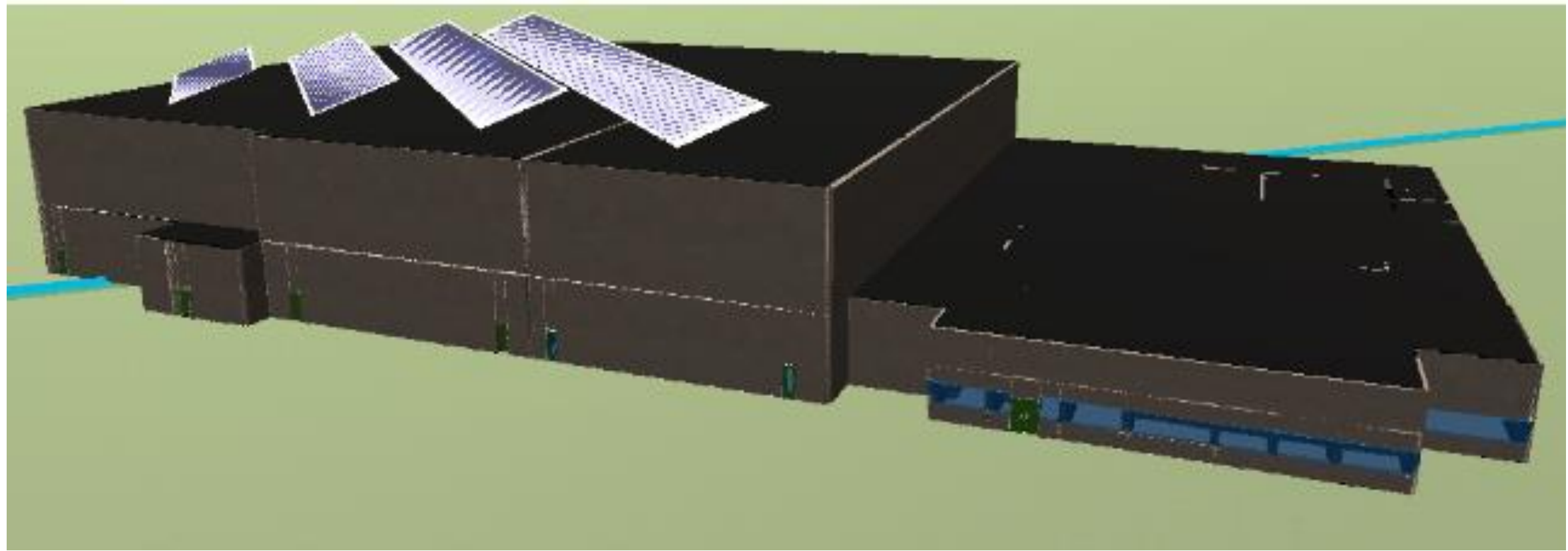
Total Energy Usage	3,796,096	kBtu/year
Site EUI	65.6	kBtu/ft ² -year
Source EUI	181.4	kBtu/ft ² -year
Annual Electricity Usage	3,332,960	kBtu
Annual NG Usage	462,300	kBtu
Annual Water Usage	9,000	Gallons
Annual Electricity Cost	106,712	USD
Annual NG Cost	1,438	USD
Annual Water Costs	63	USD
Total Annual Costs	108,213	USD
CPSF	1.87	USD/ft ²
Total Energy Generation	2,399,500	kBtu
Net Zero Energy	0	kBtu
Carbon Equivalent	1,420,238	lb CO ₂

Team

Designer Christian Taber	Designer Aaron McNely
Energy Modeler Caitlin Bohnert	Energy Modeler Jim Spielbauer
Energy Modeler Nick Cavitt	Energy Modeler Nagappan Chidambaram

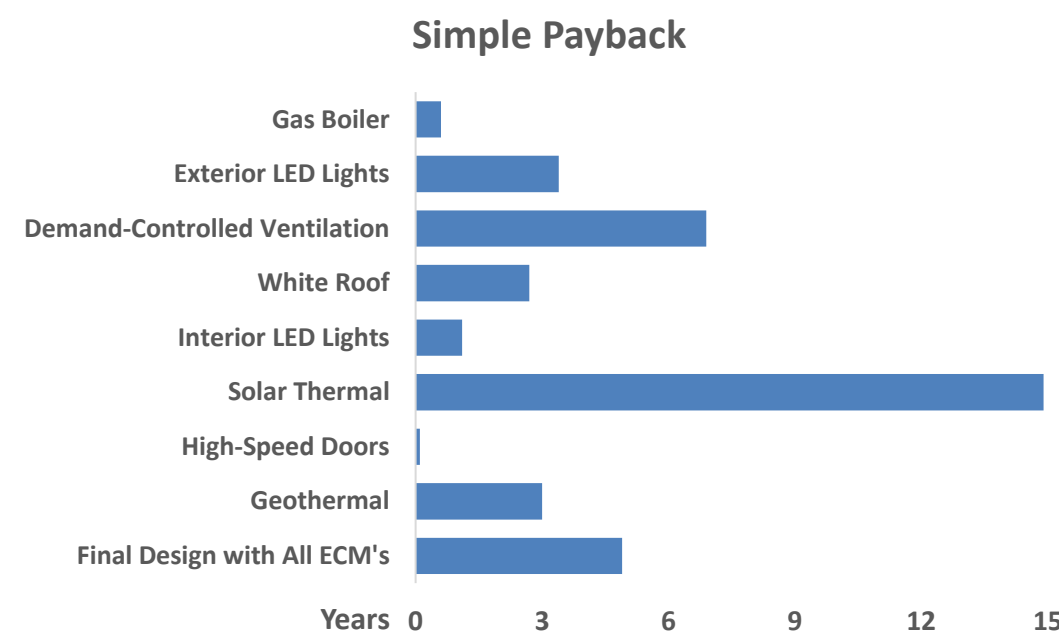
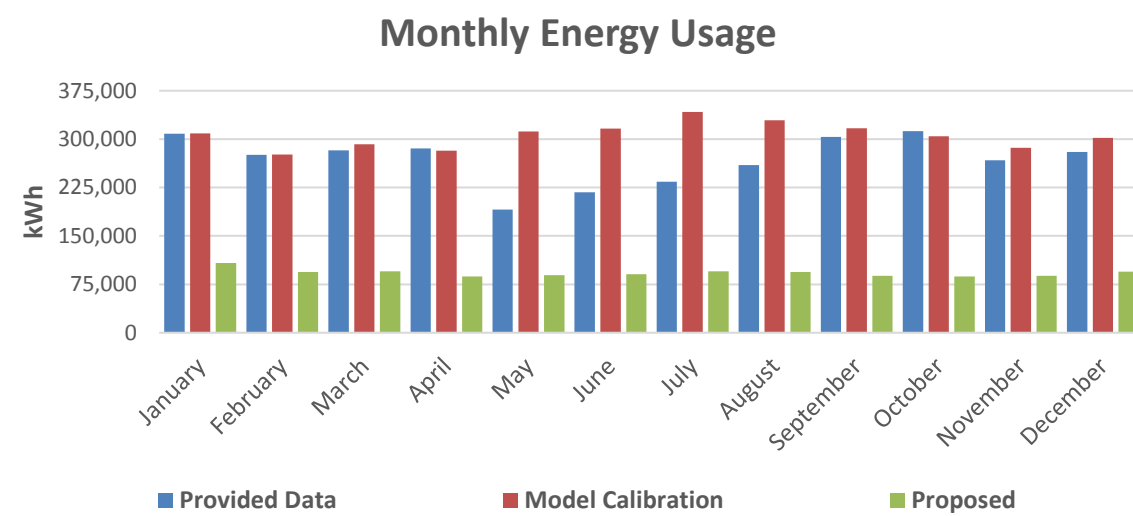
Nothin' But Net Zero

ASHRAE LowDown Showdown



Model Description

In the efforts to lower the energy usage of the existing building toward a goal of overall net zero, the team leveraged a number of analytical tools to optimize the impact of the different energy conservation measures (ECMs) that were chosen to be implemented. The team kept cost in mind in terms of payback and viability to ensure the design was valid from a financial standpoint.



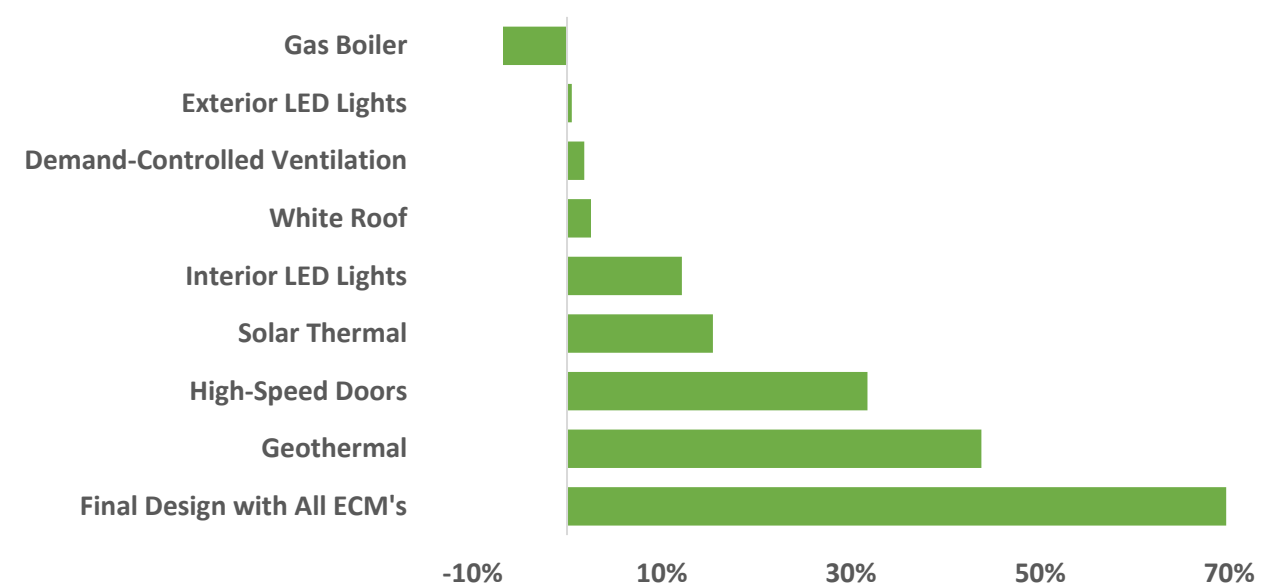
Energy Savings Strategies

As this was an existing building and cost viability was a metric, the ECMs chosen were evaluated on both EUI-reduction and financial viability. The measures applied were evaluated using simple and life cycle payback to ensure the owner would actually see financial benefit upon implementation.

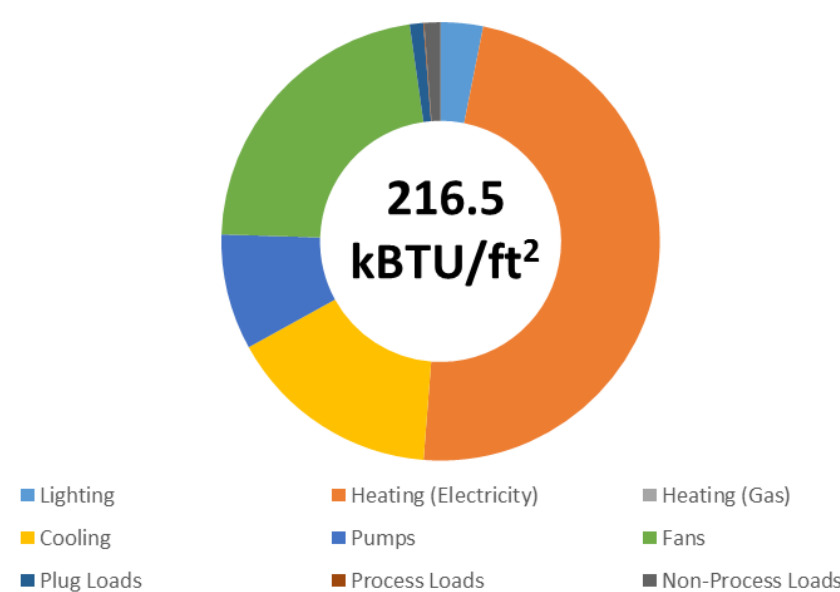
The primary focus was infiltration reduction in the warehouse-areas and HVAC energy usage. Evaluating the building location, a horizontal geothermal system located in a nearby marshy area was applied to reduce heating and cooling energy usage as well as high-speed doors in the warehouse to account for high infiltration.

Other measures include solar thermal, demand-controlled ventilation, high efficiency lighting, roof coating, and natural gas boilers.

EUI Improvement vs. Calibrated Model



Calibrated Model EUI Breakdown



Proposed Model EUI Breakdown

