ENERGY AND BUILDINGS

2021 – 2022

EnergyPlus

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Practical info

Installation guidelines file

Google doc for questions
https://docs.google.com/document/d/1PrbHYNKNaYRuopPOKa5YK-MYZ2CjoabTDx8nm5rcyZY/edit

Questions and answer meeting on Thursday 14:30, Seminar room (ex Fisica Tecnica)

Information about the report in moodle. After the practical lectures there will an in-depth explanation of the report.

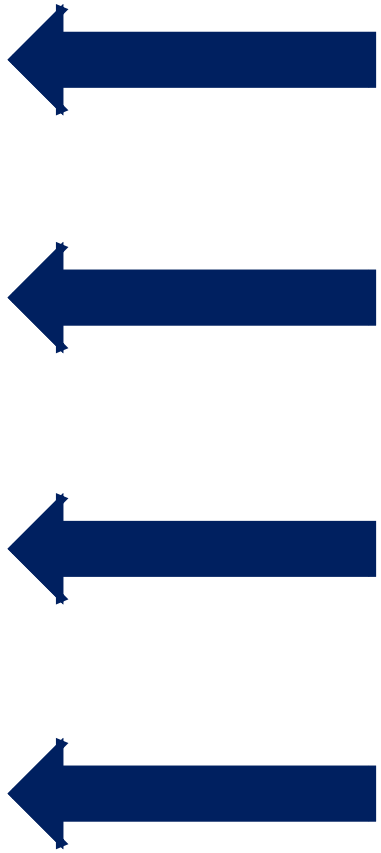
Design of the model

1 - Geometry definition

2 – Input definition

3 - Output definition & Simulation

4 - Analysis of the results



Settings in EnergyPlus: examples

Ground temperature
Outside boundary condition object
Output variables

Warning!

Changes in your *your_model.idf* are not saved in your openstudio!

Be sure your openstudio model is ready before moving to your idf

Every object is described in the documentation:

EnergyPlus Input/Output reference

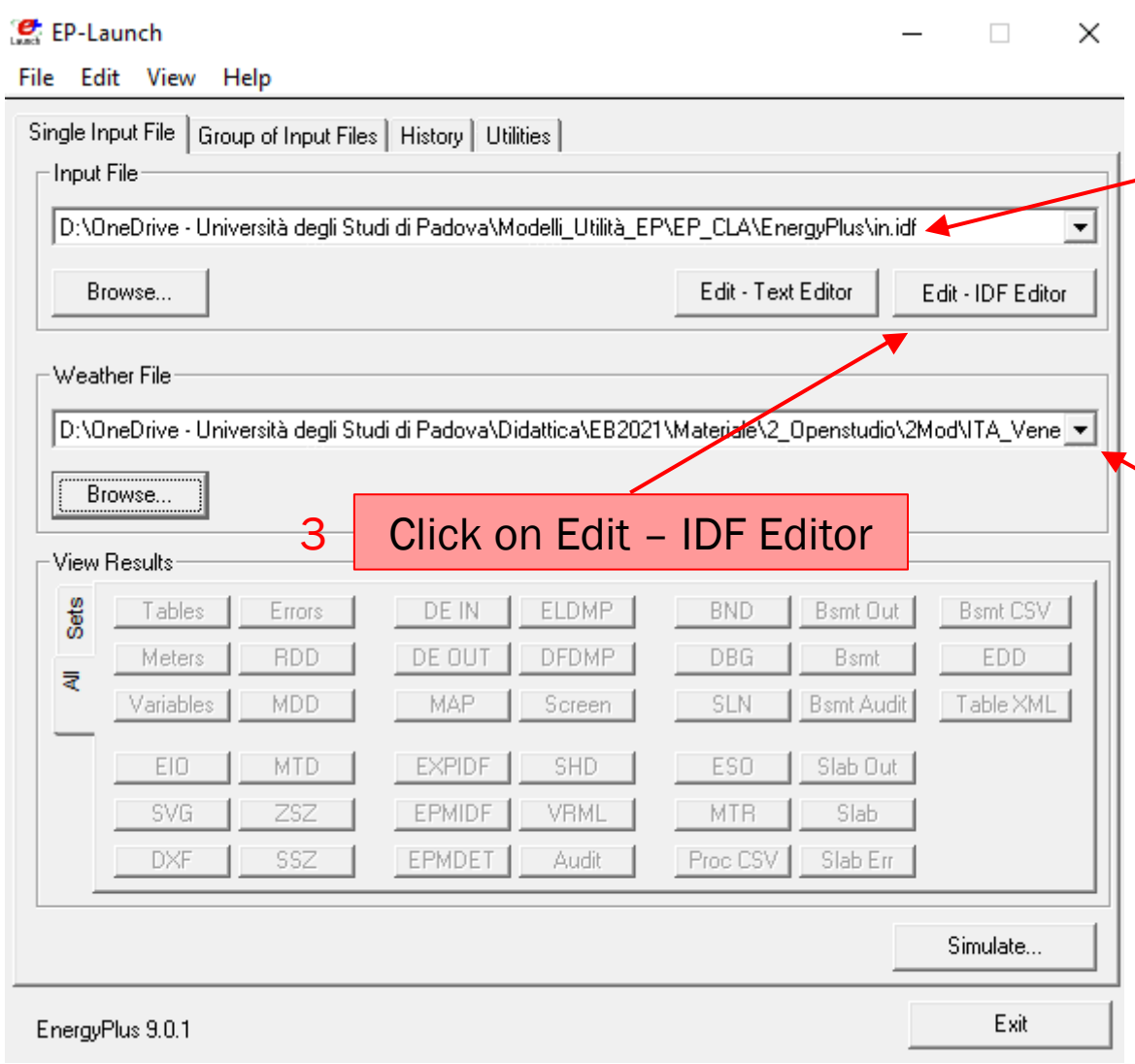
C:\Your_EP_folder\Documentation\InputOutputReference

Create a new folder *EnergyPlusModel* in the same folder of *Your_model.osm*

Copy the file *Your_osm_model\bin\In.idf* inside the new folder.

This is the EnergyPlus Input Data File that has been created by Openstudio during the first simulation

Open this file using EnergyPlus launcher



1 Your In.idf file

2 Select your weather file (.epw)

3 Click on Edit – IDF Editor

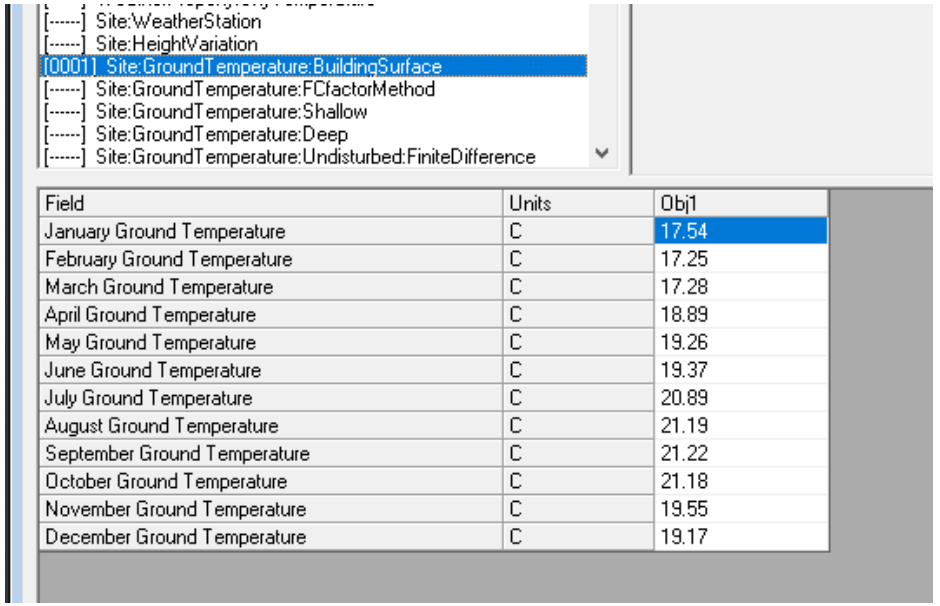
Ground temperature setting

Object

- SiteGroundTemperature:BuildingSurfaces

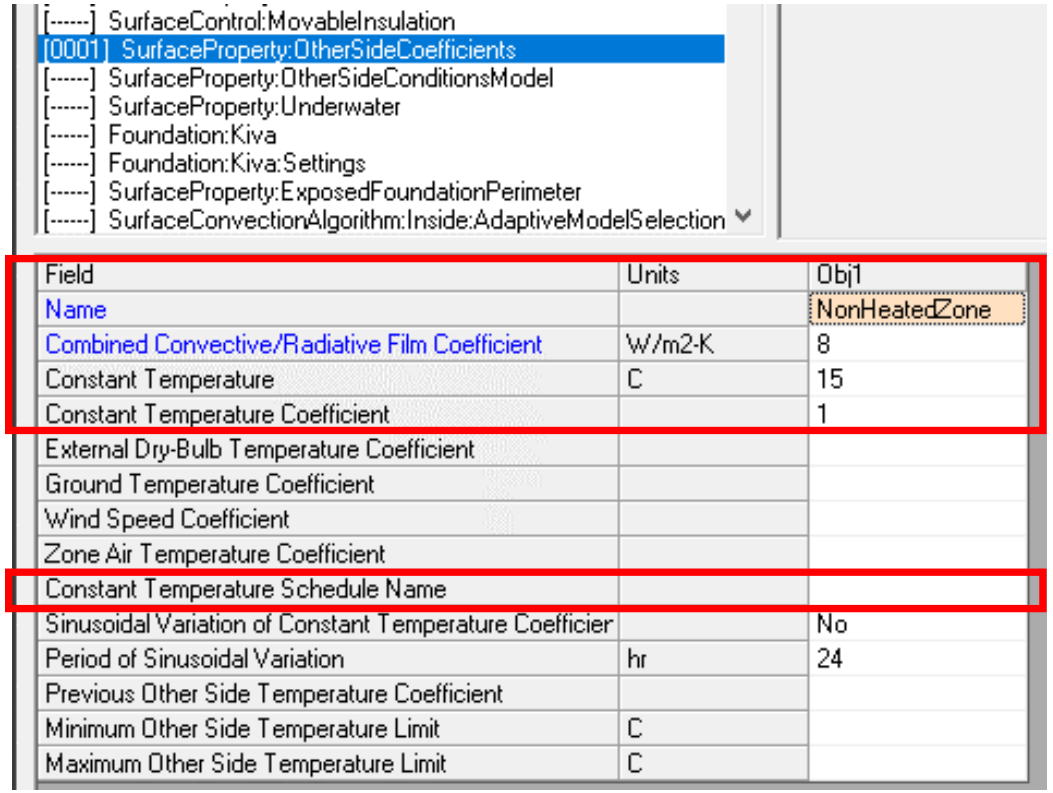
- You can set 18 - 21 °C for winter - summer months

(see engineering reference manual)



Field	Units	Obj1
January Ground Temperature	C	17.54
February Ground Temperature	C	17.25
March Ground Temperature	C	17.28
April Ground Temperature	C	18.89
May Ground Temperature	C	19.26
June Ground Temperature	C	19.37
July Ground Temperature	C	20.89
August Ground Temperature	C	21.19
September Ground Temperature	C	21.22
October Ground Temperature	C	21.18
November Ground Temperature	C	19.55
December Ground Temperature	C	19.17

Other side coefficient surface property



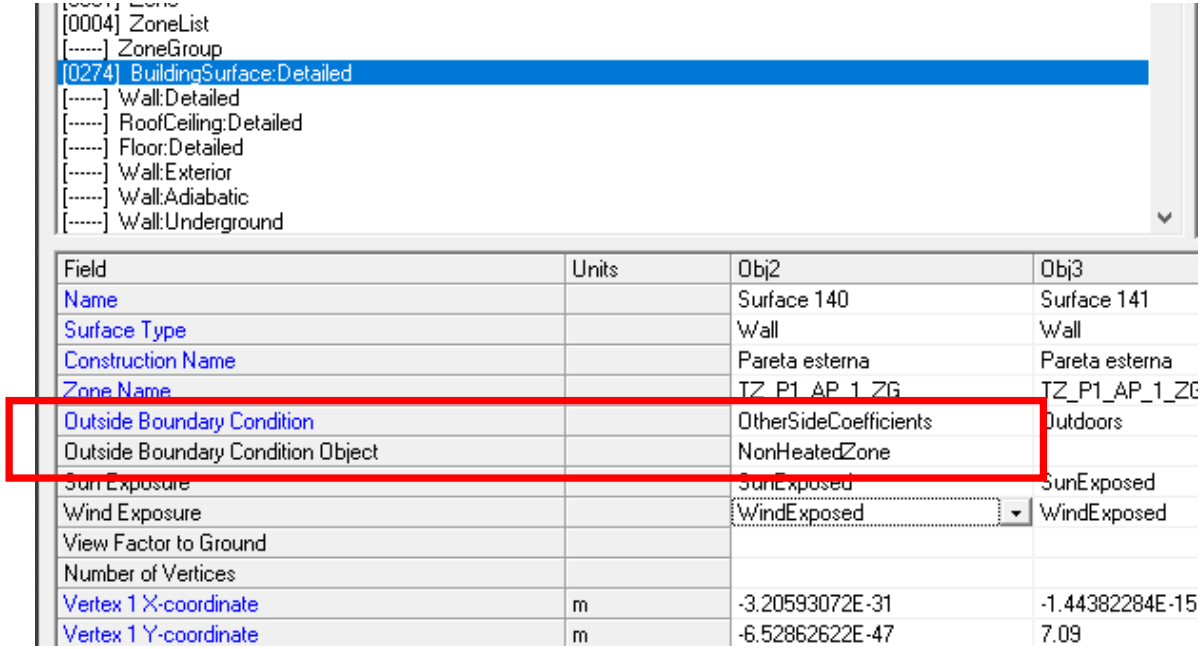
Field	Units	Obj1
Name		NonHeatedZone
Combined Convective/Radiative Film Coefficient	W/m2-K	8
Constant Temperature	C	15
Constant Temperature Coefficient		1
External Dry-Bulb Temperature Coefficient		
Ground Temperature Coefficient		
Wind Speed Coefficient		
Zone Air Temperature Coefficient		
Constant Temperature Schedule Name		
Sinusoidal Variation of Constant Temperature Coefficier		No
Period of Sinusoidal Variation	hr	24
Previous Other Side Temperature Coefficient		
Minimum Other Side Temperature Limit	C	
Maximum Other Side Temperature Limit	C	

Object

- SurfaceProperty:OtherSideCoefficient
- Set convective/radiative coefficient and constant temperature
- If necessary, include also a schedule in Constant Temperature Schedule Name, to reduce te effect in summer

Other side coefficient surface property

- Link the condition to the surface



Output variables

Object

- Output:Variable

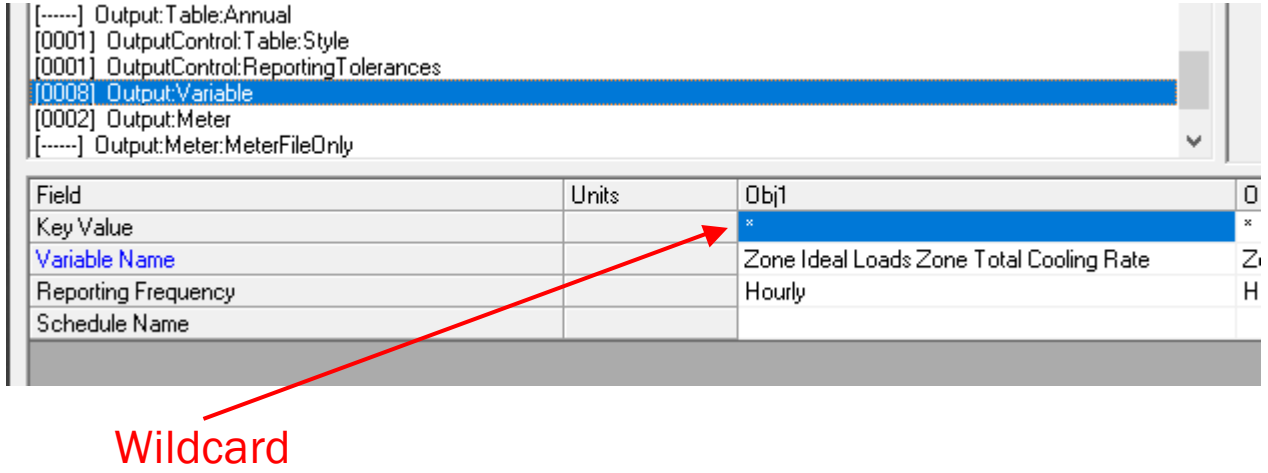
Zone Ideal Load Zone Sensible Heating Rate

Zone Ideal Load Zone Sensible Cooling Rate

Zone Ideal Load Zone Latent Cooling Rate

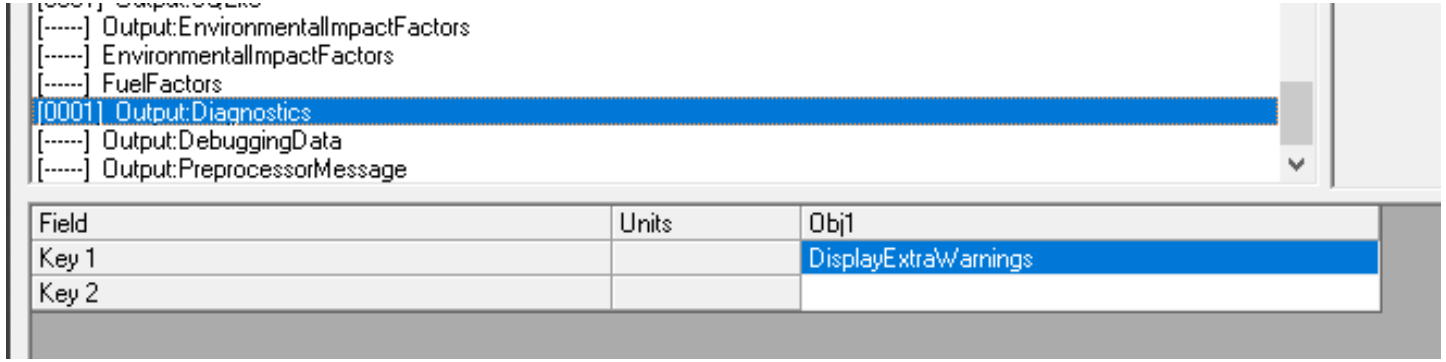
If output variables are not listed, you can simulate the model and then open it again with the IDF – Editor

(the variables list is saved in *your_model.rdd)*



- Output:Diagnostics

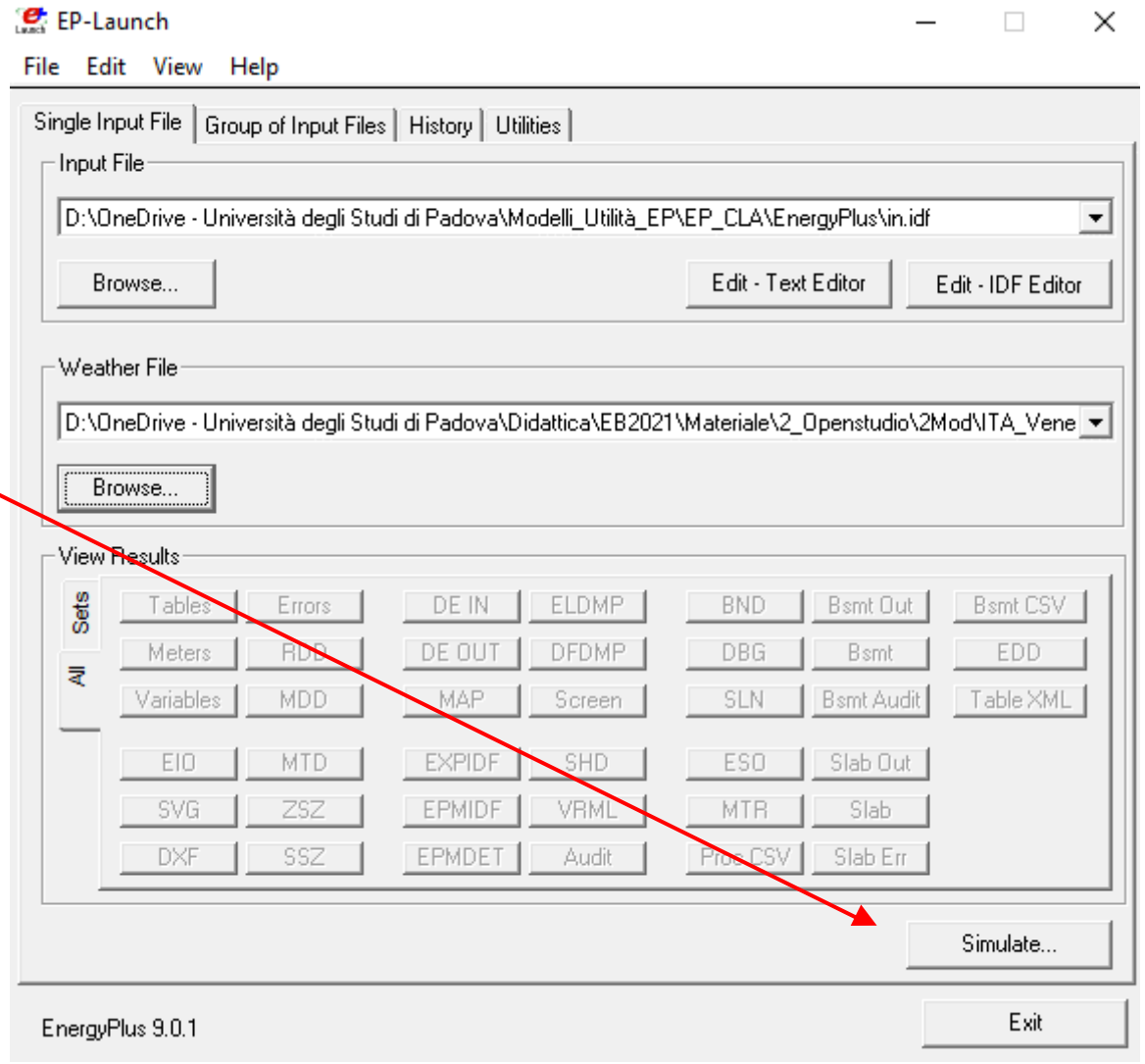
DisplayExtraWarnings



EnergyPlus simulation

Save your In.idf

Close it and simulate your model



Output of the simulation

In *EnergyPlusModel* folder (the one that you created at the beginning)

1. *In.err* file: EnergyPlus simulation must be running without errors (log file as in the openstudio simulation)

2. *In.html* file: the «Tables» file
   - District Heating energy demand [kWh]
   - District Cooling energy demand [kWh]
   - Data about surfaces, zone, …

3. *In.csv* file: file with hourly values for the output variables. Open it with Excel.

Tips for the report

1. Pay attention to the units: energy and power are different concepts! **Hourly load in kW, monthly energy demand in kWh**

2. Write units correctly! **kWh OK, Kwh WRONG**!

3. **Always** title, captions, axes labels and units in the plots. Same fo tables

4. **Avoid numbers with too many digits**! (26.4629325 °C, or a cooling demand in december of 0,0000005 kWh)

5. **Think about the results that you present**! Unreasonable numbers will be considered as errors!

OpenStudio and EnergyPlus – TIPS and Useful Info

http://nrel.github.io/OpenStudio-user-documentation/getting_started/getting_started/#introductory-tutorial

EnergyPlus InputOutput manual

EnergyPlus Engineering reference manual