Getting Started with DesignPH

Webinar. May 5, 2020

NYPH NEW YORK PASSIVE HOUSE

bldgtyp

designPH

Ed May | Partner, Building-Type, LLC

(architect, passive house consultant, teacher)

2 / 58

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Agenda [1 hour]

- The Basics
- The DesignPH Workflow
- Modeling
- Tagging
- Windows
- Exporting

3 / 58

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BASICS

Requirements

What you'll need:

- A copy of the DesignPH plugin
- Sketchup 3-D modeling software
- A copy of the PHPP v.8 or 9 (and Excel)

5 / 58

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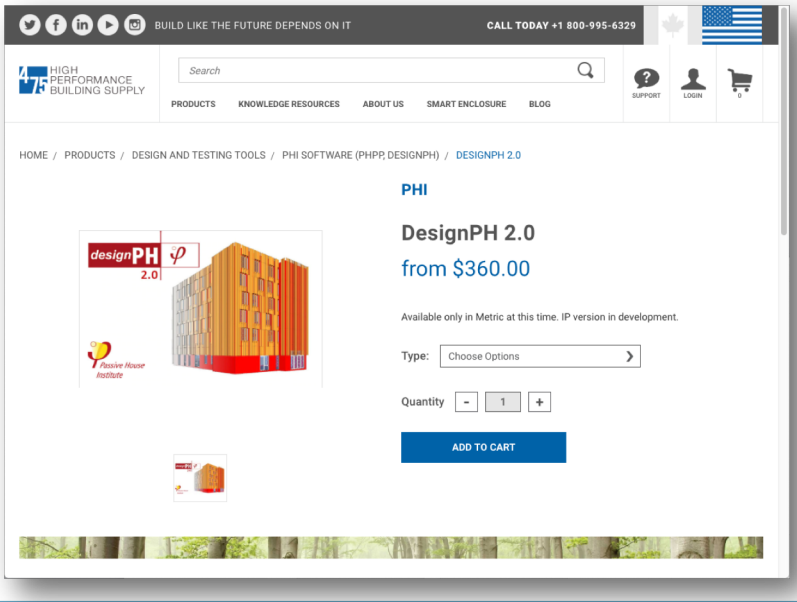
https://foursevenfive.com/designph-2-0/



6 / 58

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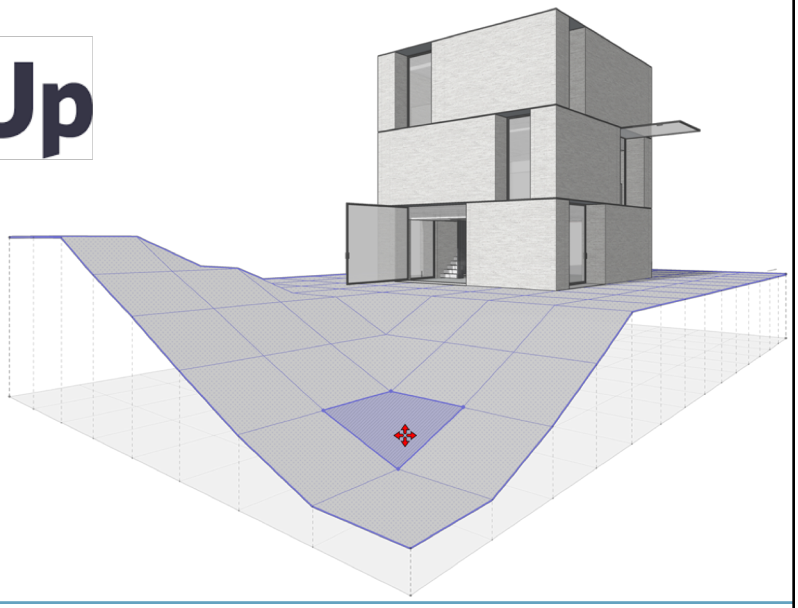
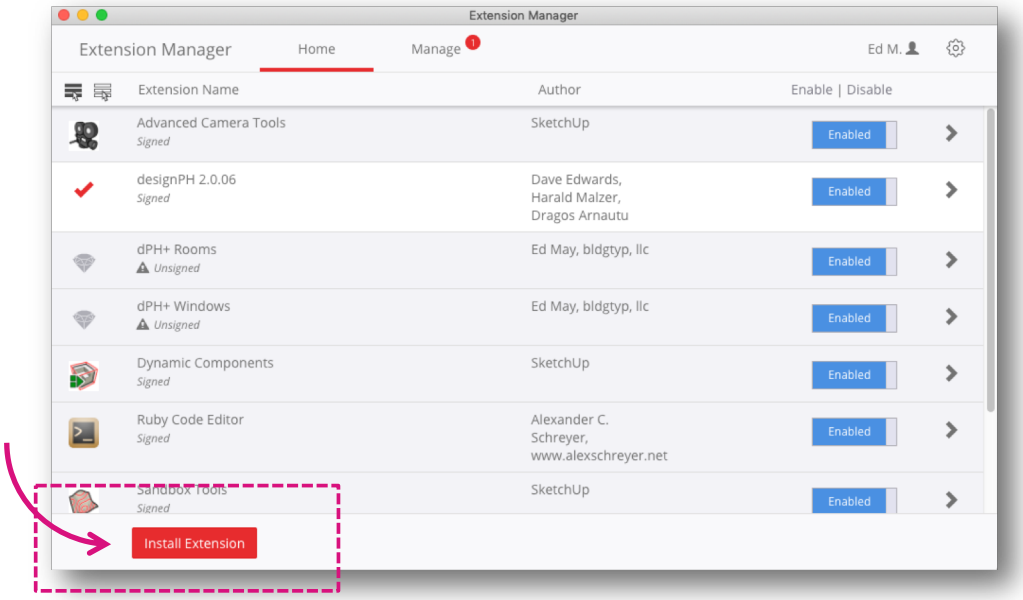
Sketchup

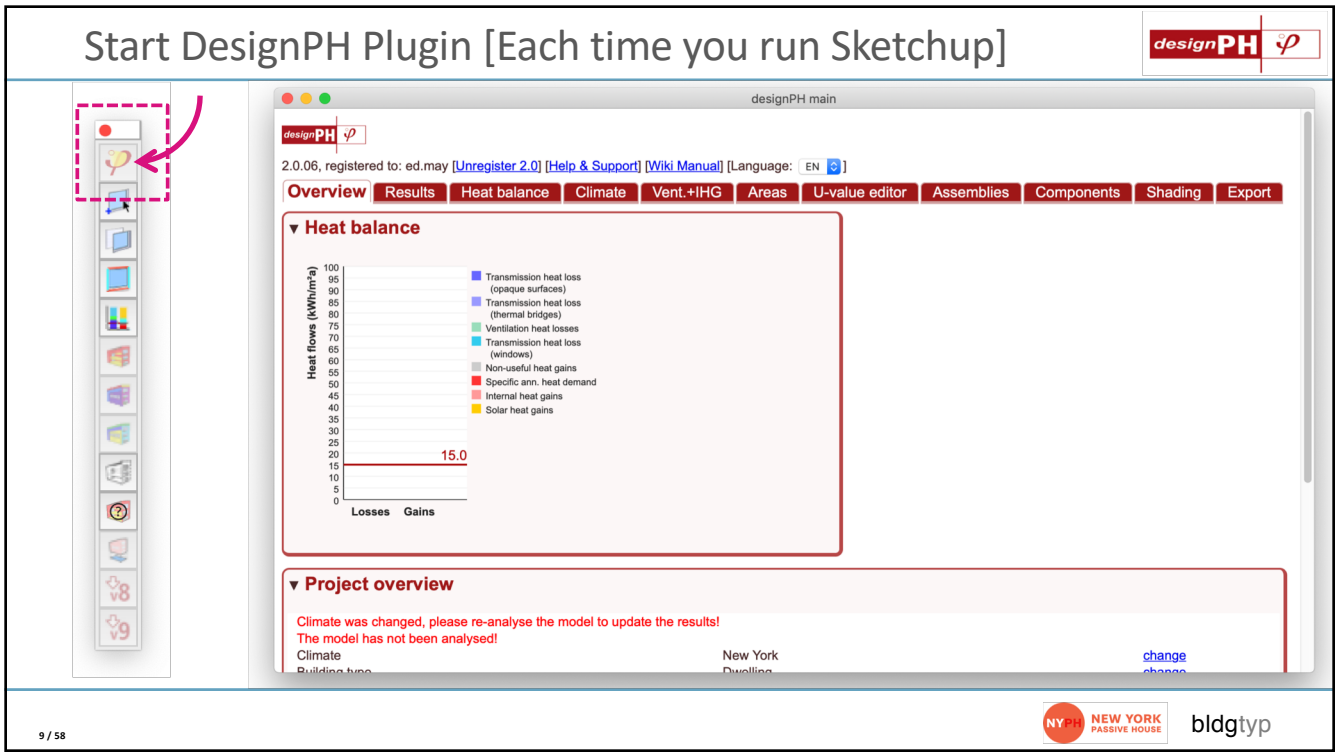


7 / 58

Sketchup Extensions Manager



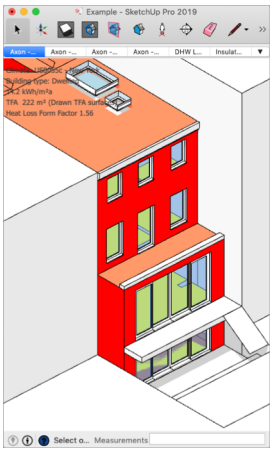
8 / 58



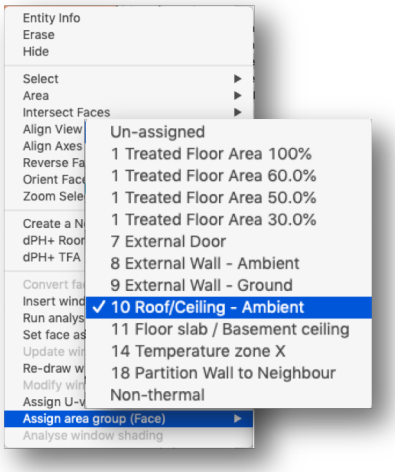
BASIC WORKFLOW

DesignPH Workflow

1) Model Geometry



2) Tag Model Geometry w/ Data



3) Analyze

4) Export

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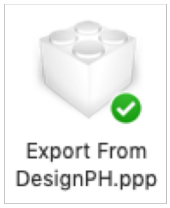
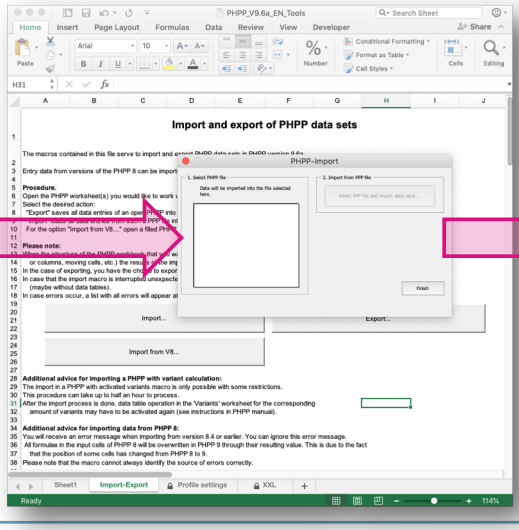
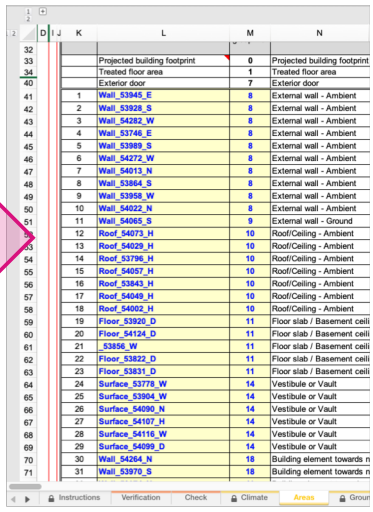
DesignPH Workflow



5) Import



6) Complete the PHPP



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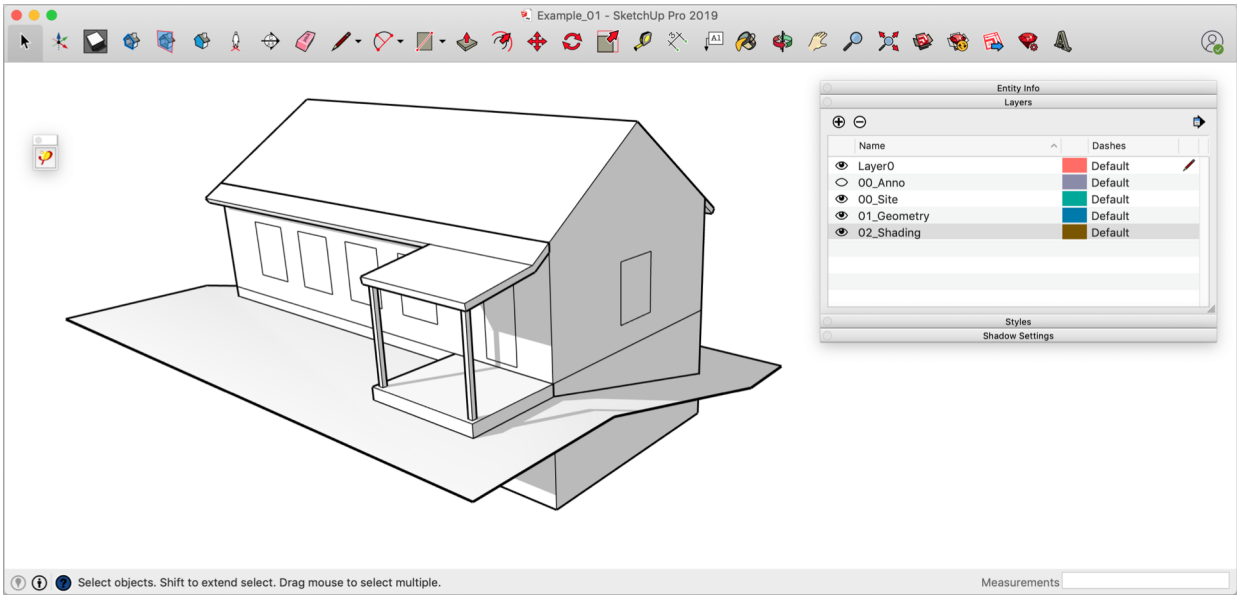
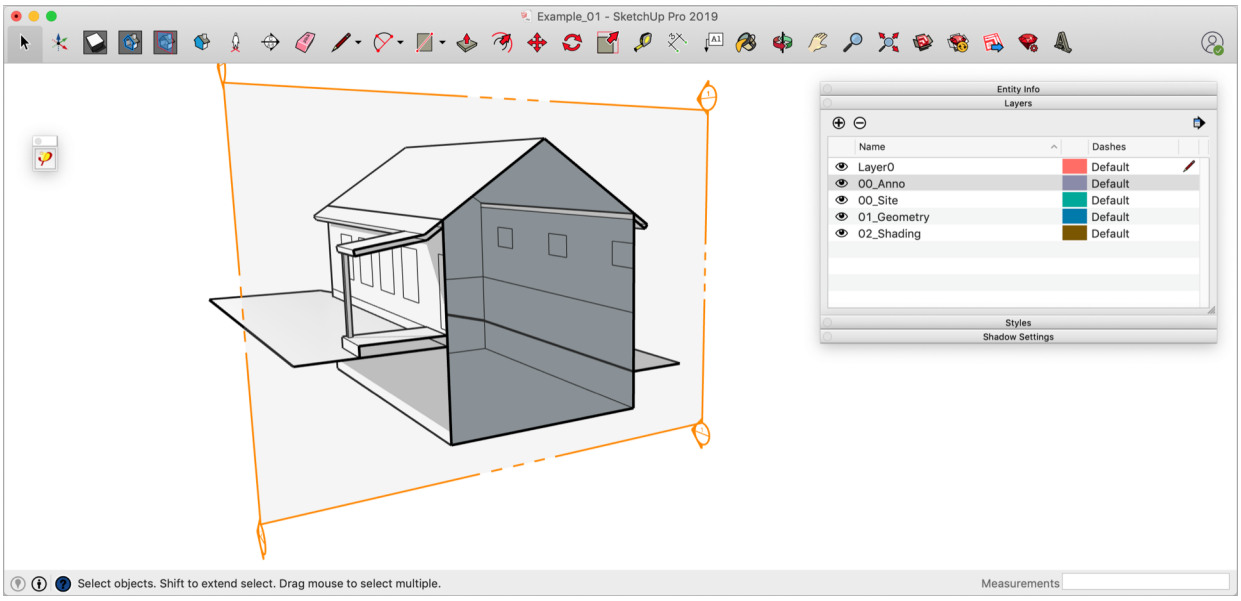
Modeling

Modeling is Done Using SURFACES with no thickness



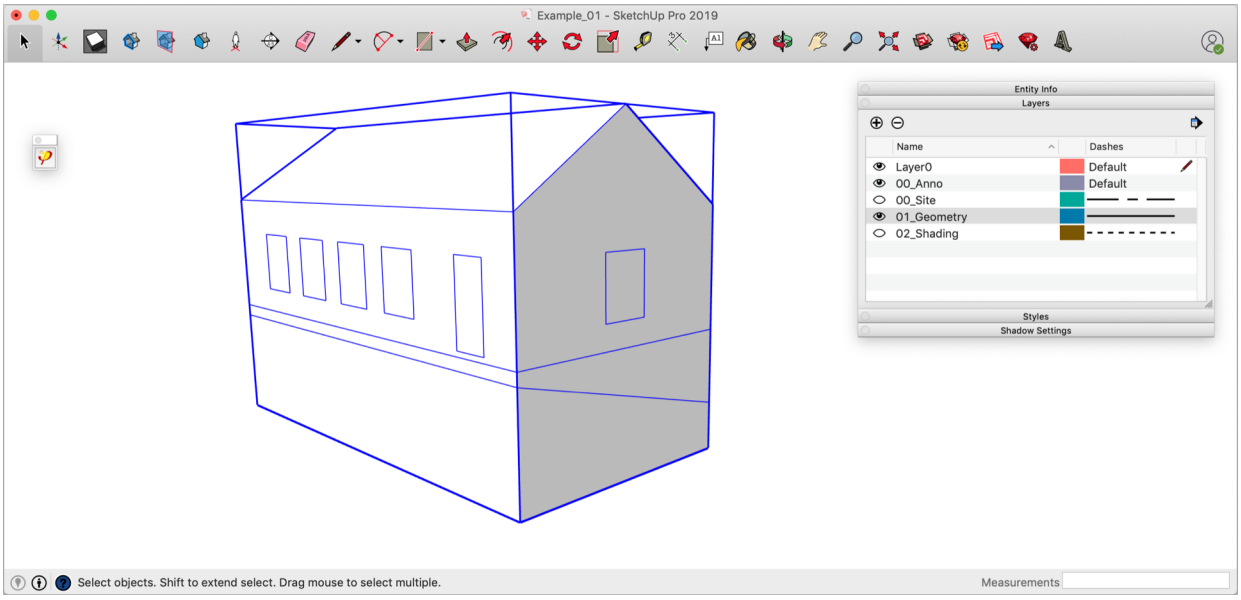
14 / 58

Modeling is Done Using SURFACES with no thickness



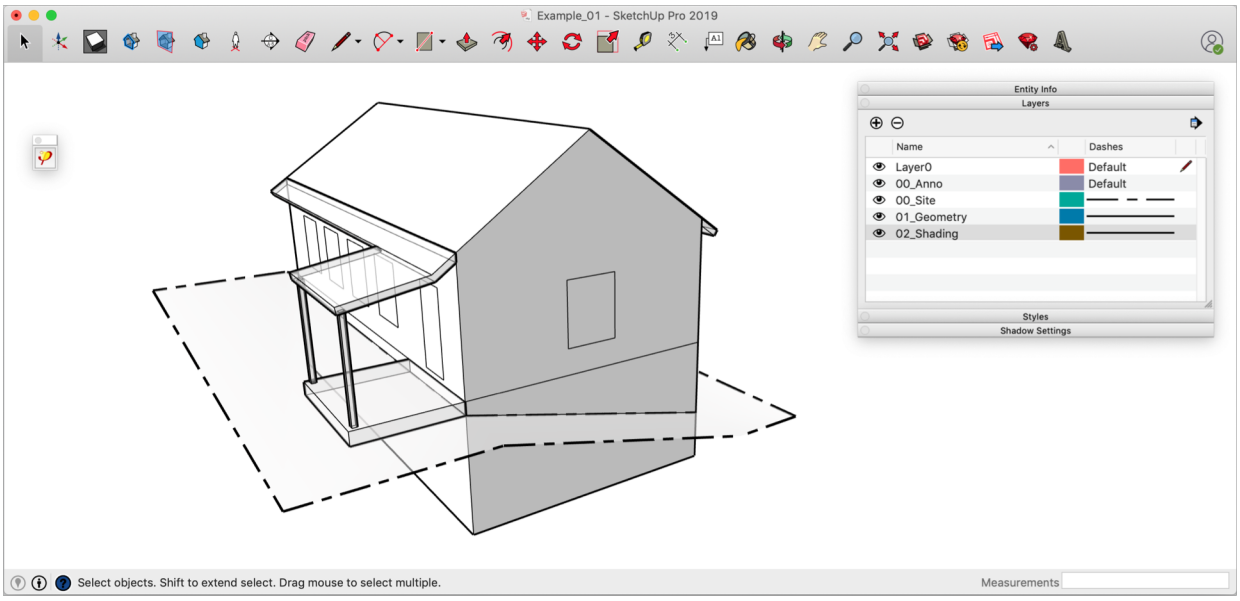
15 / 58

First, Model the Thermal Zone as a Mass



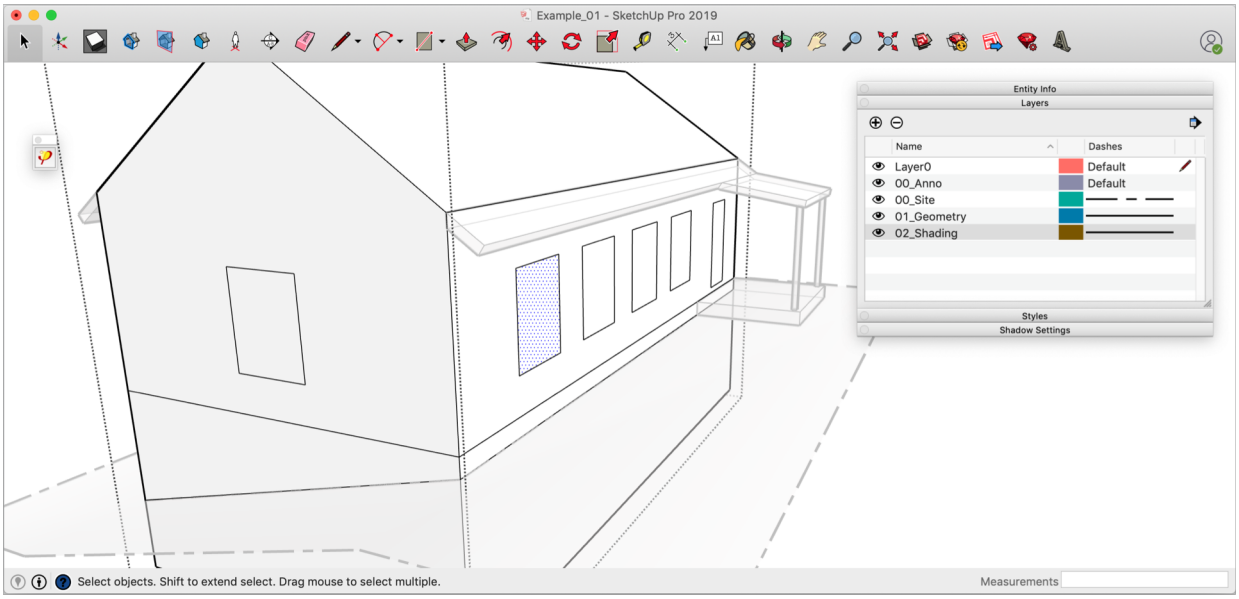
16 / 58

Then Add Shading, Site, etc. in Separate Groups



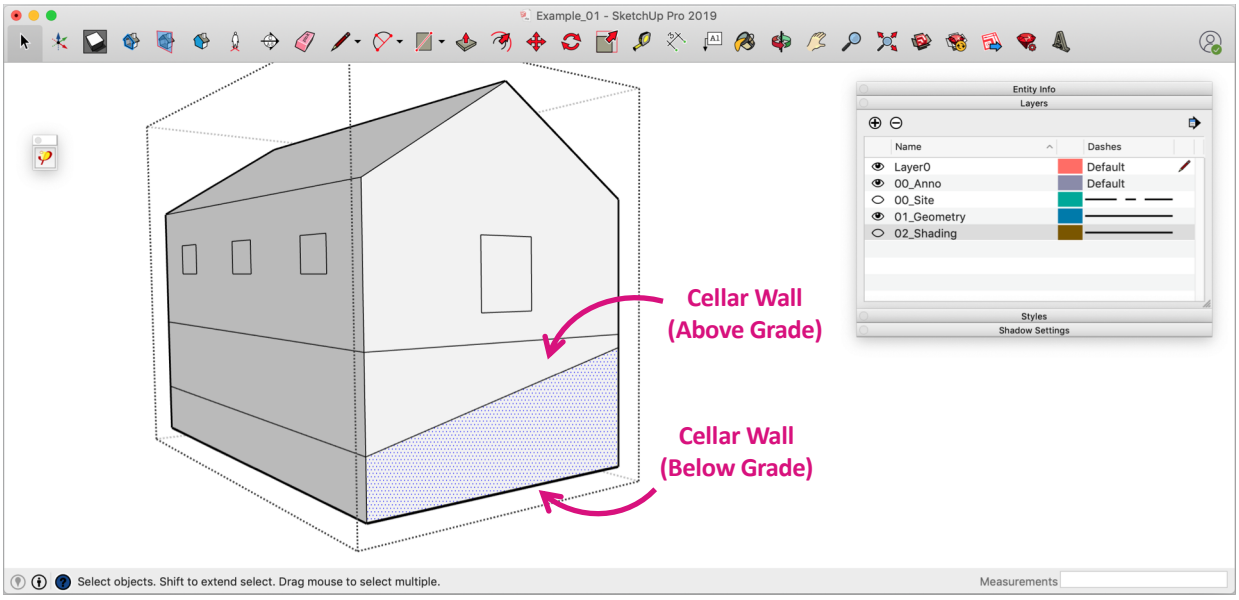
17 / 58

Model Windows as Flat Planes (for now)



18 / 58

Split Surfaces with Multiple Exposure Types (AG/BG)



19 / 58

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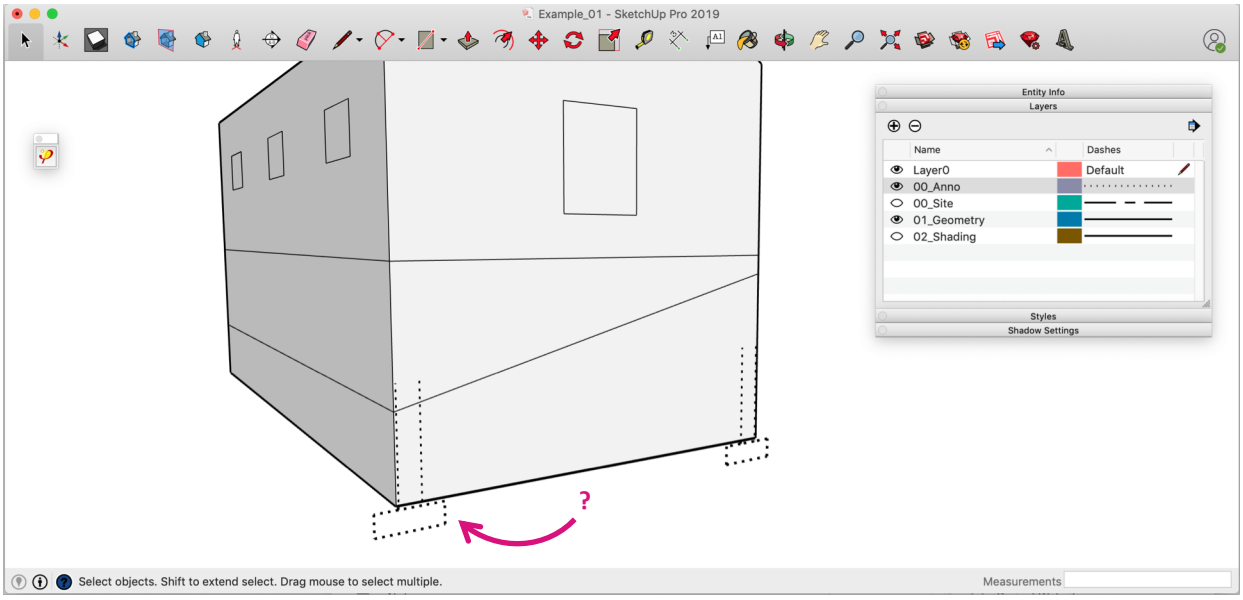
How to Deal with the Details?



20 / 58

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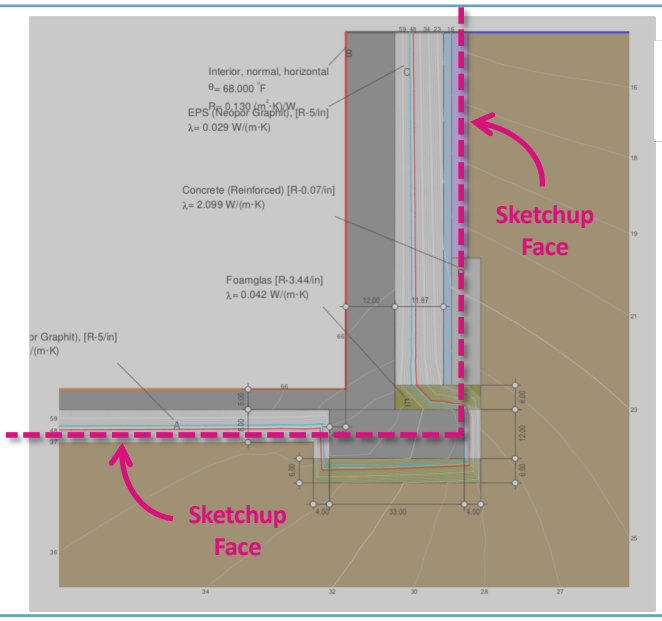
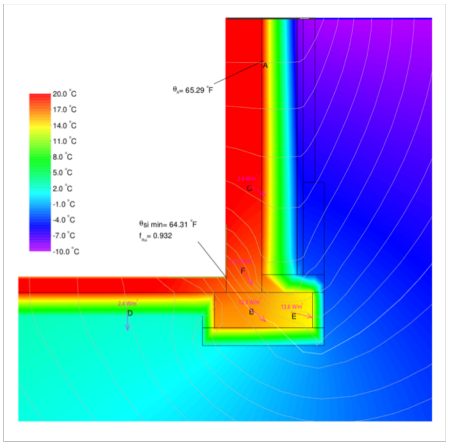
That's What Psi-Values are For!



$$\Psi_{A\text{-}E\text{-}C,*} = \frac{31.558}{30.000} - \frac{6.642}{30.000} - \frac{21.910}{30.000} = 0.100\ \text{W/(m·K)}$$

PSI



21 / 58

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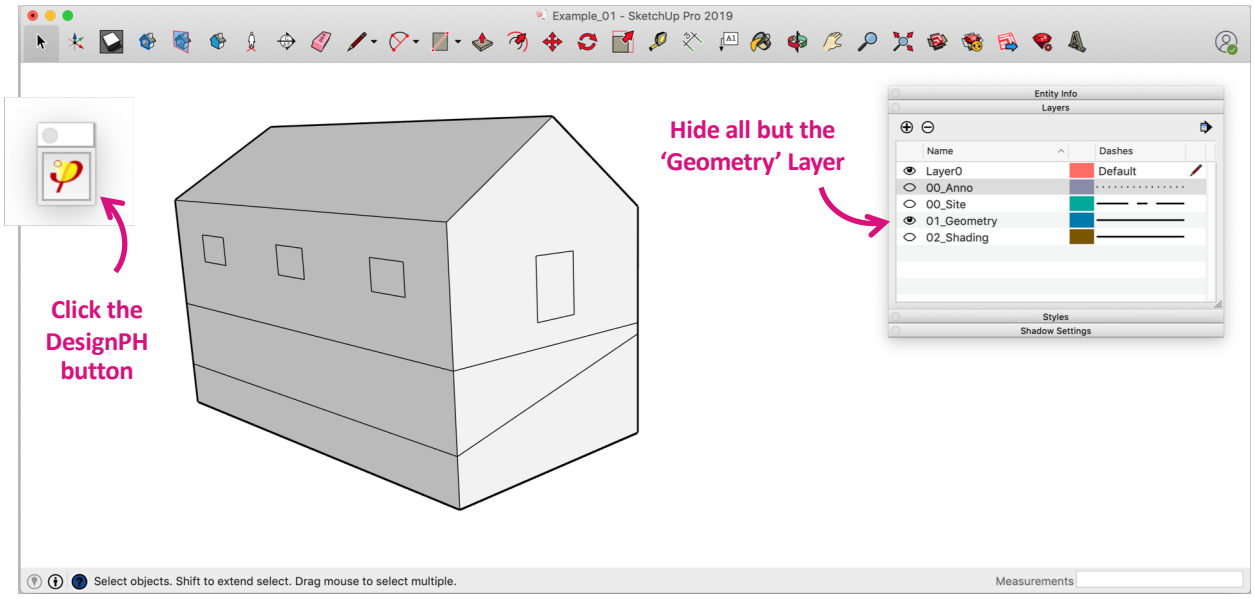
Tagging Surfaces

Start by turning ‘on’ DesignPH



23 / 58

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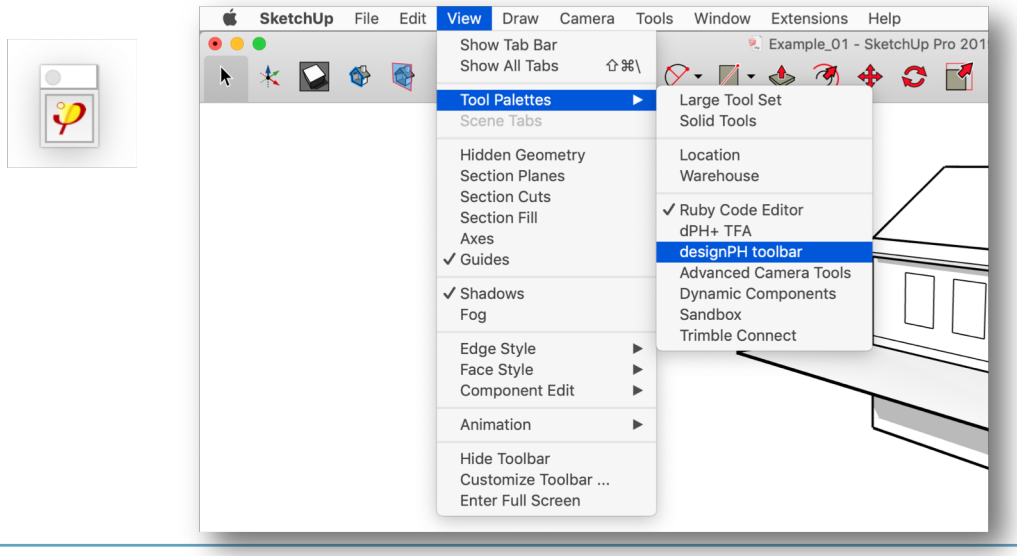
Wait! I don’t see that button!



24 / 58

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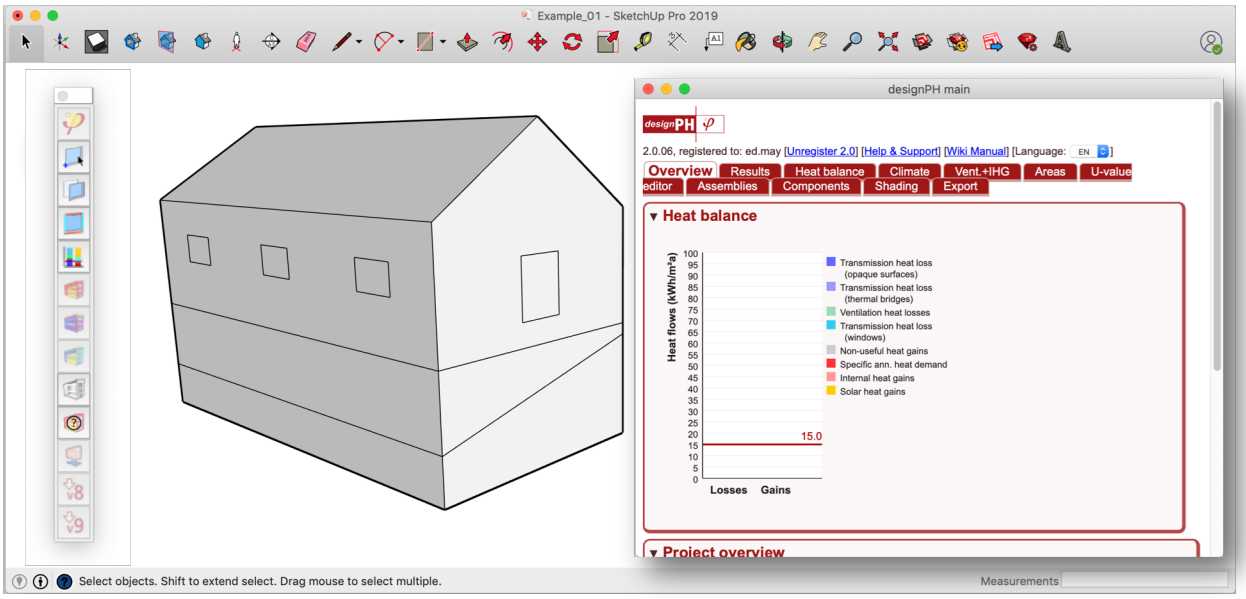
DesignPH Tools



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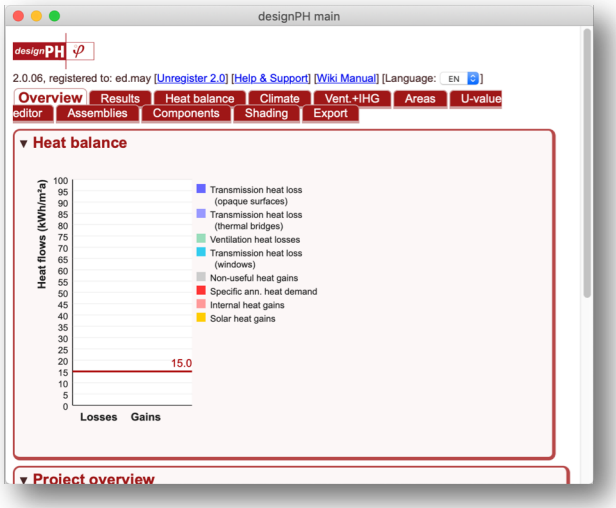
DesignPH Tools

The DesignPH Toolbar lets us access DesignPH modeling and visualization tools

The DesignPH Dialog Window gives us access to detailed inputs for Components, Exporting and seeing the results



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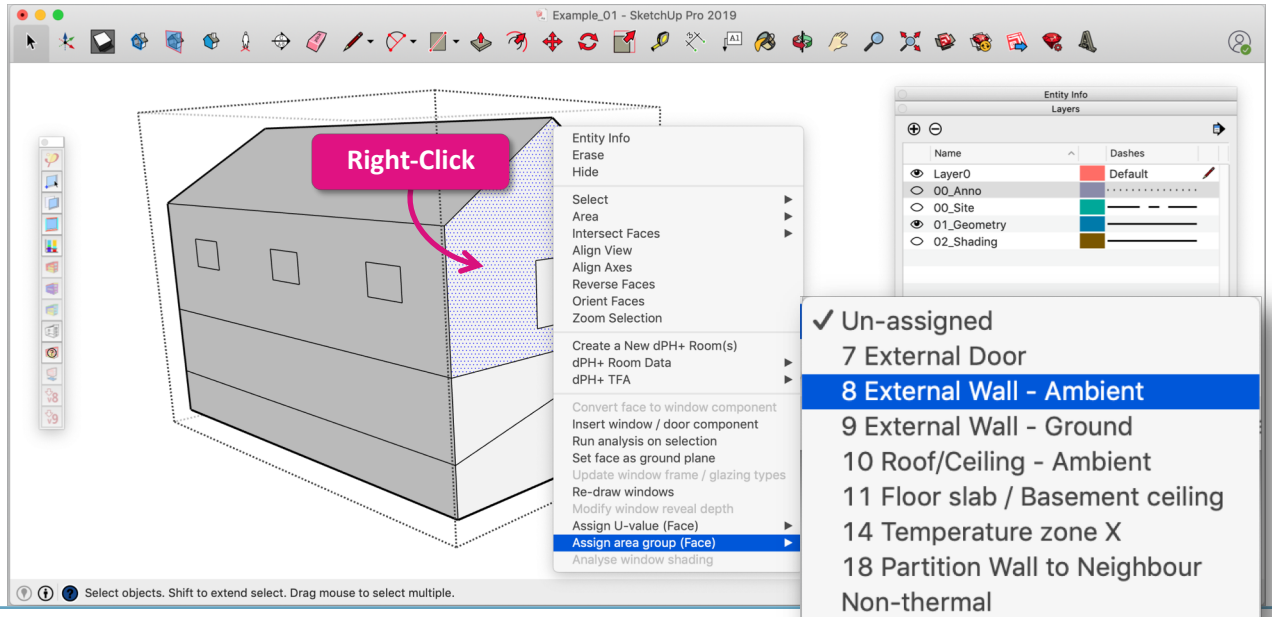
Step 1: Surface Exposure Type



27 / 58

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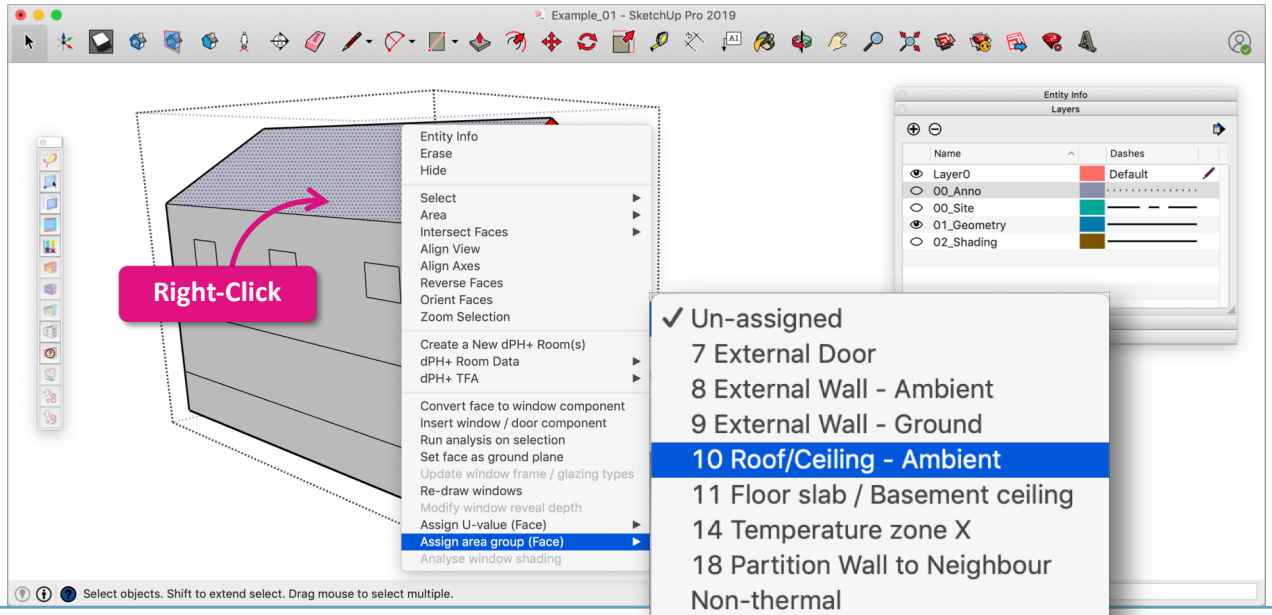
Step 1: Surface Exposure Type



28 / 58

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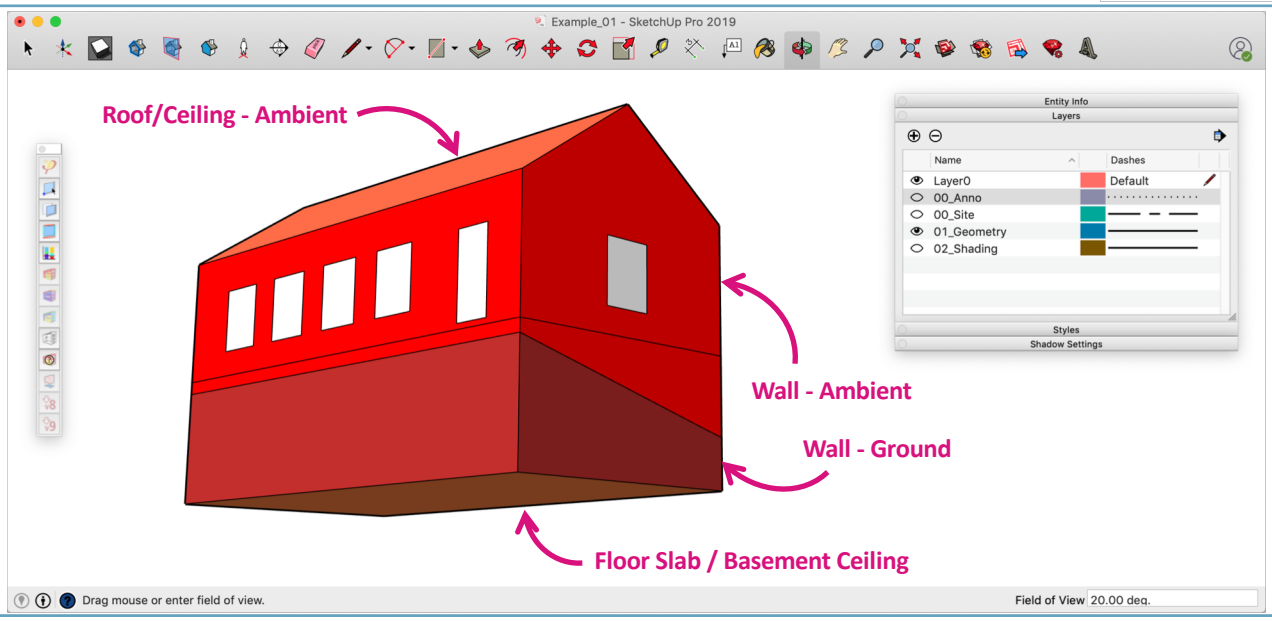
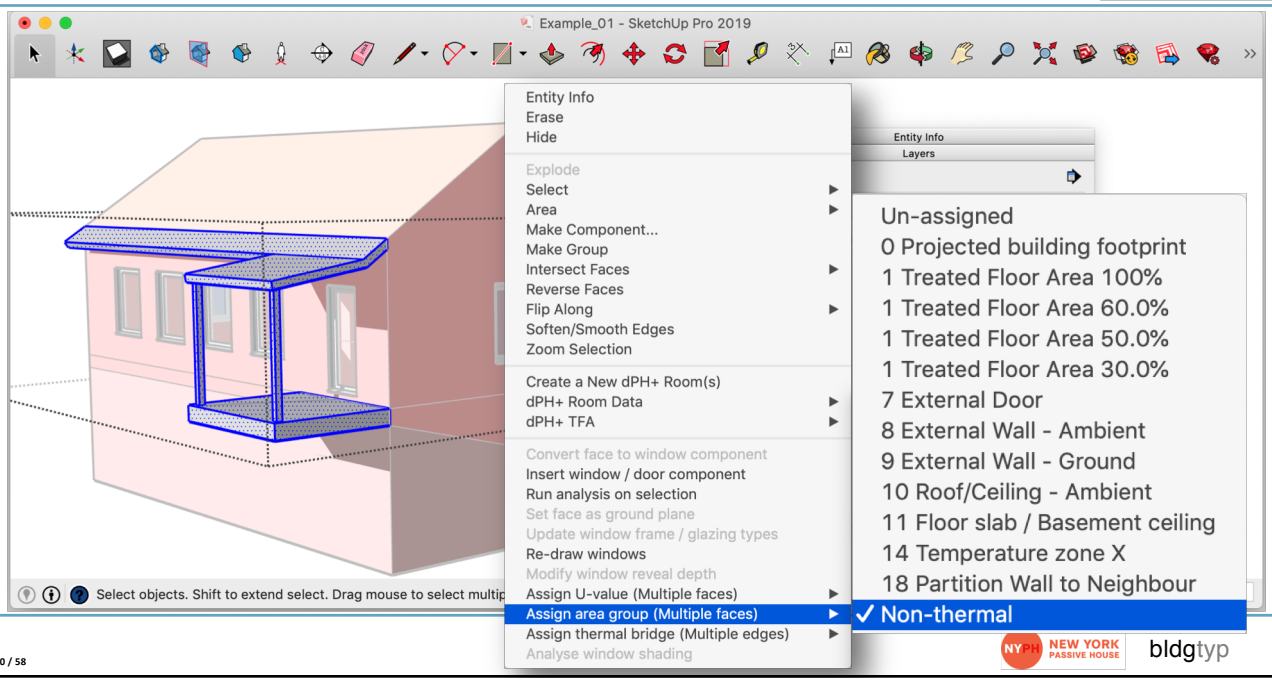
Step 1: Surface Exposure Type



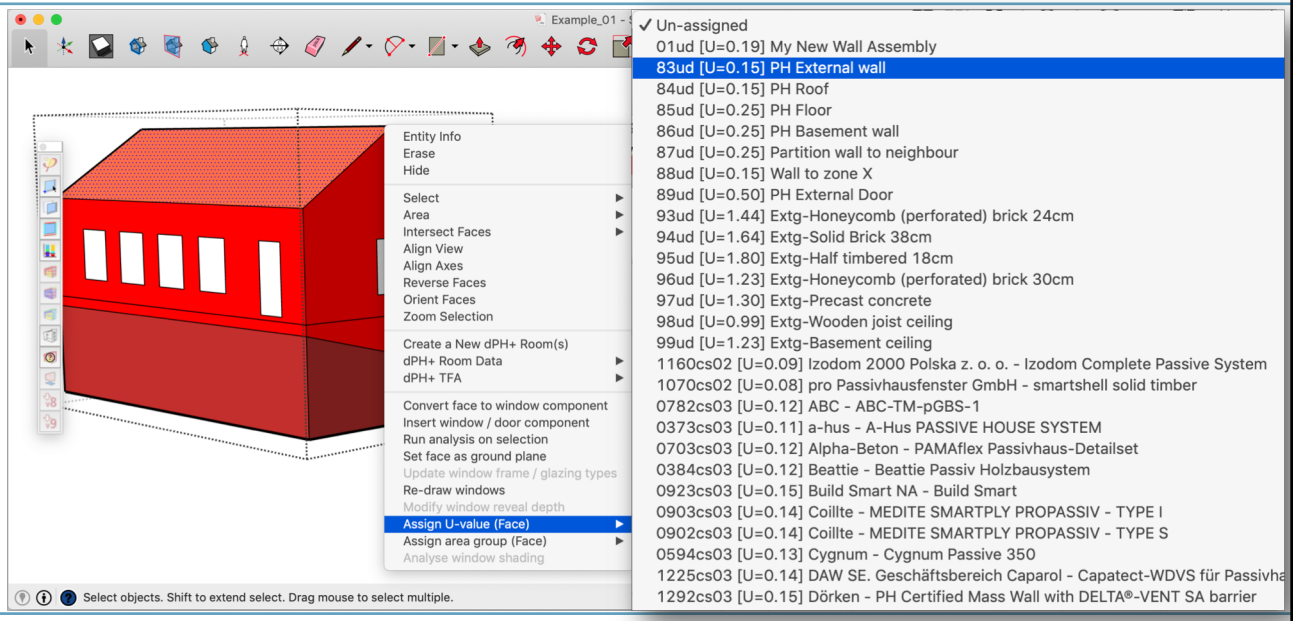
29 / 58

Shading Surfaces: 'Non-Thermal'



30 / 58

Step 2: Surface Assembly Type



31 / 58

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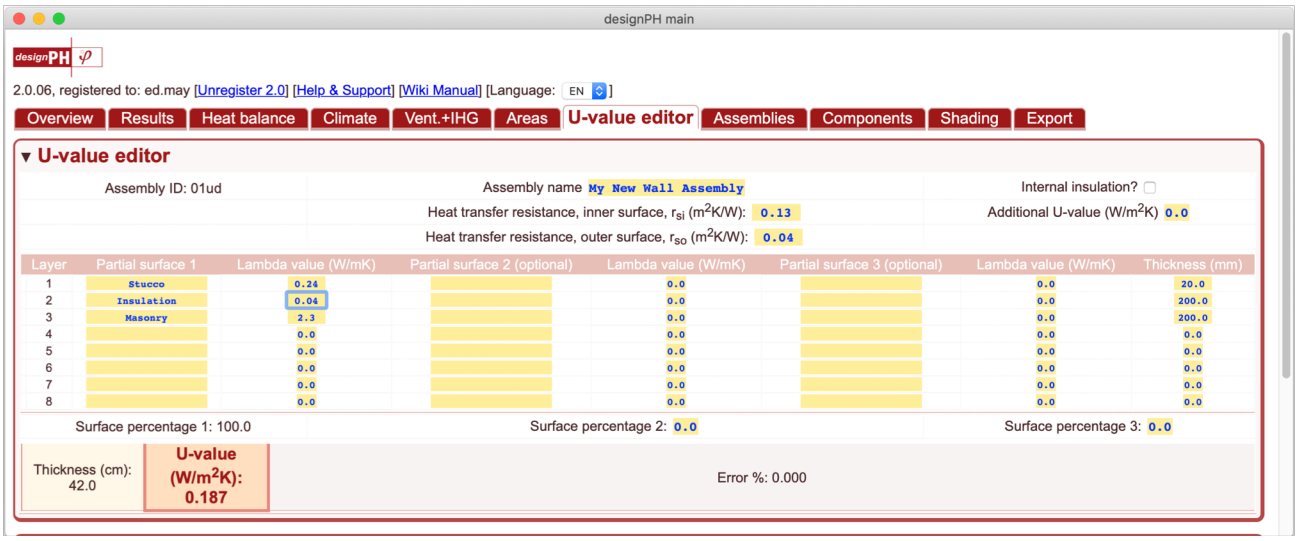
Custom Assemblies?



32 / 58

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Just like PHPP, build them one layer at a time.

Layer	Partial surface 1	Lambda value (W/mK)	Thickness (mm)
1	Stucco	0.24	20.0
2	Insulation	0.04	200.0
3	Masonry	2.3	200.0
4		0.0	0.0

Thickness (cm): 42.0

U-value (W/m^2K): 0.187

33 / 58

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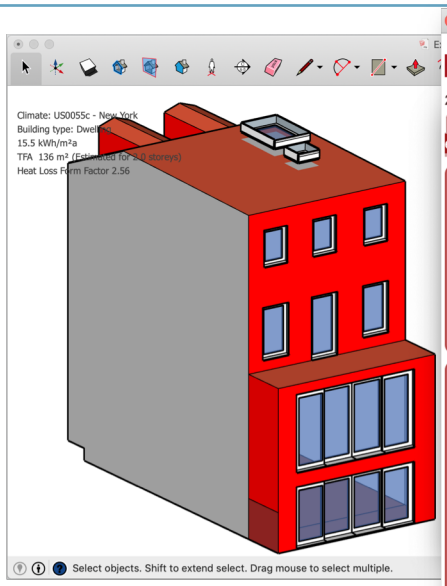
Constructions and U-Values



designPH main

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Overview | Results | Heat balance | Climate | Vent.+IHG | Areas | U-value
editor | Assemblies | Components | Shading | Export

▾ Assemblies (default)

Grp. no.	Area group	Assembly no.	Assembly name	Total thickness (m)	U-value (W/m^2K)
7	External Door	89ud	Wall 7 - New Dormer	0.21	0.22
8	External Wall - Ambient	83ud	PH External wall	0.42	0.22
9	External Wall - Ground	86ud	Wall 4 - Exg Brick	0.44	0.20
10	Roof/Ceiling - Ambient	84ud	Wall 8 - Cellar	0.45	0.18
11	Floor slab / Basement ceiling	85ud	Wall 3 - Partywall	0.35	0.30
14	Temperature zone X	88ud	Wall 6 - New CMU	0.33	0.24
18	Partition Wall to Neighbour	87ud	Wall 5 - New CMU	0.45	0.20

▾ Assemblies (user-defined)

ID	Assembly name	Total thickness	U-value (W/m^2K)	Internal insulation?
83ud	PH External wall	0.42	0.218	
84ud	Wall 8 - Cellar	0.4478	0.176	
85ud	Wall 3 - Partywall	0.346	0.298	
86ud	Wall 4 - Exg Brick	0.435	0.2	
87ud	Wall 5 - New CMU	0.4506	0.201	
88ud	Wall 6 - New CMU	0.3302	0.235	
89ud	Wall 7 - New Dormer	0.21265	0.225	

↓ show more... (10 rows hidden) ↓

34 / 58

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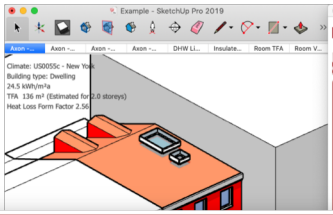
Constructions and U-Values



▾ Transmission heat loss (opaque surfaces)

Area group	Total area (m^2)	Area weighted U-value (W/m^2K)	Av. temp. factor	Ann. htg. degree hours (kKh/a)	Transmission heat losses (kWh/a)	Q_t (kWh/m^2a)
7 - External Door	0.00			64.00		
8 - External Wall - Ambient	87.47	0.21	1.00	64.00	1179.17	8.70
9 - External Wall - Ground	2.70	0.24	0.60	64.00	24.37	0.18
10 - Roof/Ceiling - Ambient	81.80	0.10	1.00	64.00	509.66	3.76
11 - Floor slab / Basement ceiling	86.86	0.27	0.60	64.00	893.87	6.59
12 -	0.00			64.00		
13 -	0.00			64.00		
14 - Temperature zone X	30.03	0.21	0.75	64.00	298.18	2.20
18 - Partition Wall to Neighbour	264.43	0.30	0.00	64.00	0.00	0.00
	553.29				**2905.25**	**21.43**

35 / 58

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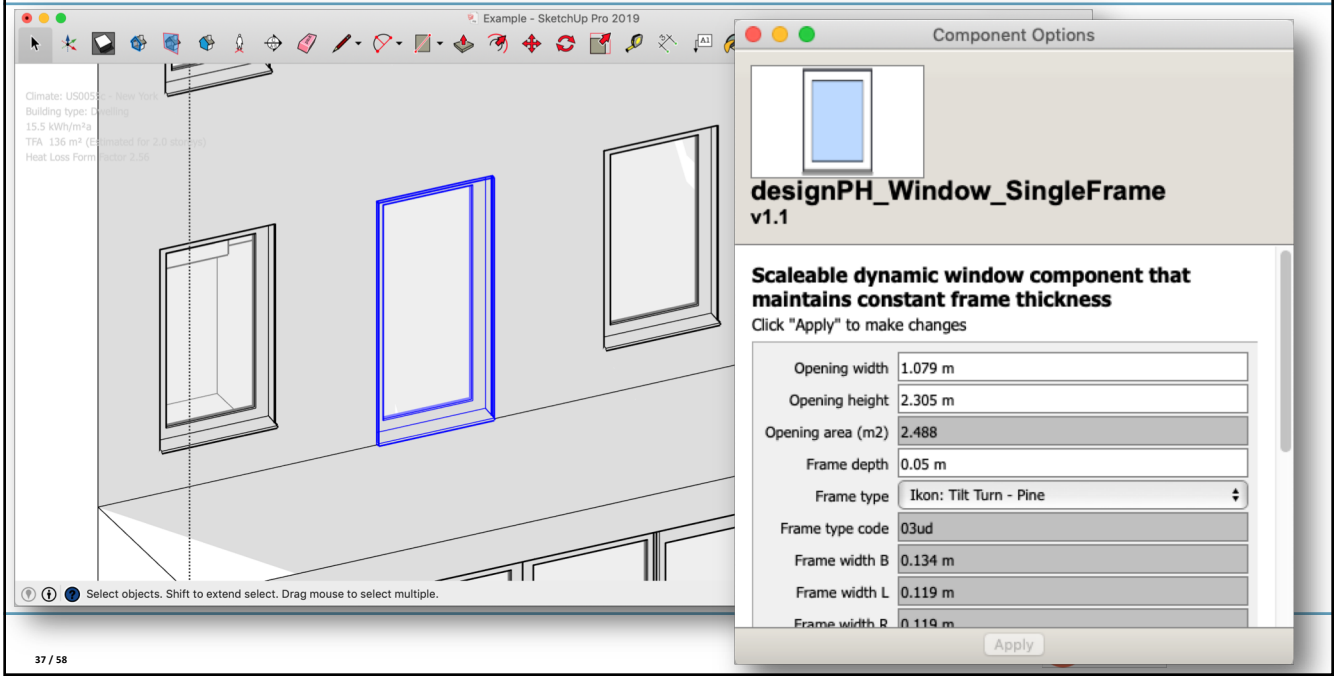
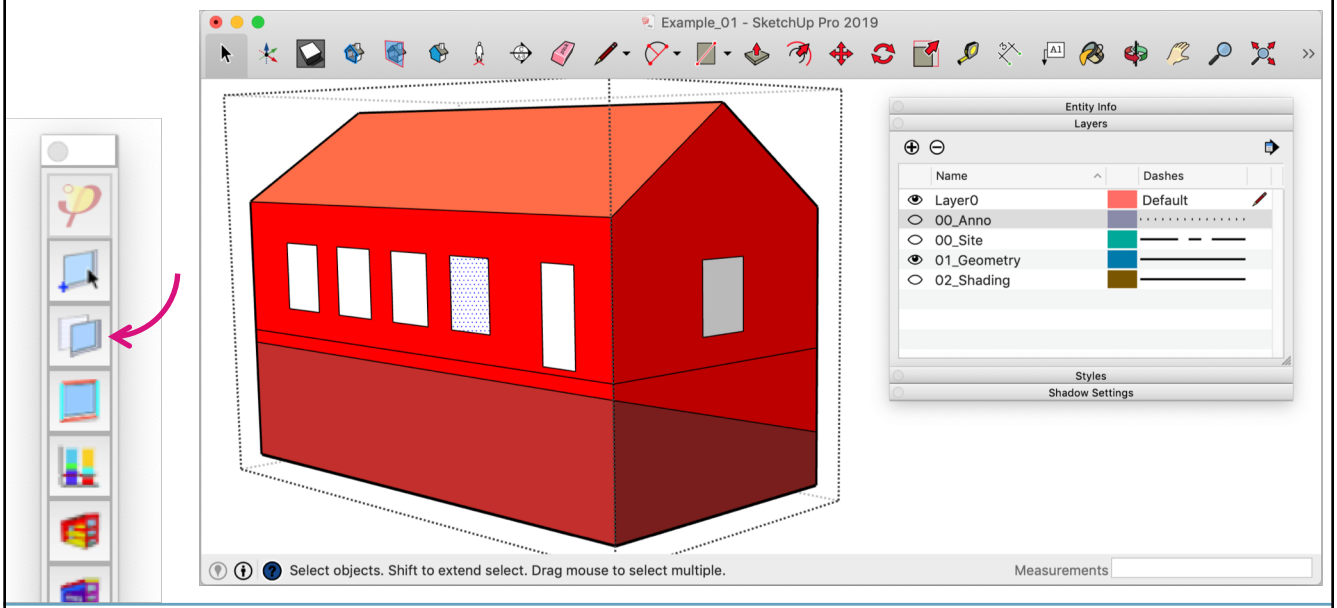
Windows

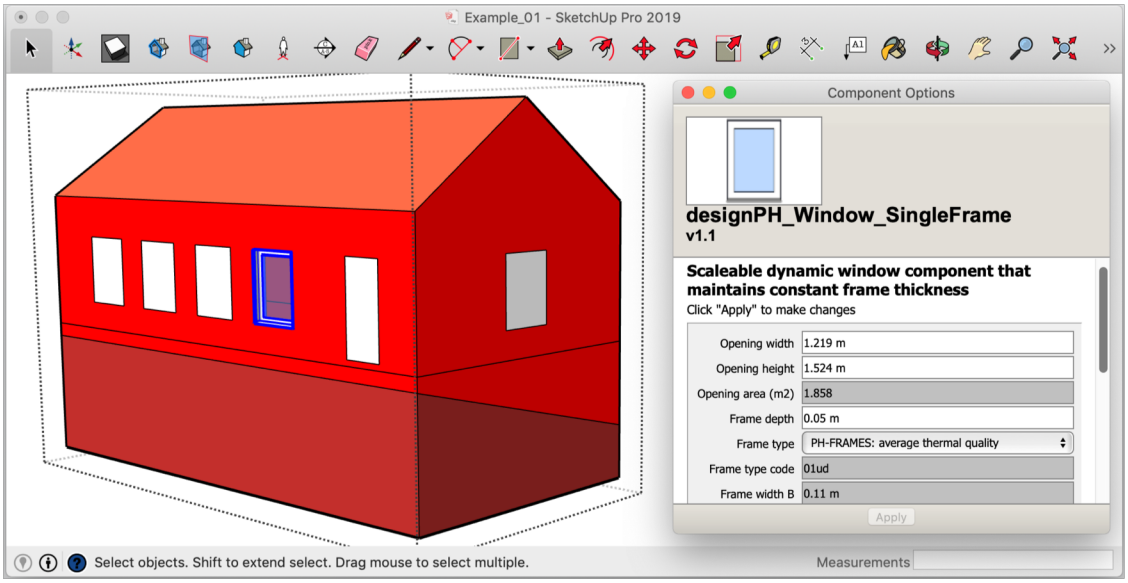
Window ‘Components’



Draw Surfaces, Convert to DesignPH Windows



Draw Surfaces, Convert to DesignPH Windows



39 / 58

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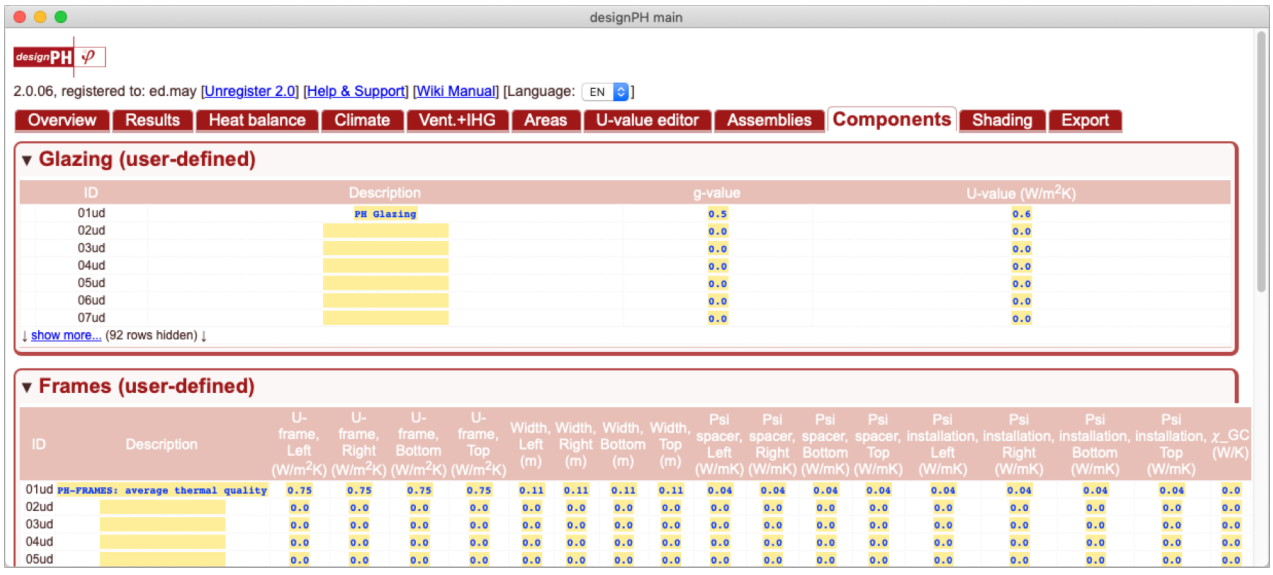
Window Components: Just like PHPP



40 / 58

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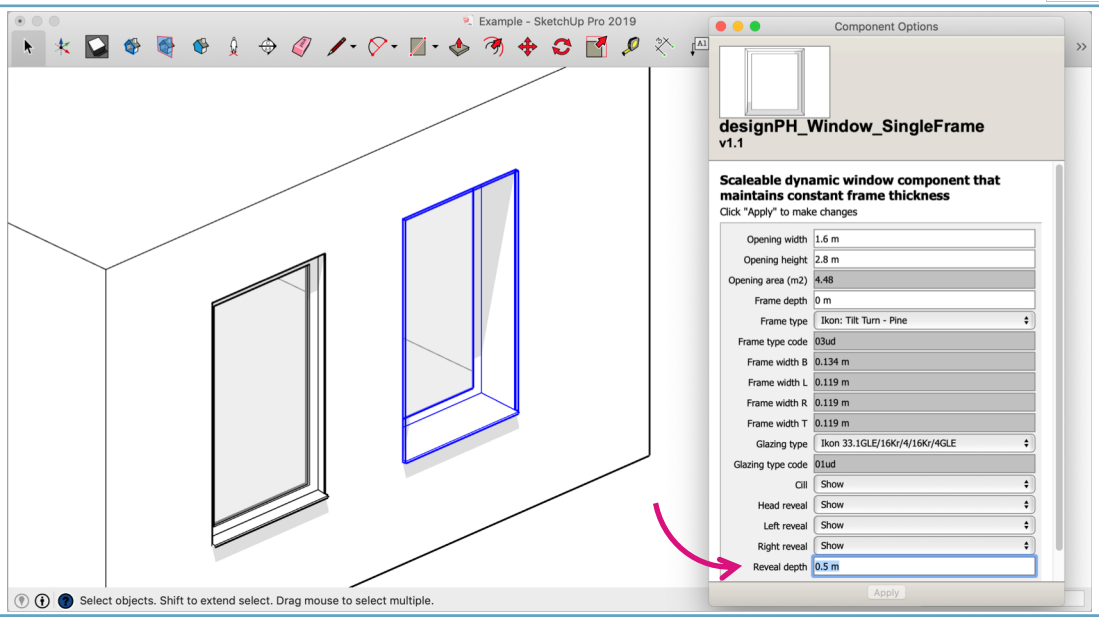
Window Reveal Depth



41 / 58

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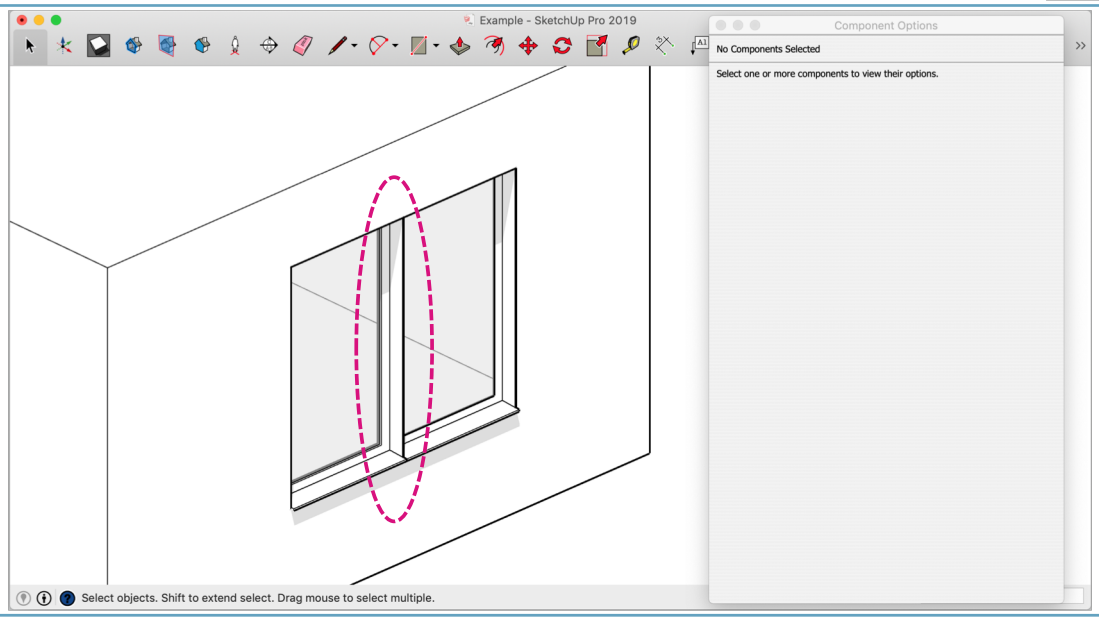
Window Mullions



42 / 58

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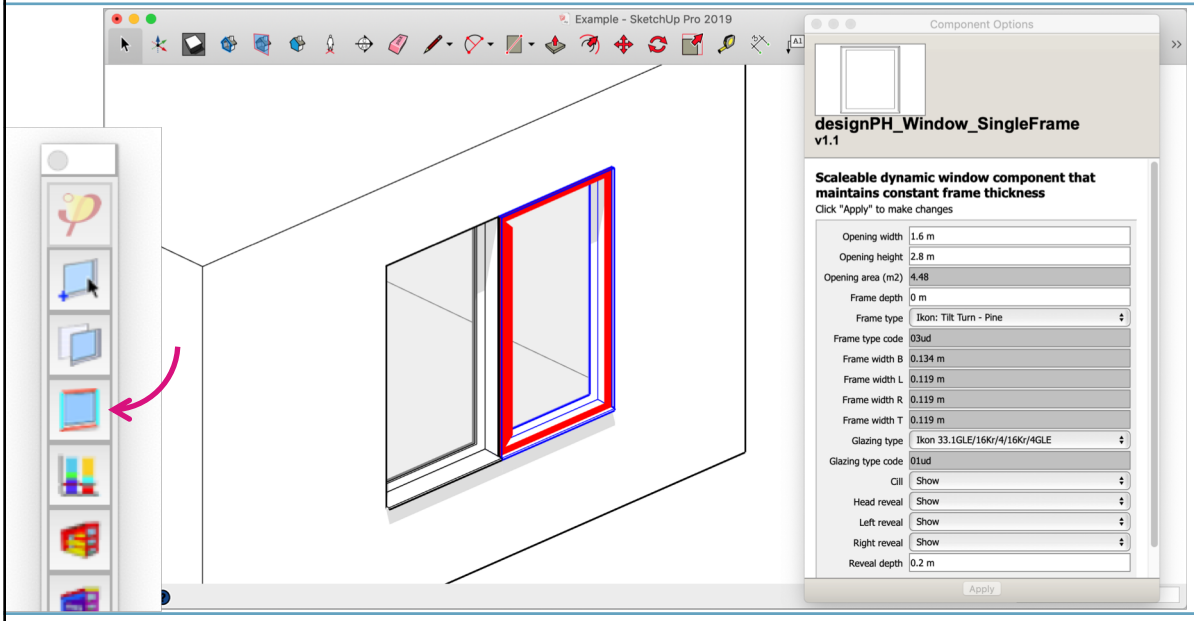
Window Mullions



43 / 58

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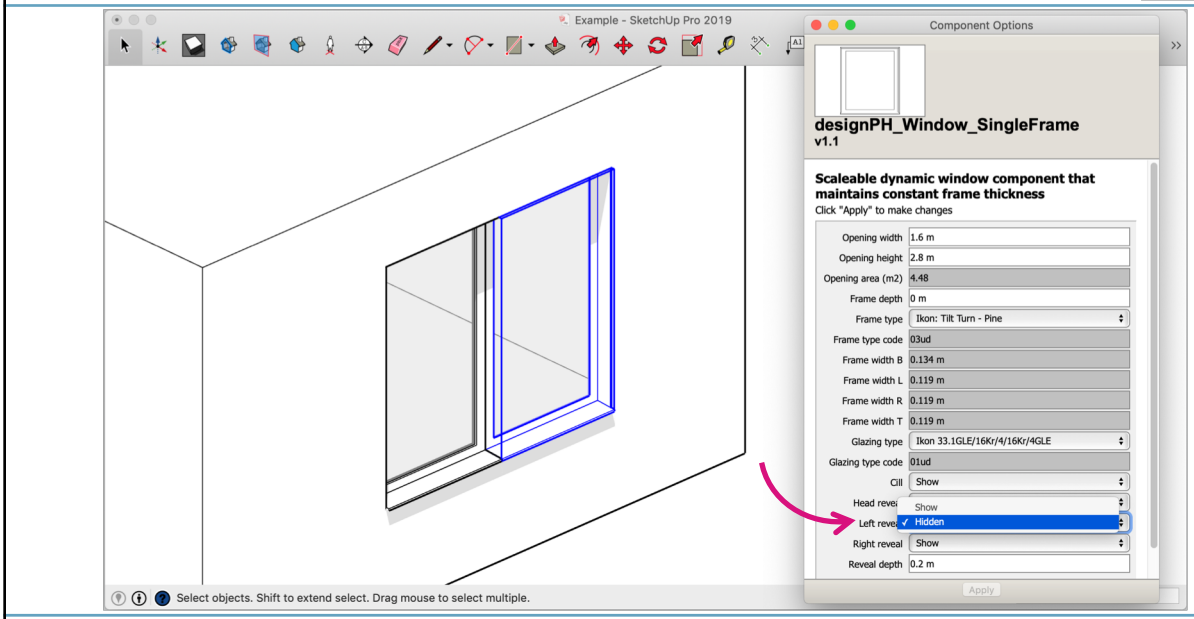
Window Mullions



44 / 58

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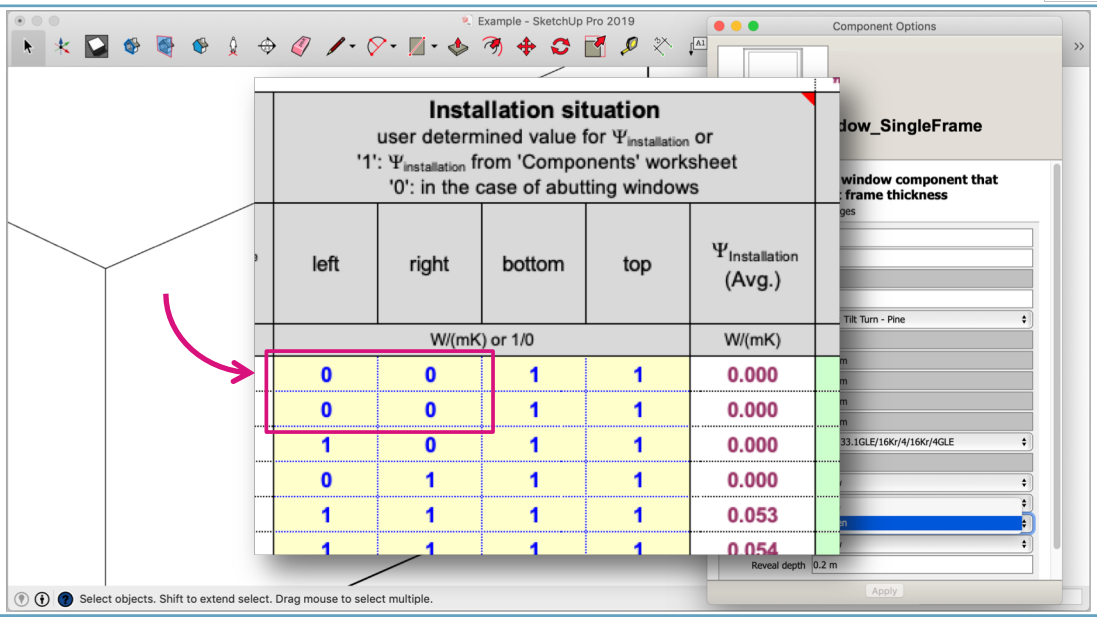
Window Mullions



45 / 58

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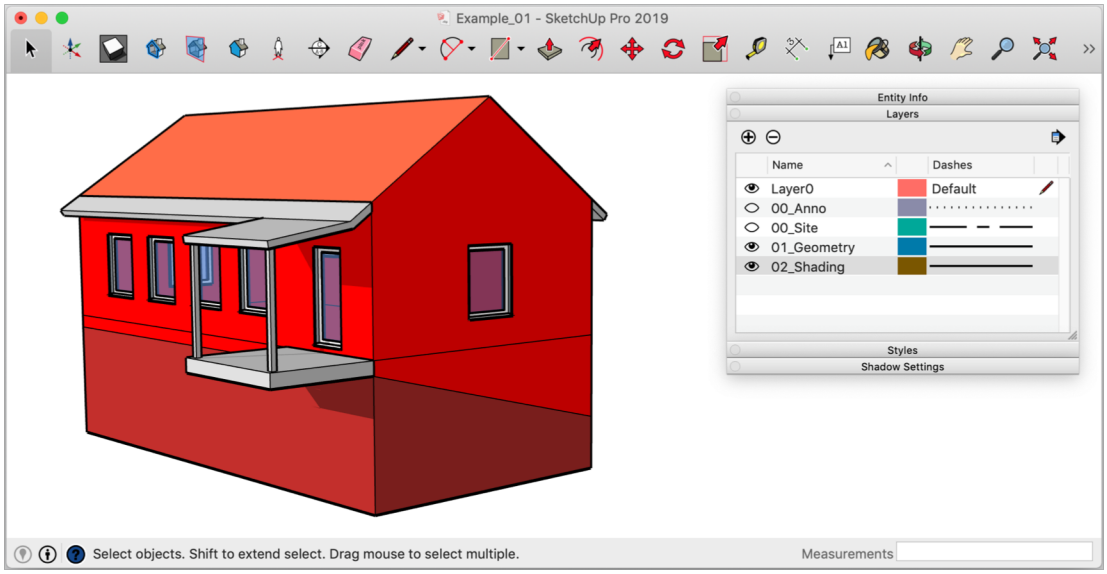
Exporting

3) Simulate



47 / 58

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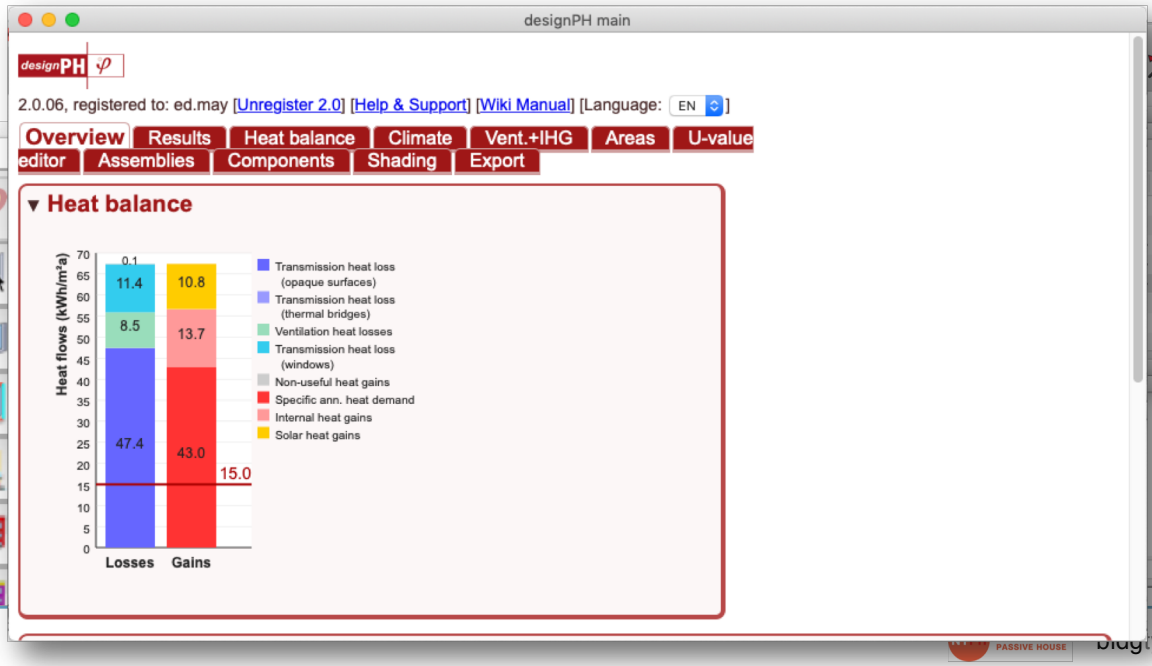
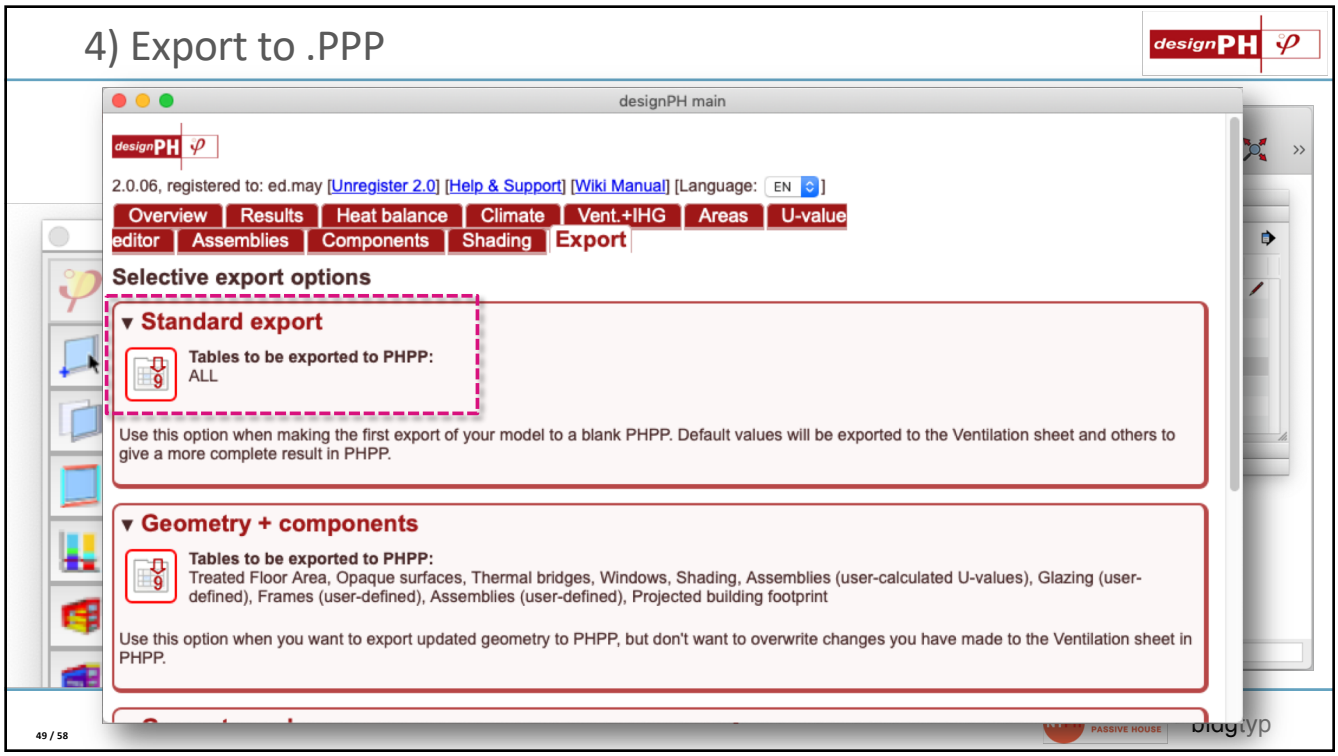
3) Simulate



48 / 58


4) Export to .PPP
designPH main
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Overview
Results
Heat balance
Climate
Vent.+IHG
Areas
U-value
editor
Assemblies
Components
Shading
Export
Selective export options
Standard export
Tables to be exported to PHPP:
ALL
Use this option when making the first export of your model to a blank PHPP. Default values will be exported to the Ventilation sheet and others to give a more complete result in PHPP.
Geometry + components
Tables to be exported to PHPP:
Treated Floor Area, Opaque surfaces, Thermal bridges, Windows, Shading, Assemblies (user-calculated U-values), Glazing (user-defined), Frames (user-defined), Assemblies (user-defined), Projected building footprint
Use this option when you want to export updated geometry to PHPP, but don't want to overwrite changes you have made to the Ventilation sheet in PHPP.
49 / 58
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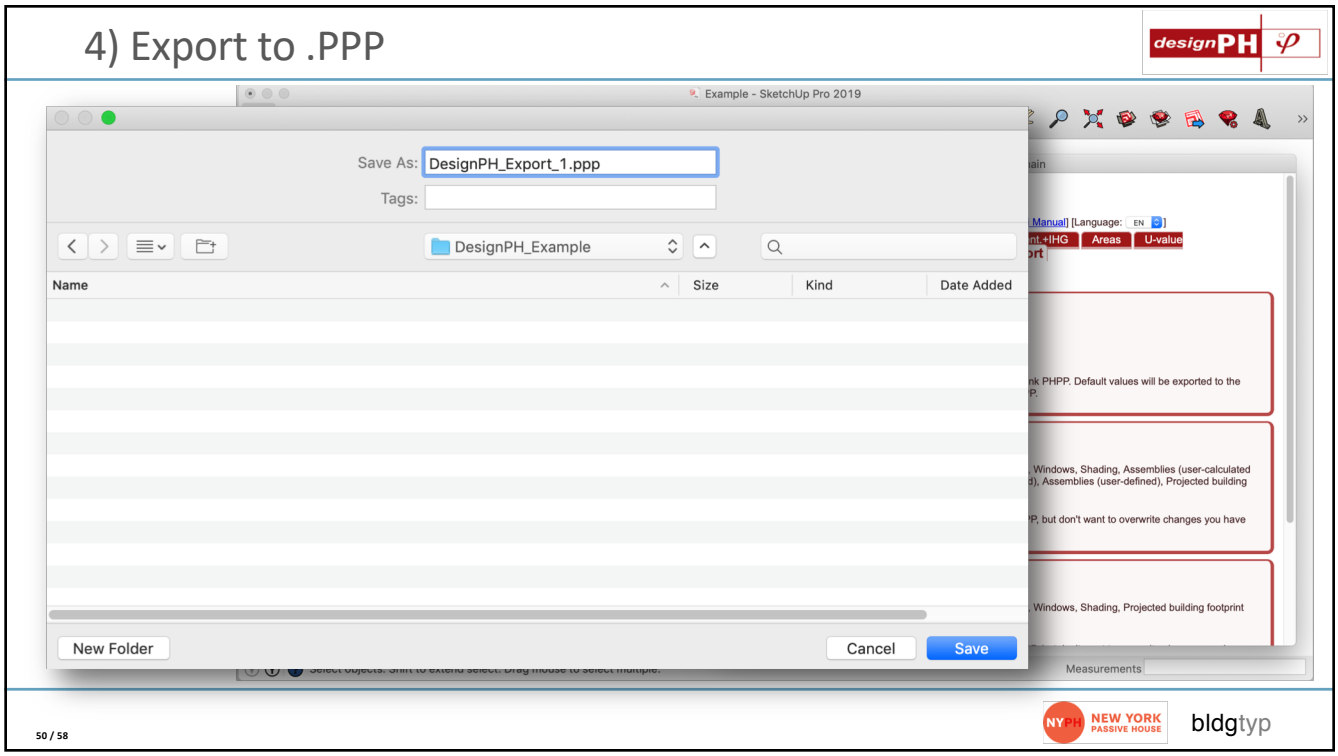
4) Export to .PPP
Example - SketchUp Pro 2019
Save As: DesignPH_Export_1.ppp
Tags:
DesignPH_Example
Name
Size
Kind
Date Added
New Folder
Cancel
Save
Measurements
50 / 58
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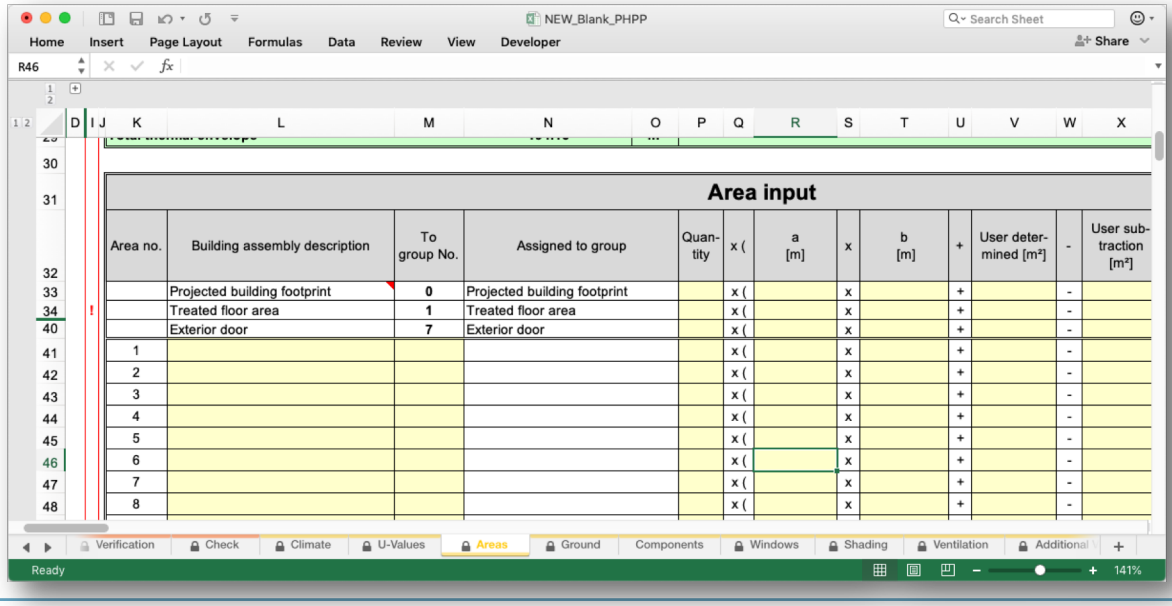
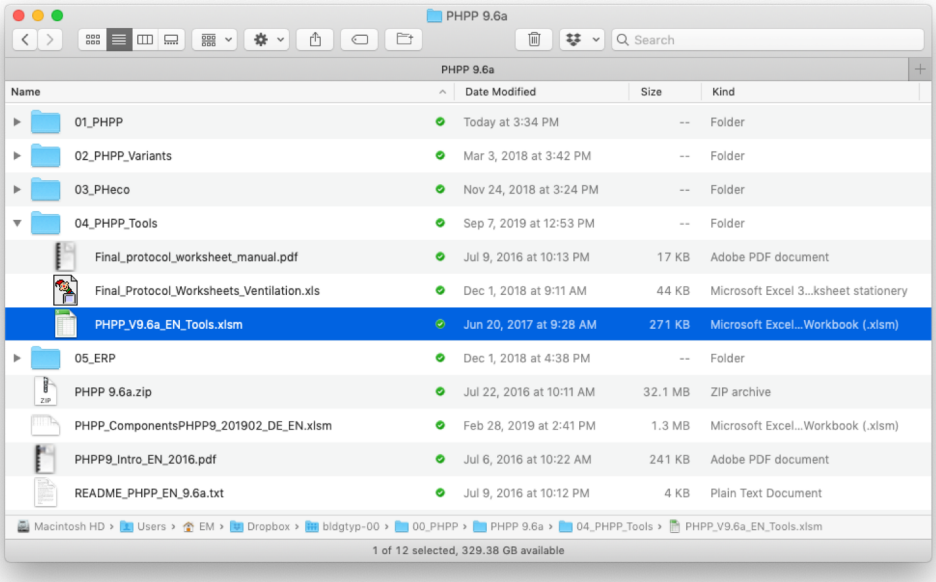
5) Create a NEW blank PHPP file to import into



NEW YORK PASSIVE HOUSE bldgtyp

5) Open your 'PHPP_V9.6a_EN_Tools.xlsm' File



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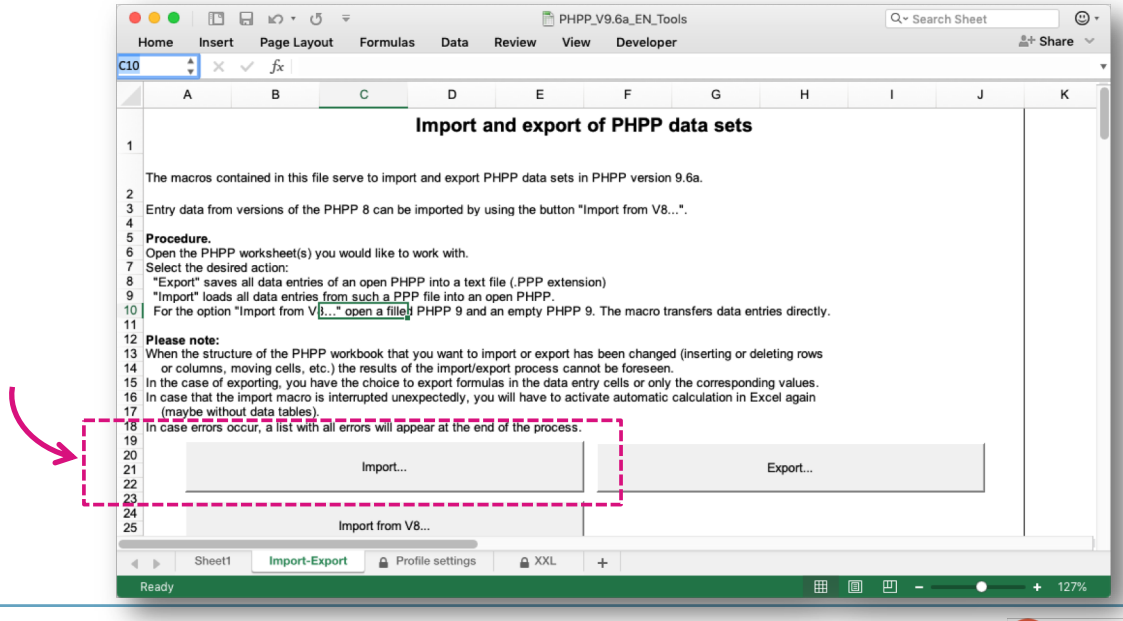
5) Click 'Import'



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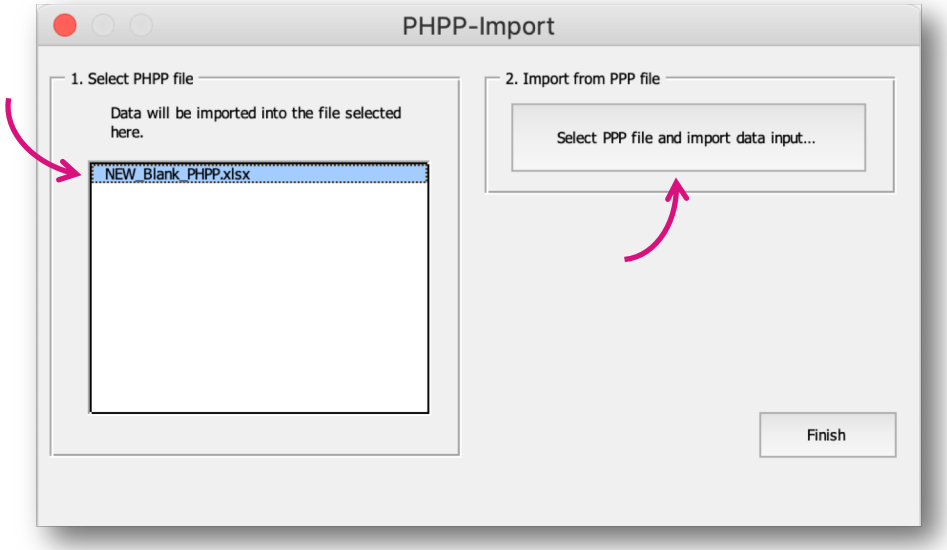

Note: be sure BOTH your new Blank PHPP AND the 'Tools' files are open at the same time for this to work.

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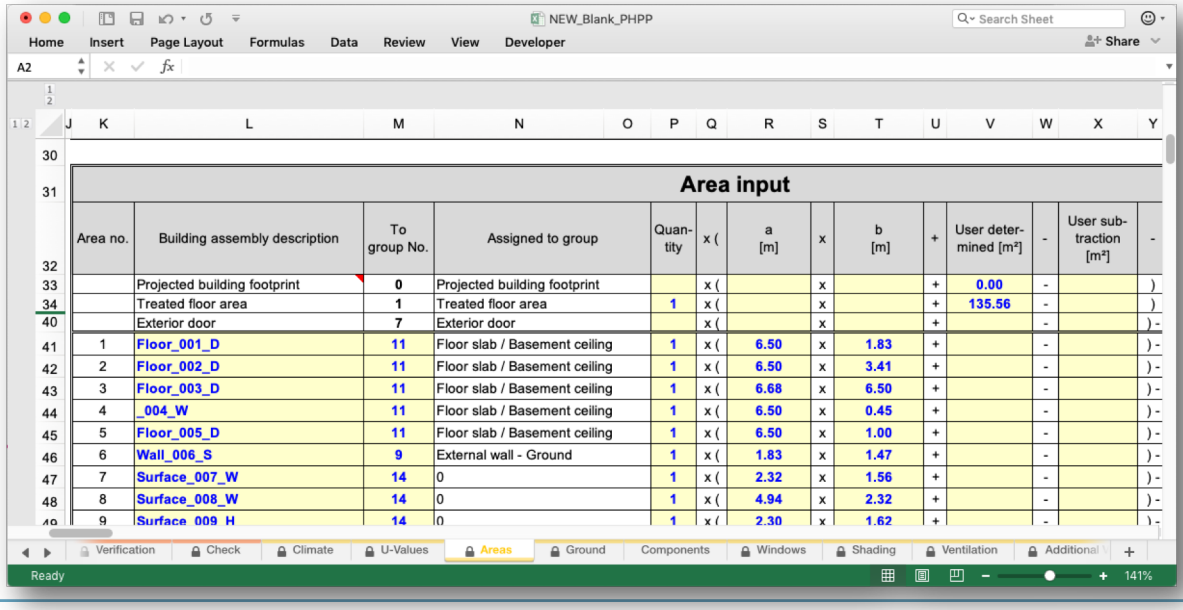
6) We now have a filled-in PHPP file. Save it.



Things to consider…

- The 'link' between the PHPP and DesignPH is not 'live'. It's a one-way export from DesignPH into the PHPP.
- If you change something in PHPP, it does not change in the DesignPH model.
- It may (often) be easier to experiment with building variants in PHPP rather than DesignPH.
- You'll still have many inputs that need to be completed in the PHPP after import (DHW, Cooling, PER, Variants, etc…)

Things to consider…

- DesignPH simulation results preview in Sketchup are approximate only. PHPP is the more accurate.
- DesignPH doesn't give any preview results for cooling or Primary Energy
- DesignPH has no inputs for DHW, appliances, etc…
- DesignPH has no inputs for Non-Residential
- DesignPH is an EXPORTER. Not a replacement for the PHPP

Questions?