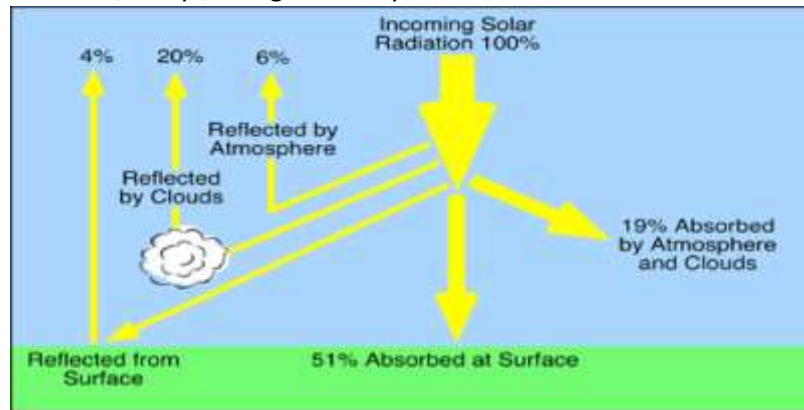**Farnaz Baadahang / 19 Nov 2019**

## WEEK 7

Task 1

**Solar radiation**
Solar Radiation is all of the energy from the Sun that hits the Earth, part of a large group of energy is called the electromagnetic radiation spectrum. Solar radiation includes visible light, ultraviolet light, infrared, radio waves, X-rays, and gamma rays.



Radiation transfers heat. Radiation has electromagnetic waves that carry the energy. Electromagnetic radiation comes from accelerating electric charges. On a molecular level, that's what happens as objects warm up their molecules vibrate harder and harder, causing acceleration of electric charges.
Heat energy transferred through radiation is as familiar as the light of day. The Sun is a huge thermal reactor about 93 million miles away. In heat transfer by radiation, energy is carried by electromagnetic waves from a starting point to the space surrounding it and does not involve contact with matter. The other forms of heat transfer cannot produce any of the energy that arrives to Earth through the vacuum of space. The Sun's energy gets to the Earth through radiation, which you can prove just by standing outside and letting the sun's rays warm your face on a sunny day.
Every object around you is continually radiating, unless its temperature is at absolute zero, at which point its molecules completely stop moving.
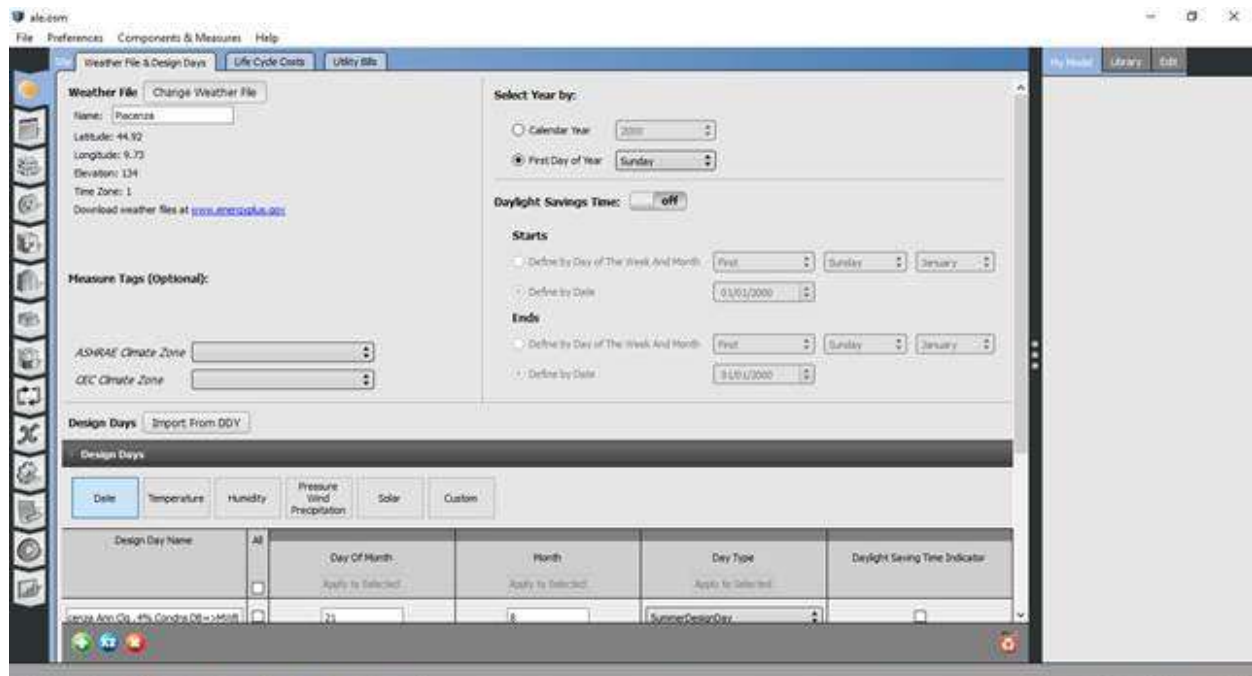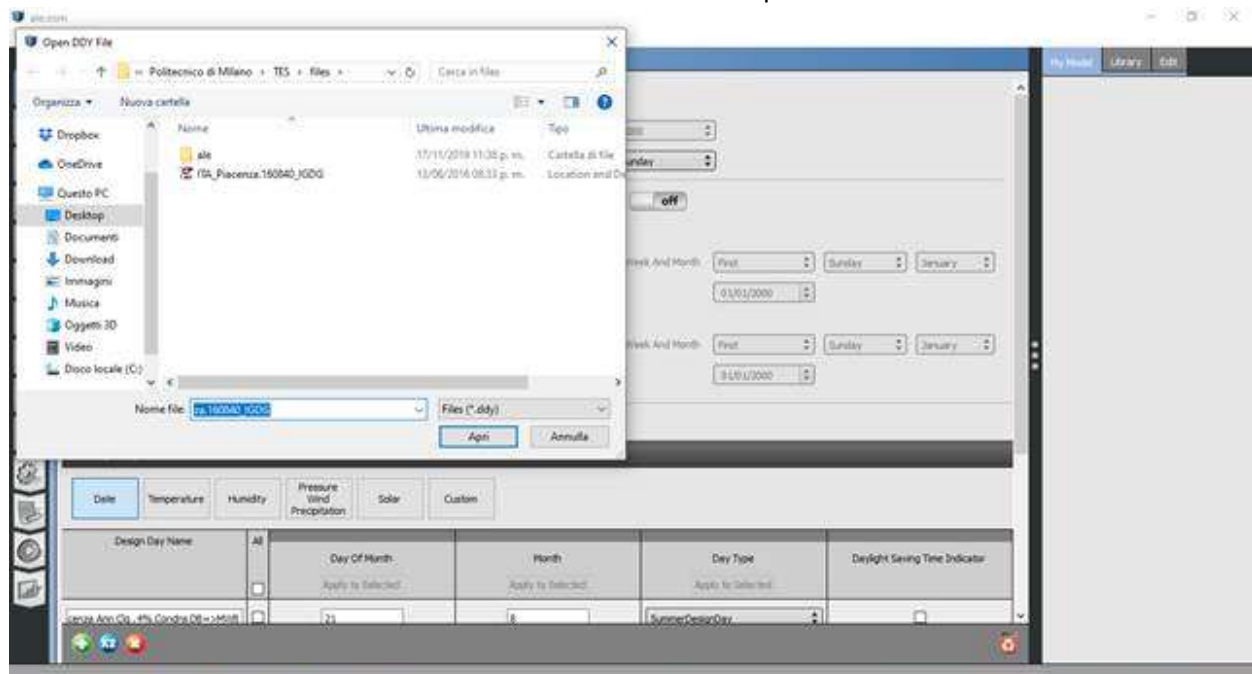
Task 2

## Open Studio Project

After doing all the model in SketchUp, we save the file as an open studio file.
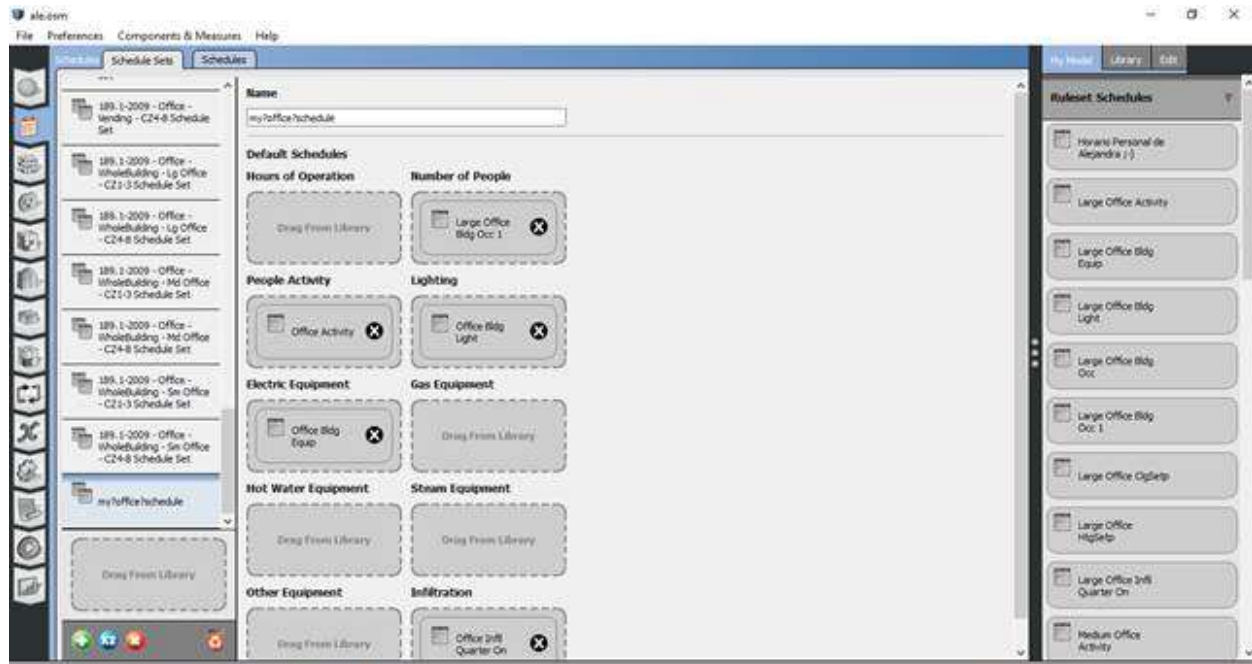And we open it on open studio.
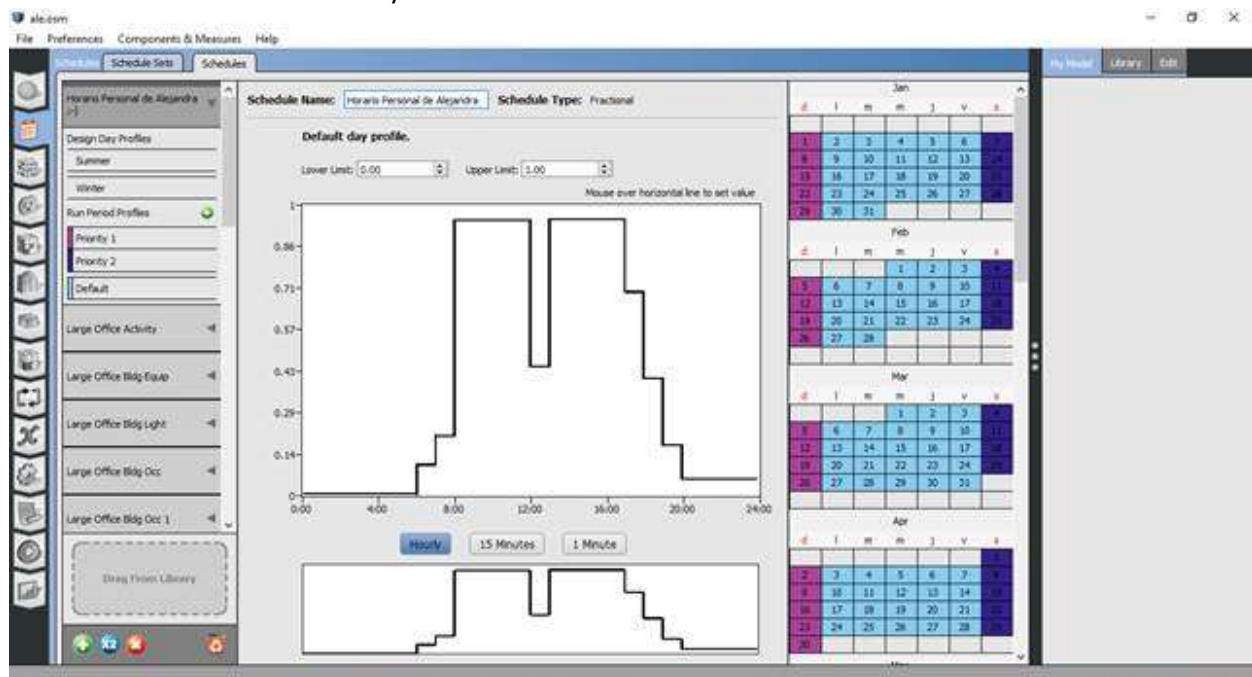In the first section we upload the weather file of Piacenza.

We selected the file that we had of the weather and load it in open studio.



After that we go to the second section that is the schedule set, we did a custom set with miscellany occupancies go to schedules.

And we set the schedule the way we wanted. And rename it.



And after that we drag the schedule from the right to the schedule set area.
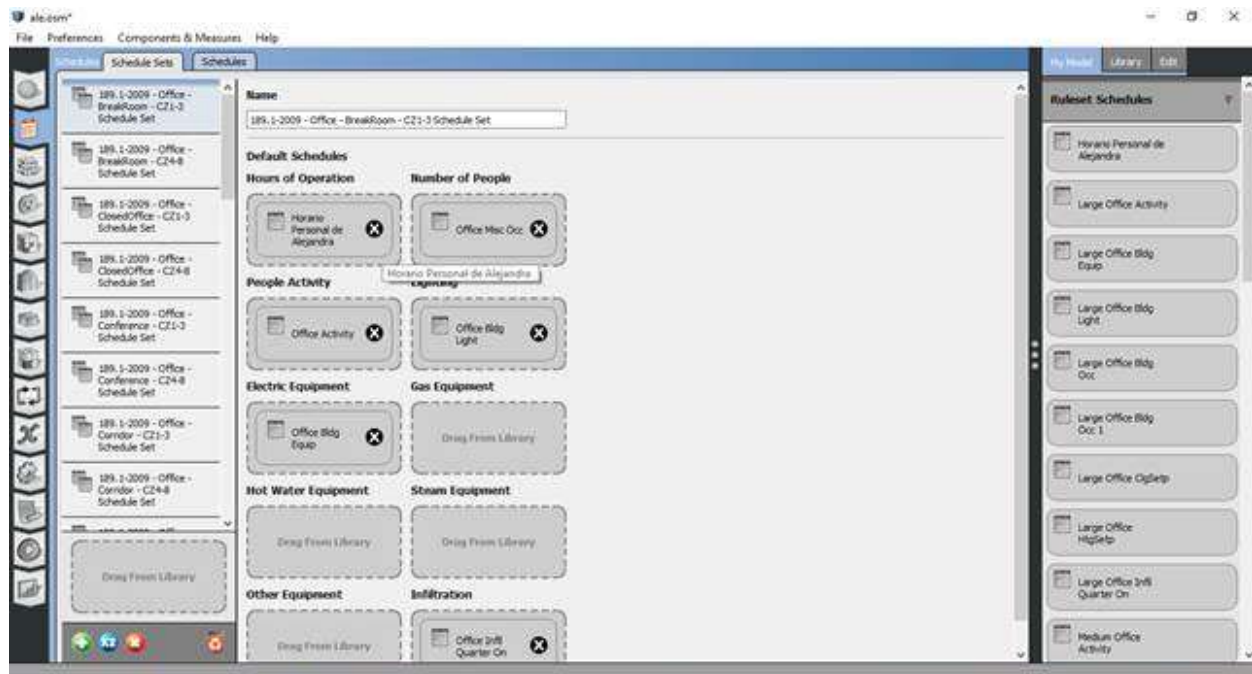
CONSTRUCTION TAB we copy a material and renamed it.
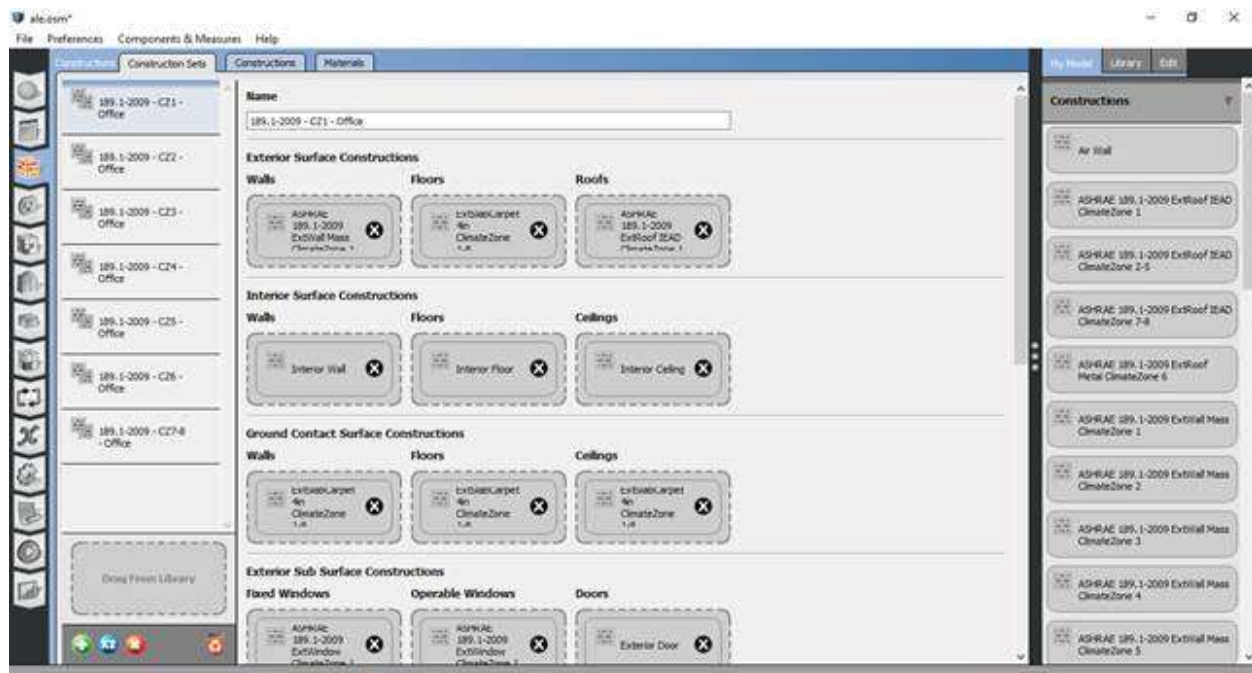


Construction and add all the details that we wanted in the material

After we have set the material and construction set, we upload everything on the construction set dragging it from the right side.



The we run the program and look the analysis of data that we have.

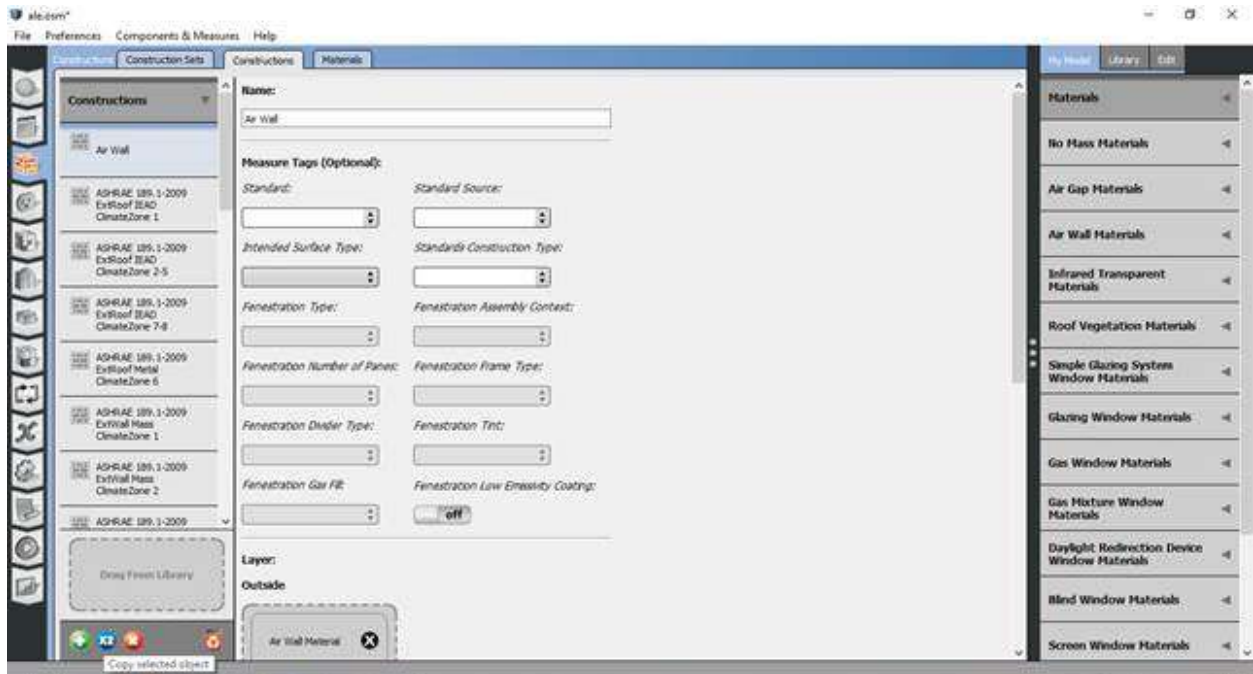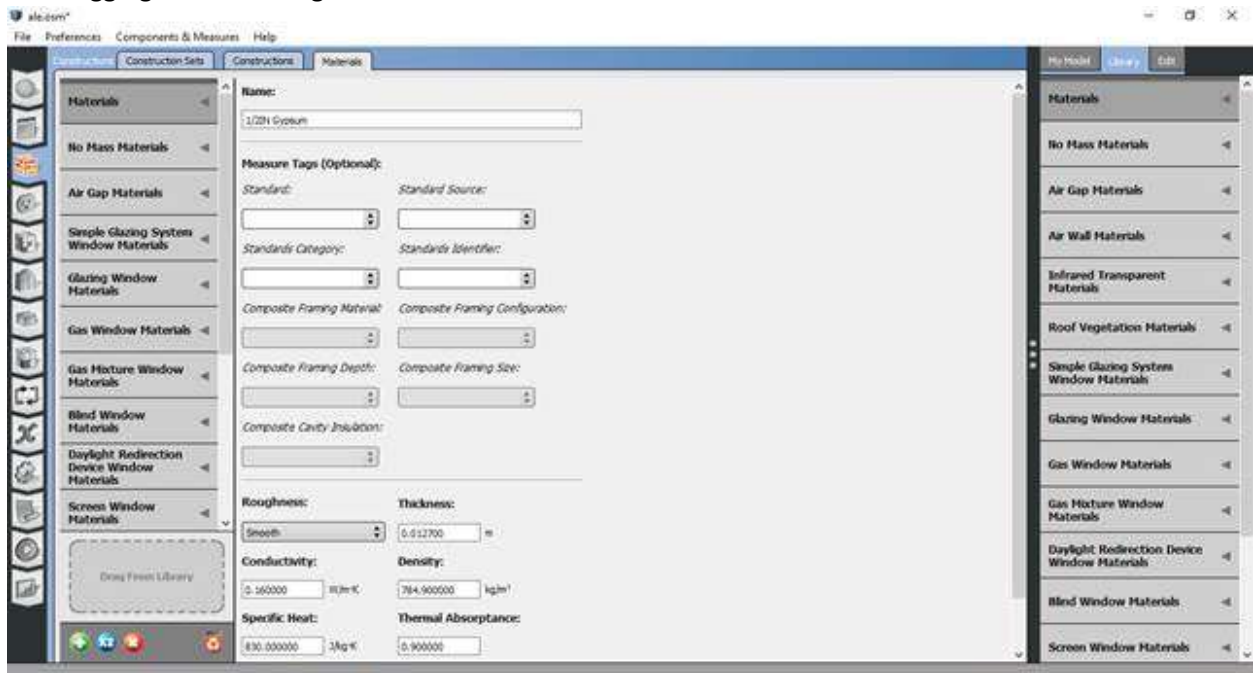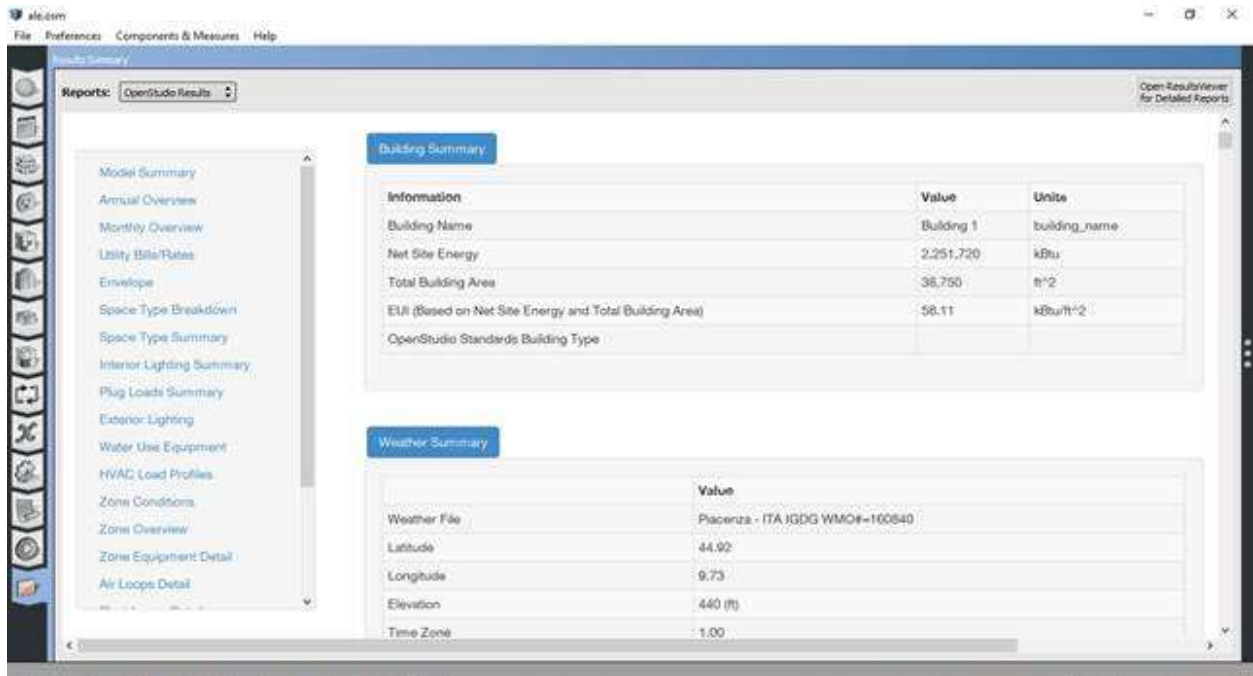Run Simulation | Output | Tree

Run ▶  Ready
       **Warnings:** 0
       **Errors:** 0
       Output

0%

---

Results Summary

**Reports:** OpenStudio Results ▾

Open ResultsViewer
for Detailed Reports

Model Summary
Annual Overview
Monthly Overview
Utility Bills/Rates
Envelope
Space Type Breakdown
Space Type Summary
Interior Lighting Summary
Plug Loads Summary
Exterior Lighting
Water Use Equipment
HVAC Load Profiles
Zone Conditions
Zone Overview
Zone Equipment Detail
Air Loops Detail

**Building Summary**

| Information | Value | Units |
|---|---|---|
| Building Name | Building 1 | building_name |
| Net Site Energy | 2,251,720 | kBtu |
| Total Building Area | 38,750 | ft^2 |
| EUI (Based on Net Site Energy and Total Building Area) | 58.11 | kBtu/ft^2 |
| OpenStudio Standards Building Type | | |

**Weather Summary**

| | Value |
|---|---|
| Weather File | Piacenza - ITA IGDG WMO#=160840 |
| Latitude | 44.92 |
| Longitude | 9.73 |
| Elevation | 440 (ft) |
| Time Zone | 1.00 |

Results Summary

Reports: OpenStudio Results

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## Monthly Overview

Electricity Consumption (kWh) - view table



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Results Summary

Reports: OpenStudio Results

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## Cash Flow

No Data to Show for Cash Flow

## Site and Source Summary

Site and Source Energy

| | Total Energy (kBtu) | Energy Per Total Building Area (kBtu/ft^2) | Energy Per Conditioned Building Area (kBtu/ft^2) |
|---|---|---|---|
| Total Site Energy | 2251719.6 | 58.1 | 58.1 |
| Net Site Energy | 2251719.6 | 58.1 | 58.1 |
| Total Source Energy | 5815692.0 | 150.1 | 150.1 |
| Net Source Energy | 5815692.0 | 150.1 | 150.1 |

Site to Source Energy Conversion Factors

| | Site=>Source Conversion Factor |
|---|---|