

High Rise Office

Portland

Normalized Baseline Energy Use Intensity (kBtu/SF)

Normalized Baseline Energy Use (kWh)

4,792,028

Impact of Design Changes (see sketches/narrative)

Adjusted Baseline EUI (kBtu/SF)

	LIGHTING	HEATING	COOLING	DOM. HOT WATER	FANS & PUMPS	ELEV & LIVING MACHINE	MISC. EQUIP	TOTAL BLDG
percent of total use	21%	26%	17%	4%	9%	7%	17%	100%
calc'd EUI	15.7	19.4	12.3	3.1	6.6	4.8	12.3	74.2
Energy Conservation Measures:								
Glazing		12.0%	7.5%		4.7%			4.8%
<i>Improved Glazing</i>								
<i>Add effective shading devices</i>								
Walls & Roof		8.0%	3.0%		2.5%			2.8%
<i>Shaded roof from solar panels</i>								
<i>Optimize insulation to core performance guide</i>								
Daylighting (incorporates tuned glazing/shading)	50.0%	-3.8%	5.0%		0.8%			10.5%
<i>Remove ceiling, raise window head, add lightshelf</i>								
<i>Daylight controls (continuous dimming)</i>								
Lighting	30.0%	-2.3%	3.0%		0.5%			6.3%
<i>Efficient fixture optics</i>								
<i>Individual occupancy sensors & dimming controls: closed offices/low occupancy spaces</i>								
<i>Individual light level control (dimming) at open office areas</i>								
<i>Light colors on walls, ceiling surfaces</i>								
<i>Occupancy sensors: transient lighting (corridors/stairs/bathrms)</i>								
Plug Loads		-0.4%	0.5%		0.1%	10.0%	5.0%	1.5%
<i>EnergyStar appliances</i>								
<i>Energy Efficient Elevator</i>								
<i>Centralized Power Management</i>								
<i>Energy efficient main transformer</i>								
Widen Set Point Temperatures		5.0%	5.0%		2.5%			2.4%
<i>Widen Set Point Temperatures (expand ASHRAE 55)</i>								
Subtotal from above Load Reduction strategies (percentage)	80%	15%	24%	0%	11%	10%	5%	27%
Subtotal Reduced EUI (kBTU/SF)	3.1	16.5	9.3	3.1	5.9	4.3	11.6	53.9
Mechanical - Distribution & Ventilation		50.0%	0.0%		50.0%			15.1%
<i>Radiant heating w/ dedicated outside air system (DOAS)</i>								
<i>Energy recovery ventilation</i>								
<i>Demand-based ventilation</i>								
<i>Minimize carpet (insulates against radiant system)</i>								
<i>Natural ventilation: operable windows</i>								
<i>Fan assisted natural ventilation</i>								
<i>Night flush</i>								
Mechanical - Plant Systems		45.0%	100.0%		0.0%			0.5%
<i>Ground source heat pump system</i>								
Domestic Hot Water				80.0%				0.7%
<i>Low flow fixtures (showers, lavs, sinks)</i>								
<i>Water heating from water to water heat pump (gshp)</i>								
Subtotal from Mechanical strategies (percentage)	0%	95%	100%	80%	50%	0%	0%	41%
Subtotal Reduced EUI (kBTU/SF)	3.1	0.8	0.0	0.6	3.0	4.3	11.6	23.5
Reduced EUI from All Energy Conservation Measures (kBTU/SF)	3.1	0.8	0.0	0.6	3.0	4.3	11.6	23.5
Occupant Enhancements	15.0%	-3.8%	5.0%	10.0%		25.0%	50.0%	13.3%
<i>Occupancy sensor controlled plug loads</i>								
<i>Cleaning during unoccupied hours</i>								
<i>Little or No Hot Water Use</i>								
<i>80% Laptops with a secondary screen / 20% desktop</i>								
<i>50% Reduction in printer use</i>								
<i>Remove all phatom loads</i>								
<i>Occupant buy-in / personal energy budget</i>								
Subtotal from Occupant (percentage)	15%	-4%	5%	10%	0%	25%	50%	
Reduced EUI from All Energy Conservation Measures (kBTU/SF)	2.7	0.9	0.0	0.5	3.0	3.3	5.8	16.1
Final Energy Use Breakdown as Percentage of Baseline Use	4%	1%	0%	1%	4%	4%	8%	78%

Factor of Safety	1.00
	1.10

EUI	17.7
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kWh	1,142,862
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92.9	CBECS Baseline EUI (kBTU/sf)
60%	target reduction from CBECS

Achievement:

81%	percent reduction from CBECS
76%	percent reduction from Normalized Baseline Bldg