

ENERGY MODEL

General Assumptions*:	
Section 1.1 - General Information	
Simulation Program	TRACE 700 v6.2.2.S
Principal Heating Source	Distric Steam
Energy Code Used	ASHRAE 90.1-2013 Section 11
New Construction Percent	100%
Weather File	University of Illinois, Willard - TMY3 File
	Design Conditions -
	Cooling: 95°F DB 81°F WB
	Heating: -12°F
Thermostat Settings	Cooling: 75°F 50% RH
	Heating: 70°F 35% RH
Climate Zone	5A
Existing Renovation Percent	100%

Section 1.2 - Comparison of Proposed v. Baseline Design Energy Model Inputs	
Model Input Parameter	Proposed
Exterior Wall	ASHARE 90.1 2013 Energy Code Requirement for Metal Frame U= 0.055
Roof	ASHARE 90.1 2013 Energy Code Requirement U-0.03
Window-to-gross wall ratio	34%
Fenestration type	ASHARE 90.1 2013 Energy Code Requirement Vertical Fenestration, Metal Frame Fixed
Fenestration U-factor	0.42
Fenestration SC	0.46
Fenestration Visual Light Transmittance	0.78
Shading Devices	none
	Corridor 0.59
	Dining 0.59
	Fitness 0.65
	Kitchen 1.09
	Library 1.54
	Lobby 0.81
	Locker 0.68
	MEP Room 0.38
	Multi-Purpose 1.11
	Office 1
	Restroom 0.88
	Retail 1.3
	Seminar 1.11
	Stair 0.59
	Storage 0.57
Lighting [Watts/sf]	

	Ware washing	1.09
Receptical Loads [Watts/sf]	Corridor	0
	Dining	0.25
	Fitness	0.75
	Kitchen	30 [Btuh/sf]
	Library	0.5
	Lobby	0.25
	Locker	0
	MEP Room	0
	Multi-Purpose	0.75
	Office	1
	Restroom	0
	Retail	0.5
	Seminar	0.75
	Stair	0
	Storage	0
	Ware washing	30 [Btuh/sf]
Ventilation	ASHRAE 62.1	
Demand Control Ventilation	Yes	
Humidity Controls	Yes	
Hot water loop & pump parameters	19 Watts/gpm Variable Volume	
Chilled water loop & pump parameters	22 Watts/gpm Variable Volume	

General Assumptions*:

Section 1.3 - Energy Rates : UIUC FY17 Budget and Rate Approval

Energy Type	Utility Rate Description	Units of Energy
Electricity	0.0859	kWh
Chilled Water	1.548	therm
Steam	1.62	therm

ENERGY BUDGET FOR SUSTAINABILITY

By DBHMS

Project Name: UIUC ISR Renovation	Date: February 27, 2017
City: UIUC	Weather Data: University of Illinois Willard, Illinois

Note: The percentage displayed for the "Proposed/ Base %" column of the base case is actually the percentage of the total energy consumption.

* Denotes the base alternative for the ECB study.

	* Alt-3 LEED Baseline			Alt-1 Proposed Halton Hood			Alt-2 Building Code Baseline			Alt-4 Proposed Standard Hood		
	Energy 10 ^{^6} Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10 ^{^6} Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10 ^{^6} Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10 ^{^6} Btu/yr	Proposed / Base %	Peak kBtuh
Lighting - Conditioned	1,461.1	9	322	1,139.1	78	255	1,260.6	86	283	1,139.1	78	255
Space Heating	8.4	0	1	8.0	95	1	8.0	95	1	10.1	120	1
	3,837.4	24	2,555	3,286.5	86	2,449	3,237.2	84	2,440	4,115.3	107	3,221
Space Cooling	4,936.0	31	5,716	4,438.7	90	5,432	4,481.1	91	5,460	4,453.2	90	6,036
Pumps	31.1	0	78	27.9	90	74	28.2	91	75	27.7	89	78
Fans - Conditioned	1,835.5	11	515	1,735.3	95	486	1,744.4	95	489	2,272.7	124	592
Receptacles - Conditioned	1,165.4	7	231	1,165.4	100	231	1,165.4	100	231	1,165.4	100	231
Stand-alone Base Utilities	849.1	5	97	849.1	100	97	849.1	100	97	849.1	100	97
	2,006.0	12	229	1,804.6	90	206	1,804.6	90	206	1,804.6	90	206
Total Building Consumption	16,130.1			14,454.6			14,578.5			15,837.2		
Total	* Alt-3 LEED Baseline			Alt-1 Proposed Halton Hood			Alt-2 Building Code Baseline			Alt-4 Proposed Standard Hood		
	104			140			114			140		
	0			0			0			0		
Number of hours heating load not met												
Number of hours cooling load not met												
Electricity	4,501.5	113,296		4,075.7	102,580		4,206.6	105,873		4,615.1	116,154	
Gas	849.1	7,396		849.1	7,396		849.1	7,396		849.1	7,396	
Purchased Chilled Water	4,936.0	76,410		4,438.7	68,711		4,481.1	69,367		4,453.2	68,935	
Purchased Steam	5,843.5	94,664		5,091.1	82,475		5,041.7	81,676		5,919.9	95,902	

	* Alt-3 LEED Baseline		Alt-1 Proposed Halton Hood		Alt-2 Building Code Baseline		Alt-4 Proposed Standard Hood	
	Energy 10 ⁶ Btu/yr	Cost/yr \$/yr	Energy 10 ⁶ Btu/yr	Cost/yr \$/yr	Energy 10 ⁶ Btu/yr	Cost/yr \$/yr	Energy 10 ⁶ Btu/yr	Cost/yr \$/yr
Total	16,130	291,766	14,455	261,163	14,578	264,312	15,837	288,387

Alternate 1

Energy Use Intensities:

Electricity - 39.78 kBtu/sf
 - \$1.00 /sf

Gas - 8.29 kBtu/sf
 - \$0.07 /sf

Chilled Water - 43.32 kBtu/sf
 - \$0.67 /sf

District Steam - 49.69 kBtu/sf
 - \$0.80 /sf

Alternate 4

Energy Use Intensities:

Electricity - 45.05 kBtu/sf
 - \$1.13 /sf

Gas - 7.99 kBtu/sf
 - \$0.07 /sf

Chilled Water - 43.46 kBtu/sf
 - \$0.67 /sf

District Steam - 57.78 kBtu/sf
 - \$0.94 /sf