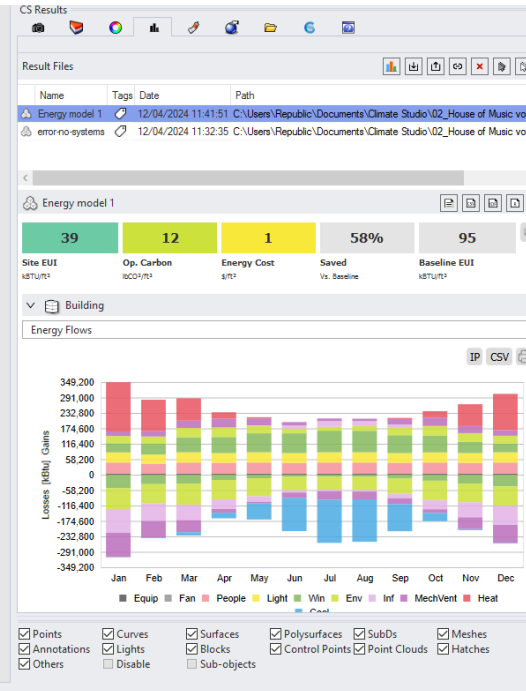
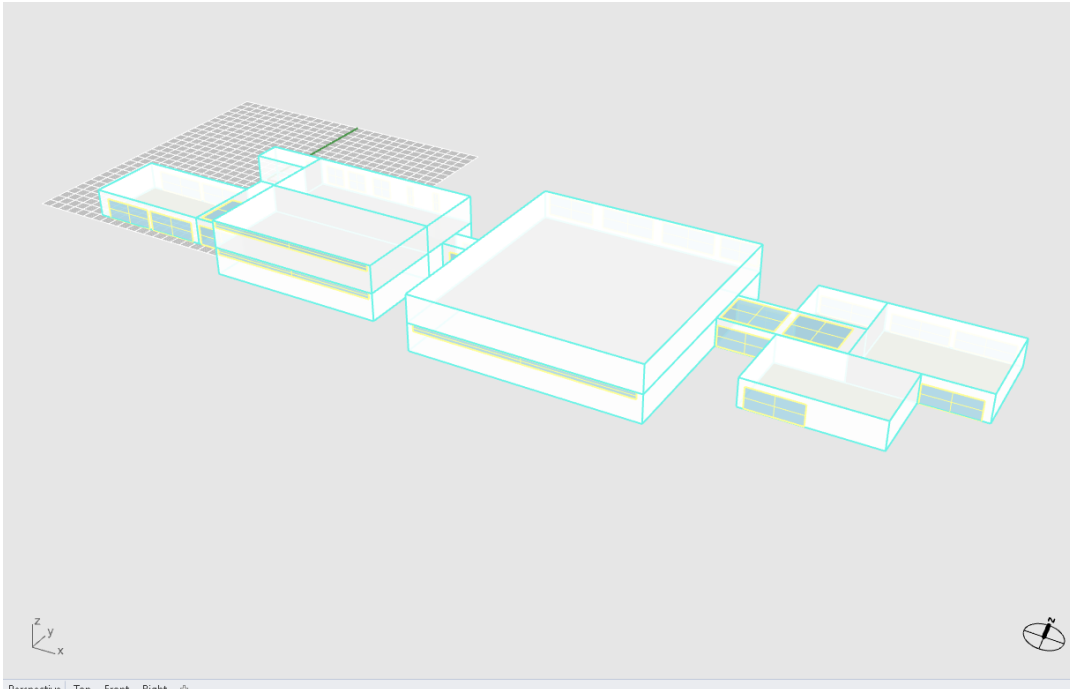
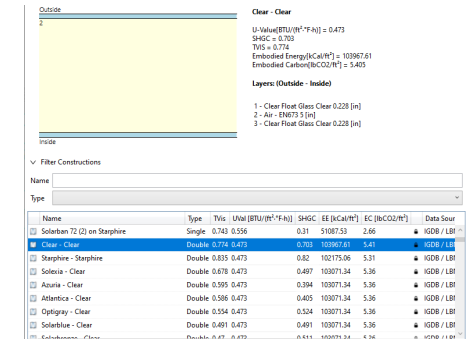


House of music 3D model

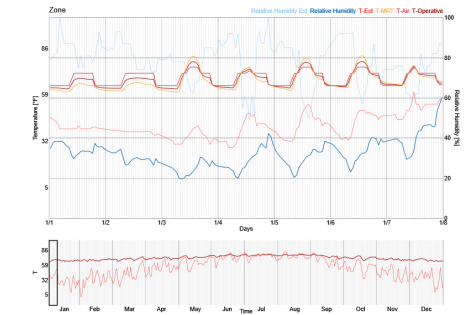
Volumes and glass surfaces



Double-pane glass clear- clear



Daily weekly zone temperature



What is the EUI number of your project, as currently modeled?

39 kBtu/sf

What is the energy reduction as currently modeled?

58%

Review the Energy Flows results graph. Is the building losing/gaining more energy through the opaque wall (Env) or through the glazing (Win)?

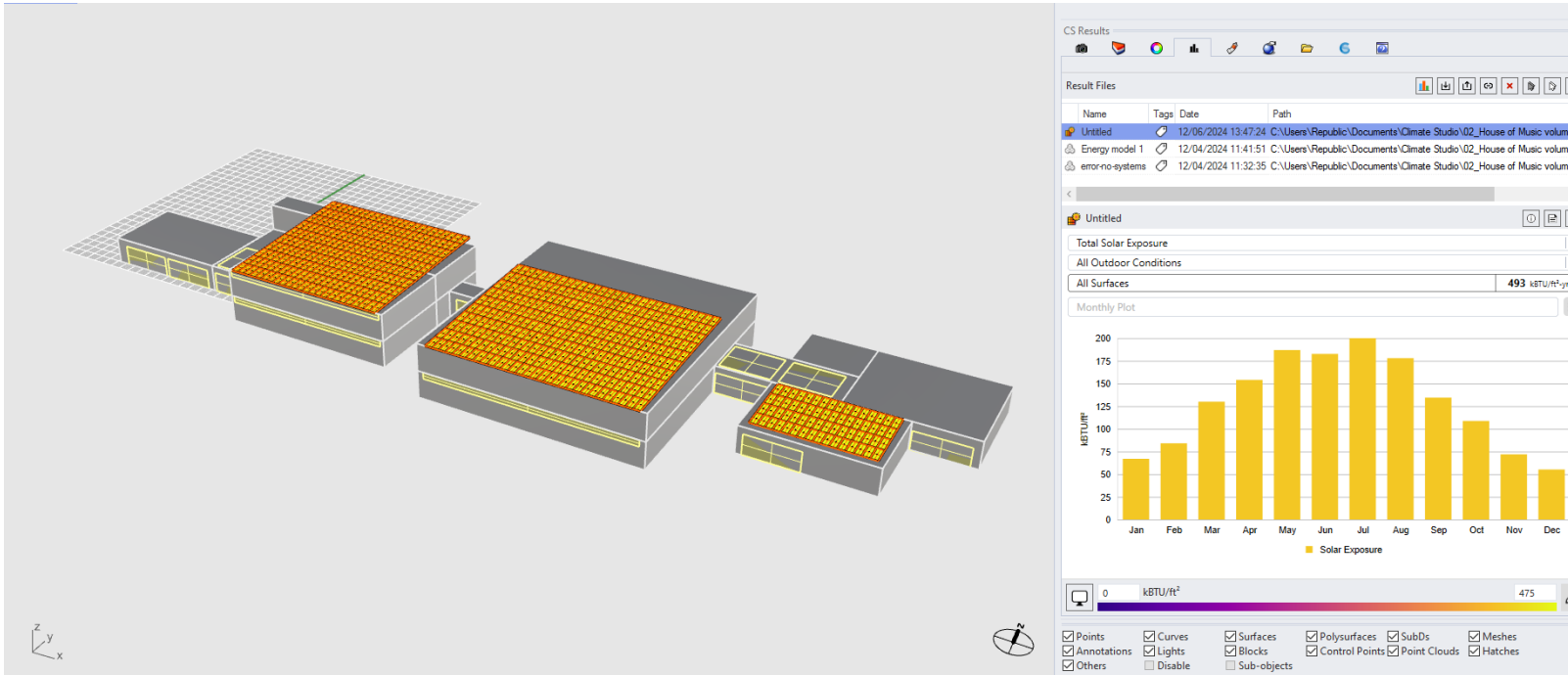
The building is gaining more energy through the glazing
 The building is losing more energy through the opaque wall

Do you see an opportunity to adjust the amount or location of the glazing to reduce energy use? If so, state in which areas you think this could be effective.

I will see an opportunity of using louvers and shading devices among the glazing surfaces

House of music 3D model

Double-pane glass clear- clear



Area of solar Panels:
12,684 sf

604 objects (3'x7')
3x7=21sf
21sf x 604 = 12,684 sf

Total solar exposure:
493 kBTU/ft²-yr

Total Radiation:

[Total Solar Exposure in kBTU/sf-yr] x [Area of solar panels in square footage] = total annual radiation received by the panels (in kBTU/yr)

$$(493 \text{ kBTU/sf-yr}) \times (12,684 \text{ sf}) = 6,253,212 \text{ kBTU/yr}$$

$$(6,253,212 \text{ kBTU/yr}) / 3.412 = \mathbf{1,832,711.6 \text{ kWh-yr}}$$

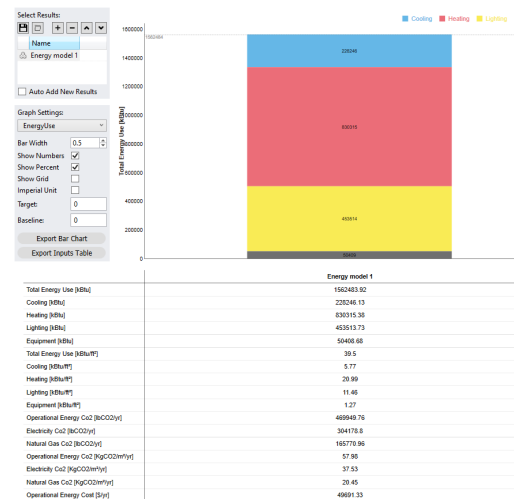
typical solar panel and inverter efficiency

18% Panel efficiency:

$$(0.18 \times 1,832,711.6 \text{ kWh-yr}) = \mathbf{329,888 \text{ kWh-yr}}$$

96% Inverter efficiency:

$$(0.96 \times 329,888 \text{ kWh-yr}) = \mathbf{316,692.48 \text{ kWh-yr}}$$



$$\text{Total Energy use: } 1562483.92 \text{ kBtu} / 3.412 = \mathbf{457,937.842 \text{ kWh-yr}}$$

Compare your PV energy production number to your building total energy

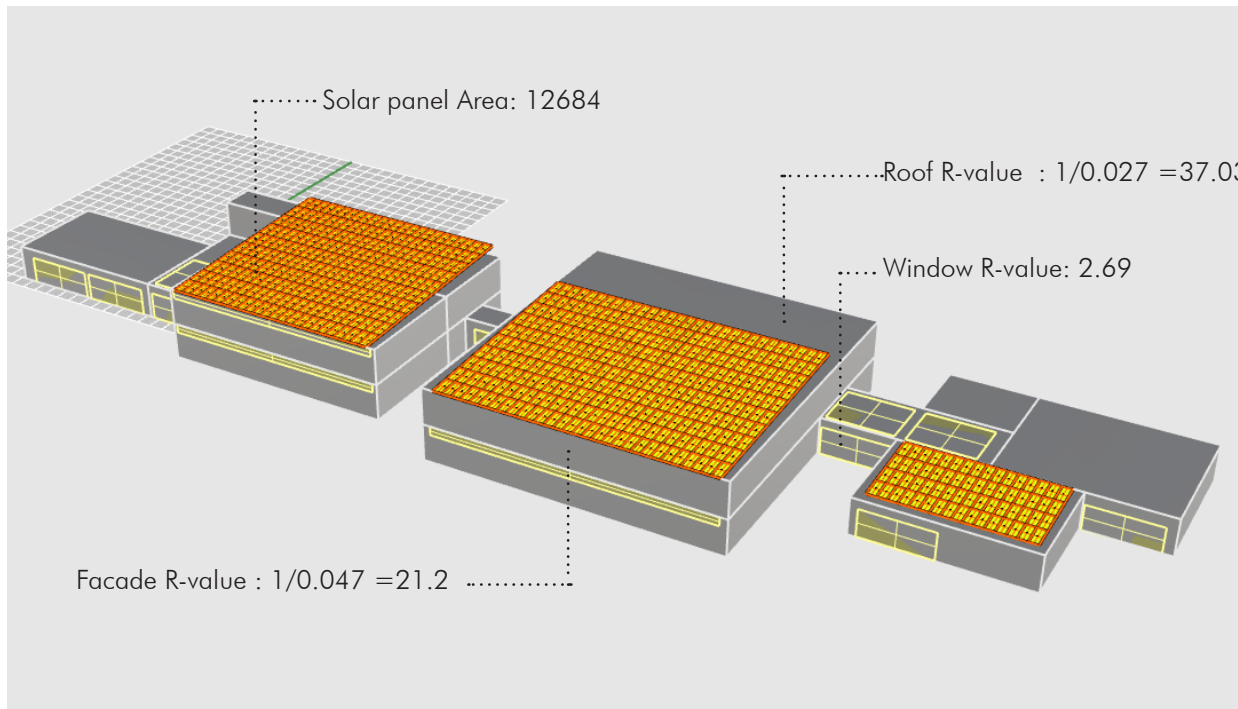
[annual solar PV harvest / annual building energy use] x 100 = percentage of building energy use provided by solar panels.

$$(316,692.48 \text{ kWh-yr} / 457,937.842 \text{ kWh-yr}) \times 100 = \mathbf{69\%}$$

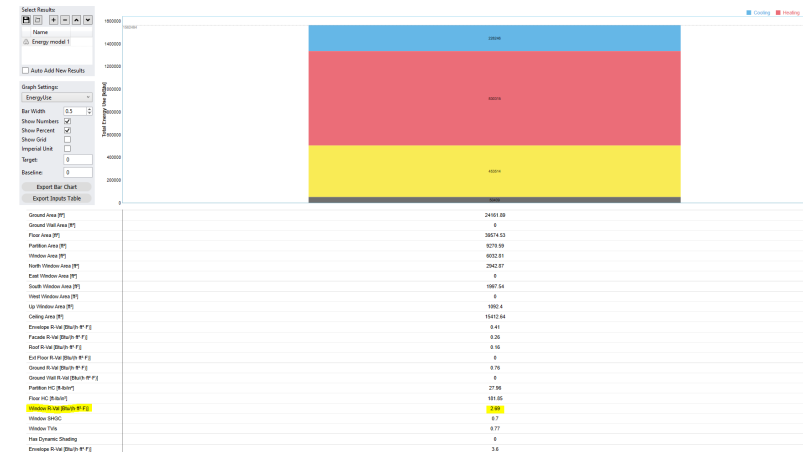
If your number is less than 100%, where do you see additional opportunities for incorporating solar panels into the design?

More areas on the roof and also in the south elevation. Also another opportunity could be to change the slope of the roof, so the angle of the solar panels can be more effective.

U-value of the wall and roof



$R = 1/U$
 Facade U-value: 0.047
 Facade R-value : $1/0.047 = 21.2$
 Roof U-value : 0.027
 Roof R-value : $1/0.027 = 37.03$
 Window U-value: $1/2.69 = 0.37$
 Window R-value: 2.69



Building Type: Cultural

Space Use: NECB-2020 Performing arts theatre - WholeBuilding

Occupancy	0.012 p/ft ²	2487 hr/year	
Equipment	0.093 W/ft ²	4017 hr/year	
Lighting	0.836 W/ft ²	4017 hr/year	Dimming Off
Hot Water	Off		
Setpoints	Heat Avg. 68.28 °F	Cool Avg. 83.69 °F	
Min Fresh Air	0.06 cfm/ft ²	5 cfm/P	

Construction: NECB-2020 Performing arts theatre CZ 5

Facade	UVal 0.047 BTU/(ft ² ·F)→ TC 556 kJ/m ² ·K
Roof	UVal 0.027 BTU/(ft ² ·F)→ TC 474 kJ/m ² ·K
Infiltration	FlowExtArea 0.049 cfm/ft ²
Foundation Model	GroundTemperature
Glazing	-Custom-

WWR: Uniform

Overall Window To Wall Ratio: 0

System: Ideal Air Load Default

Heating	COP 0.8	NaturalGas
Cooling	COP 3	Electricity