

Building Committee Update

Farmington High School

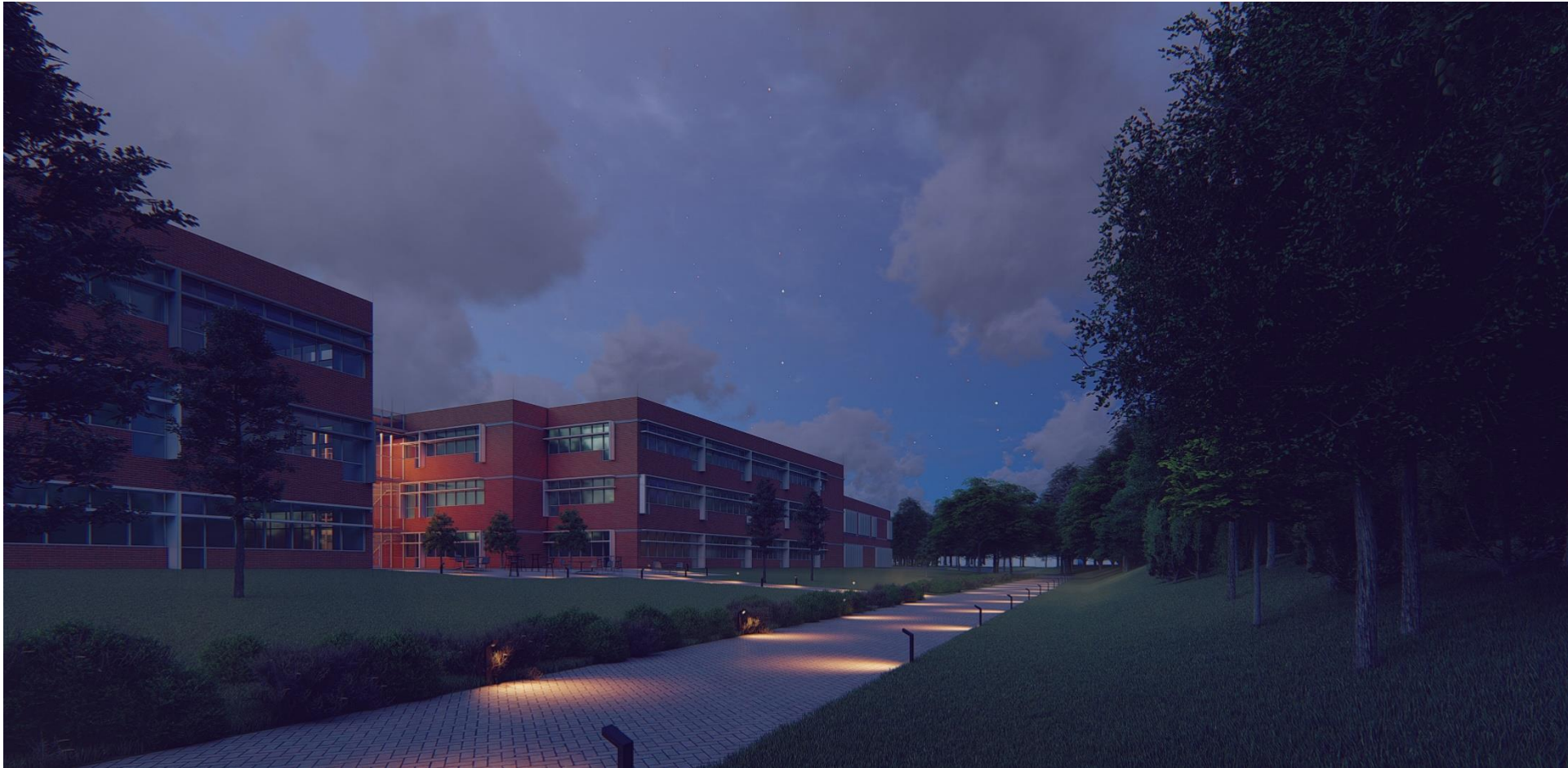


Design Updates

View along East Property Line



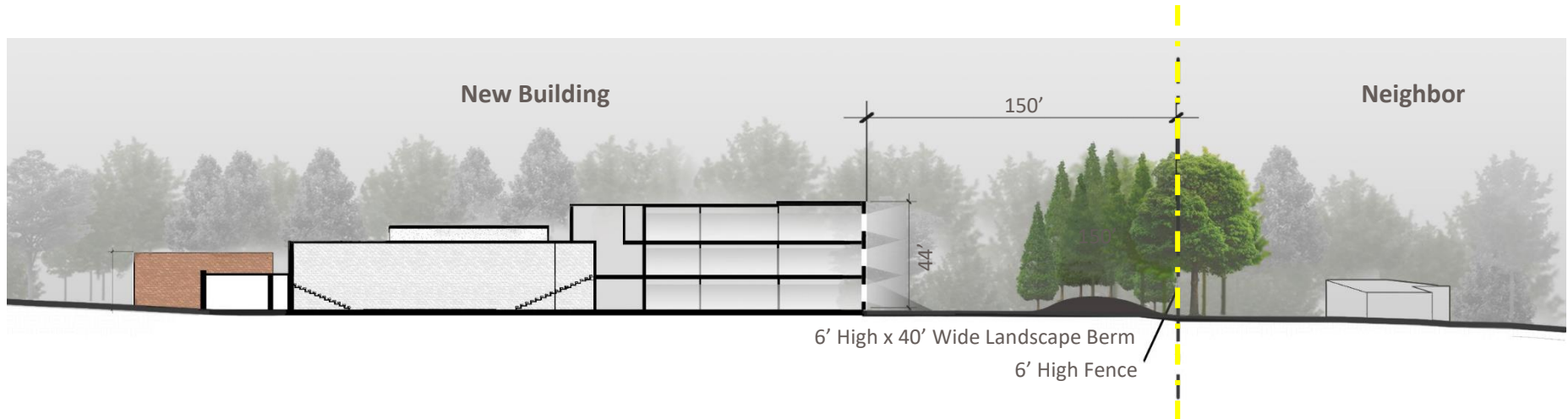
View along East Property Line – Evening View



Site Section



East Edge of Property



Potential Cost Reductions

Budget Review

On January 22, 2020:

	Detailed Estimate	In Millions
1. Arch./Eng. Design Fee	\$ 5,690,000	\$ 5.7
2. Professional Fees	\$ 3,018,487	\$ 3.0
3. Construction Costs	\$ 120,640,036	\$ 120.6
4. Alternates	\$ 0	\$ 0
5. FF&E and Technology	\$ 5,591,000	\$ 5.6
6. Owner Contingency (5%)	\$ 7,100,000	\$ 7.1
7. Grand Total	\$ 142,039,523	\$ 142.0

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7. Grand Total Cost	\$ 142,039,523	\$ 142.0
8. Est. State Reimbursement	- 28,007,905	- 28.0
9. Net Town Share	\$ 114,031,618	\$ 114.0

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On February 4, 2020:

10. Target Net Town Share		\$105 to \$110
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Potential Cost Reductions

Carried Forward From Previous Page:

After Est. State Reimbursement	Detailed Estimate	In Millions
9. Net Town Share	\$ 114,031,618	\$ 114.0

Potential Cost Reductions Discussed On March 4, 2020:

	Est. Reductions	
10. Reduce Building (7,100 SF x \$480/SF)	\$ 3,400,000	
11. Delete Green Roof (Per Estimate)	425,000	
12. Delete Softball Field (Per Estimate)	620,000	
13. Delete Relocation of Cupola (Per Est.)	150,000	
* 14. Reduce FF&E and Technology (TBD)	500,000	
15. Total Cost Reductions	\$ 5,095,000	(\$ 5.1)
16. Revised Net Town Share		\$108.9

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FF&E Analysis

FF&E Categories			
1.	Admin. Offices, Counseling, Nurse's Office, and Support Services	\$	392,502
2.	Academic Core Areas, Classrooms, Science Labs, Break-Out Areas		1,188,311
3.	Special Ed / Special Services, Classrooms, Group Rooms, Offices		200,000
4.	Alternative High School, Classroom, Offices, Conference Room		25,000
5.	Media Center, Learning Commons		327,975
6.	Visual Arts Program Classrooms, Labs		209,485
7.	Music, Instrumental, Vocal, Practice and Ensemble Rooms		477,781
8.	Performing Arts, Auditorium, Control Room, Dressing		44,725
9.	Career & Tech Ed, Wood, Metal, Culinary, and Robotics Labs		114,788
10.	Phys Ed Offices		60,384
11.	Dining Areas for Students and Faculty (excluding kitchen equip)		123,510
12.	Food Services, Custodial Work Room and Office		100,000
13.	Building Services		20,214
14.	TOTAL		\$ 3,235,829
		Say	\$3,240,000
<p>Assumptions: Carts for document cameras are in technology budget. Teacher desks are included above as furniture, not as millwork. Existing equipment in Edge Studio will be relocated to new building. Outdoor furniture is excluded. An allowance of \$30,000 is included for a CNC Machine. Power tools and chargers for Engineering Maker Space are relocated from existing building. An allowance of \$5,000 for Choral Risers is included.</p>			

Technology Analysis

Technology Categories			
1.	Classrooms, 80 spaces at \$7,000 ea	\$ 560,000	
2.	Small Group & Conf. Rms., 8 at \$5,000 ea	40,000	
3.	Offices & Small Rooms, 40 at \$500 ea	20,000	
4.	Gymnasium Projector and Screen	60,000	
5.	Auditorium Digital Equipment	100,000	
6.	Phone System and Handsets	75,000	
7.	Radio Comm., Antenna System, Repeaters	250,000	
8.	Security Cameras, 200 at \$1,200 ea	240,000	
9.	Supplemental Audio System, 90 at \$1,000 ea	90,000	
10.	Call Regeneration System, Repeaters - allowance	100,000	
11.	Carts for Document Cameras - allowance	50,000	
12.	District Office Equipment, Servers - allowance	100,000	
13.	TOTAL	\$ 1,685,000	
			Say \$1,700,000
<p>Assumptions: Conduits and conductors are in construction budget. Servers and racks are in construction budget. Assisted-Listening Devices are in construction budget. Chromebooks, Laptops, and Desktop computers will be relocated from the existing building. Printers and copiers will be relocated from the existing building.</p>			

Potential Cost Reductions

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12. Delete Softball Field (Per Estimate)	620,000	
13. Delete Relocation of Cupola (Per Est.)	150,000	
14. Reduce FF&E and Technology	651,000	
15. Reduced Retainage on Savings	300,000	
15. Total Cost Reductions	\$ 5,546,000	(\$ 5.5)
16. Revised Net Town Share		\$108.3

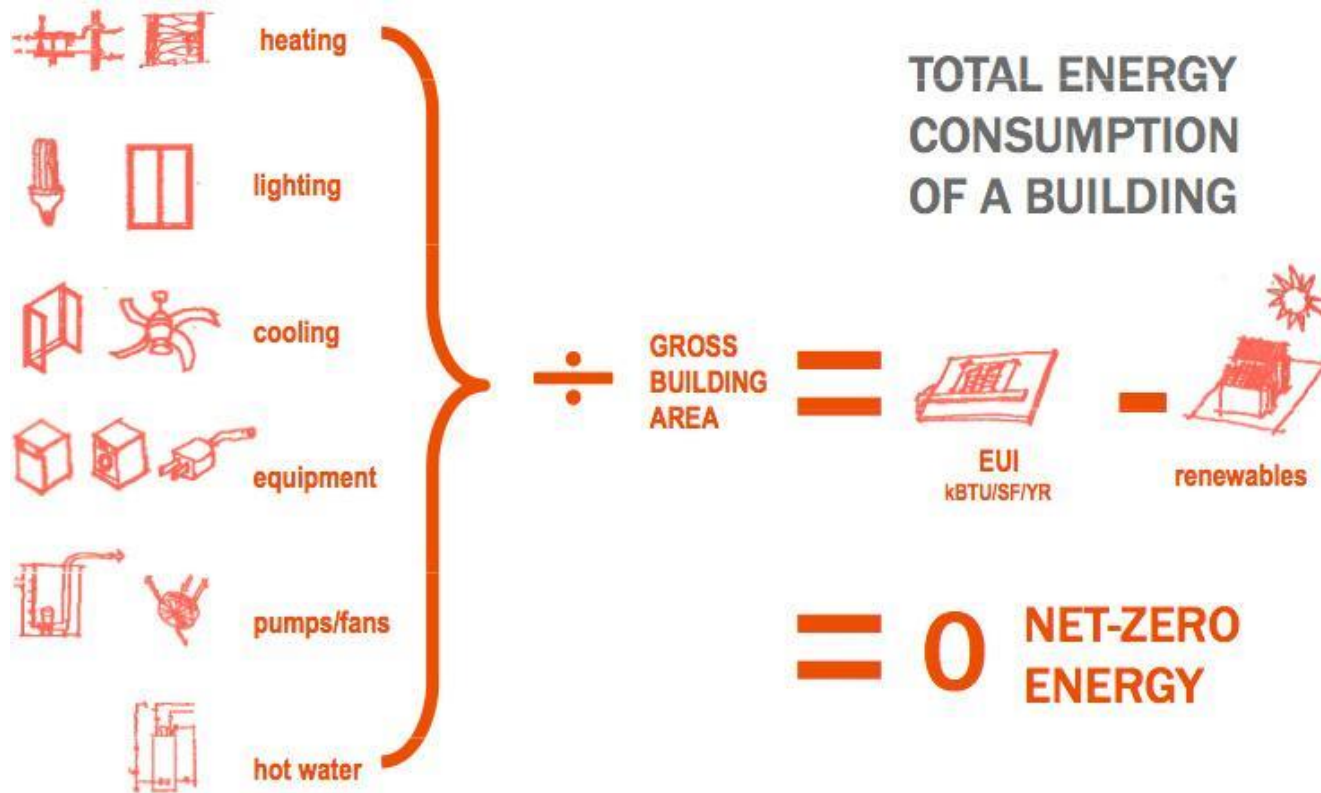
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Net Zero Discussion Points

Net Zero Energy

A Net Zero Energy school returns as much energy to the power grid as it uses in a year.



Net Zero Energy

Huge Nationwide Growth in Zero Energy Schools

- 700% Growth in Zero Energy Projects
- Schools Lead All Sectors

Zero Energy Building Growth

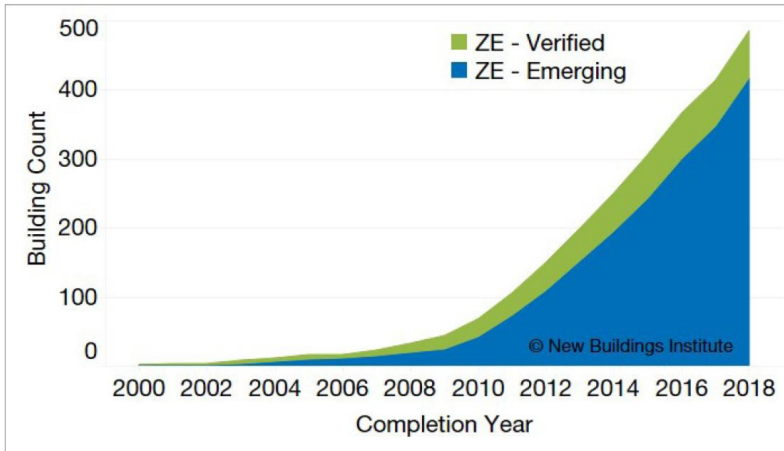
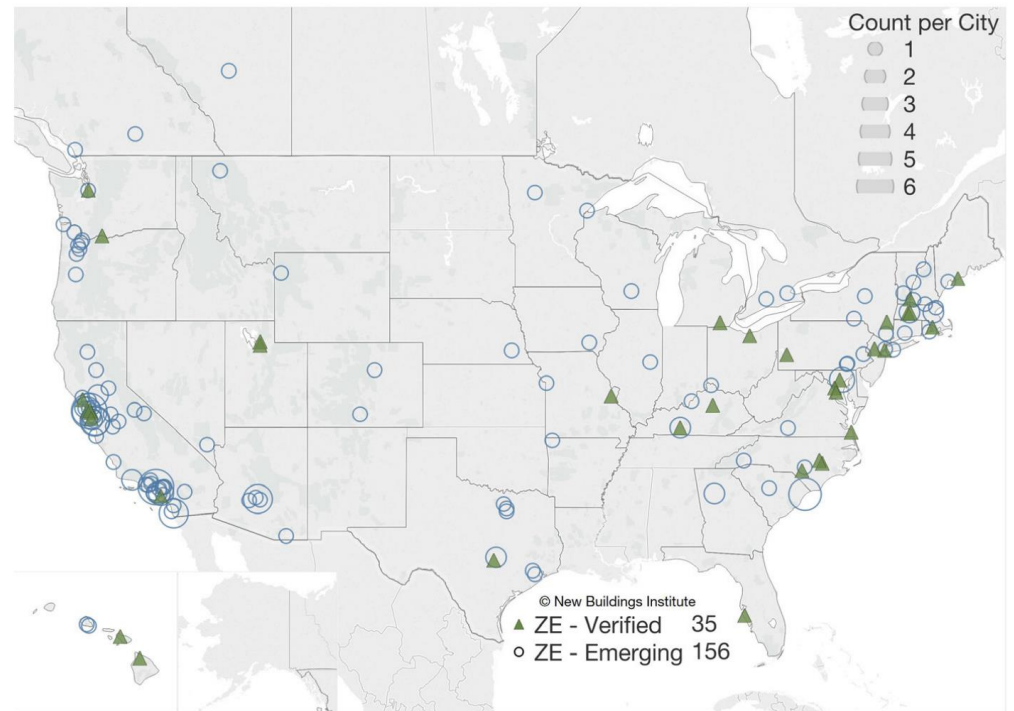


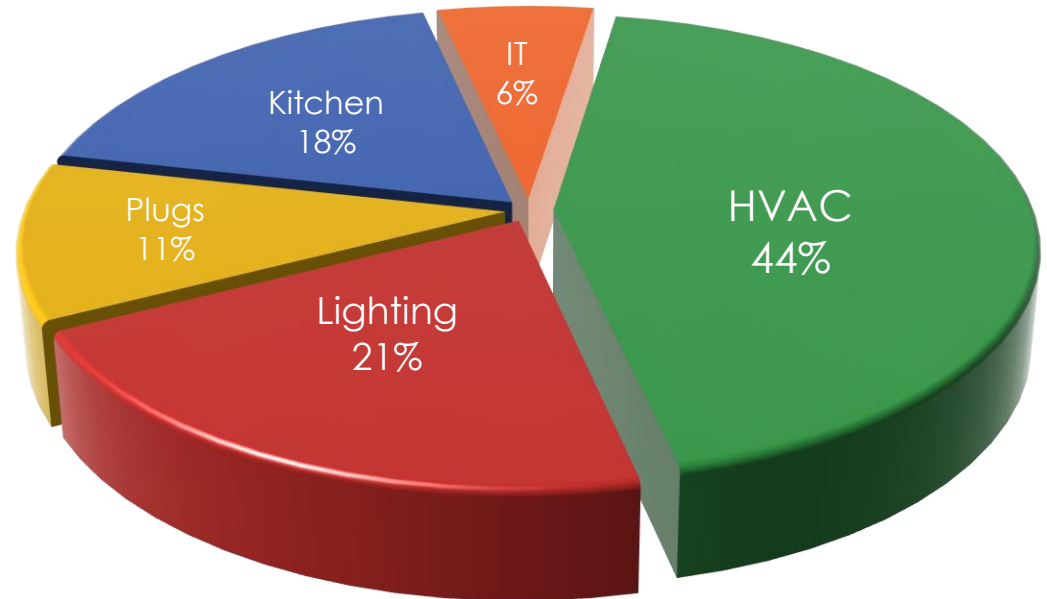
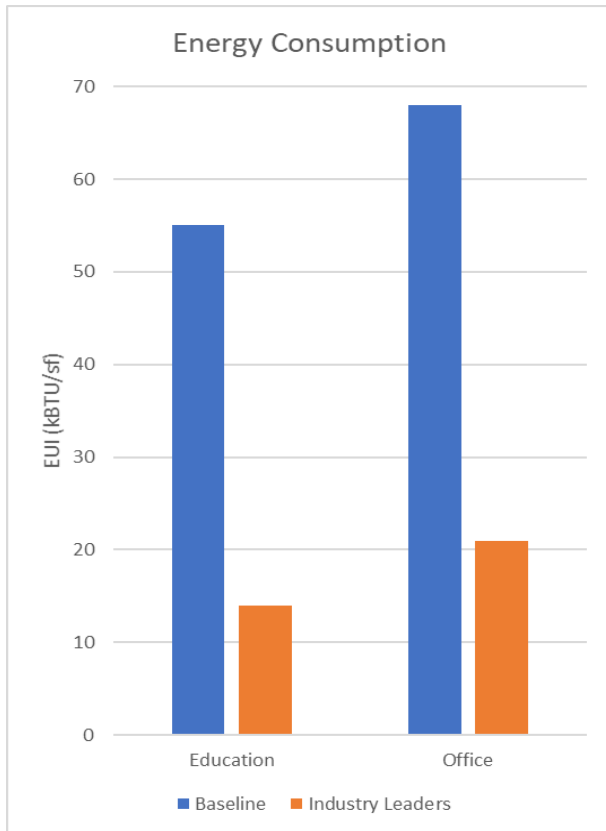
Fig 1. The Buildings List includes nearly 500 projects and is on a steep curve upward, having increased over 700% since 2012.

Locations of Zero Energy School Buildings

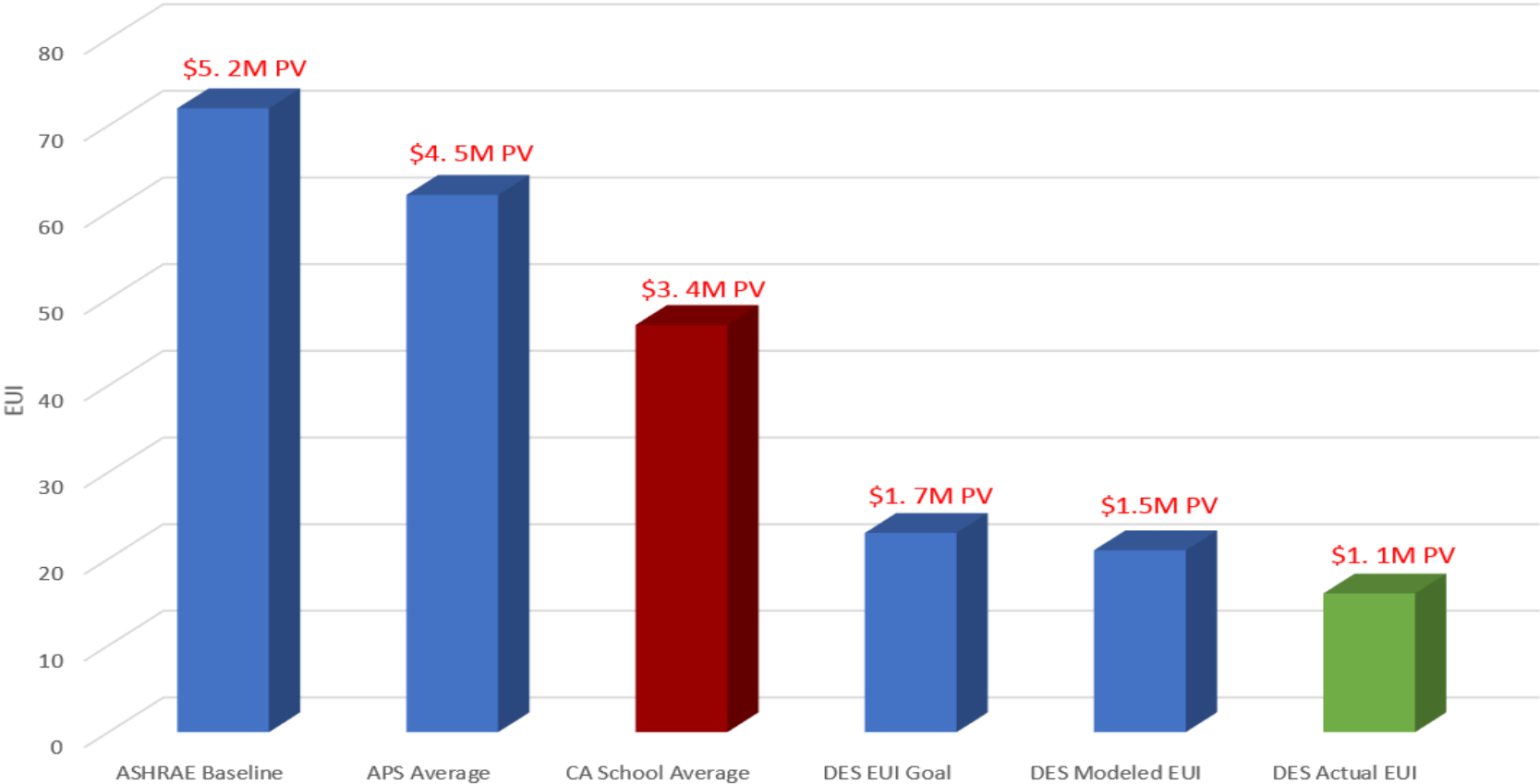


Net Zero Energy

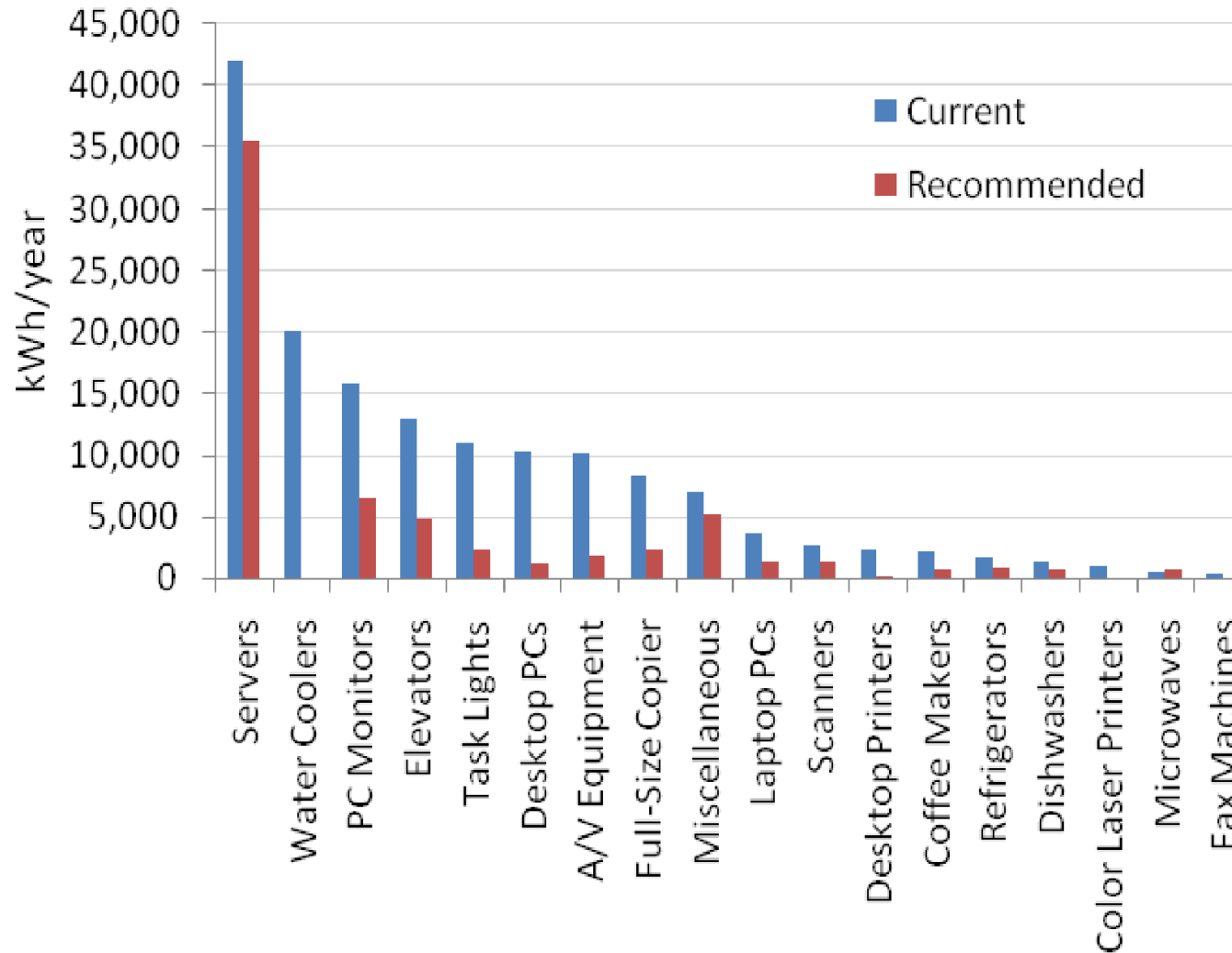
Energy Targets



Net Zero Energy

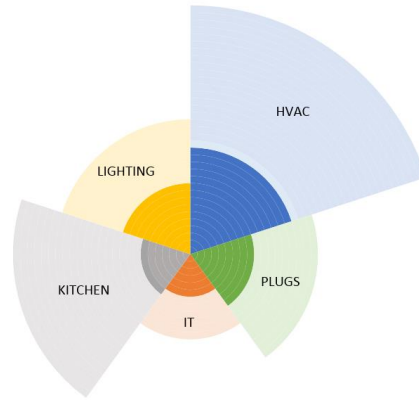


Net Zero Energy – Plug Loads



Annual Energy Consumption by Plug Load Category

Net Zero Energy – Food Service



Refrigeration
6%



Lighting
13%



Sanitation
18%



HVAC
28%

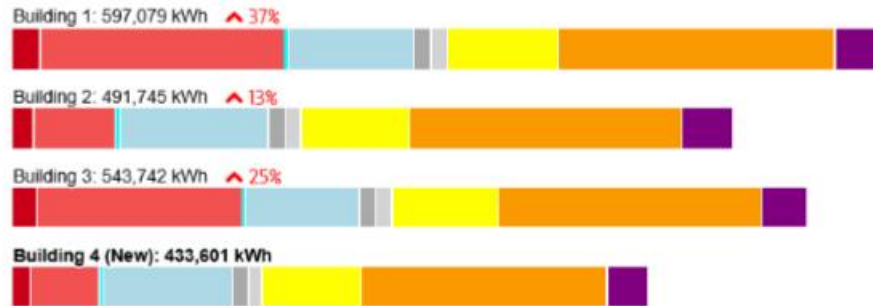


Food Preparation
35%

Net Zero Energy – Building Factors

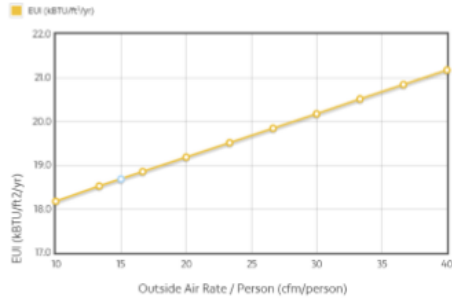
Massing Model Summary

			EUI	Annual Electricity De...	Annual Net CO _{2e} Em...	Annual Energy Cost...	
	Building 1	Water Source Heat Pump	23	▲ 21%	597,079 ▲ 37%	315,854 ▲ 37%	\$1.3 ▲ 30%
	Building 2	Water Source Heat Pump	19	→ 0%	491,744 ▲ 13%	260,186 ▲ 13%	\$1.1 ▲ 10%
	Building 3	Water Source Heat Pump	22	▲ 15%	543,742 ▲ 25%	287,699 ▲ 25%	\$1.2 ▲ 19%
	Building 4 (New)	HVAC System Type Water Source Heat Pump	19 kBtu/m ² /yr		433,601 kWh	229,375 lbCO _{2e} /yr	\$1.0 /ft ²

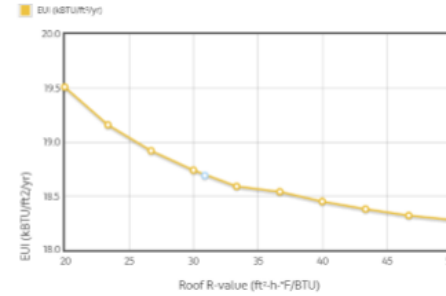


Net Zero Energy – Building Factors

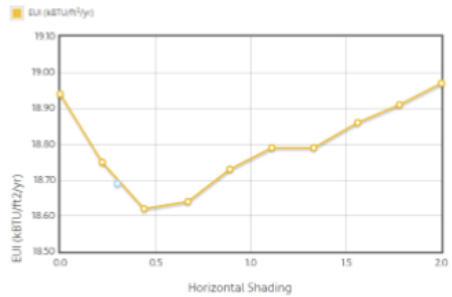
Outside Air Rate



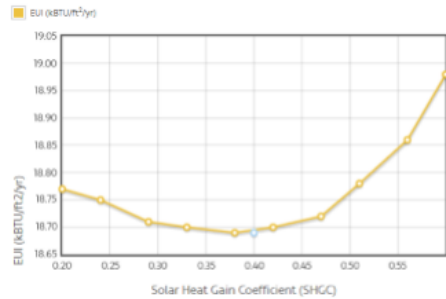
Roof R-Value



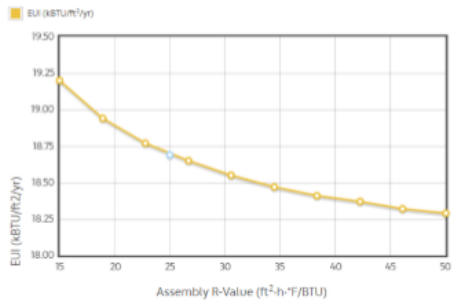
Horizontal Shading



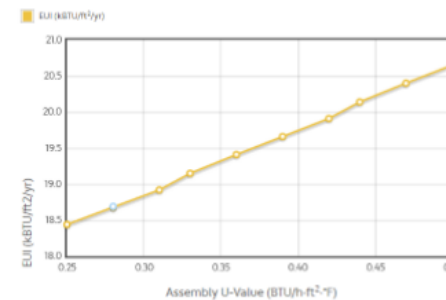
Glass Solar Heat Gain



Wall Assembly

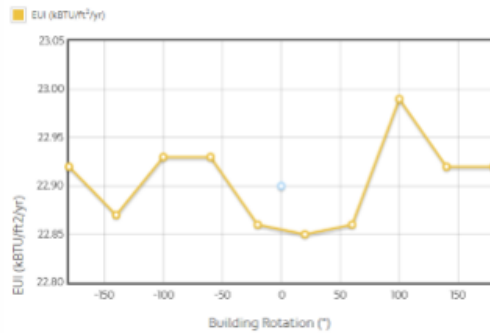


Window U-Factor

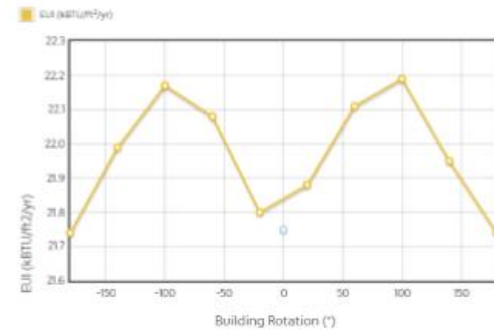


Net Zero Energy – Solar Orientation

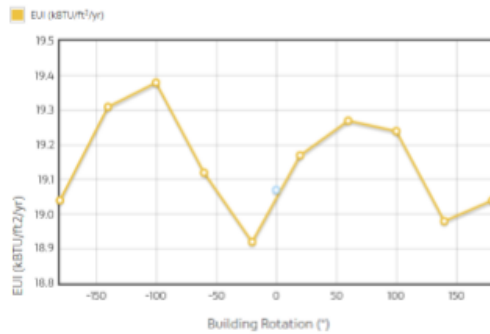
Building 1:



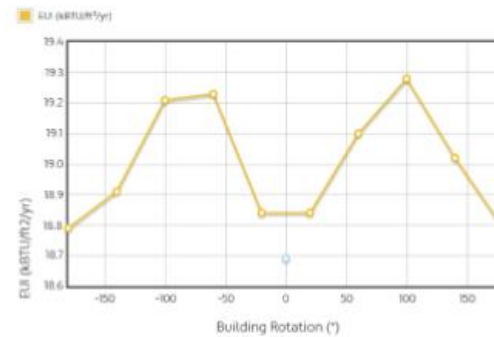
Building 3:



Building 2:



Building 4:



Net Zero Energy - Potential Cost

Net Zero design goals:

- No fossil fuel consumption onsite; use only renewable energy sources
- Onsite generation of all kBTUs required for building operations

	Const. Cost	Project Cost
1. Geothermal Plan	\$ 2,750,000	\$ 3,238,000
2. PV array to offset kW consumption	\$ 3,788,000	\$ 4,460,000
	\$ 6,538,000	\$ 7,698,000

- >20 year payback on \$7.7M first cost

The End