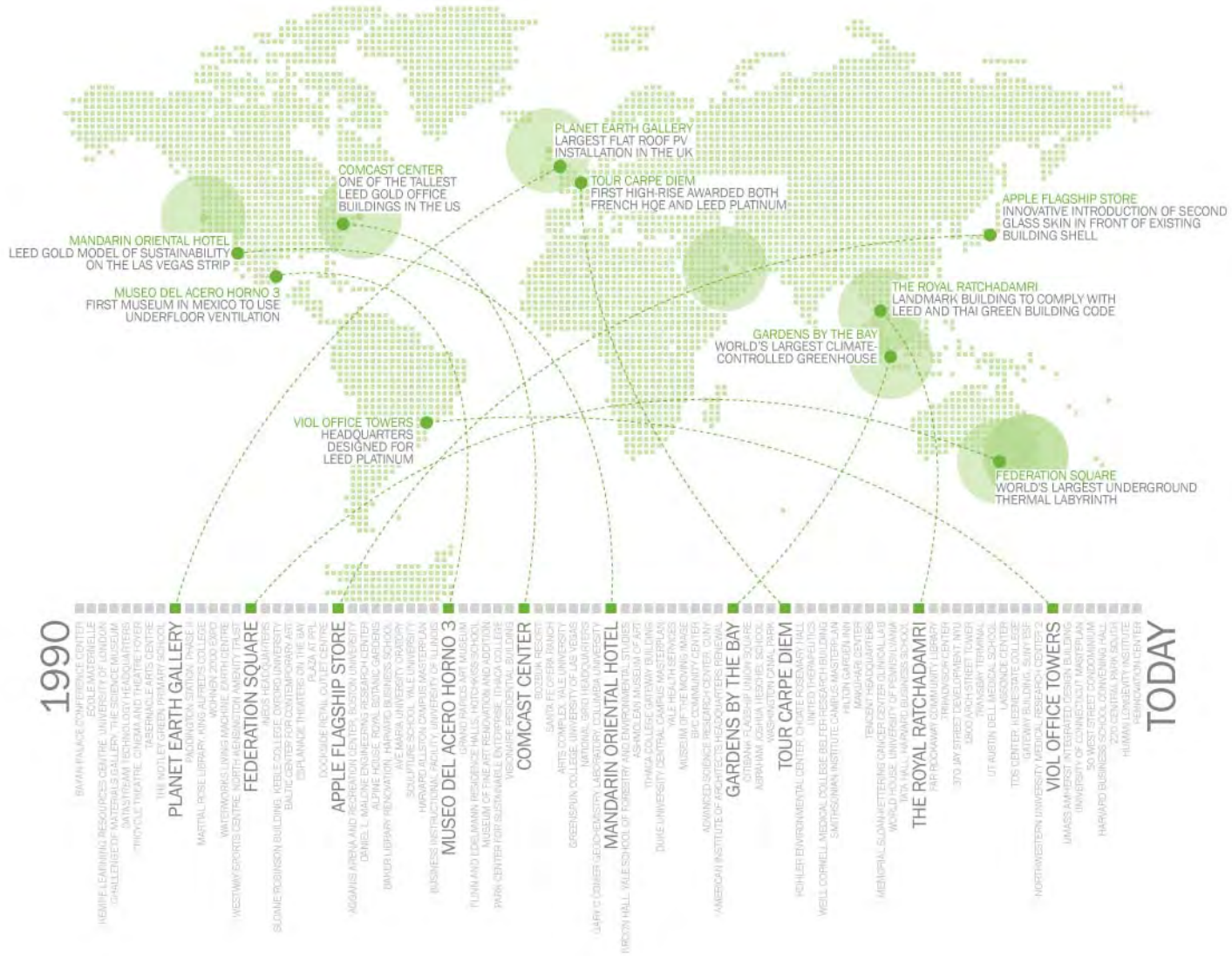
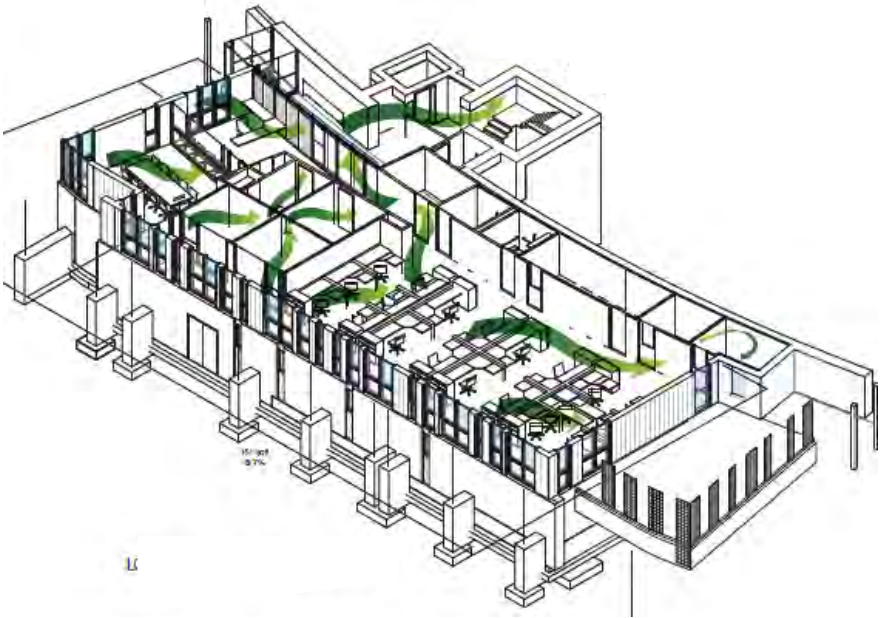


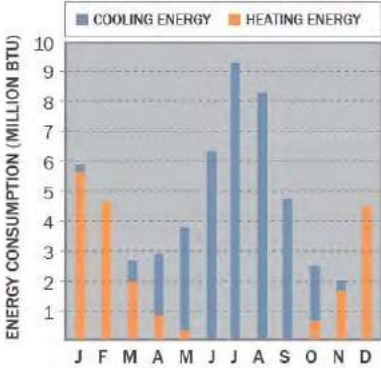
Who We Are



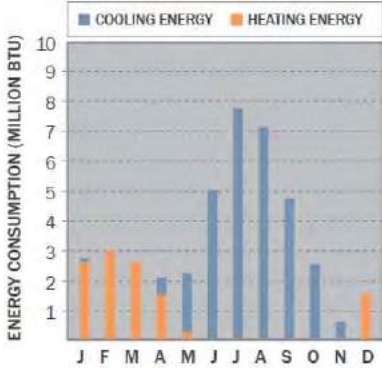
Frick Park Environmental Center



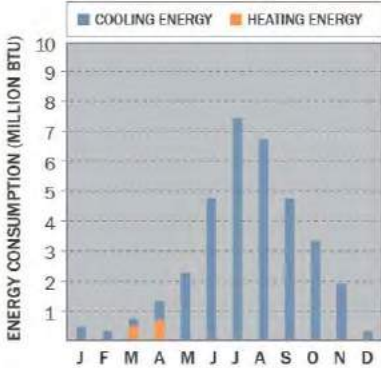
Base Case Design



Add Earth Duct



Add Earth Duct & Energy Recovery



Class of 1978 Life Sciences Center, Dartmouth College

Bohlin Cywinski Jackson

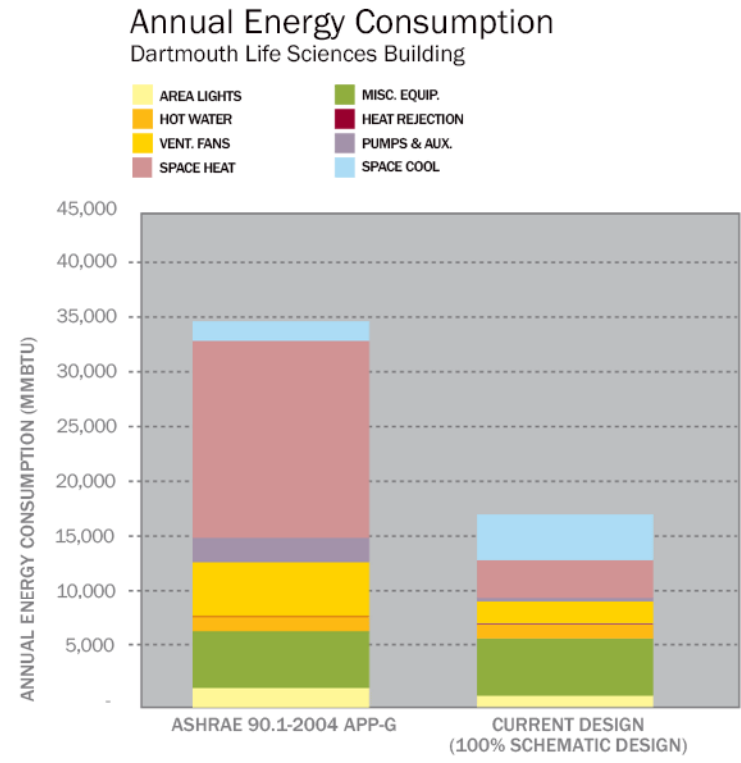


Through an integrated sustainable design process, the building has achieved an annual energy intensity of 97 kBtu/sq. ft. compared to that of a conventional lab building of 199 kBtu/sq. ft. per year.

LOCATION: HANOVER, NH
AREA: 174,000 SQ FT
COST: \$93 M
COMPLETED: 2011

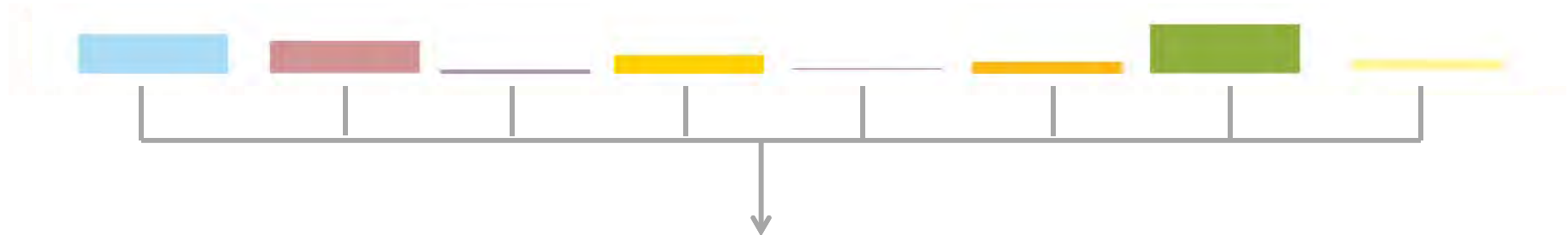
LEED PLATINUM

Tracking Energy by End Use



Tracking Energy by End Use

Energy Analysis Data



ELECTRIC	Electricity for lighting		Electricity for ventilation	
	Metrics	Model	Metrics	Model
Design load (W/gsf)	0.52	0.86	0.50	0.69
Peak demand (W/gsf)	0.42	0.52	0.50	0.69
Peak demand (kW)	70.72	88.29	85.34	118.90
Annual consumption (kWh/yr)	218,153.52	365,400.00	346,597.69	654,286.00
Annual Use Index (kWh/gsf/yr) Goal	1.28	2.14	2.04	3.83
Annual Use Index (Site BTU/gsf/yr) Goal	4,378.47	7,300.00	6,956.42	13,069.92
Annual Use Index (kWh/gsf/yr) LABS 21	2.51 to 3.32		4.48 to 6.88	
Annual Use index (Site BTU/gsf/yr) LABS 21	8,564.12		15,285.76	

Progress of Design

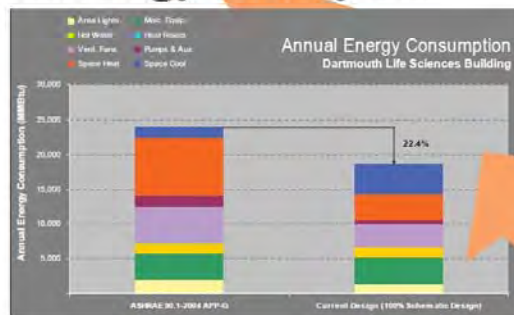
Metrics

Metric	ASHRAE 90.1-2004 APP-0		Current Design (100% Submittal Design)	
	Value	Target	Value	Target
Design Load (W/m²)	9.82	9.88	9.82	9.88
Peak Demand (MW)	0.40	0.50	0.50	0.50
Peak Demand (kW)	70.72	88.20	88.24	118.00
Annual Consumption (kWh/yr)	2,414,852	2,864,000	2,405,973	2,842,000
Annual Use Index (Wh/m²/yr)	1.28	2.18	2.04	2.82
Annual Use Index (Wh/m²/yr) (LABS 21)			0.80042	11.00962
Annual Use Index (Wh/m²/yr) (LABS 22)			0.0118100	

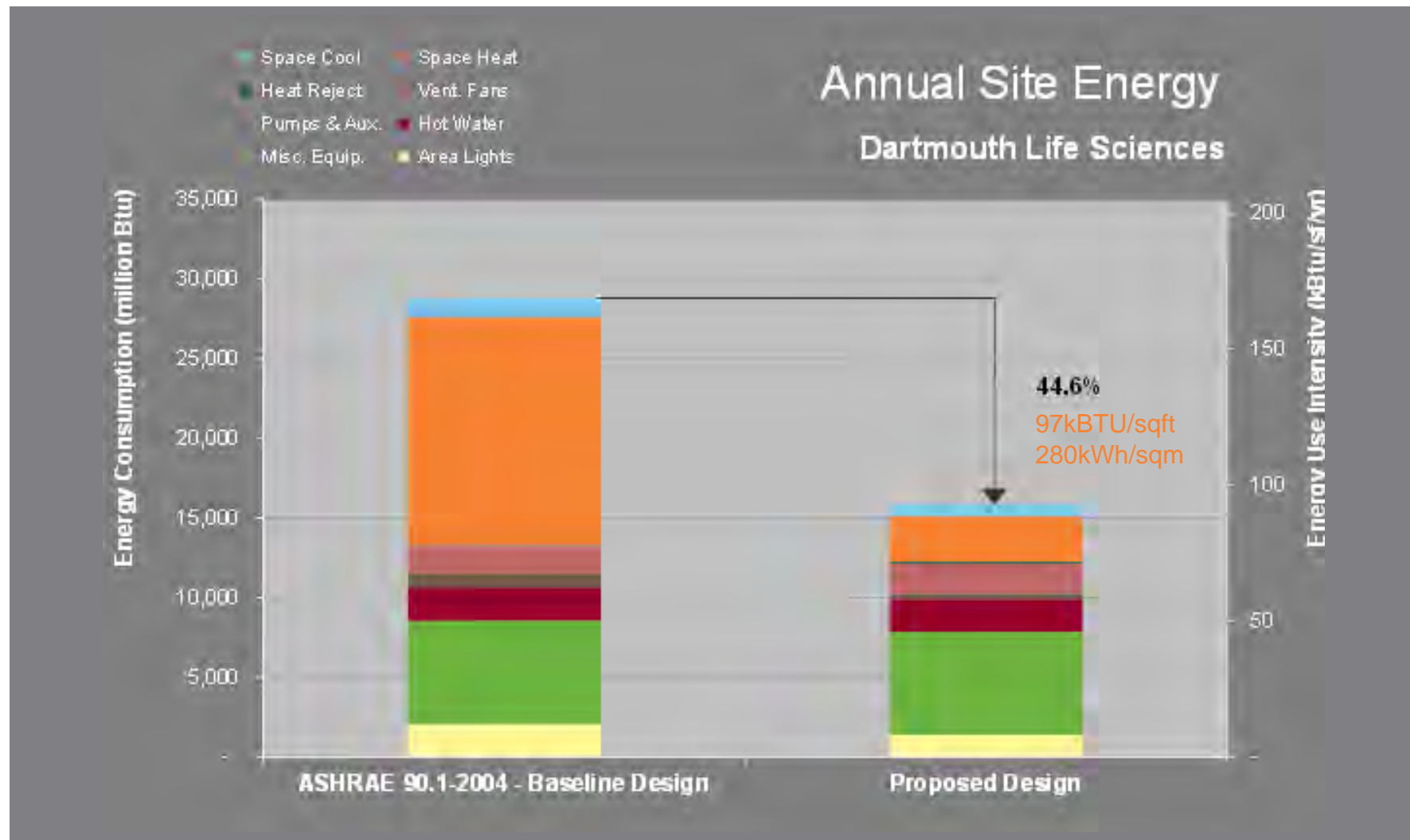
MEP Design Decisions



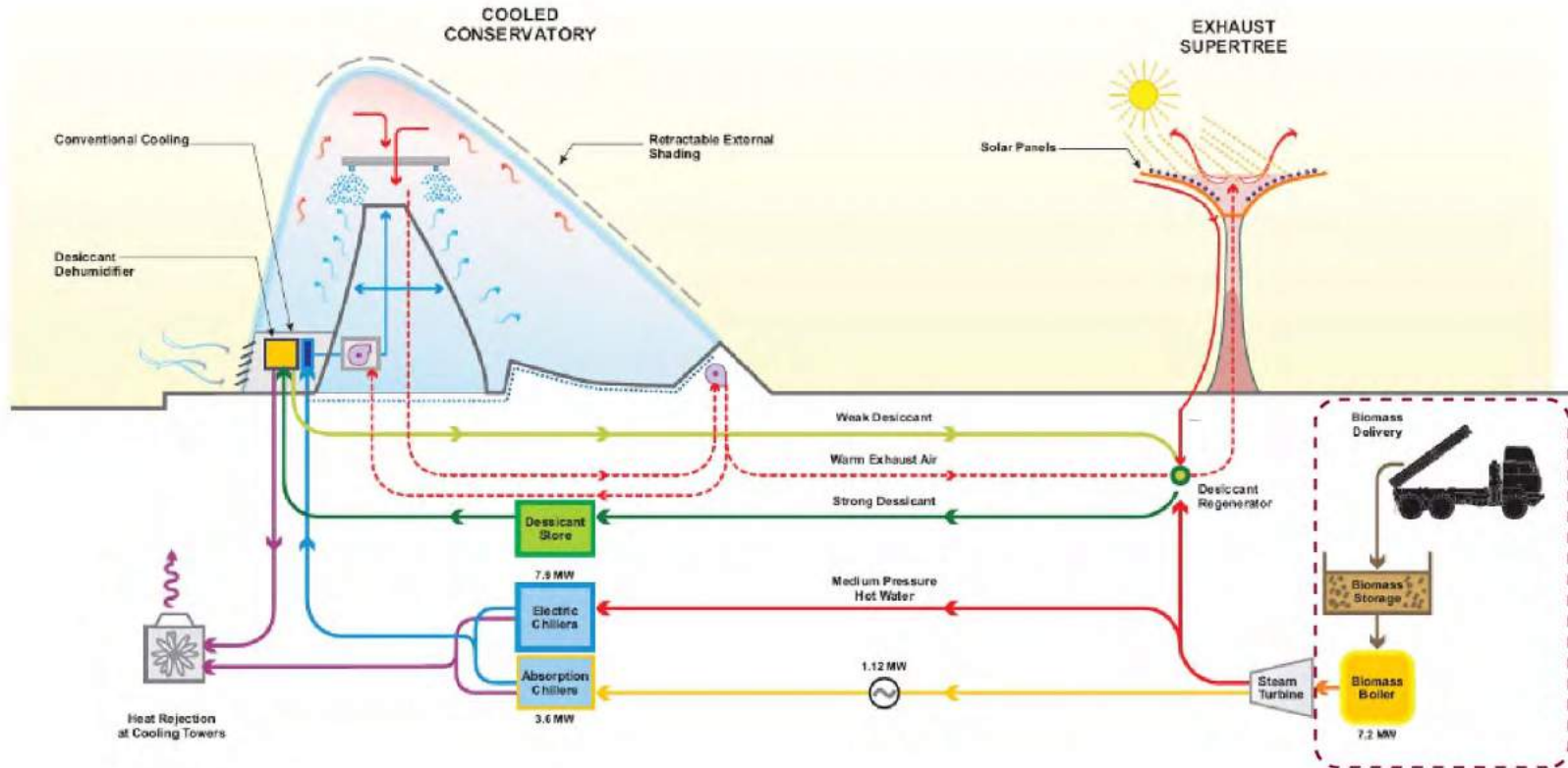
Energy Analysis



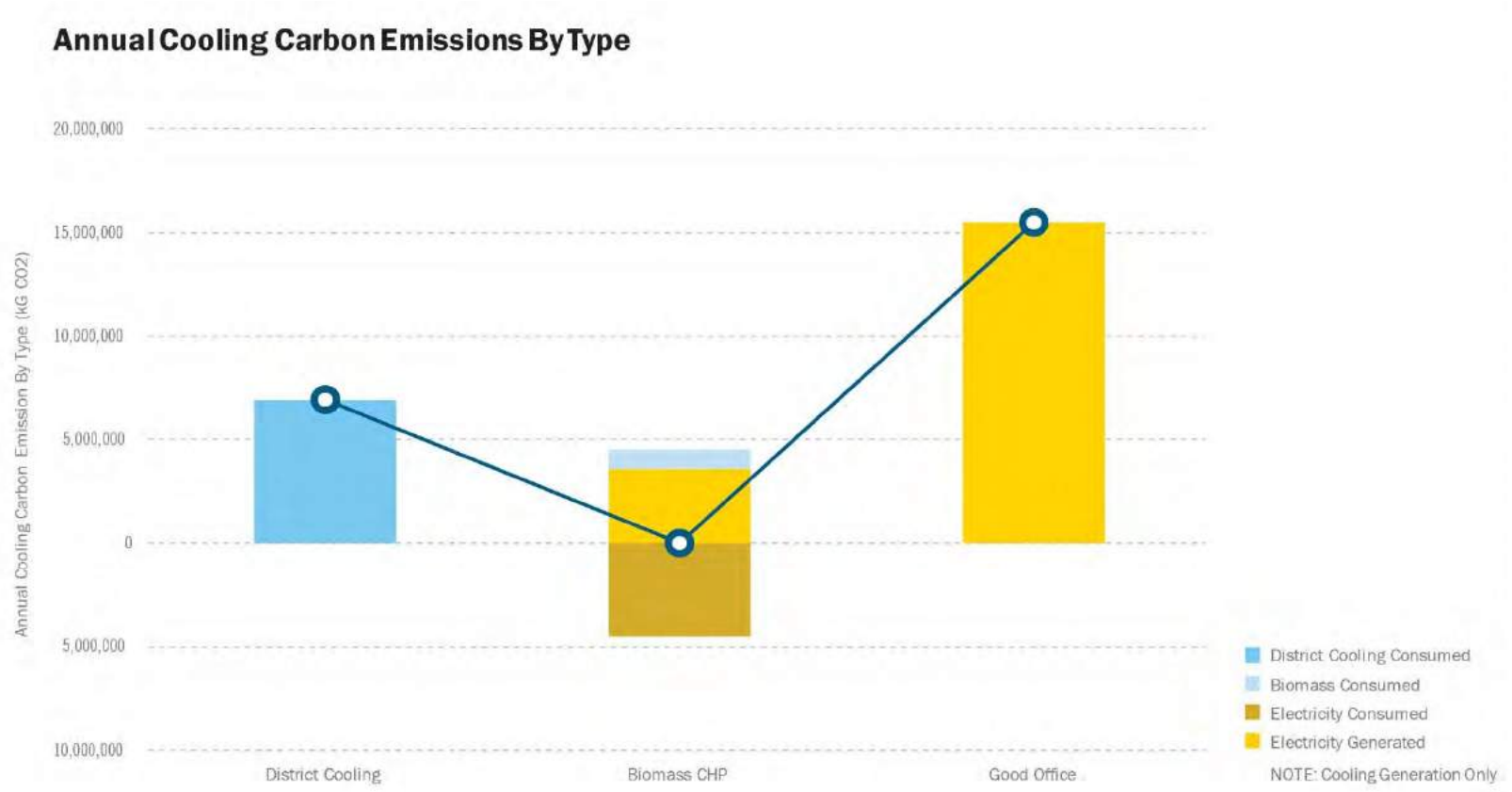
Progress of Design



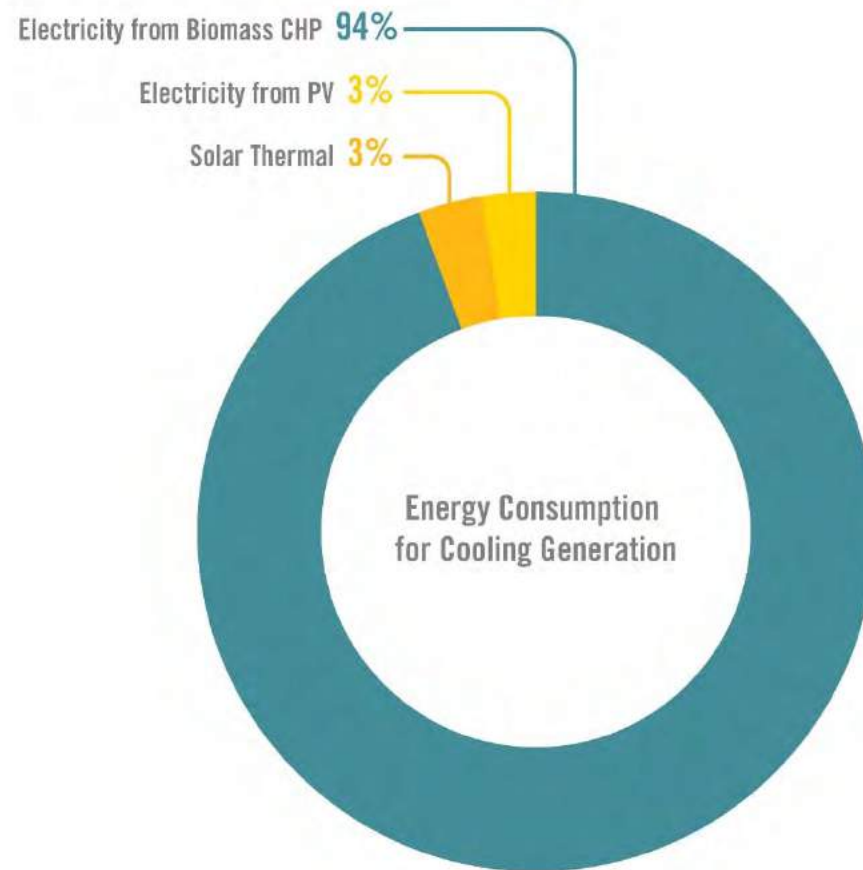
Environmental Concept



Carbon Footprinting



Biomass Energy



Carbon Emissions

Gardens By The Bay

Annual Carbon Evaluation

Annual Carbon Consumption Or Offset
[kg CO₂ / Year]



Tufts University Science and Engineering Complex

Payette



- New building attachment to Anderson Hall
- Integrated teaching and research center featuring state-of-the-art laboratories
- The facility will be a model for sustainability standards for mechanical, electrical and plumbing systems
- Anticipated exemplary performance for optimizing exemplary performance

LOCATION: MEDFORD, MASSACHUSETTS
AREA: 70,000 SQ FT (4 STORIES)

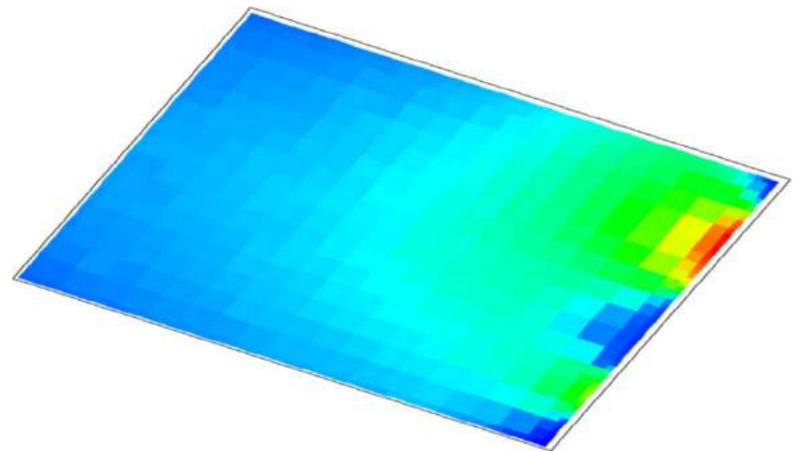
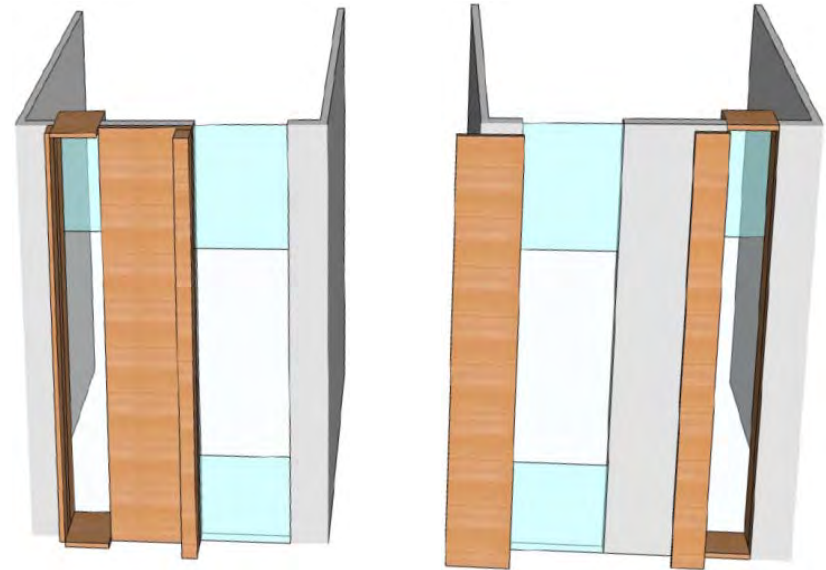
LEED NC GOLD TARGET

Tufts University Science and Engineering Complex

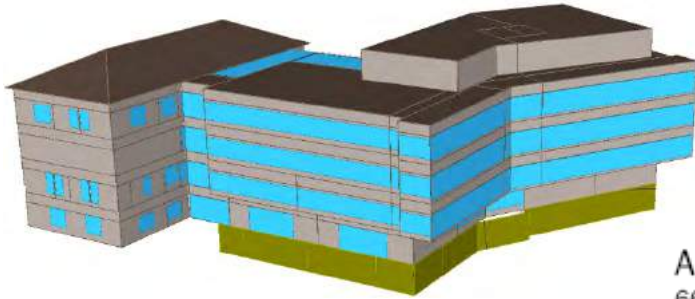
Schematic Design Daylighting



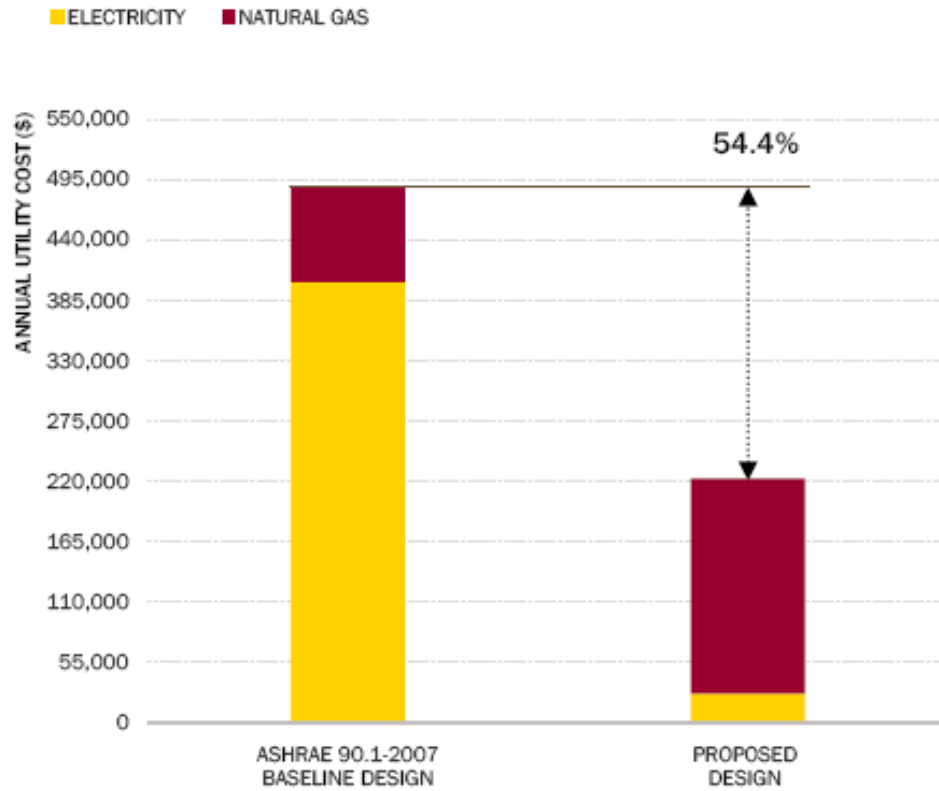
- The target illuminance on the work surface should be 300-400 lux
- Fin and Plank design perform relatively the same with respect to controlling illuminance into the office spaces



Tufts University Science and Engineering Complex



ANNUAL UTILITY COST
6646 TUFTS UNIVERSITY SCIENCE AND ENGINEERING CENTER



Tufts University Science and Engineering Complex

