

## **REPORT: SIMULATION FOR MODIFICATION 2**

### **Site and Source Energy**

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	4865.43	905.03	905.03
Net Site Energy	3691.52	686.67	686.67
Total Source Energy	15532.51	2889.23	2889.23
Net Source Energy	11814.75	2197.68	2197.68

### **Site to Source Energy Conversion Factors**

	Site=>Source Conversion Factor
Electricity	3.167
Natural Gas	1.084
District Cooling	1.056
District Heating	3.613
Steam	0.300
Gasoline	1.050
Diesel	1.050
Coal	1.050
Fuel Oil #1	1.050
Fuel Oil #2	1.050
Propane	1.050
Other Fuel 1	1.000
Other Fuel 2	1.000

### **Building Area**

	Area [m2]
Total Building Area	5376.00
Net Conditioned Building Area	5376.00
Unconditioned Building Area	0.00

## End Uses

	Electricity [GJ]	Natural Gas [GJ]	Additional Fuel [GJ]	District Cooling [GJ]	District Heating [GJ]	Water [m3]
Heating	0.00	0.00	0.00	0.00	2810.97	0.00
Cooling	0.00	0.00	0.00	535.65	0.00	0.00
Interior Lighting	602.26	0.00	0.00	0.00	0.00	0.00
Exterior Lighting	0.00	0.00	0.00	0.00	0.00	0.00
Interior Equipment	916.55	0.00	0.00	0.00	0.00	0.00
Exterior Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Fans	0.00	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00	0.00
Humidification	0.00	0.00	0.00	0.00	0.00	0.00
Heat Recovery	0.00	0.00	0.00	0.00	0.00	0.00
Water Systems	0.00	0.00	0.00	0.00	0.00	0.00
Refrigeration	0.00	0.00	0.00	0.00	0.00	0.00
Generators	0.00	0.00	0.00	0.00	0.00	0.00
Total End Uses	1518.81	0.00	0.00	535.65	2810.97	0.00

*Note: District heat appears to be the principal heating source based on energy usage.*

## Electric Loads Satisfied

	Electricity [GJ]	Percent Electricity [%]
Fuel-Fired Power Generation	0.000	0.00
High Temperature Geothermal*	0.000	0.00
Photovoltaic Power	1197.863	78.87
Wind Power	0.000	0.00
Power Conversion	-23.96	-1.6
Net Decrease in On-Site Storage	0.000	0.00
Total On-Site Electric Sources	1173.906	77.29
Electricity Coming From Utility	784.047	51.62
Surplus Electricity Going To Utility	439.149	28.91
Net Electricity From Utility	344.899	22.71

Total On-Site and Utility Electric Sources	1518.805	100.00
Total Electricity End Uses	1518.805	100.00

## ENVELOPE

### Window-Wall Ratio

	Total	North (315 to 45 deg)	East (45 to 135 deg)	South (135 to 225 deg)	West (225 to 315 deg)
Gross Wall Area [m2]	8845.20	2478.00	1944.60	2478.00	1944.60
Above Ground Wall Area [m2]	8845.20	2478.00	1944.60	2478.00	1944.60
Window Opening Area [m2]	2709.84	904.26	530.04	904.26	371.28
Gross Window-Wall Ratio [%]	30.64	36.49	27.26	36.49	19.09
Above Ground Window-Wall Ratio [%]	30.64	36.49	27.26	36.49	19.09

### Conditioned Window-Wall Ratio

	Total	North (315 to 45 deg)	East (45 to 135 deg)	South (135 to 225 deg)	West (225 to 315 deg)
Gross Wall Area [m2]	8845.20	2478.00	1944.60	2478.00	1944.60
Above Ground Wall Area [m2]	8845.20	2478.00	1944.60	2478.00	1944.60
Window Opening Area [m2]	2709.84	904.26	530.04	904.26	371.28
Gross Window-Wall Ratio [%]	30.64	36.49	27.26	36.49	19.09
Above Ground Window-Wall Ratio [%]	30.64	36.49	27.26	36.49	19.09

### Skylight-Roof Ratio

	Total
Gross Roof Area [m2]	5376.00
Skylight Area [m2]	0.00
Skylight-Roof Ratio [%]	0.00

Report: **Source Energy End Use Components Summary**

For: **Entire Facility**

Timestamp: **2018-01-16 18:39:58** Values gathered over **8760.00** hours

**Source Energy End Use Components Summary**

	Source Electricity [GJ]	Source Natural Gas [GJ]	Source Additional Fuel [GJ]	Source District Cooling [GJ]	Source District Heating [GJ]
Heating	0.00	0.00	0.00	0.00	10156.99
Cooling	0.00	0.00	0.00	565.47	0.00
Interior Lighting	1907.35	0.00	0.00	0.00	0.00
Exterior Lighting	0.00	0.00	0.00	0.00	0.00
Interior Equipment	2902.70	0.00	0.00	0.00	0.00
Exterior Equipment	0.00	0.00	0.00	0.00	0.00
Fans	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00
Humidification	0.00	0.00	0.00	0.00	0.00
Heat Recovery	0.00	0.00	0.00	0.00	0.00
Water Systems	0.00	0.00	0.00	0.00	0.00
Refrigeration	0.00	0.00	0.00	0.00	0.00
Generators	0.00	0.00	0.00	0.00	0.00
Total Source Energy End Use Components	4810.06	0.00	0.00	565.47	10156.99

**Normalized Metrics**

**Source Energy End Use Components Per Conditioned Floor Area**

	Source Electricity [MJ/m2]	Source Natural Gas [MJ/m2]	Source Additional Fuel [MJ/m2]	Source District Cooling [MJ/m2]	Source District Heating [MJ/m2]
Heating	0.00	0.00	0.00	0.00	1889.32
Cooling	0.00	0.00	0.00	105.18	0.00
Interior Lighting	354.79	0.00	0.00	0.00	0.00
Exterior Lighting	0.00	0.00	0.00	0.00	0.00
Interior Equipment	539.94	0.00	0.00	0.00	0.00

Exterior Equipment	0.00	0.00	0.00	0.00	0.00
Fans	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00
Humidification	0.00	0.00	0.00	0.00	0.00
Heat Recovery	0.00	0.00	0.00	0.00	0.00
Water Systems	0.00	0.00	0.00	0.00	0.00
Refrigeration	0.00	0.00	0.00	0.00	0.00
Generators	0.00	0.00	0.00	0.00	0.00
Total Source Energy End Use Components	894.73	0.00	0.00	105.18	1889.32

#### Source Energy End Use Components Per Total Floor Area

	Source Electricity [MJ/m2]	Source Natural Gas [MJ/m2]	Source Additional Fuel [MJ/m2]	Source District Cooling [MJ/m2]	Source District Heating [MJ/m2]
Heating	0.00	0.00	0.00	0.00	1889.32
Cooling	0.00	0.00	0.00	105.18	0.00
Interior Lighting	354.79	0.00	0.00	0.00	0.00
Exterior Lighting	0.00	0.00	0.00	0.00	0.00
Interior Equipment	539.94	0.00	0.00	0.00	0.00
Exterior Equipment	0.00	0.00	0.00	0.00	0.00
Fans	0.00	0.00	0.00	0.00	0.00
Pumps	0.00	0.00	0.00	0.00	0.00
Heat Rejection	0.00	0.00	0.00	0.00	0.00
Humidification	0.00	0.00	0.00	0.00	0.00
Heat Recovery	0.00	0.00	0.00	0.00	0.00
Water Systems	0.00	0.00	0.00	0.00	0.00
Refrigeration	0.00	0.00	0.00	0.00	0.00
Generators	0.00	0.00	0.00	0.00	0.00
Total Source Energy End Use Components	894.73	0.00	0.00	105.18	1889.32

Report: **Climatic Data Summary**

For: **Entire Facility**

Timestamp: **2018-01-16 18:39:58 Sizing Period: Design Day**

	Maximum Dry Bulb [C]	Daily Temperature Range [deltaC]	Humidity Value	Humidity Type	Wind Speed [m/s]	Wind Direction
MILANO-LINATE ANN CLG .4% CONDNS DB=>MWB	33.00	10.20	24.10	Wetbulb [C]	2.30	220.00
MILANO-LINATE ANN CLG .4% CONDNS DP=>MDB	28.50	10.20	23.50	Dewpoint [C]	2.30	220.00
MILANO-LINATE ANN CLG .4% CONDNS ENTH=>MDB	31.00	10.20	77500.00	Enthalpy [J/kg]	2.30	220.00
MILANO-LINATE ANN CLG .4% CONDNS WB=>MDB	31.00	10.20	25.20	Wetbulb [C]	2.30	220.00
MILANO-LINATE ANN HTG 99.6% CONDNS DB	-5.10	0.00	-5.10	Wetbulb [C]	0.40	240.00
MILANO-LINATE ANN HTG WIND 99.6% CONDNS WS=>MCDB	8.80	0.00	8.80	Wetbulb [C]	10.30	240.00
MILANO-LINATE ANN HUM_N 99.6% CONDNS DP=>MCDB	2.30	0.00	-11.50	Dewpoint [C]	0.40	240.00

#### EAp2-6. Energy Use Summary

	Process Subtotal [GJ]	Total Energy Use [GJ]
Electricity	916.55	1518.81
Natural Gas	0.00	0.00
Additional	0.00	3346.62
Total	916.55	4865.43

Report: **BUILDING ENERGY PERFORMANCE - ELECTRICITY**

For: **Meter**

Timestamp: **2018-01-16 18:39:58 Custom Monthly Report**

	INTERIOR LIGHTS : ELECTRICITY [J]	INTERIOR EQUIPMENT : ELECTRICITY [J]
January	0.507546E+11	0.775948E+11

February	0.463103E+11	0.703965E+11
March	0.526406E+11	0.791041E+11
April	0.473373E+11	0.734828E+11
May	0.526406E+11	0.791041E+11
June	0.505305E+11	0.762015E+11
July	0.494474E+11	0.763854E+11
August	0.526406E+11	0.791041E+11
September	0.492234E+11	0.749922E+11
October	0.507546E+11	0.775948E+11
November	0.505305E+11	0.762015E+11
December	0.494474E+11	0.763854E+11
Annual Sum or Average	0.602258E+12	0.916547E+12
Minimum of Months	0.463103E+11	0.703965E+11
Maximum of Months	0.526406E+11	0.791041E+11

Report: **BUILDING ENERGY PERFORMANCE - DISTRICT HEATING**

For: **Meter**

Timestamp: **2018-01-16 18:39:58 Custom Monthly Report**

	HEATING : DISTRICT HEATING [J]
January	0.645826E+12
February	0.502216E+12
March	0.304191E+12
April	0.184658E+12
May	0.542460E+11
June	0.169220E+11
July	0.219675E+10
August	0.364176E+10
September	0.334204E+11
October	0.132976E+12
November	0.365303E+12
December	0.565378E+12
Annual Sum or Average	0.281097E+13

Minimum of Months	0.219675E+10
Maximum of Months	0.645826E+12

Report: **BUILDING ENERGY PERFORMANCE - DISTRICT COOLING**

For: **Meter**

Timestamp: **2018-01-16 18:39:58 Custom Monthly Report**

	COOLING : DISTRICT COOLING [J]
January	0.00
February	0.103718E+09
March	0.574772E+10
April	0.818216E+10
May	0.507843E+11
June	0.107569E+12
July	0.159305E+12
August	0.128535E+12
September	0.595657E+11
October	0.138259E+11
November	0.202864E+10
December	793446.43
Annual Sum or Average	0.535648E+12
Minimum of Months	0.00
Maximum of Months	0.159305E+12

Report: **BUILDING ENERGY PERFORMANCE - ELECTRICITY PEAK DEMAND**

For: **Meter**

Timestamp: **2018-01-16 18:39:58 Custom Monthly Report**

	ELECTRICITY : FACILITY {Maximum}[W]	ELECTRICITY : FACILITY {TIMESTAMP}	INTERIOR LIGHTS : ELECTRICITY {AT MAX/MIN} [W]	INTERIOR EQUIPMENT : ELECTRICITY {AT MAX/MIN} [W]
January	95059.56	02-JAN-08:15	46683.77	48375.79



February	95059.56	01-FEB-08:15	46683.77	48375.79
March	95059.56	01-MAR-08:15	46683.77	48375.79
April	95059.56	03-APR-08:15	46683.77	48375.79
May	95059.56	01-MAY-08:15	46683.77	48375.79
June	95059.56	01-JUN-08:15	46683.77	48375.79
July	95059.56	03-JUL-08:15	46683.77	48375.79
August	95059.56	01-AUG-08:15	46683.77	48375.79
September	95059.56	01-SEP-08:15	46683.77	48375.79
October	95059.56	02-OCT-08:15	46683.77	48375.79
November	95059.56	01-NOV-08:15	46683.77	48375.79
December	95059.56	01-DEC-08:15	46683.77	48375.79
Annual Sum or Average				
Minimum of Months	95059.56		46683.77	48375.79
Maximum of Months	95059.56		46683.77	48375.79

Report: **BUILDING ENERGY PERFORMANCE - DISTRICT HEATING PEAK DEMAND**

For: **Meter**

Timestamp: **2018-01-16 18:39:58 Custom Monthly Report**

	DISTRICT HEATING : FACILITY {Maximum}[W]	DISTRICT HEATING : FACILITY {TIMESTAMP}	HEATING : DISTRICT HEATING {AT MAX/MIN} [W]
January	712792.15	30-JAN-06:15	712792.15
February	643386.87	08-FEB-06:15	643386.87
March	594766.75	01-MAR-06:15	594766.75
April	550209.46	01-APR-06:15	550209.46
May	407214.43	02-MAY-06:15	407214.43
June	361661.26	13-JUN-06:15	361661.26
July	186855.14	15-JUL-06:15	186855.14
August	205366.33	30-AUG-06:15	205366.33
September	392441.50	29-SEP-06:15	392441.50
October	504603.96	31-OCT-06:15	504603.96
November	570046.48	18-NOV-06:15	570046.48

December	674429.81	29-DEC-06:15	674429.81
Annual Sum or Average			
Minimum of Months	186855.14		186855.14
Maximum of Months	712792.15		712792.15

Report: **BUILDING ENERGY PERFORMANCE - DISTRICT COOLING PEAK DEMAND**

For: **Meter**

Timestamp: **2018-01-16 18:39:58 Custom Monthly Report**

	DISTRICT COOLING : FACILITY {Maximum}[W]	DISTRICT COOLING : FACILITY {TIMESTAMP}	COOLING : DISTRICT COOLING {AT MAX/MIN} [W]
January	0.00	01-JAN-00:15	0.00
February	10436.81	17-FEB-15:00	10436.81
March	45992.42	15-MAR-15:00	45992.42
April	46202.86	07-APR-15:00	46202.86
May	165026.99	25-MAY-16:15	165026.99
June	279267.91	29-JUN-15:00	279267.91
July	278546.73	24-JUL-16:15	278546.73
August	234111.22	08-AUG-15:00	234111.22
September	182438.34	01-SEP-15:00	182438.34
October	75649.81	13-OCT-14:00	75649.81
November	21935.93	03-NOV-15:00	21935.93
December	273.49	11-DEC-15:00	273.49
Annual Sum or Average			
Minimum of Months	0.00		0.00
Maximum of Months	279267.91		279267.91