BUILDING INFORMATION

Category:	**Non-residential**
Status:	**In planning**
Building type:	**New construction**
Year of construction:	**2024**
Units:	**1**
Number of occupants:	**6 (Design)**
Occupant density:	**482.2** ft²/Person

Boundary conditions

Climate:	**User defined**
Internal heat gains:	**2.4** Btu/hr ft²
Interior temperature:	**68** °F
Overheat temperature:	**77** °F

Building geometry

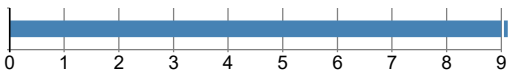
Enclosed volume:	**62,906** ft³
Net-volume:	**47,808.6** ft³
Total area envelope:	**9,323.6** ft²
Area/Volume Ratio:	**0.1** 1/ft
Floor area:	**2,893** ft²
Envelope area/iCFA:	**3.223**

PASSIVEHOUSE REQUIREMENTS

Certificate criteria: **Phius CORE 2021**

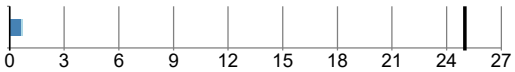
Heating demand

specific:	**51.15**	kBtu/ft²yr
target:	**25**	kBtu/ft²yr
total:	147,973.69	kBtu/yr



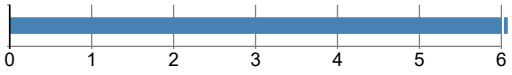
Cooling demand

sensible:	**0.6**	kBtu/ft²yr
latent:	**0.11**	kBtu/ft²yr
specific:	**0.71**	kBtu/ft²yr
target:	**25**	kBtu/ft²yr
total:	2,041.2	kBtu/yr



Heating load

specific:	**20.18**	Btu/hr ft²
target:	**25**	Btu/hr ft²
total:	58,390.82	Btu/hr

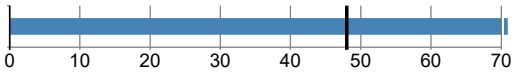


Cooling load

specific:	**0**	Btu/hr ft²
target:	**25**	Btu/hr ft²
total:	0	Btu/hr

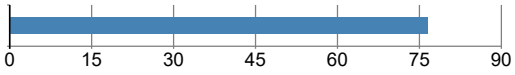
Source energy

total:	**82,820.58**	kWh/yr
specific:	**97.68**	kBtu/ft²yr
target:	**48.02**	kBtu/ft²yr
total:	**282,567.67**	kBtu/yr
specific:	97.68	kBtu/ft²yr



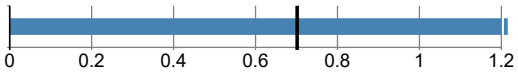
Site energy

total:	221,521.32	kBtu/yr
specific:	76.58	kBtu/ft²yr
total:	64,927.9	kWh/yr
specific:	22.44	kWh/ft²



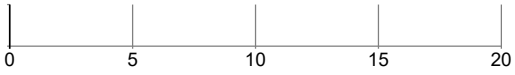
Air tightness

ACH50:	**1.4**	1/hr
CFM50 per envelope area:	**0.12**	cfm/ft²
target:	**0.7**	1/hr
target CFM50:	**0.06**	cfm/ft²



PASSIVEHOUSE RECOMMENDATIONS

Sensible recovery efficiency:	**73.8**	%
Frequency of overheating: Cooling system is not required	**0**	%



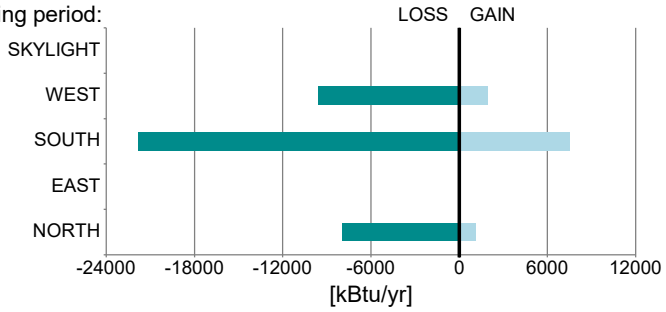
Frequency of overheating only applies if there is not a [properly sized] cooling system installed.

BUILDING ELEMENTS

Windows

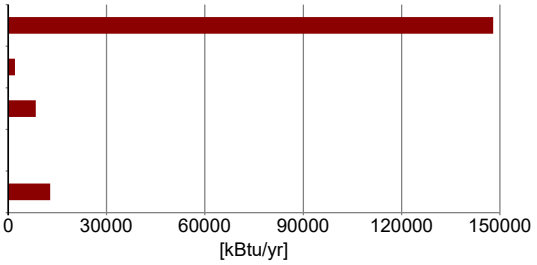
Average SHGC:	**0.36**	
Average solar reduction factor heating:	**0.37**	
Average solar reduction factor cooling:	**0.4**	
Average U-value:	**0.45**	Btu/hr ft² °F
Total glazing area:	**339.2**	ft²
Total window area:	**537.1**	ft²

Heat gain/loss heating period:



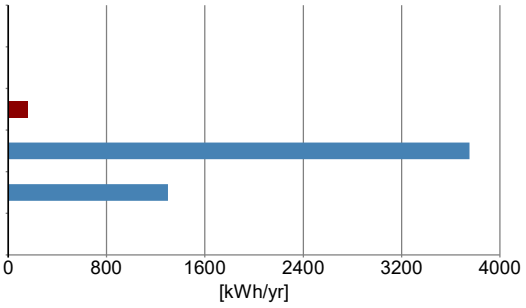
HVAC

Total heating demand:	**147,974**	kBtu/yr
Total cooling demand:	**2,041**	kBtu/yr
Total DHW energy demand:	**8,379**	kBtu/yr
Solar DHW contribution:	**0**	kBtu/yr
Auxiliary electricity:	**12,800**	kBtu/yr



Electricity

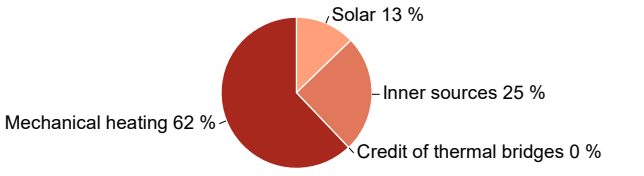
Direct heating / DHW:	**0**	kWh/yr
Heatpump heating:	**0**	kWh/yr
Cooling:	**155**	kWh/yr
HVAC auxiliary energy:	**3,752**	kWh/yr
Appliances:	**1,299**	kWh/yr
Renewable generation, coincident production and use:	**0**	kWh/yr
Total electricity demand:	**5,206**	kWh/yr



HEAT FLOW - HEATING PERIOD

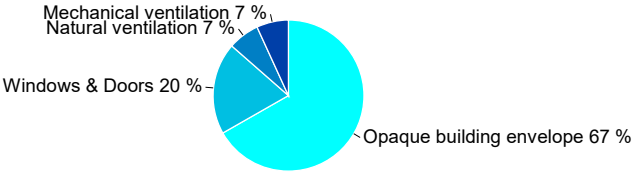
Heat gains

Solar:	**26,265**	kBtu/yr
Inner sources:	**51,726**	kBtu/yr
Credit of thermal bridges:	**0**	kBtu/yr
Mechanical heating:	**147,974**	kBtu/yr



Heat losses

Opaque building envelope:	**150,961**	kBtu/yr
Windows & Doors:	**44,303**	kBtu/yr
Natural ventilation:	**15,258**	kBtu/yr
Mechanical ventilation:	**15,443**	kBtu/yr

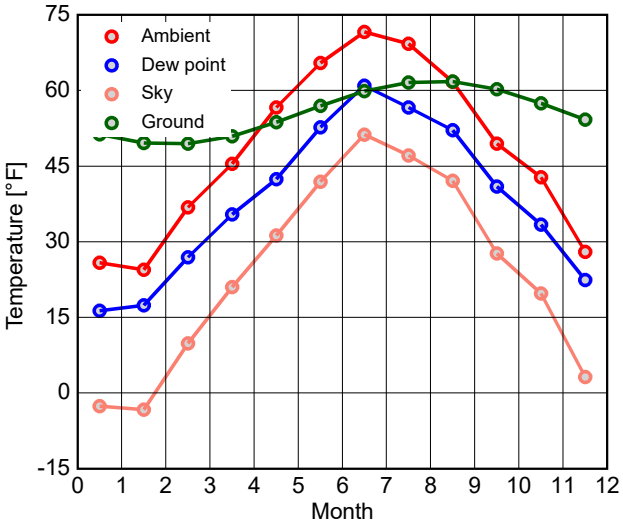


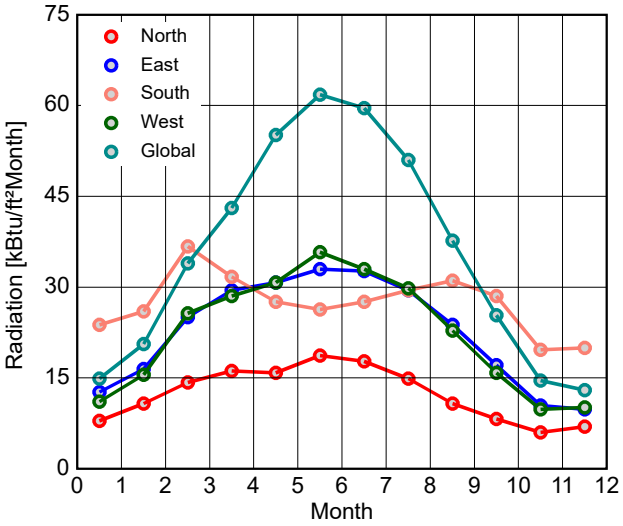
CLIMATE

Latitude:	**42.9**	°
Longitude:	**-78.7**	°
Elevation of weather station:	**705.4**	ft
Elevation of building site:	**623**	ft
Heat capacity air:	**0.018**	Btu/ft³F
Daily temperature swing summer:	**18**	°F
Average wind speed:	**13.1**	ft/s

Ground

Average ground surface temperature:	**50.2**	°F
Amplitude ground surface temperature:	**55.6**	°F
Ground thermal conductivity:	**1.2**	Btu/hr ft °F
Ground heat capacity:	**29.8**	Btu/ft³F
Depth below grade of groundwater:	**9.8**	ft
Flow rate groundwater:	**0.2**	ft/d





Calculation parameters

Length of heating period:	**365**	days/yr
Heating degree hours:	**163.1**	kFh/a
Phase shift months:	**1.3**	mths
Time constant heating demand:	**42.3**	hr
Time constant cooling demand:	**0**	hr
Time constant cooling demand with night ventilation:	**0**	hr

Climate for		Heating load 1	Heating load 2	Cooling
Temperature	[°F]	12.2	26.8	77
Solar radiation North	[Btu/hr ft²]	16.8	9.5	21.9
Solar radiation East	[Btu/hr ft²]	29.5	12.4	40.9
Solar radiation South	[Btu/hr ft²]	50.1	19.3	36.8
Solar radiation West	[Btu/hr ft²]	25.4	11.7	28.5
Solar radiation Global	[Btu/hr ft²]	33.9	15.9	72.3

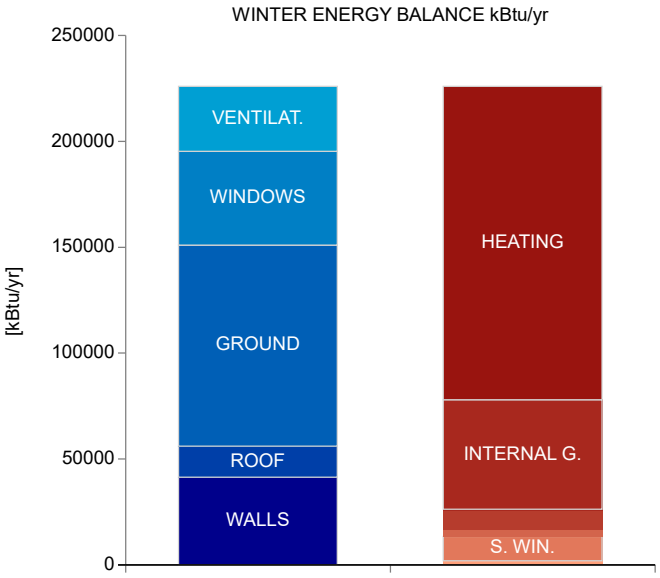
Relevant boundary conditions for heating load calculation: Heating load 1

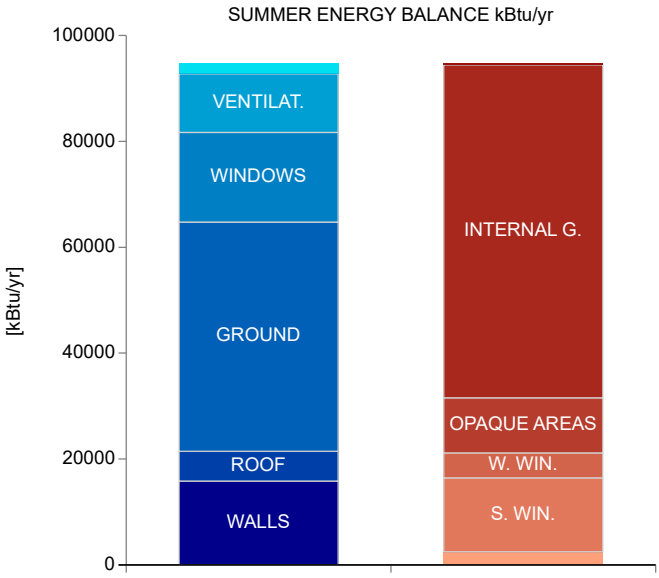
ANNUAL HEAT DEMAND

Transmission losses :	**195,264**	kBtu/yr
Ventilation losses:	**30,701**	kBtu/yr
Total heat losses:	**225,965**	kBtu/yr
Solar heat gains:	**30,371**	kBtu/yr
Internal heat gains:	**59,813**	kBtu/yr
Total heat gains:	**90,185**	kBtu/yr
Utilization factor:	**86.5**	%
Useful heat gains:	**77,992**	kBtu/yr
Annual heat demand:	**147,974**	kBtu/yr
Specific annual heat demand:	**51,153.9**	Btu/ft²yr

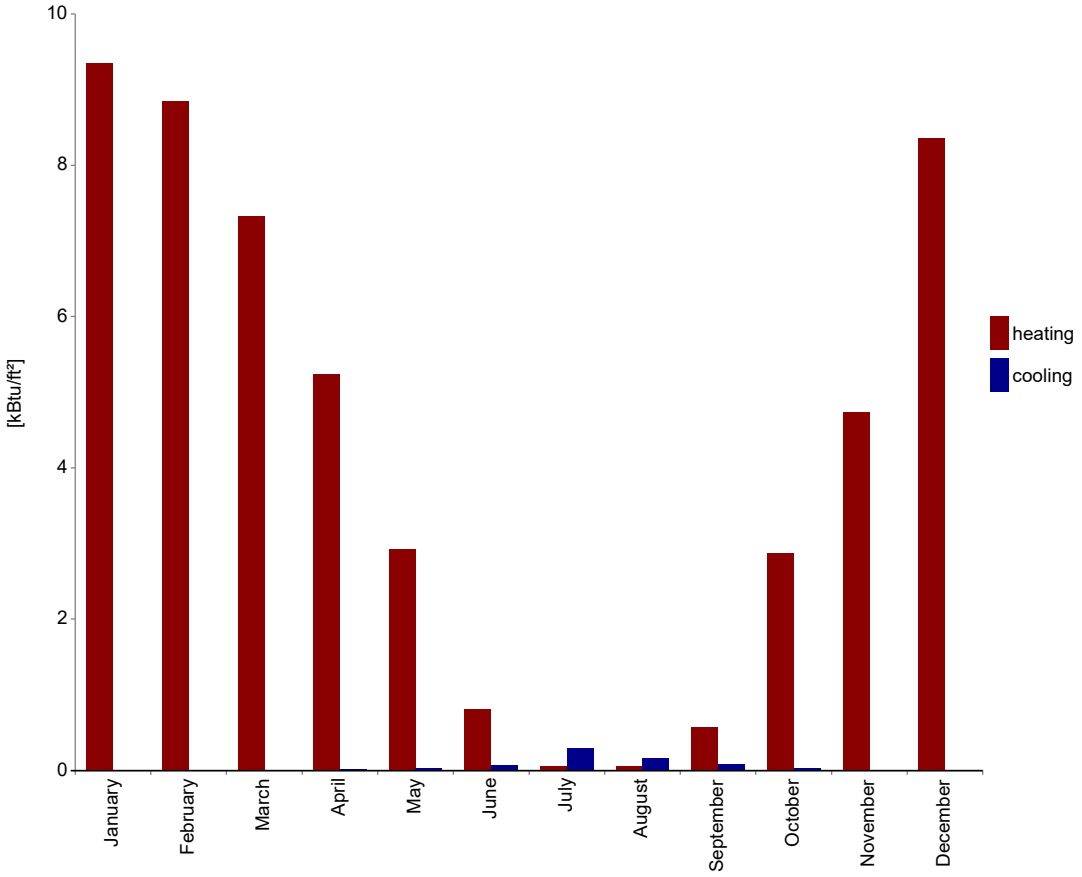
ANNUAL COOLING DEMAND

Solar heat gains:	**31,546**	kBtu/yr
Internal heat gains:	**62,908**	kBtu/yr
Total heat gains:	**94,454**	kBtu/yr
Transmission losses :	**309,604**	kBtu/yr
Ventilation losses:	**41,752**	kBtu/yr
Total heat losses:	**351,356**	kBtu/yr
Utilization factor:	**26.4**	%
Useful heat losses:	**92,719**	kBtu/yr
Cooling demand - sensible:	**1,734**	kBtu/yr
Cooling demand - latent:	**307**	kBtu/yr
Annual cooling demand:	**2,041**	kBtu/yr
Specific annual cooling demand:	**0.7**	kBtu/ft²yr





SPECIFIC HEAT/COOLING DEMAND MONTHLY



Month	Heating [kBtu/ft²]	Cooling [kBtu/ft²]
January	9.3	0
February	8.8	0
March	7.3	0
April	5.2	0
May	2.9	0
June	0.8	0.1
July	0.1	0.3
August	0.1	0.2
September	0.6	0.1
October	2.9	0
November	4.7	0
December	8.4	0

HEATING LOAD

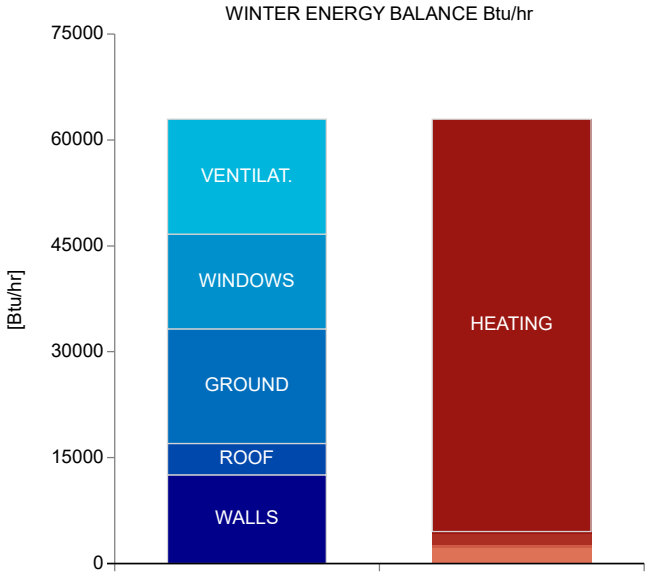
	First climate		Second climate	
Transmission heat losses:	**46,678.8**	Btu/hr	**38,690.1**	Btu/hr
Ventilation heat losses:	**16,235.4**	Btu/hr	**11,972.5**	Btu/hr
Total heat loss:	**62,914.2**	Btu/hr	**50,662.7**	Btu/hr
Solar heat gain:	**3,056.1**	Btu/hr	**1,266**	Btu/hr
Internal heat gain:	**1,467.3**	Btu/hr	**1,467.3**	Btu/hr
Total heat gains heating:	**4,523.4**	Btu/hr	**2,733.3**	Btu/hr
Heating load:	**58,390.8**	Btu/hr	**47,929.3**	Btu/hr

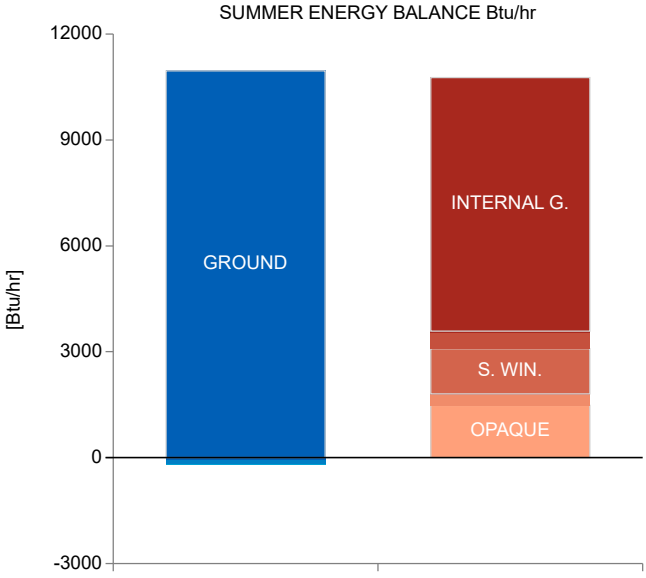
Relevant heating load:	**58,390.8**	Btu/hr
Specific heating load:	**20.2**	Btu/hr ft²

COOLING LOAD

Solar heat gain:	**3,586**	Btu/hr
Internal heat gain:	**7,182**	Btu/hr
Total heat gains cooling:	**10,768**	Btu/hr
Transmission heat losses:	**11,443.9**	Btu/hr
Ventilation heat losses:	**-45.4**	Btu/hr
Total heat loss:	**11,398.5**	Btu/hr
Cooling load - sensible:	**0**	Btu/hr
Cooling load - latent:	**0**	Btu/hr

Relevant cooling load:	**0**	Btu/hr
Specific maximum cooling load:	**0**	Btu/hr ft²





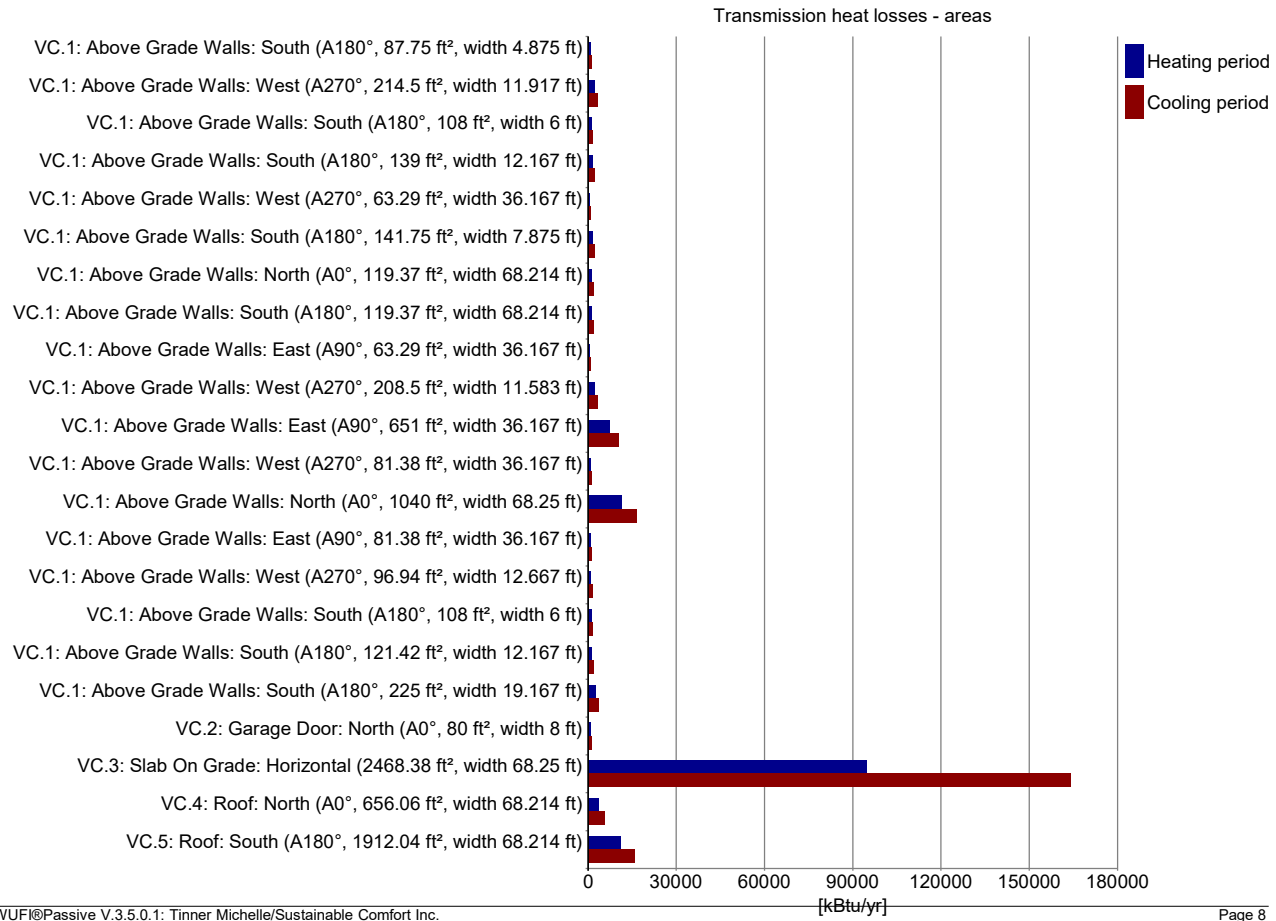
AREAS

Transmission heat losses - areas

Name	Area [ft²]	Average U-value [Btu/hr ft² °F]	Absorption coefficient	Emission coefficient	Reduction factor shading [%]	Transmission losses heating [kBtu/yr]	Transmission losses cooling [kBtu/yr]
VC.1: Above Grade Walls: South (A180°, 87.75 ft², width 4.875 ft)	87.8	0.06	0.4	0.9	100	969.6	1406.6
VC.1: Above Grade Walls: West (A270°, 214.5 ft², width 11.917 ft)	214.5	0.06	0.4	0.9	100	2370	3438.3
VC.1: Above Grade Walls: South (A180°, 108 ft², width 6 ft)	108	0.06	0.4	0.9	100	1193.3	1731.2
VC.1: Above Grade Walls: South (A180°, 139 ft², width 12.167 ft)	139	0.06	0.4	0.9	100	1535.8	2228.1
VC.1: Above Grade Walls: West (A270°, 63.29 ft², width 36.167 ft)	63.3	0.06	0.4	0.9	100	699.3	1014.5
VC.1: Above Grade Walls: South (A180°, 141.75 ft², width 7.875 ft)	141.8	0.06	0.4	0.9	100	1566.2	2272.2
VC.1: Above Grade Walls: North (A0°, 119.37 ft², width 68.214 ft)	119.4	0.06	0.4	0.9	100	1319	1913.5
VC.1: Above Grade Walls: South (A180°, 119.37 ft², width 68.214 ft)	119.4	0.06	0.4	0.9	100	1319	1913.5
VC.1: Above Grade Walls: East (A90°, 63.29 ft², width 36.167 ft)	63.3	0.06	0.4	0.9	100	699.3	1014.5
VC.1: Above Grade Walls: West (A270°, 208.5 ft², width 11.583 ft)	208.5	0.06	0.4	0.9	100	2303.7	3342.1
VC.1: Above Grade Walls: East (A90°, 651 ft², width 36.167 ft)	651	0.06	0.4	0.9	100	7192.9	10435.1
VC.1: Above Grade Walls: West (A270°, 81.38 ft², width 36.167 ft)	81.4	0.06	0.4	0.9	100	899.1	1304.4
VC.1: Above Grade Walls: North (A0°, 1040 ft², width 68.25 ft)	1040	0.06	0.4	0.9	100	11491	16670.6
VC.1: Above Grade Walls: East (A90°, 81.38 ft², width 36.167 ft)	81.4	0.06	0.4	0.9	100	899.1	1304.4
VC.1: Above Grade Walls: West (A270°, 96.94 ft², width 12.667 ft)	96.9	0.06	0.4	0.9	100	1071.1	1553.8
VC.1: Above Grade Walls: South (A180°, 108 ft², width 6 ft)	108	0.06	0.4	0.9	100	1193.3	1731.2
VC.1: Above Grade Walls: South (A180°, 121.42 ft², width 12.167 ft)	121.4	0.06	0.4	0.9	100	1341.6	1946.3
VC.1: Above Grade Walls: South (A180°, 225 ft², width 19.167 ft)	225	0.06	0.4	0.9	100	2486	3606.6
VC.2: Garage Door: North (A0°, 80 ft², width 8 ft)	80	0.06	0.4	0.9	100	883.9	1282.4
VC.3: Slab On Grade: Horizontal (2468.38 ft², width 68.25 ft)	2468.4	0.355	0	0	0	94837.6	163910.9
VC.4: Roof: North (A0°, 656.06 ft², width 68.214 ft)	656.1	0.031	0.4	0.9	100	3752.9	5444.5
VC.5: Roof: South (A180°, 1912.04 ft², width 68.214 ft)	1912	0.031	0.4	0.9	100	10937.5	15867.6

Degree hours [kFh/a]

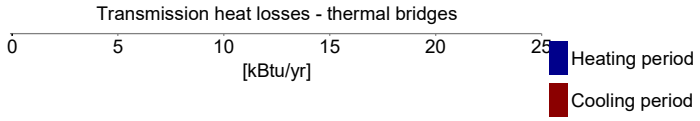
	Heating	Cooling
Ambient heating	101.8	147.7
Ground heating	60.1	103.9



THERMAL BRIDGES

Transmission heat losses - thermal bridges

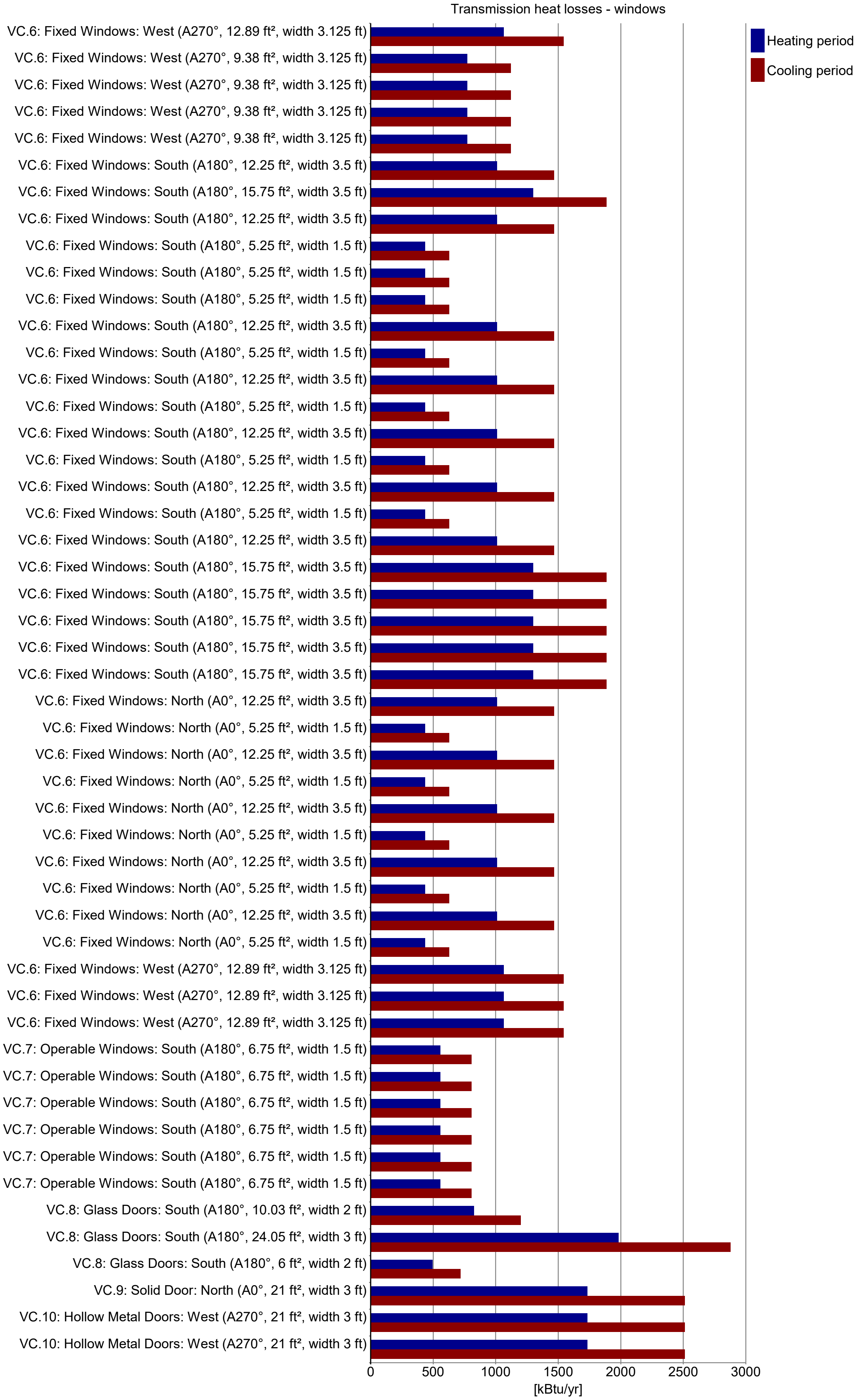
Name	Length [ft]	Psi-value [Btu/hr ft °F]	Transmission losses [kBtu/yr]	Transmission losses cooling [kBtu/yr]



WINDOWS

Transmission heat losses - windows

Name	Quantity	Inclination [°]	U-value total [Btu/hr ft² °F]	SHGC (perpendicular)	Reduction factor shading [%]	Reduction factor shading summer [%]	Solar gain heating [kBtu/yr]	Solar gain cooling [kBtu/yr]	Transmission losses heating [kBtu/yr]	Transmission losses cooling [kBtu/yr]
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)	1	90	0.45	0.4	70.8	69.8	473.5	501.4	1,063.2	1,542.4
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)	1	90	0.45	0.4	70.5	68.2	318.9	337.7	773.2	1,121.8
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)	1	90	0.45	0.4	66.8	67.4	302.1	319.9	773.2	1,121.8
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)	1	90	0.45	0.4	70.5	68.2	318.9	337.7	773.2	1,121.8
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)	1	90	0.45	0.4	68.1	67.6	307.7	325.8	773.2	1,121.8
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	80.9	66	624.7	661.4	1,010.4	1,465.8
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)	1	90	0.45	0.4	83.9	81.1	875.6	927.1	1,299	1,884.6
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	80.3	64.9	619.6	656	1,010.4	1,465.8
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	83.3	73.8	190.8	202	433	628.2
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	82	72	187.7	198.8	433	628.2
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	82.8	73	189.7	200.8	433	628.2
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	80.5	65.2	621.2	657.8	1,010.4	1,465.8
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	82.7	72.8	189.4	200.5	433	628.2
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	80.5	65.2	621.2	657.8	1,010.4	1,465.8
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	82.7	72.8	189.4	200.5	433	628.2
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	80.3	64.9	619.6	656	1,010.4	1,465.8
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	83.1	73.4	190.3	201.5	433	628.2
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	80.5	65.2	621.3	657.9	1,010.4	1,465.8
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	83.1	73.5	190.3	201.5	433	628.2
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	80.8	65.7	623.6	660.3	1,010.4	1,465.8
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)	1	90	0.45	0.4	89.5	83.2	933.6	988.5	1,299	1,884.6
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)	1	90	0.45	0.4	88.3	82.8	921	975.1	1,299	1,884.6
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)	1	90	0.45	0.4	34.7	32.7	362.6	383.9	1,299	1,884.6
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)	1	90	0.45	0.4	85	82.7	887.2	939.4	1,299	1,884.6
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)	1	90	0.45	0.4	89.2	84.4	931.1	985.9	1,299	1,884.6
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	81.9	79	285.8	302.6	1,010.4	1,465.8
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	82.8	80.3	85.7	90.8	433	628.2
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	83.5	80.9	291.1	308.2	1,010.4	1,465.8
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	83.7	81.4	86.6	91.7	433	628.2
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	83.4	80.8	290.7	307.8	1,010.4	1,465.8
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	83.7	81.4	86.6	91.7	433	628.2
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	83.4	80.8	290.7	307.8	1,010.4	1,465.8
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	83.7	81.4	86.6	91.7	433	628.2
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)	1	90	0.45	0.4	82.4	79.5	287.4	304.3	1,010.4	1,465.8
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)	1	90	0.45	0.4	82.8	80.3	85.7	90.8	433	628.2
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)	1	90	0.45	0.4	72.3	70.2	483.9	512.4	1,063.2	1,542.4
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)	1	90	0.45	0.4	72.4	70.3	484.7	513.2	1,063.2	1,542.4
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)	1	90	0.45	0.4	71.4	70	477.9	506.1	1,063.2	1,542.4
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)	1	90	0.45	0.4	85.5	82.5	264.6	280.2	556.7	807.7
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)	1	90	0.45	0.4	86.4	83.3	267.7	283.4	556.7	807.7
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)	1	90	0.45	0.4	84.8	82	262.6	278.1	556.7	807.7
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)	1	90	0.45	0.4	85.1	81.4	263.4	278.9	556.7	807.7
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)	1	90	0.45	0.4	85.6	82.4	265.1	280.7	556.7	807.7
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)	1	90	0.45	0.4	55.6	53.6	172.1	182.2	556.7	807.7
VC.8: Glass Doors: South (A180°, 10.03 ft², width 2 ft)	1	90	0.45	0.4	47	44.2	262.7	278.2	827.4	1,200.3
VC.8: Glass Doors: South (A180°, 24.05 ft², width 3 ft)	1	90	0.45	0.4	39.5	33.2	650.1	688.3	1,983.4	2,877.3
VC.8: Glass Doors: South (A180°, 6 ft², width 2 ft)	1	90	0.45	0.4	63	55.4	189.4	200.5	494.9	717.9
VC.9: Solid Door: North (A0°, 21 ft², width 3 ft)	1	90	0.45	0.4	71.7	68.4	459.4	486.4	1,732.1	2,512.8
VC.10: Hollow Metal Doors: West (A270°, 21 ft², width 3 ft)	1	90	0.45	0.4	55.1	54.9	639.8	677.4	1,732.1	2,512.8
VC.10: Hollow Metal Doors: West (A270°, 21 ft², width 3 ft)	1	90	0.45	0.4	54.3	54.8	631.2	668.3	1,732.1	2,512.8


Transmission heat losses - windows
Heating period
Cooling period
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
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VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
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VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)
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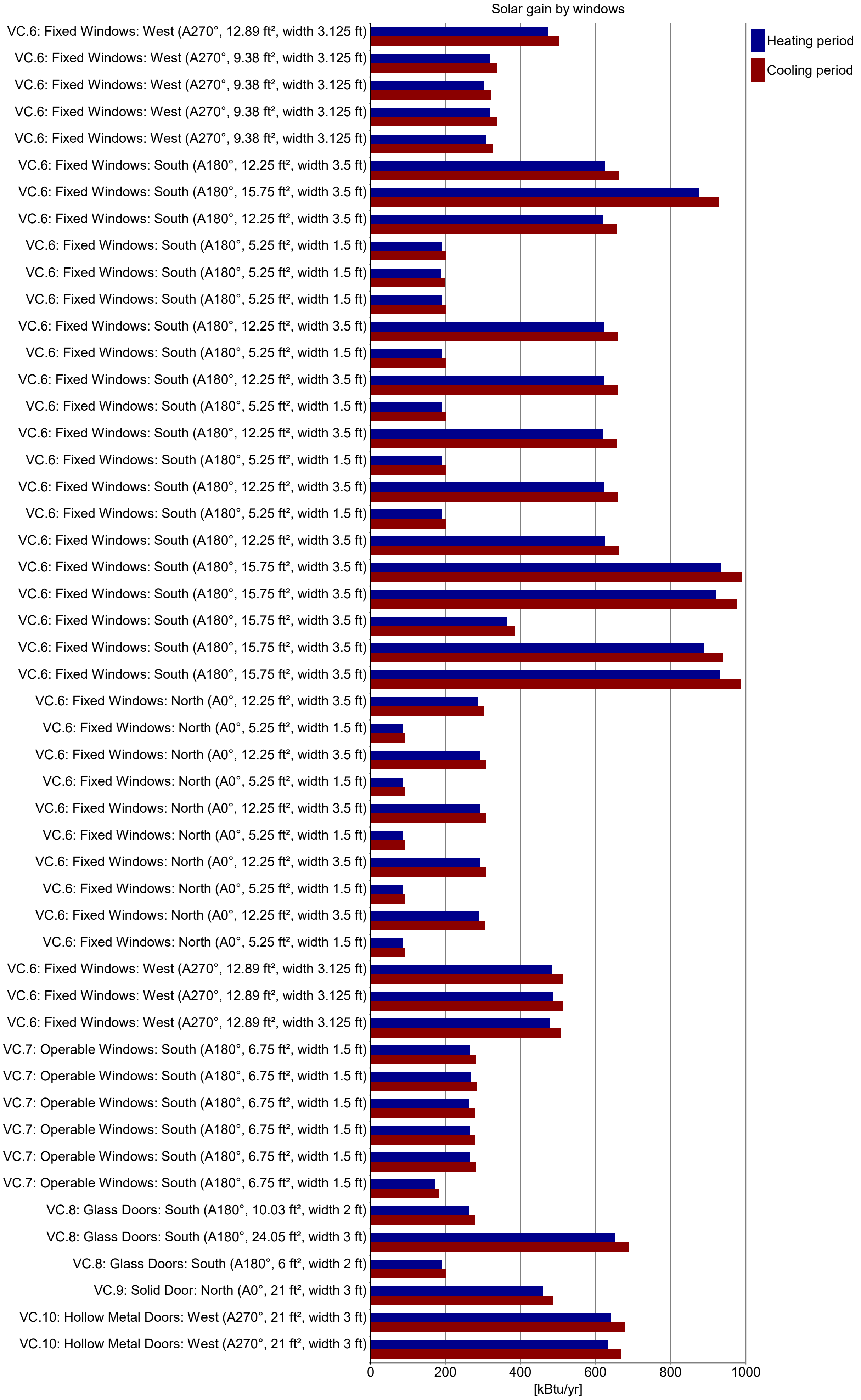
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)
VC.8: Glass Doors: South (A180°, 10.03 ft², width 2 ft)
VC.8: Glass Doors: South (A180°, 24.05 ft², width 3 ft)
VC.8: Glass Doors: South (A180°, 6 ft², width 2 ft)
VC.9: Solid Door: North (A0°, 21 ft², width 3 ft)
VC.10: Hollow Metal Doors: West (A270°, 21 ft², width 3 ft)
VC.10: Hollow Metal Doors: West (A270°, 21 ft², width 3 ft)
0
500
1000
1500
2000
2500
3000
[kBtu/yr]



Solar gain by windows
Heating period
Cooling period
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 9.38 ft², width 3.125 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
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VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
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VC.6: Fixed Windows: South (A180°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: South (A180°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: South (A180°, 15.75 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: North (A0°, 12.25 ft², width 3.5 ft)
VC.6: Fixed Windows: North (A0°, 5.25 ft², width 1.5 ft)
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)
VC.6: Fixed Windows: West (A270°, 12.89 ft², width 3.125 ft)
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)
VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)
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VC.7: Operable Windows: South (A180°, 6.75 ft², width 1.5 ft)
VC.8: Glass Doors: South (A180°, 10.03 ft², width 2 ft)
VC.8: Glass Doors: South (A180°, 24.05 ft², width 3 ft)
VC.8: Glass Doors: South (A180°, 6 ft², width 2 ft)
VC.9: Solid Door: North (A0°, 21 ft², width 3 ft)
VC.10: Hollow Metal Doors: West (A270°, 21 ft², width 3 ft)
VC.10: Hollow Metal Doors: West (A270°, 21 ft², width 3 ft)
0
200
400
600
800
1000
[kBtu/yr]

Summary building envelope

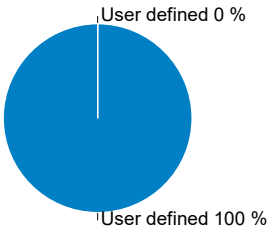
	Total area / length	Average U-value / Psi value	Transmission losses
Exterior wall ambient:	**3,749.9** ft²	**0.06** Btu/hr ft² °F	**41,433.2** kBtu/yr
Exterior wall ground:	**0** ft²	**0** Btu/hr ft² °F	**0** kBtu/yr
Basement:	**2,468.4** ft²	**0.355** Btu/hr ft² °F	**94,837.6** kBtu/yr
Roof:	**2,568.1** ft²	**0.031** Btu/hr ft² °F	**14,690.4** kBtu/yr
Windows:	**537.1** ft²	**0.45** Btu/hr ft² °F	**44,302.6** kBtu/yr
Doors:	**0** ft²	**0** Btu/hr ft² °F	**0** kBtu/yr
Thermal bridge ambient:	**0** ft	**0** Btu/hr ft °F	**0** kBtu/yr
Thermal bridge perimeter:	**0** ft	**0** Btu/hr ft °F	**0** kBtu/yr
Thermal bridge floor slab:	**0** ft	**0** Btu/hr ft °F	**0** kBtu/yr

Shading

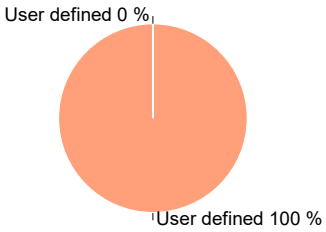
	Heating	Cooling
Reduction factor North:	**80.5** %	**77.8** %
Reduction factor East:	**100** %	**100** %
Reduction factor South:	**74.8** %	**66.7** %
Reduction factor West:	**65.2** %	**64.3** %
Reduction factor Horizontal:	**100** %	**100** %

System	DHW			Heating			Total		
	Covered DHW demand [%]	Estimated solar fraction [%]	Final energy demand [kBtu/yr]	Covered heating demand [%]	Estimated solar fraction [%]	Final energy demand [kBtu/yr]	Performance ratio	CO2 equivalent emissions [lb/yr]	Source energy demand [kBtu/yr]
User defined, DHW_State_GS640YBPDS300_0.68UEF_0.69EF_GAS_40GAL_AHRI202576138	0	0	0	100	0	153,892.6	0	84.8	169,281.9
User defined, DHW_State_GS640YBPDS300_0.68UEF_0.69EF_GAS_40GAL_AHRI202576138	100	0	12,065.5	0	0	0	1.4	6.6	13,272.1
Σ	100	0	12,065.5	100	0	153,892.6		91.5	182,554

DHW - final energy



Heating - final energy



COOLING UNITS

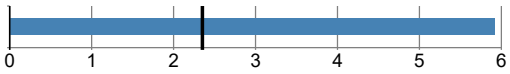
	sensible	latent
Air cooling:	**0** kBtu/ft²yr	**0** kBtu/ft²yr
Recirculation cooling:	**0.4** kBtu/ft²yr	**0.2** kBtu/ft²yr
Additional dehumidification:		**0** kBtu/ft²yr
Panel cooling:	**0** kBtu/ft²yr	
Sum:	**0.4** kBtu/ft²yr	**0.3** kBtu/ft²yr

VENTILATION

Energy transportable by supply air

Heating energy

transportable: **2.35** W/ft²
load: **5.92** W/ft²



Cooling energy

transportable: **1.29** W/ft²
load: **0** W/ft²

Infiltration pressure test ACH50:	**1.4**	1/hr
Total extract air demand:	**540**	cfm
Supply air per person:	**18**	cfm
Occupancy:	**6**	
Average air flow rate:	**303.04**	cfm
Average air change rate:	**0.38**	1/hr
Effective ACH ambient:	**0.2**	1/hr
Effective ACH ground:	**0**	1/hr
Energetically effective air exchange:	**0.2**	1/hr
Infiltration air change rate:	**0.1**	1/hr
Infiltration air change rate (heating load):	**0.25**	1/hr

Type of ventilation system:	**Balanced PH ventilation**
Wind screening coefficient (e):	**0.07**
Wind exposure factor:	**15**
Wind shield factor:	**0.05**

Ventilation heat losses: **27,310.45** kBtu/yr

Devices

Name	Sensible recovery efficiency [-]	Electric efficiency [W/cfm]	Heat recovery efficiency SHX [-]	Effective recovery efficiency [-]
Basic	0.8	0.06	0	0.7
Altogether	0.8	0.06	0	0.7

Ducts

Name	Length (total) [ft]	Clear cross-section [ft²]	U-value [Btu/hr ft² °F]	Assigned ventilation units
Supply / outdoor air duct	10	0.5454	2.31	Basic
Extract / Exhaust air duct	10	0.5454	2.31	Basic
Σ	20			

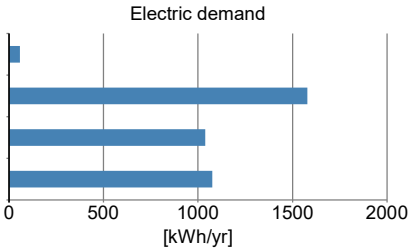
*length * quantity ** thermal conductivity / thickness

SUMMER VENTILATION

ACH night ventilation:	**0**	1/hr
ACH natural summer:	**0**	1/hr
Mechanical ventilation summer:	**0.4**	1/hr
Mechanical ventilation summer with HR:	**yes**	
Preferred minimum indoor temperature for night ventilation:	**68**	°F
Overheating temperature:	**77**	°F

ELECTRICITY DEMAND - AUXILIARY ELECTRICITY

Type	Quantity	Indoor	Norm demand	Electric demand [kWh/yr]	Source energy [kBtu/yr]
Other	1	yes	58 W	58	356.4
Ventilation winter	1	yes	1 W/cfm	1578.4	9693.2
Ventilation Defrost	1	yes	2,281 W	1039	6380.7
Ventilation summer	1	yes	1 W/cfm	1076.2	6609.4
∑				3751.6	23039.6

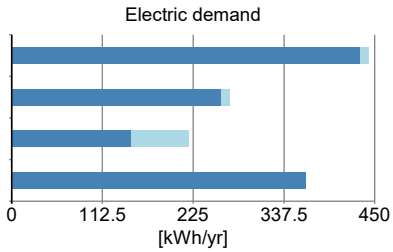


ELECTRICITY DEMAND NON-RESIDENTIAL BUILDING

Equipment

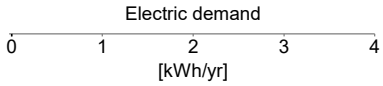
Type	Quantity	Indoor	Utilization pattern	Power rating norm demand	Electric demand [kWh/yr]	Source energy [kBtu/yr]
PC	3	yes	Pattern 1: Office	83 (+5) W	431.4 (+11.1)	2717.7
Monitor	3	yes	Pattern 1: Office	50 (+5) W	259.9 (+11.1)	1664.4
Printer	1	yes	Pattern 1: Office	540 (+29) W	148.5 (+71.8)	1352.8
Refrigerator	1	yes		1 kWh/d	365	2241.6
∑	8				1,204.8 (+94.1)	7976.4

Values in brackets ( ) display energy saving mode



Lighting

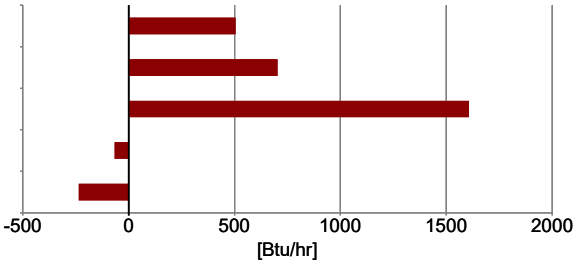
Name	Utilization pattern	Installed lighting power [W/ft²]	Daylight utilization	Lighting full load hours [hrs/yr]	Electric demand [kWh/yr]	Source energy [kBtu/yr]
∑					0	0



INTERNAL HEAT GAINS

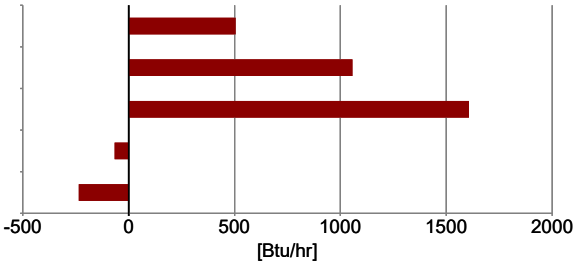
Heating season

Electricity total:	**505.9**	Btu/hr
Auxiliary electricity:	**703.2**	Btu/hr
People:	**1,606.7**	Btu/hr
Cold water:	**-66.9**	Btu/hr
Evaporation:	**-236.2**	Btu/hr
Σ:	**6,828.6**	Btu/hr
Specific internal heat gains:	**2.4**	Btu/hr ft²



Cooling season

Electricity total:	**505.9**	Btu/hr
Auxiliary electricity:	**1,056.6**	Btu/hr
People:	**1,606.7**	Btu/hr
Cold and hot water:	**-66.9**	Btu/hr
Evaporation:	**-236.2**	Btu/hr
Σ:	**6,828.6**	Btu/hr
Specific internal heat gains:	**2.4**	Btu/hr ft²



DHW AND DISTRIBUTION

DHW consumption per person per day:	**3.2**	gal/Person/day
Average cold water temperature supply:	**50.2**	°F
Useful heat DHW:	**8,316.5**	kBtu/yr
Specific useful heat DHW:	**2,875**	Btu/ft²yr
Total heat losses of the DHW system:	**62.4**	kBtu/yr
Specific losses of the DHW system:	**21.6**	Btu/ft²yr
Performance ratio DHW distribution system and storage:	**1**	
Utilization ratio DHW distribution system and storage:	**1**	
Total heat demand of DHW system:	**8,378.8**	kBtu/yr
Total specific heat demand of DHW system:	**2,896.5**	Btu/ft²yr
Total heat losses of the hydronic heating distribution:	**0**	kBtu/yr
Specific losses of the hydronic heating distribution:	**0**	Btu/ft²yr
Performance ratio of heat distribution:	**100**	%

Region	Length [ft]	Annual heat loss [kBtu/yr]
Hydronic heating distribution pipes		
Σ	0	0
DHW circulation pipes		
In conditioned space	0	0
Σ	0	0
Individual pipes		
In conditioned space	0	0
Σ	0	0
Water storage		
Device 2 (Water storage: DHW): Rheem Marathon MR50245C		28.5
Σ		28.5

Property/Site

Building name: **Sustainable Workforce Training Center**

Property information

Owner's name: **Buffalo Neighborhood Stabilization Company, Inc.**
Property address: **169 Arkansas St.**
City: **Buffalo, NY**
Zip: **14213**

Site information

Climate Location: **User defined**

Building

Building Information

Area of Conditioned Space: **2,893** ft²
Volume of conditioned space: **47,808.6** ft³
Number of bedrooms: **4**
Foundation Type: **Slab on grade**
Winter setpoint temperature: **68** °F
Summer setpoint temperature: **77** °F

Slab floor

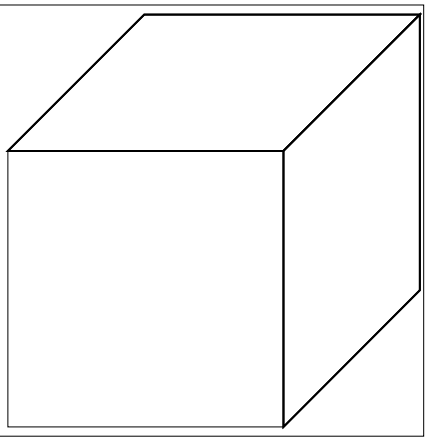
Name	Area [ft²]	Assembly
Slab On Grade	2,468.4	BASELINE: GROUND FLOOR

Assembly (Id.235): BASELINE: GROUND FLOOR

Homogenous layers

Thermal resistance: 1.852 hr ft² °F/Btu (without Rsi, Rse)

Thickness: 39.37 in



Nr.	Material/Layer (from outside to inside)	ρ [lb/ft³]	c [Btu/lb°F]	λ [Btu/hr ft °F]	Thickness [in]	Color
1	Material			1.7717	39.37	

Slab on grade

Floor slab area: **2,489.4** ft²

U-Value of basement slab: **0.1** Btu/hr ft² °F

Floor slab perimeter (P): **209.6** ft

Total R-value of perimeter insulation: **15** hr ft² °F/Btu

Above-grade walls & Rim/band joists

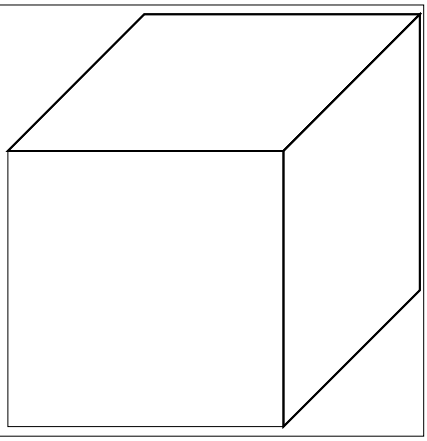
Name	Orientation	Area [ft²]	Short wave radiation absorption	Assembly
Above Grade Walls	S (29 %), E (22 %), W (18 %), N (32 %)	3,669.9	0.4	BASELINE: EXPOSED WALL
Garage Door	N (100 %)	80	0.4	BASELINE: EXPOSED WALL
Roof	Horizontal (100 %)	656.1	0.4	BASELINE: ROOF
Roof	Horizontal (100 %)	1,912	0.4	BASELINE: ROOF
	Total	**6,318**		

Assembly (Id.232): BASELINE: EXPOSED WALL

Homogenous layers

Thermal resistance: 15.623 hr ft² °F/Btu (without Rsi, Rse)

Thickness: 39.37 in



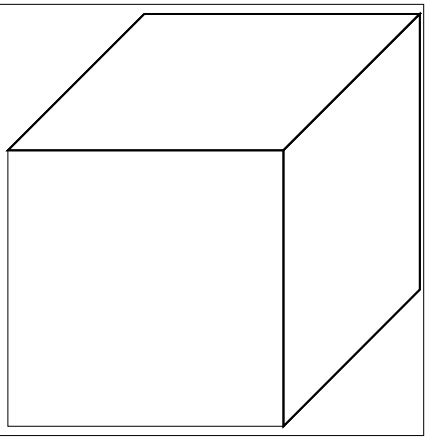
Nr.	Material/Layer (from outside to inside)	ρ [lb/ft³]	c [Btu/lb°F]	λ [Btu/hr ft °F]	Thickness [in]	Color
1	Material			0.21	39.37	

Assembly (Id.231): BASELINE: ROOF

Homogenous layers

Thermal resistance: 31.246 hr ft² °F/Btu (without Rsi, Rse)

Thickness: 39.37 in



Nr.	Material/Layer (from outside to inside)	ρ [lb/ft³]	c [Btu/lb°F]	λ [Btu/hr ft °F]	Thickness [in]	Color
1	Material			0.105	39.37	

Windows and Glass Doors

Name	Orientation	Area [ft²]	Window type
Fixed Windows	S (55 %), W (23 %), N (22 %)	393.6	BASELINE: WINDOW 001
Operable Windows	S (100 %)	40.5	BASELINE: WINDOW 004
Glass Doors	S (100 %)	40.1	BASELINE: WINDOW 002
Solid Door	N (100 %)	21	BASELINE: WINDOW 003
Hollow Metal Doors	W (100 %)	42	BASELINE: WINDOW 003
	Total	**537.1**	

Window type (Id 141): BASELINE: WINDOW 001

Basic data

Uw -mounted	[Btu/hr ft² °F]	0.45
Frame factor		0.75
Glass U-value	[Btu/hr ft² °F]	0.45
SHGC/Solar energy transmittance (perpendicular)		0.36

Frame data

Setting		Left	Right	Top	Bottom
Frame width	[in]	3.937	3.937	3.937	3.937
Frame U-value	[Btu/hr ft² °F]	0.45	0.45	0.45	0.45
Glazing-to-frame psi-value	[Btu/hr ft °F]	0	0	0	0
Frame-to-Wall psi-value	[Btu/hr ft °F]	0	0	0	0

Solar radiation angle dependent data

Angle [°]	Total solar trans.
0	

Window type (Id 144): BASELINE: WINDOW 004

Basic data

Uw -mounted	[Btu/hr ft² °F]	0.45
Frame factor		0.75
Glass U-value	[Btu/hr ft² °F]	0.45
SHGC/Solar energy transmittance (perpendicular)		0.36

Frame data

Setting		Left	Right	Top	Bottom
Frame width	[in]	3.937	3.937	3.937	3.937
Frame U-value	[Btu/hr ft² °F]	0.45	0.45	0.45	0.45
Glazing-to-frame psi-value	[Btu/hr ft °F]	0	0	0	0
Frame-to-Wall psi-value	[Btu/hr ft °F]	0	0	0	0

Solar radiation angle dependent data

Angle [°]	Total solar trans.
0	

Window type (Id 142): BASELINE: WINDOW 002

Basic data

Uw -mounted	[Btu/hr ft² °F]	0.45
Frame factor		0.75
Glass U-value	[Btu/hr ft² °F]	0.45
SHGC/Solar energy transmittance (perpendicular)		0.36

Frame data

Setting		Left	Right	Top	Bottom
Frame width	[in]	3.937	3.937	3.937	3.937
Frame U-value	[Btu/hr ft² °F]	0.45	0.45	0.45	0.45
Glazing-to-frame psi-value	[Btu/hr ft °F]	0	0	0	0
Frame-to-Wall psi-value	[Btu/hr ft °F]	0	0	0	0

Solar radiation angle dependent data

Angle [°]	Total solar trans.
0	

Window type (Id 143): BASELINE: WINDOW 003

Basic data

Uw -mounted	[Btu/hr ft² °F]	0.45
Frame factor		0.75
Glass U-value	[Btu/hr ft² °F]	0.45
SHGC/Solar energy transmittance (perpendicular)		0.36

Frame data

Setting		Left	Right	Top	Bottom
Frame width	[in]	3.937	3.937	3.937	3.937
Frame U-value	[Btu/hr ft² °F]	0.45	0.45	0.45	0.45
Glazing-to-frame psi-value	[Btu/hr ft °F]	0	0	0	0
Frame-to-Wall psi-value	[Btu/hr ft °F]	0	0	0	0

Solar radiation angle dependent data

Angle [°]	Total solar trans.
0	

Ceilings

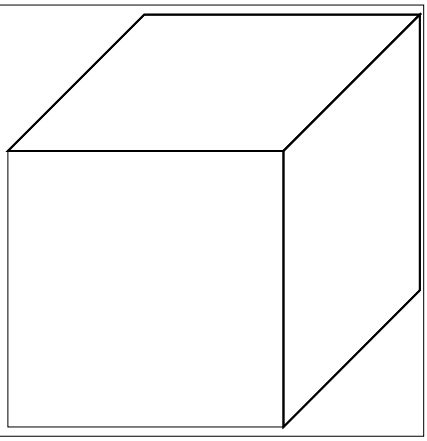
Name	Area [ft²]	Short wave radiation absorption	Assembly
Roof	656.1	0.4	BASELINE: ROOF
Roof	1,912	0.4	BASELINE: ROOF
Total	**2,568.1**		

Assembly (Id.231): BASELINE: ROOF

Homogenous layers

Thermal resistance: 31.246 hr ft² °F/Btu (without Rsi, Rse)

Thickness: 39.37 in



Nr.	Material/Layer (from outside to inside)	ρ [lb/ft³]	c [Btu/lb°F]	λ [Btu/hr ft °F]	Thickness [in]	Color
1	Material			0.105	39.37	

Space heating

Type	Performance ratio of heat generator [-]	Fuel type
User defined	1.04	Natural Gas

Space cooling

Type	Distribution	Capacity [kBtu/hr]	COP
Heat pump	| Recirculation air| Dehumidification	47.06	4 | 2
Total		**47.06**	

Water heating

Type	Performance ratio of heat generator [-]	Fuel type
User defined	1.44	Natural Gas

Water storage

Nr	Capacity [gal]
2	40
Total	**40**

Infiltration/Ventilation

ACH @ 50 Pascal **1.4** 1/hr

CFM @ 50 Pascal **1,119** cfm

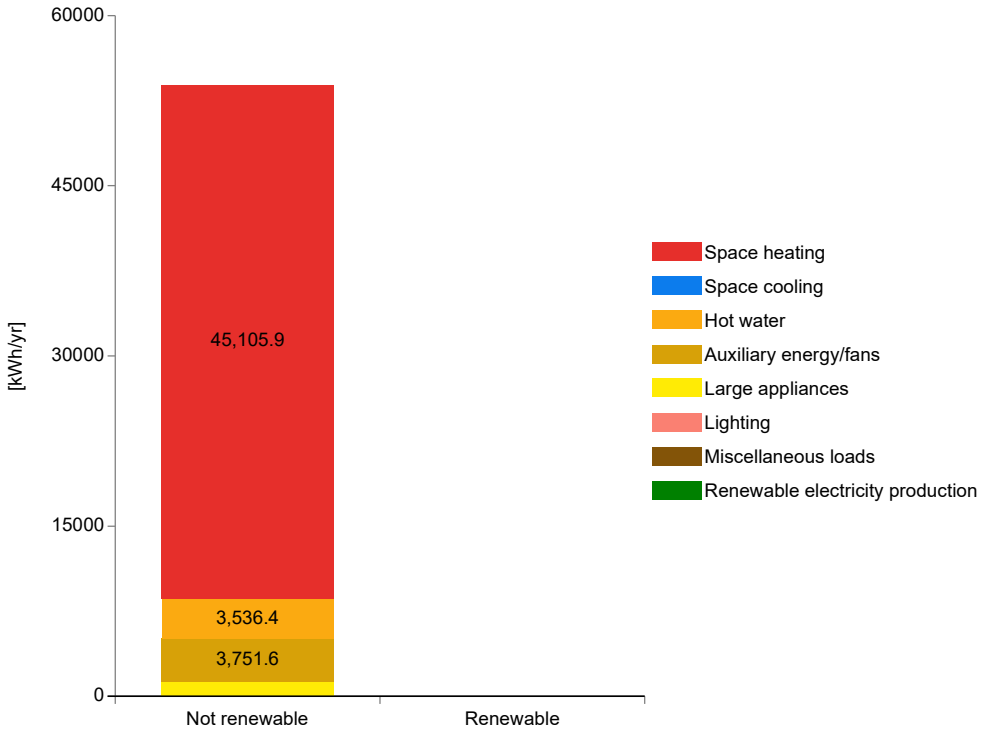
Nr	Sensible recovery efficiency [-]	Rate [cfm]	Electric efficiency [W/cfm]	Fan [W]	Defrost	Temperature below which defrost must be used [°F]	Subsoil heat exchanger efficiency [-]
5	0.44	249.71	0.03	249.71	yes	16.48	0
Total	**0.44**	**249.71**		**249.71**			

Lights and appliances

Type	Energy use [kWh/yr]	In conditioned space
Other	58.03	yes
Ventilation winter	1,578.38	yes
Ventilation Defrost	1,038.99	yes
Ventilation summer	1,076.22	yes
Total	**3,751.62**	

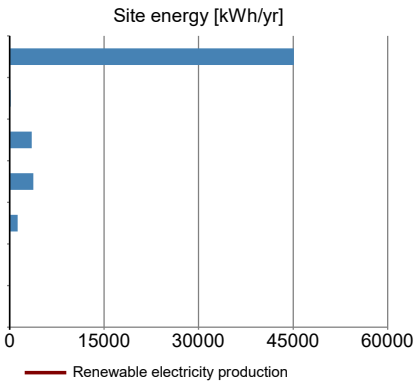
Project name:	**Baseline**
Climate:	**User defined**
Type:	**Non-residential**
Interior conditioned floor area:	**2,893** ft²
Number of units:	**1**
Occupants:	**6**
Site energy use:	**221,521.3** kBtu/yr
Specific site energy use:	**76.6** kBtu/ft²yr
Site energy use:	**64,927.9** kWh/yr
Specific site energy use:	**22.4** kWh/ft²yr
Site energy use per person:	**10,821.3** kWh/Person yr
Net site energy use (with 100% renewables):	**221,521.3** kBtu/yr
Specific net site energy use (with 100% renewables):	**76.6** kBtu/ft²yr
Net site energy use (with 100% renewables):	**64,927.9** kWh/yr
Specific net site energy use (with 100% renewables):	**22.4** kWh/ft²yr
Net site energy use per person (with 100% renewables):	**10,821.3** kWh/Person yr

OVERVIEW



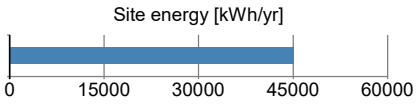
TOTAL USE BY TYPE

Type	Site Energy [kWh/yr]	Specific site energy [kWh/ft² yr]	Site Energy [kBtu/yr]	Specific Site Energy [kBtu/ft² yr]
Space heating	45,105.9	15.6	153,892.6	53.2
Space cooling	155.1	0.1	529.3	0.2
Hot water	3,536.4	1.2	12,065.5	4.2
Auxiliary energy/fans	3,751.6	1.3	12,799.8	4.4
Large appliances	1,298.8	0.4	4,431.3	1.5
Lighting	0	0	0	0
Miscellaneous loads	0	0	0	0
Renewable electricity production	0	0	0	0
Total	**53,847.9**	**18.6**	**183,718.5**	**63.5**



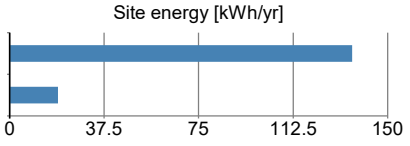
SPACE HEATING

Type	Site Energy [kWh/yr]	Specific site energy [kWh/ft² yr]	Site Energy [kBtu/yr]	Specific Site Energy [kBtu/ft² yr]
User defined	45,105.9	15.6	153,892.6	53.2
Total	**45,105.9**	**15.6**	**153,892.6**	**53.2**



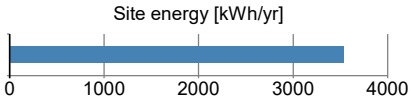
SPACE COOLING

Type	Site Energy [kWh/yr]	Specific site energy [kWh/ft² yr]	Site Energy [kBtu/yr]	Specific Site Energy [kBtu/ft² yr]
Recirculation Cooling	136	0	463.8	0.2
Dehumidification	19.2	0	65.4	0
Total	**155.1**	**0.1**	**529.3**	**0.2**



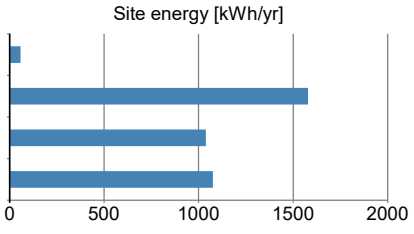
DHW

Type	Site Energy [kWh/yr]	Specific site energy [kWh/ft² yr]	Site Energy [kBtu/yr]	Specific Site Energy [kBtu/ft² yr]
User defined	3,536.4	1.2	12,065.5	4.2
Total	**3,536.4**	**1.2**	**12,065.5**	**4.2**



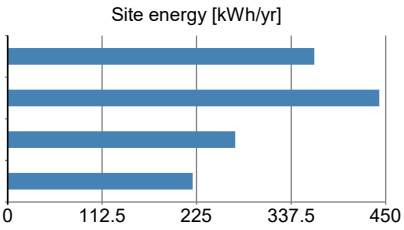
AUXILIARY ENERGY/FANS

Type	Site Energy [kWh/yr]	Specific site energy [kWh/ft² yr]	Site Energy [kBtu/yr]	Specific Site Energy [kBtu/ft² yr]
Other	58	0	198	0.1
Ventilation winter	1,578.4	0.5	5,385.1	1.9
Ventilation Defrost	1,039	0.4	3,544.8	1.2
Ventilation summer	1,076.2	0.4	3,671.9	1.3
Total	**3,751.6**	**1.3**	**12,799.8**	**4.4**



LARGE APPLIANCES

Type	Site Energy [kWh/yr]	Specific site energy [kWh/ft² yr]	Site Energy [kBtu/yr]	Specific Site Energy [kBtu/ft² yr]
Refrigerator	365	0.1	1,245.3	0.4
PC	442.5	0.2	1,509.8	0.5
Monitor	271	0.1	924.6	0.3
Printer	220.3	0.1	751.5	0.3
Total	**1,298.8**	**0.4**	**4,431.3**	**1.5**



LIGHTING

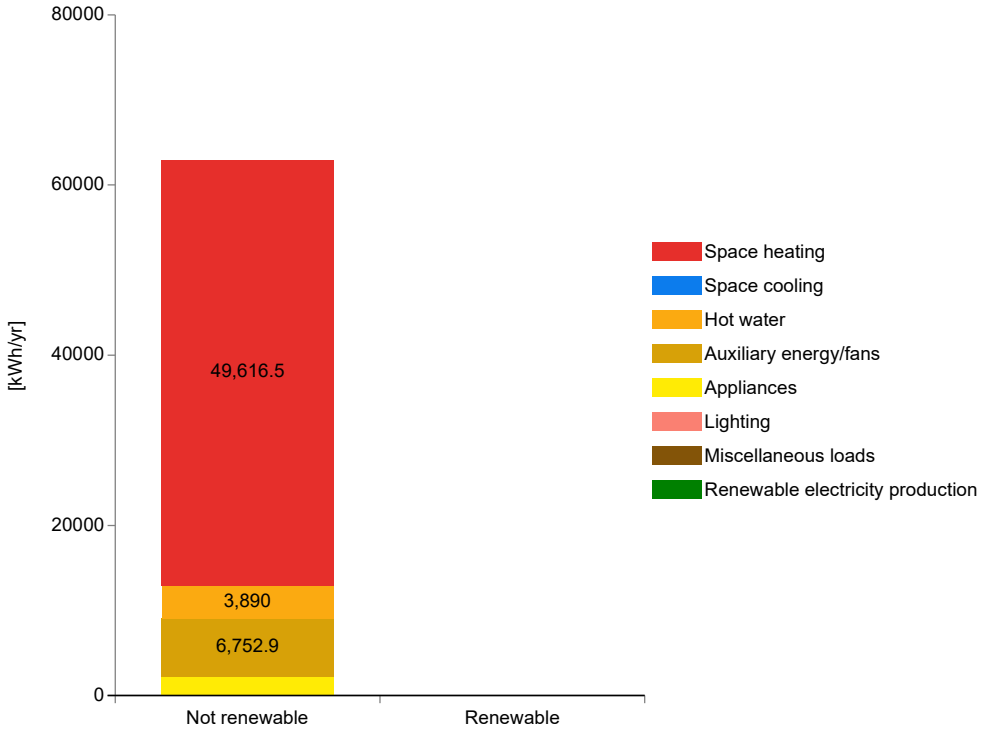
Type	Site Energy [kWh/yr]	Specific site energy [kWh/ft² yr]	Site Energy [kBtu/yr]	Specific Site Energy [kBtu/ft² yr]
Total	**0**	**0**	**0**	**0**

MISC LOADS

Type	Site Energy [kWh/yr]	Specific site energy [kWh/ft² yr]	Site Energy [kBtu/yr]	Specific Site Energy [kBtu/ft² yr]
Total	**0**	**0**	**0**	**0**

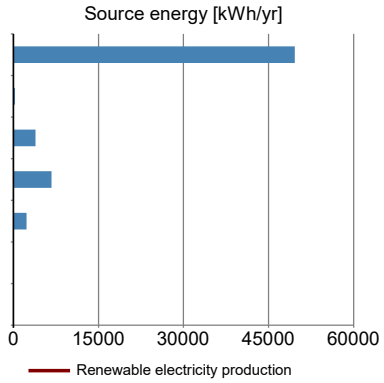
Project name:	**Baseline**	
Climate:	**User defined**	
Type:	**Non-residential**	
Interior conditioned floor area:	**2,893**	ft²
Number of units:	**1**	
Occupants:	**6**	
Source energy use:	**282,567.7**	kBtu/yr
Specific source energy use:	**97.7**	kBtu/ft²yr
Source energy use:	**82,820.6**	kWh/yr
Source energy use per person:	**308.1**	kWh/Person yr
Net source energy use (with 100% renewables):	**282,567.7**	kBtu/yr
Specific net source energy use (with 100% renewables):	**97.7**	kBtu/ft²yr
Net source energy use (with 100% renewables):	**82,820.6**	kWh/yr
Specific source energy use per person (with 100% renewables):	**13,803.4**	kWh/Person yr
PHIUS+ Source Zero:	**NO**	

OVERVIEW



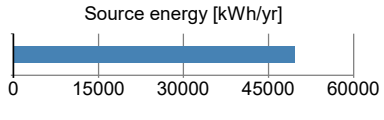
TOTAL USE BY TYPE

Type	Source energy [kWh/yr]	Specific source energy [kWh/ft² yr]	Source energy [kBtu/yr]	Specific source energy [kBtu/ft² yr]
Space heating	49,616.5	17.2	169,281.9	58.5
Space cooling	279.2	0.1	952.7	0.3
Hot water	3,890	1.3	13,272.1	4.6
Auxiliary energy/fans	6,752.9	2.3	23,039.6	8
Appliances	2,337.9	0.8	7,976.4	2.8
Lighting	0	0	0	0
Miscellaneous loads	0	0	0	0
Renewable electricity production	0	0	0	0
Total	**62,876.6**	**21.7**	**214,522.6**	**74.2**



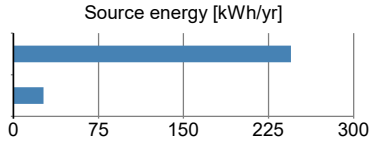
SPACE HEATING

Type	Source energy [kWh/yr]	Specific source energy [kWh/ft² yr]	Source energy [kBtu/yr]	Specific source energy [kBtu/ft² yr]	Source energy factor [kWh/kWh]	Source
User defined	49,616.5	17.2	169,281.9	58.5	1.1	Natural Gas
Total	**49,616.5**	**17.2**	**169,281.9**	**58.5**		



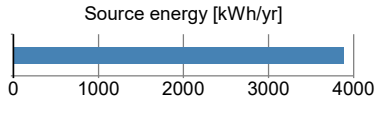
SPACE COOLING

Type	Source energy [kWh/yr]	Specific source energy [kWh/ft² yr]	Source energy [kBtu/yr]	Specific source energy [kBtu/ft² yr]	Source energy factor [kWh/kWh]	Source
Recirculation Cooling	244.7	0.1	834.9	0.3	1.8	Electricity
Dehumidification	26.5	0	90.3	0	1.8	Electricity
Total	**271.2**	**0.1**	**925.3**	**0.3**		



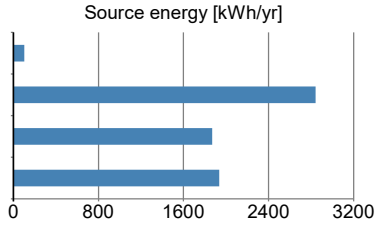
DHW

Type	Source energy [kWh/yr]	Specific source energy [kWh/ft² yr]	Source energy [kBtu/yr]	Specific source energy [kBtu/ft² yr]	Source energy factor [kWh/kWh]	Source
User defined	3,890	1.3	13,272.1	4.6	1.1	Natural Gas
Total	**3,890**	**1.3**	**13,272.1**	**4.6**		



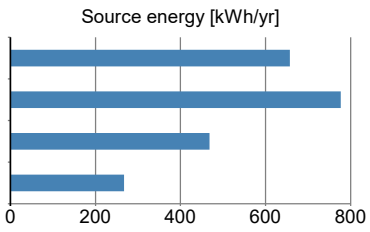
AUXILIARY ENERGY/FANS

Type	Source energy [kWh/yr]	Specific source energy [kWh/ft² yr]	Source energy [kBtu/yr]	Specific source energy [kBtu/ft² yr]	Source energy factor [kWh/kWh]	Source
Other	104.5	0	356.4	0.1	1.8	Electricity
Ventilation winter	2,841.1	1	9,693.2	3.4	1.8	Electricity
Ventilation Defrost	1,870.2	0.6	6,380.7	2.2	1.8	Electricity
Ventilation summer	1,937.2	0.7	6,609.4	2.3	1.8	Electricity
Total	**6,752.9**	**2.3**	**23,039.6**	**8**		



LARGE APPLIANCES

Type	Source energy [kWh/yr]	Specific source energy [kWh/ft² yr]	Source energy [kBtu/yr]	Specific source energy [kBtu/ft² yr]	Source energy factor [kWh/kWh]	Source
Refrigerator	657	0.2	2,241.6	0.8	1.8	Electricity
PC	776.5	0.3	2,649.3	0.9	1.8	Electricity
Monitor	467.8	0.2	1,596	0.6	1.8	Electricity
Printer	267.3	0.1	912	0.3	1.8	Electricity
Total	**2,168.6**	**0.7**	**7,398.8**	**2.6**		



LIGHTING

Type	Source energy [kWh/yr]	Specific source energy [kWh/ft² yr]	Source energy [kBtu/yr]	Specific source energy [kBtu/ft² yr]	Source energy factor [kWh/kWh]	Source
Total	**0**	**0**	**0**	**0**		

MISC LOADS

Type	Source energy [kWh/yr]	Specific source energy [kWh/ft² yr]	Source energy [kBtu/yr]	Specific source energy [kBtu/ft² yr]	Source energy factor [kWh/kWh]	Source
Total	**0**	**0**	**0**	**0**		

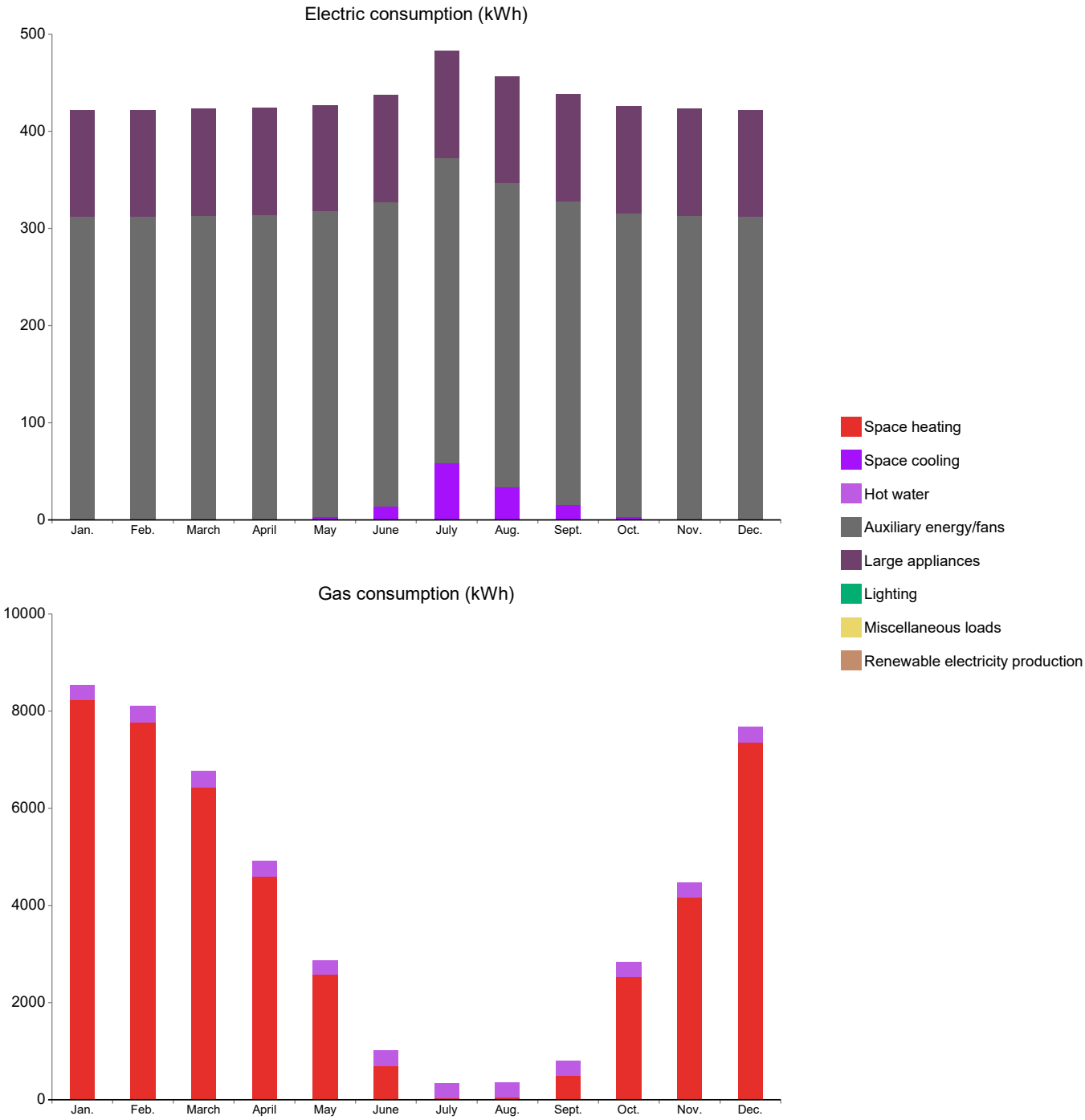
SITE ENERGY MONTHLY REPORT

ELECTRICITY USE [kWh]

Type	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Space heating	0	0	0	0	0	0	0	0	0	0	0	0
Space cooling	0.63	0.71	1.86	2.89	5.86	16.31	61.53	35.73	17.35	4.97	1.72	0.67
Hot water	0	0	0	0	0	0	0	0	0	0	0	0
Auxiliary energy/fans	312.64	312.64	312.64	312.64	312.64	312.64	312.64	312.64	312.64	312.64	312.64	312.64
Large appliances	108.23	108.23	108.23	108.23	108.23	108.23	108.23	108.23	108.23	108.23	108.23	108.23
Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous loads	0	0	0	0	0	0	0	0	0	0	0	0
Renewable electricity production	0	0	0	0	0	0	0	0	0	0	0	0

GAS USE [kWh]

Type	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Space heating	8,241.16	7,802.31	6,464.01	4,619.99	2,577.1	711.06	46.77	55.61	508.14	2,531.11	4,177.75	7,370.93
Space cooling	0	0	0	0	0	0	0	0	0	0	0	0
Hot water	294.7	294.7	294.7	294.7	294.7	294.7	294.7	294.7	294.7	294.7	294.7	294.7
Auxiliary energy/fans	0	0	0	0	0	0	0	0	0	0	0	0
Large appliances	0	0	0	0	0	0	0	0	0	0	0	0
Lighting	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous loads	0	0	0	0	0	0	0	0	0	0	0	0
Renewable electricity production	0	0	0	0	0	0	0	0	0	0	0	0


Electric consumption (kWh)
500
400
300
200
100
0
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.
Space heating
Space cooling
Hot water
Auxiliary energy/fans
Large appliances
Lighting
Miscellaneous loads
Renewable electricity production
Gas consumption (kWh)
10000
8000
6000
4000
2000
0
Jan.
Feb.
March
April
May
June
July
Aug.
Sept.
Oct.
Nov.
Dec.

Project data

Client	
Surname & Name	Buffalo Neighborhood Stabilization Company, Inc.
Locality	Buffalo, NY
Postal code	14213
Street	429 Plymouth Avenue, Suite 1
Tel.	716-775-7193
e-mail	jen@bnscbuffalo.org
Building	
Name/Type	Sustainable Workforce Training Center
Locality	Buffalo, NY
Postal code	14213
Street	169 Arkansas St.
Country	
Owner	
Surname & Name	Buffalo Neighborhood Stabilization Company, Inc.
Locality	Buffalo, NY
Postal code	14213
Street	429 Plymouth Avenue, Suite 1
Responsible	
Surname & Name	Tinner Michelle
Locality	Syracuse
Postal code	13208
Street	639 North Salina Street
Tel.	(315) 552-9060, ext. 721
License Nr.	michelle@greenrater.com
e-mail	112659
Date	1.1.0001

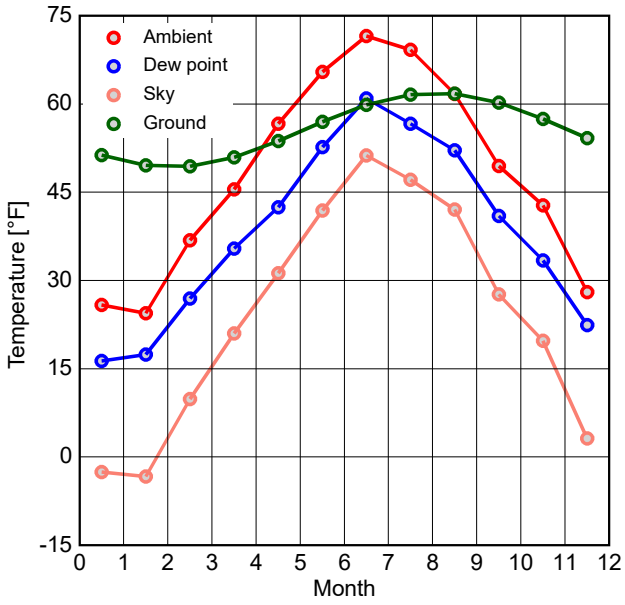
Climate

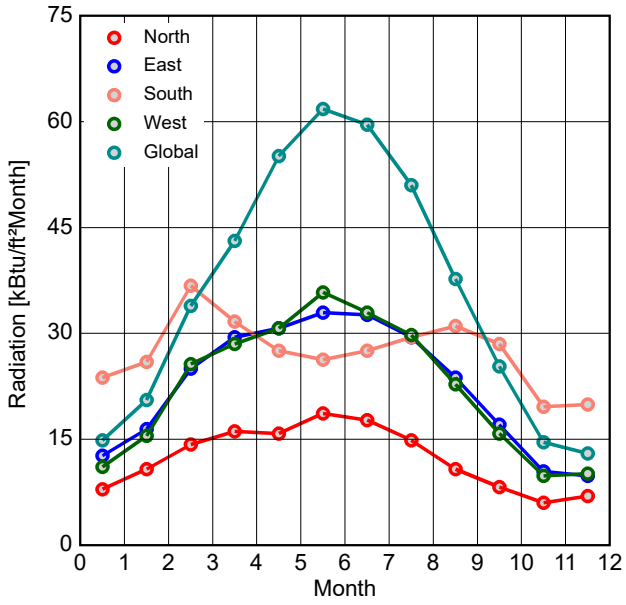
Case 1: Climate

Location: User defined		
Latitude	[°]	42.933
Longitude	[°]	-78.733
Altitude weather station	[ft]	705.3806
Altitude building	[ft]	623
Daily temperature swing summer	[°F]	18
Average wind speed	[ft/s]	13.1234
Additional data		
Ground thermal conductivity	[Btu/hr ft °F]	1.1556
Ground heat capacity	[Btu/lb°F]	0.2388
Ground density	[lb/ft³]	124.8559
Depth below grade of groundwater	[ft]	9.8425
Flow rate of groundwater	[ft/d]	0.164

Climate Data

Setting	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Heating W. 1	Heating W. 2	Cooling W. 1	Cooling W. 2
Temperature [°F]																
Ambient	25.9	24.4	36.9	45.5	56.7	65.5	71.6	69.3	61.7	49.5	42.8	28	12.2	26.8	77	
Dew point	16.3	17.4	27	35.4	42.4	52.7	61	56.7	52.2	41	33.4	22.5				
Sky	-2.6	-3.3	9.9	21	31.3	41.9	51.3	47.1	42.1	27.7	19.8	3.2				
Ground	51.3	49.6	49.5	51	53.7	57	59.9	61.6	61.8	60.3	57.5	54.2				
Solar radiation [kBtu/ft²Month]													Solar radiation [Btu/hr ft²]			
North	7.9	10.8	14.3	16.2	15.8	18.7	17.8	14.9	10.8	8.2	6	7	16.8	9.5	21.9	
East	12.7	16.5	25	29.5	30.7	33	32.7	29.5	23.8	17.1	10.5	9.8	29.5	12.4	40.9	
South	23.8	26	36.8	31.7	27.6	26.3	27.6	29.5	31.1	28.5	19.7	20	50.1	19.3	36.8	
West	11.1	15.5	25.7	28.5	30.7	35.8	33	29.8	22.8	15.8	9.8	10.1	25.4	11.7	28.5	
Global	14.9	20.6	33.9	43.1	55.2	61.8	59.6	51	37.7	25.4	14.6	13	33.9	15.9	72.3	





Passive house data

General data

Building category		Non-residential
Occupancy type		Office/Administrative building
Building status		In planning
Type		New construction
Indoor temperature	[°F]	68
Internal gains setting		Calculated
Internal heat gains	[Btu/hr ft²]	2.36
Occupancy setting method		Design
Number of occupants		6
Number of units		1
Number of floors		1
Visualized volume	[ft³]	54299.9
Gross volume	[ft³]	62906
Net volume	[ft³]	47808.6
Floor area	[ft²]	2893

Additional data

Preferred minimum indoor temperature for night ventilation	[°F]	68
Overheating temperature threshold	[°F]	77
Fresh air per person	[cfm]	18
Hot water tap-openings per person per day		3
Hot water tap-opening utilization days per year	[days/yr]	365
Air-tightness metric		Envelope airtightness at 50 Pa
Envelope airtightness at 50 Pa	[cfm/ft²]	0.1201
Non combustible materials		No
Type of ventilation system		Balanced PH ventilation
Max. humidity ratio (if dehumidification)	[lbw/lba]	0.012
Building wind exposure		Several sides exposed - moderate screening
Wind screening coefficient (e)		0.07
Wind exposure factor (f)		15
Wind shield factor		0.05
DHW consumption (60°) per person per day	[gal/Person/day]	
Average cold water temperature of the supply	[°F]	
Mechanical room temperature	[°F]	68

Foundation interface: Slab

Type		Slab on grade
Floor slab area	[ft²]	2489.4
U-Value of basement slab	[Btu/hr ft² °F]	0.05
Floor slab perimeter (P)	[ft]	209.6
Position of the perimeter insulation		Not defined
Perimeter insulation width/depth	[ft]	4
Thickness of perimeter insulation	[in]	3
Conductivity perimeter insulation	[Btu/hr ft °F]	0.0167
Phase shift months	[months]	
Harmonic fraction	[Btu/hr F]	

Utilization pattern: 1, Office

Begin utilization	[hr]	7
End utilization	[hr]	18
Annual utilization	[days/yr]	250
Illumination level	[lux]	300
Height of utilization level		Level 2: 2.62 ft
Relative absence	[-]	0.3
Part use factor of building operating period for lighting	[-]	0.9
Optional data		
Average occupancy	[ft²/Person]	
Room setpoint temperature	[°F]	
Heating reduction temperature	[°F]	
Daily utilization hours	[hrs/d]	
Annual utilization hours	[hrs/yr]	
Annual utilization hours during daytime	[hrs/yr]	
Annual utilization hours during nighttime	[hrs/yr]	
Daily heating operation hours	[hrs/d]	
Daily ventilation operation hours	[hrs/d]	
Number of max water tap openings per day	[-]	

Utilization pattern: 2, Workshop

Begin utilization	[hr]	7
End utilization	[hr]	18
Annual utilization	[days/yr]	200
Illumination level	[lux]	300
Height of utilization level		Level 2: 2.62 ft
Relative absence	[-]	0
Part use factor of building operating period for lighting	[-]	0.7
Optional data		
Average occupancy	[ft²/Person]	
Room setpoint temperature	[°F]	
Heating reduction temperature	[°F]	
Daily utilization hours	[hrs/d]	
Annual utilization hours	[hrs/yr]	
Annual utilization hours during daytime	[hrs/yr]	
Annual utilization hours during nighttime	[hrs/yr]	
Daily heating operation hours	[hrs/d]	
Daily ventilation operation hours	[hrs/d]	
Number of max water tap openings per day	[-]	

Ventilation utilization pattern

Name	Operating days per week	Weeks per year	Additional data
Office	5	52	12 h/d (100%); 12 h/d (40%)
Workshop	5	52	12 h/d (100%); 6 h/d (77%); 6 h/d (40%)

Zones / Components

Case 1/Zone 1

Case 1/Zone 1: General data

Name		PUSH Training Center
Type		Simulated zone
PH case		
Geometry		
Gross volume	[ft³]	62906.0009
Net volume	[ft³]	47808.5607
Floor area	[ft²]	2893
Clearance height	[ft]	8.2
Other data		
Specific heat capacity	[Btu/ft²F]	23.2442
Humidity capacity	[lb/(lbw/lbda) ft²]	143.3713

Inner load / occupancy

Occupant quantity		6
Humidity sources	[lb/(ft²hr)]	4.096E-4
Additional data		
Heat loss due to evaporation (per person)	[Btu/hr]	51.1821
Heat loss due to flushing toilets (cold water)		Yes
Number of flush toilets		1
Toilet utilization pattern		Pattern 1: Office
Use default values for school		No

Name	Utilization pattern	Activity of persons	Occupant quantity	Floor area of utilization zone [ft²]
Office	Pattern 1: Office	Adult, standing or light work	2	0.0
Workshop	Pattern 2: Workshop	Adult, standing or light work	17	0.0

Office equipment: 1

Application type		PC
Utilization pattern		Pattern 1: Office
Quantity		3
Within thermal envelope		Yes
Power rating	[W]	83
Power rating (energy saving mode)	[W]	5

Office equipment: 2

Application type		Monitor
Utilization pattern		Pattern 1: Office
Quantity		3
Within thermal envelope		Yes
Power rating	[W]	50
Power rating (energy saving mode)	[W]	5

Office equipment: 3

Application type		Printer
Utilization pattern		Pattern 1: Office
Quantity		1
Within thermal envelope		Yes
Power rating	[W]	540
Power rating (energy saving mode)	[W]	29
Duration of utilization time in energy saving mode*	[hrs/yr]	

Kitchen equipment: 1

Application type		Refrigerator
Quantity		1
Within thermal envelope		Yes
Norm demand	[kWh/d]	1

Process loads: 1, Plainer

Name		Plainer
Total energy use	[kWh/yr]	1760
Quantity		1
Include in source energy total		Yes
Increase source energy allowance		Yes
Inside thermal envelope		Yes
Power rating	[W]	
Annual use hours	[hr]	
Comment		

Process loads: 2, Table Top AC Unit

Name		Table Top AC Unit
Total energy use	[kWh/yr]	1800
Quantity		1
Include in source energy total		Yes
Increase source energy allowance		Yes
Inside thermal envelope		Yes
Power rating	[W]	
Annual use hours	[hr]	
Comment		

Process loads: 3, Residential AC Unit

Name		Residential AC Unit
Total energy use	[kWh/yr]	3600
Quantity		1
Include in source energy total		Yes
Increase source energy allowance		Yes
Inside thermal envelope		Yes
Power rating	[W]	
Annual use hours	[hr]	
Comment		

Process loads: 4, Joiner

Name		Joiner
Total energy use	[kWh/yr]	1760
Quantity		1
Include in source energy total		Yes
Increase source energy allowance		Yes
Inside thermal envelope		Yes
Power rating	[W]	
Annual use hours	[hr]	
Comment		

Process loads: 5, Dust Collector

Name		Dust Collector
Total energy use	[kWh/yr]	960
Quantity		1
Include in source energy total		Yes
Increase source energy allowance		Yes
Inside thermal envelope		Yes
Power rating	[W]	
Annual use hours	[hr]	
Comment		

Process loads: 6, Table Saw

Name		Table Saw
Total energy use	[kWh/yr]	600
Quantity		1
Include in source energy total		Yes
Increase source energy allowance		Yes
Inside thermal envelope		Yes
Power rating	[W]	
Annual use hours	[hr]	
Comment		

Process loads: 7, Table Saw

Name		Table Saw
Total energy use	[kWh/yr]	600
Quantity		1
Include in source energy total		Yes
Increase source energy allowance		Yes
Inside thermal envelope		Yes
Power rating	[W]	
Annual use hours	[hr]	
Comment		

Ventilation / Rooms

Name	Room type	Quantity	Utilization pattern	Design volume flow rate [cfm]		Average volume flow rate [cfm]		Average air change rate [1/hr]
				Supply Air	Exhaust Air	Supply Air	Exhaust Air	
Office	User defined	1	Pattern 1: Office	39.9997	39.9997	0	0	
Workshop	User defined	1	Pattern 2: Workshop	500.0027	500.0027	0	0	
			Total	540	540	0	0	

ACH via natural ventilation (day)	[1/hr]	0
Average mechanical ventilation air change rate	[1/hr]	
ACH via natural ventilation (night)	[1/hr]	0

Case 1/Zone 1: Visualized components

Zone 1/Component 1: General data

Name		Above Grade Walls
Type		Opaque
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Assembly		Assembly (Id.232): BASELINE: EXPOSED WALL
U	[Btu/hr ft² °F]	0.0603
Geometry		
Area	[ft²]	3669.9
Inclination	[°]	90
Orientation		South (29 %), East (22 %), West (18 %), North (32 %)
Surface		
Rse / Rsi (According to component type)	[hr ft² °F/Btu]	0.2271 / 0.7382
Absorption / Emission (User defined)	[-]	0.4 / 0.9

Zone 1/Component 2: General data

Name		Garage Door
Type		Opaque
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Assembly		Assembly (Id.232): BASELINE: EXPOSED WALL
U	[Btu/hr ft² °F]	0.0603
Geometry		
Area	[ft²]	80
Inclination	[°]	90
Orientation		North (100 %)
Surface		
Rse / Rsi (According to component type)	[hr ft² °F/Btu]	0.2271 / 0.7382
Absorption / Emission (User defined)	[-]	0.4 / 0.9

Zone 1/Component 3: General data

Name		Slab On Grade
Type		Opaque
Inner side		Zone 1: PUSH Training Center
Outer side		Ground
Assembly		Assembly (Id.235): BASELINE: GROUND FLOOR
U	[Btu/hr ft² °F]	0.355
Geometry		
Area	[ft²]	2468.4
Inclination	[°]	180
Orientation		Horizontal (100 %)
Surface		
Rse / Rsi (According to component type)	[hr ft² °F/Btu]	0 / 0.9653

Zone 1/Component 4: General data

Name		Roof
Type		Opaque
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Assembly		Assembly (Id.231): BASELINE: ROOF
U	[Btu/hr ft² °F]	0.0312
Geometry		
Area	[ft²]	656.1
Inclination	[°]	27.9
Orientation		Horizontal (100 %)
Surface		
Rse / Rsi (According to component type)	[hr ft² °F/Btu]	0.2271 / 0.5678
Absorption / Emission (User defined)	[-]	0.4 / 0.9

Zone 1/Component 5: General data

Name		Roof
Type		Opaque
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Assembly		Assembly (Id.231): BASELINE: ROOF
U	[Btu/hr ft² °F]	0.0312
Geometry		
Area	[ft²]	1912
Inclination	[°]	9.2
Orientation		Horizontal (100 %)
Surface		
Rse / Rsi (According to component type)	[hr ft² °F/Btu]	0.2271 / 0.5678
Absorption / Emission (User defined)	[-]	0.4 / 0.9

Zone 1/Component 6: General data

Name		Fixed Windows
Type		Transparent
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Window type		Window type (Id 141): BASELINE: WINDOW 001
Uw -mounted	[Btu/hr ft² °F]	0.45
Geometry		
Area	[ft²]	393.6
Inclination	[°]	90
Orientation		South (55 %), West (23 %), North (22 %)

Zone 1/Component 7: General data

Name		Operable Windows
Type		Transparent
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Window type		Window type (Id 144): BASELINE: WINDOW 004
Uw -mounted	[Btu/hr ft² °F]	0.45
Geometry		
Area	[ft²]	40.5
Inclination	[°]	90
Orientation		South (100 %)

Zone 1/Component 8: General data

Name		Glass Doors
Type		Transparent
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Window type		Window type (Id 142): BASELINE: WINDOW 002
Uw -mounted	[Btu/hr ft² °F]	0.45
Geometry		
Area	[ft²]	40.1
Inclination	[°]	90
Orientation		South (100 %)

Zone 1/Component 9: General data

Name		Solid Door
Type		Transparent
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Window type		Window type (Id 143): BASELINE: WINDOW 003
Uw -mounted	[Btu/hr ft² °F]	0.45
Geometry		
Area	[ft²]	21
Inclination	[°]	90
Orientation		North (100 %)

Zone 1/Component 10: General data

Name		Hollow Metal Doors
Type		Transparent
Inner side		Zone 1: PUSH Training Center
Outer side		Outer air
Window type		Window type (Id 143): BASELINE: WINDOW 003
Uw -mounted	[Btu/hr ft² °F]	0.45
Geometry		
Area	[ft²]	42
Inclination	[°]	90
Orientation		West (100 %)

Case 1/Zone 1: Thermal bridges

Assemblies/window types

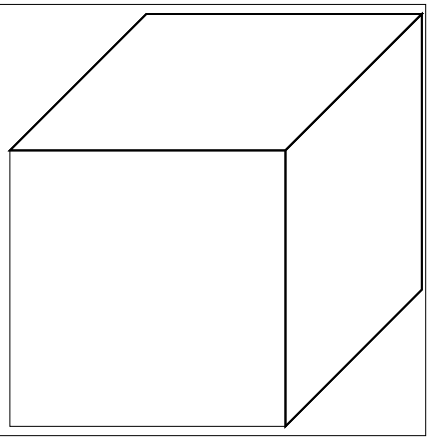
Assembly (Id.232): BASELINE: EXPOSED WALL

Homogenous layers

Thermal resistance: 15.623 hr ft² °F/Btu (without Rsi, Rse)

Heat transfer coefficient (U-value): 0.06 Btu/hr ft² °F

Thickness: 39.37 in



Nr.	Material/Layer (from outside to inside)	ρ [lb/ft³]	c [Btu/lb°F]	λ [Btu/hr ft °F]	Thickness [in]	Color
1	Material			0.21	39.37	

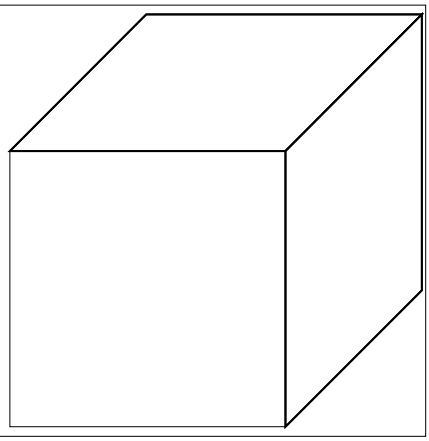
Assembly (Id.235): BASELINE: GROUND FLOOR

Homogenous layers

Thermal resistance: 1.852 hr ft² °F/Btu (without Rsi, Rse)

Heat transfer coefficient (U-value): 0.355 Btu/hr ft² °F

Thickness: 39.37 in



Nr.	Material/Layer (from outside to inside)	ρ [lb/ft³]	c [Btu/lb°F]	λ [Btu/hr ft °F]	Thickness [in]	Color
1	Material			1.7717	39.37	

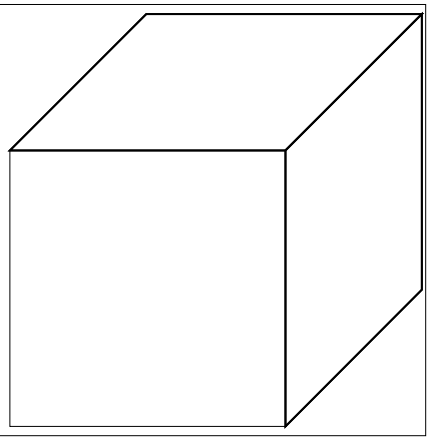
Assembly (Id.231): BASELINE: ROOF

Homogenous layers

Thermal resistance: 31.246 hr ft² °F/Btu (without Rsi, Rse)

Heat transfer coefficient (U-value): 0.031 Btu/hr ft² °F

Thickness: 39.37 in



Nr.	Material/Layer (from outside to inside)	ρ [lb/ft³]	c [Btu/lb°F]	λ [Btu/hr ft °F]	Thickness [in]	Color
1	Material			0.105	39.37	

Window type (Id 141): BASELINE: WINDOW 001

Basic data

Uw -mounted	[Btu/hr ft² °F]	0.45
Frame factor		0.75
Glass U-value	[Btu/hr ft² °F]	0.45
SHGC/Solar energy transmittance (perpendicular)		0.36

Frame data

Setting		Left	Right	Top	Bottom
Frame width	[in]	3.937	3.937	3.937	3.937
Frame U-value	[Btu/hr ft² °F]	0.45	0.45	0.45	0.45
Glazing-to-frame psi-value	[Btu/hr ft °F]	0	0	0	0
Frame-to-Wall psi-value	[Btu/hr ft °F]	0	0	0	0

Solar radiation angle dependent data

Angle [°]	Total solar trans.
0	

Window type (Id 144): BASELINE: WINDOW 004

Basic data

Uw -mounted	[Btu/hr ft² °F]	0.45
Frame factor		0.75
Glass U-value	[Btu/hr ft² °F]	0.45
SHGC/Solar energy transmittance (perpendicular)		0.36

Frame data

Setting		Left	Right	Top	Bottom
Frame width	[in]	3.937	3.937	3.937	3.937
Frame U-value	[Btu/hr ft² °F]	0.45	0.45	0.45	0.45
Glazing-to-frame psi-value	[Btu/hr ft °F]	0	0	0	0
Frame-to-Wall psi-value	[Btu/hr ft °F]	0	0	0	0

Solar radiation angle dependent data

Angle [°]	Total solar trans.
0	

Window type (Id 142): BASELINE: WINDOW 002

Basic data

Uw -mounted	[Btu/hr ft² °F]	0.45
Frame factor		0.75
Glass U-value	[Btu/hr ft² °F]	0.45
SHGC/Solar energy transmittance (perpendicular)		0.36

Frame data

Setting		Left	Right	Top	Bottom
Frame width	[in]	3.937	3.937	3.937	3.937
Frame U-value	[Btu/hr ft² °F]	0.45	0.45	0.45	0.45
Glazing-to-frame psi-value	[Btu/hr ft °F]	0	0	0	0
Frame-to-Wall psi-value	[Btu/hr ft °F]	0	0	0	0

Solar radiation angle dependent data

Angle [°]	Total solar trans.
0	

Window type (Id 143): BASELINE: WINDOW 003

Basic data

Uw -mounted	[Btu/hr ft² °F]	0.45
Frame factor		0.75
Glass U-value	[Btu/hr ft² °F]	0.45
SHGC/Solar energy transmittance (perpendicular)		0.36

Frame data

Setting		Left	Right	Top	Bottom
Frame width	[in]	3.937	3.937	3.937	3.937
Frame U-value	[Btu/hr ft² °F]	0.45	0.45	0.45	0.45
Glazing-to-frame psi-value	[Btu/hr ft °F]	0	0	0	0
Frame-to-Wall psi-value	[Btu/hr ft °F]	0	0	0	0

Solar radiation angle dependent data

Angle [°]	Total solar trans.
0	

HVAC

System 1 (User defined): Basic, Device

Mechanical ventilation: Basic

Sensible recovery efficiency	[-]	0.75
Humidity recovery efficiency	[-]	0
Electric efficiency	[W/cfm]	1
Equipped with frost protection		Yes
Subsoil heat exchanger efficiency	[-]	0
Quantity		1
HRV/ERV in conditioned space		Yes
No summer bypass feature (summer ventilation with HRV/ERV)		No
Defrost active		Yes
Temperature below which defrost must be used	[°F]	28
Rooms ventilated by this unit		Z.1, R.1, User defined: Office , Z.1, R.2, User defined: Workshop

Water storage: Rheem Marathon MR50245C

Storage capacity	[gal]	40
Specific total thermal storage losses	[Btu/hr F]	1.6
Specific storage losses standby part only	[Btu/hr F]	
Typical storage water temperature	[°F]	130
Within thermal envelope		Yes
Quantity		1
Coverage		DHW

Heat pump, Heat pump: GSHP Water Furnace NBV12 Cooling Only

Coverage	Cooling 1

User defined: Furn_59TP6B040V171112_Carrier_96AFUE_39 kbtuh_Gas_AHRI203359137

Auxiliary energy (electric power)	[Btu/hr]	198
Performance ratio of heat generator	[-]	1.04
Source energy factor	[Btu/Btu]	1.1
CO2 emissions factor	[g/kBtu]	0.25
Within thermal envelope		Yes
Coverage		Heating 1

User defined: DHW_State_GS640YBPDS300_0.68UEF_0.69EF_GAS_40GAL_AHRI202576138

Auxiliary energy (electric power)	[Btu/hr]	
Performance ratio of heat generator	[-]	1.44
Source energy factor	[Btu/Btu]	1.1
CO2 emissions factor	[g/kBtu]	0.25
Within thermal envelope		Yes
Coverage		DHW 1

System 1 (User defined): Basic, Distribution

Heating distibution

Setting		In conditioned space	Outside conditioned space 1	Outside conditioned space 2
Design flow temperature	[°F]			
Length of distribution pipes	[ft]			
Heat loss coefficient per ft pipe	[Btu/hr ft °F]			
Temperature of the room the pipes pass through	[°F]			
Design system heating load	[kBtu/hr]			
Flow temperature controlled		No	No	No

DHW distibution

Setting		In conditioned space	Outside conditioned space 1	Outside conditioned space 2
Circulation pipes				
Design flow temperature	[°F]	122		
Length of circulation pipes	[ft]	0		
Heat loss coefficient per ft pipe	[Btu/hr ft °F]			
Temperature of the room the pipes pass through	[°F]			
Daily running hours of the circulation	[hr]	24		
Individual pipes				
Length of individual pipes	[ft]	0		
Exterior pipe diameter	[in]			
Storage				
Average heat released from storage*	[Btu/hr]			

Cooling distribution

Cooling via ventilation air		No
Cooling via air recirculation		Yes
Dehumidification		Yes
Panel cooling		No
Additional data		
Recirculation air cooling is single-speed		No
Minimum temperature of cooling coil (for recirculation air)	[°F]	49.3
Recirculation air flow rate	[cfm]	779.4289

Ventilation distribution

Duct 1

Duct type		Supply / outdoor air duct
Duct shape		Round
Quantity	[-]	1
Duct length	[ft]	10
Duct diameter, nominal width	[in]	10
Insulation thickness	[in]	2
Thermal conductivity	[Btu/hr ft °F]	0.0278
Is reflective		Yes
Assigned ventilation units		Basic

Duct 2

Duct type		Extract / Exhaust air duct
Duct shape		Round
Quantity	[-]	1
Duct length	[ft]	10
Duct diameter, nominal width	[in]	10
Insulation thickness	[in]	2
Thermal conductivity	[Btu/hr ft °F]	0.0278
Is reflective		Yes
Assigned ventilation units		Basic

Results

Main results

Specific space heating demand	[kBtu/ft²yr]	51.2
Specific sensible cooling energy demand	[kBtu/ft²yr]	0.6
Specific dehumidification energy demand	[kBtu/ft²yr]	0
Specific heating load	[Btu/hr ft²]	20.2
Specific cooling load	[Btu/hr ft²]	0
Specific source energy demand	[kBtu/ft²yr]	97.7
Pressurization test result	[ACH50]	1.404
Average U-value exterior wall ambient	[Btu/hr ft² °F]	0.06
Average U-value exterior wall ground	[Btu/hr ft² °F]	0
Average U-value roof ceiling ambient	[Btu/hr ft² °F]	0.031
Average U-value floor slab basement ceiling	[Btu/hr ft² °F]	0.355
Average ΔU thermal bridges	[Btu/hr ft² °F]	0
Average U-value window total	[Btu/hr ft² °F]	0.45
Effective heat recovery efficiency	[%]	73.8