Ladybug Tutorial

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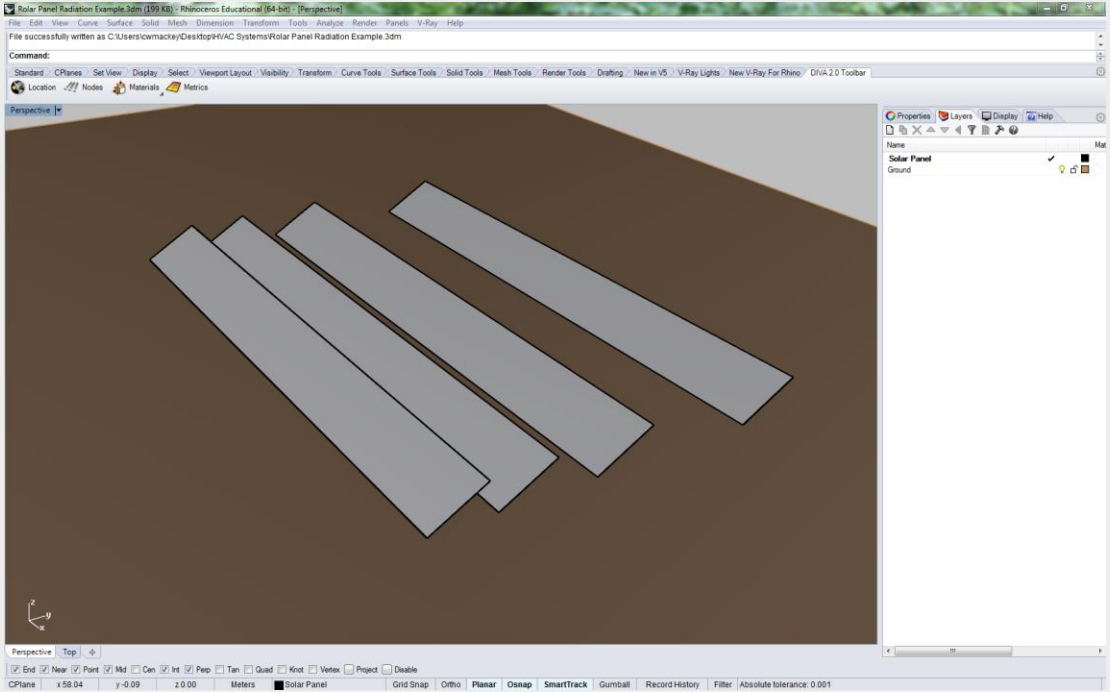
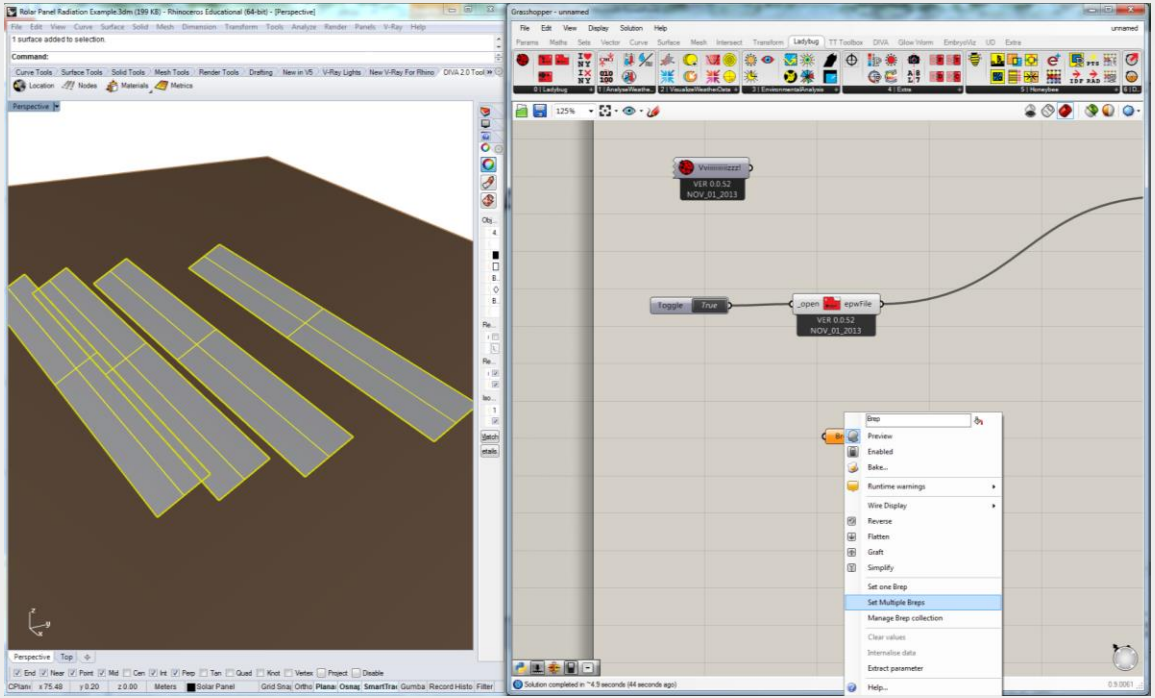
4.411

8.0 Radiation Analysis



1. Start by drawing some geometry in Rhino that you would like to do a radiation study for (the image to the left shows a series of tilted solar panels that are 1m x 10m).
2. To bring the Rhino geometry into grasshopper, select the surfaces representing solar panels and then open your grasshopper canvass.

8.0 Radiation Analysis



1. Double-click on the canvass and type the words “brep” and select the first search item that comes up. This will bring an empty holder for your surfaces onto the grasshopper canvass.
2. Right-click on this empty holder and choose “Select Multiple Breps” to bring the geometry into Grasshopper.

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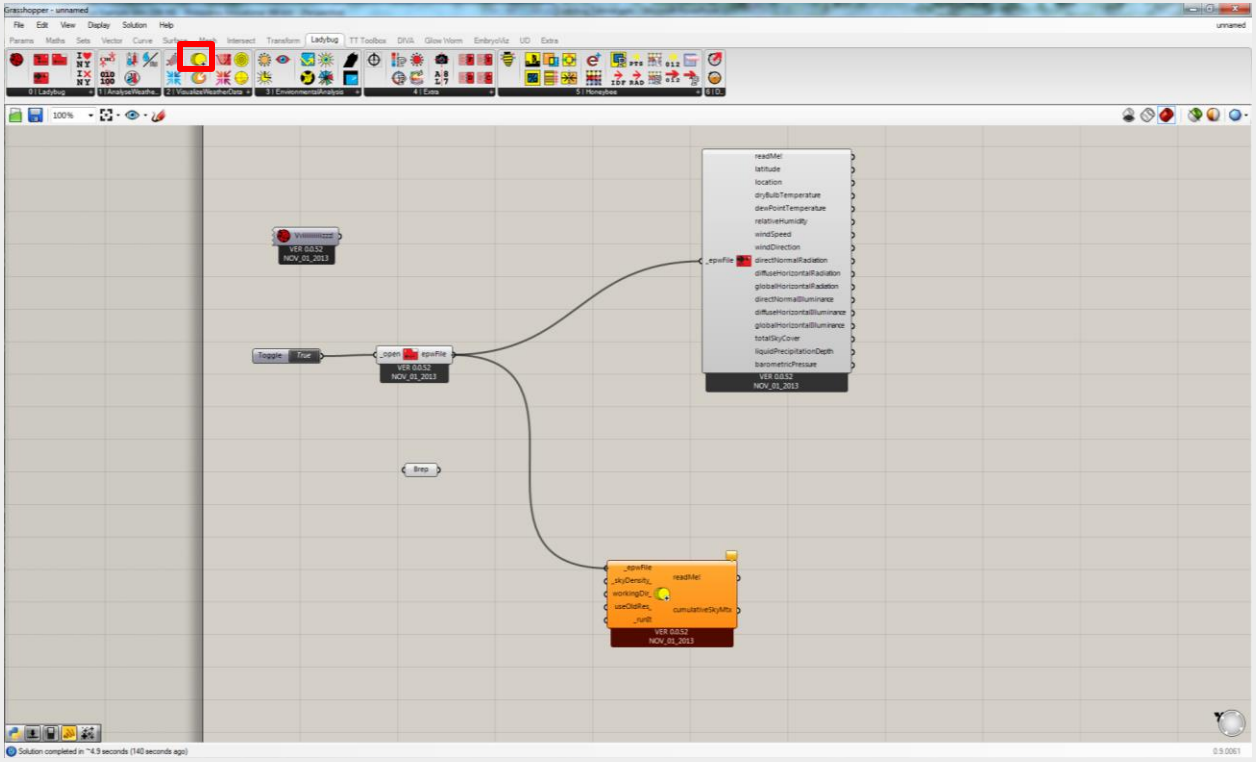

1. From the Ladybug tab, drag and drop a “GenCumulativeSkyMxt” component onto the canvass.
2. Connect the “epwFile” output of the OpenEPW component to the GenCumulativeSkyMxt component.

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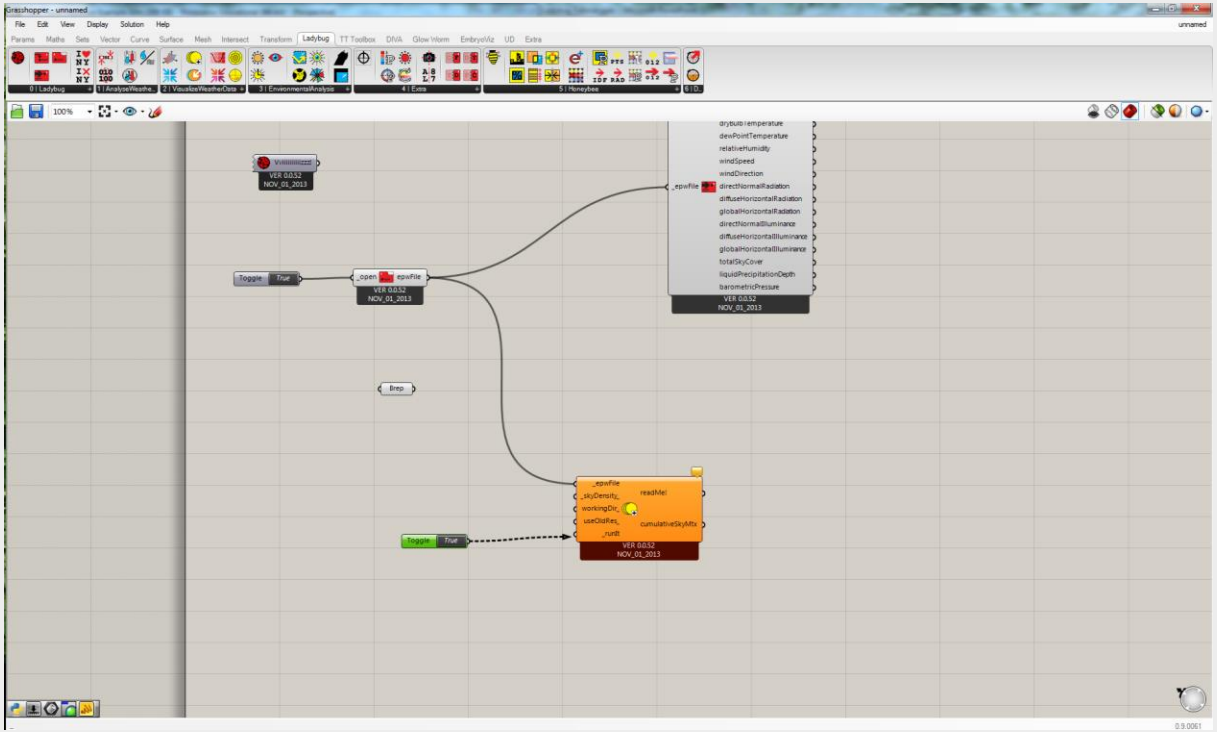

1. Bring up a boolean toggle and set it to “True”. Connect it to the “runIt” input of the GenSkyMxt component.

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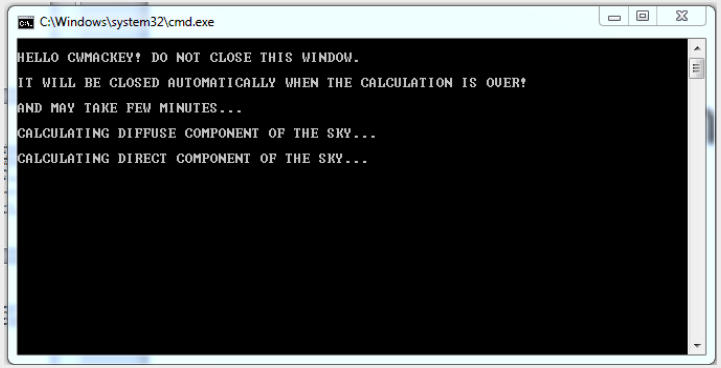

1. A simulation window will pop up like the one seen to the left. This indicates that Ladybug is running a simulation that will enable you to look at radiation for any type of surface for any time period of the year down to the resolution of an hour.
2. The simulation will take a long time (usually a few minutes) but, once you run it, you will never have to again.
3. Watch this video while you wait, which shows you one cool thing you could do when the sim is done: http://www.youtube.com/watch?v=uJiEf4_AMvk
4. Grab a coffee and sit tight.

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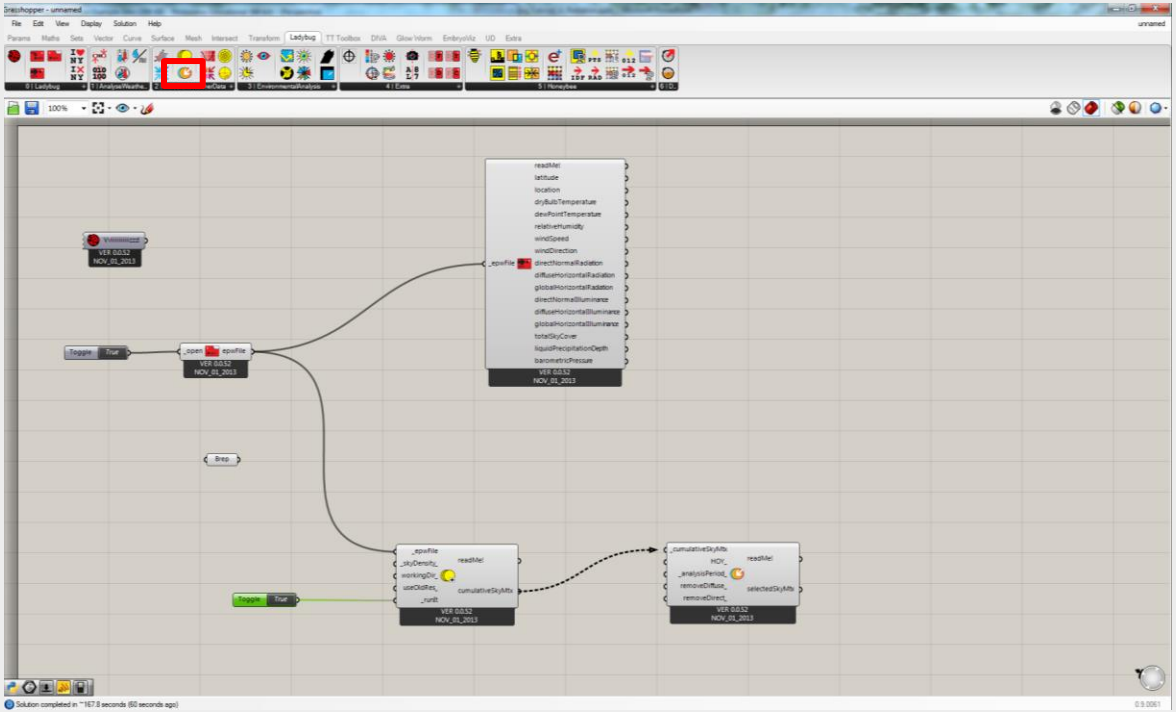

1. When the simulation is done, grab a “selectSkyMxt” component from the Ladybug tab and drop it onto the canvass.
2. Connect the output of the “genSkyMxt” component to the GenSkyMxt.

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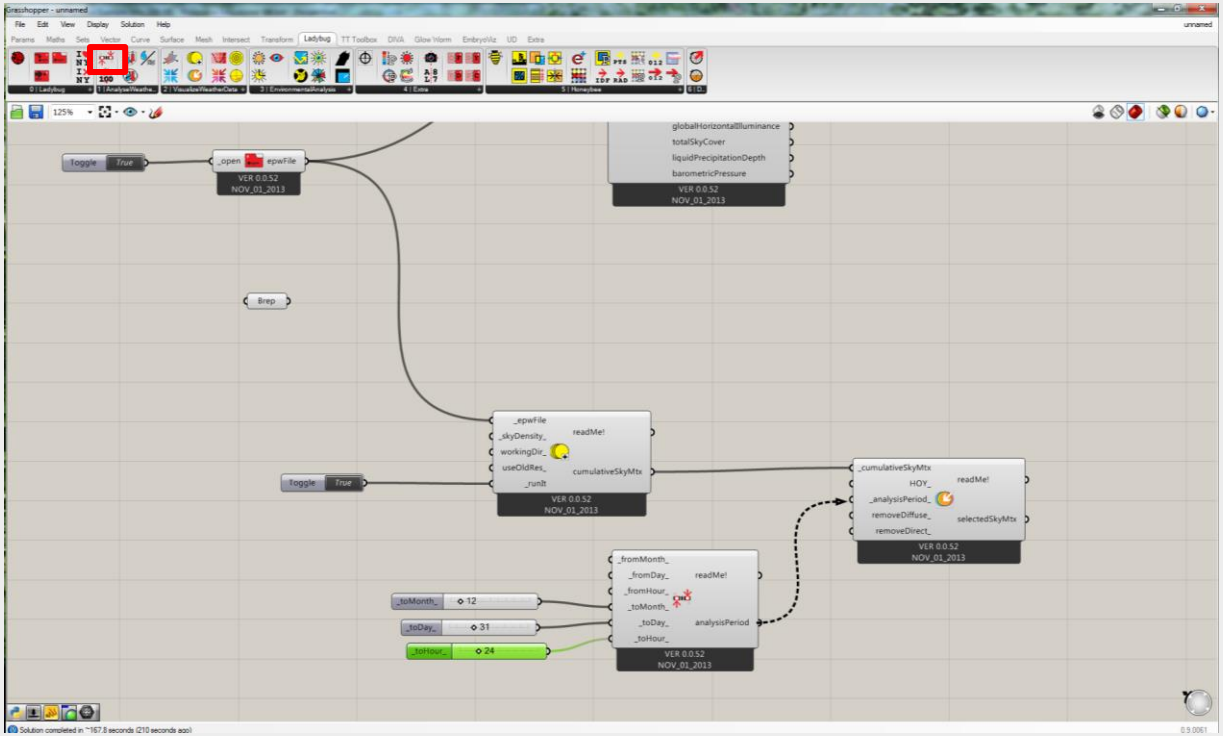

1. Grab an “analysisPeriod” component from the ladybug tab and drop it onto the canvass.
2. Connect up some “sliders” to the “analysisPeriod” component and set them to the numbers in the image to the left.
3. Connect the output of the analysisPeriod component to the selectSkyMxt component.

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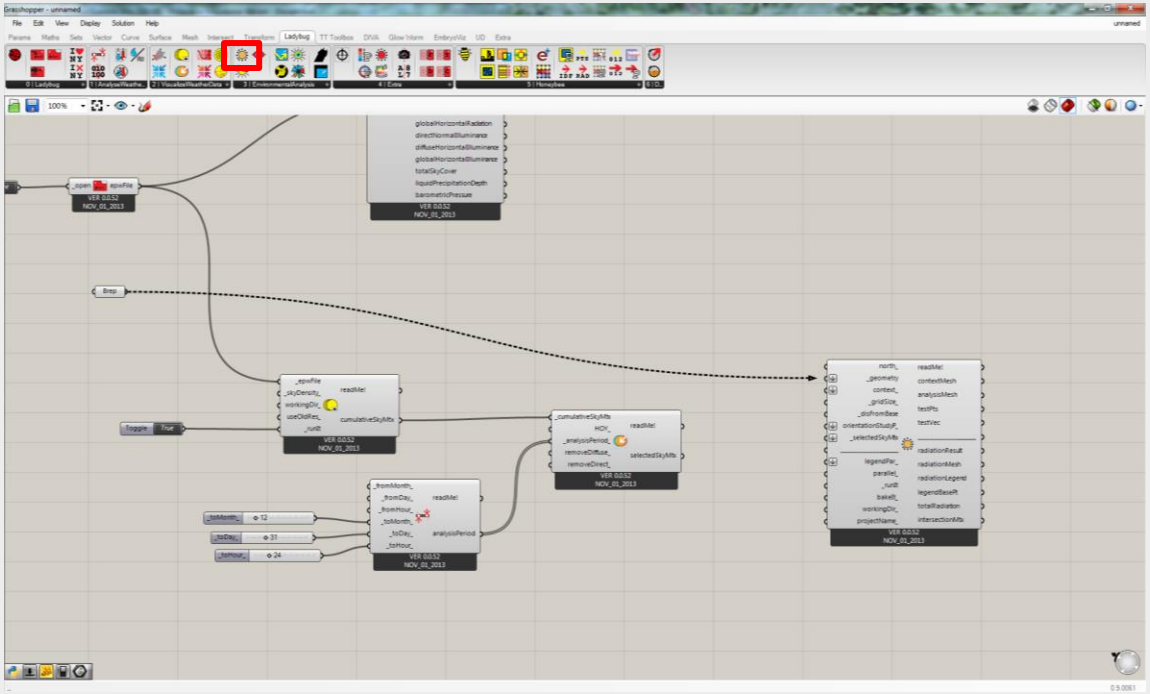

1. Grab an Radiation Analysis component from the ladybug tab and drop it onto the canvass.
2. Connect the brep geometry that you brought in earlier to the Radiation Analysis component.

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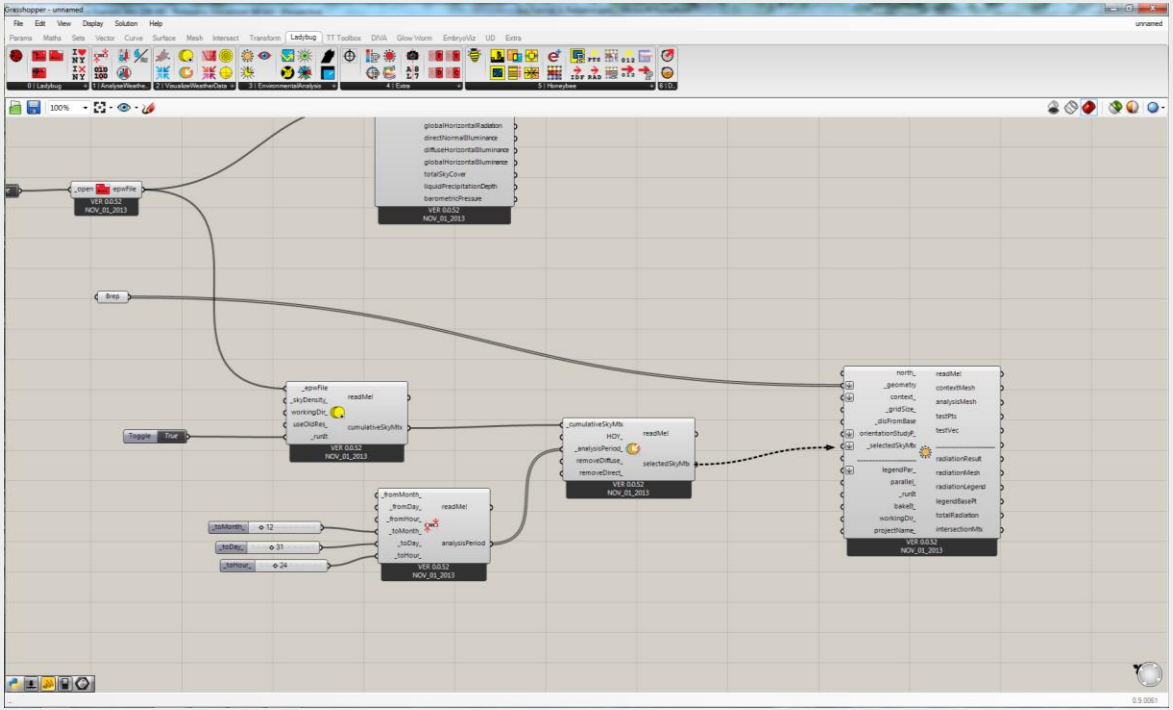

1. Connect selectedSkyMxt output to the Radiation Analysis component.

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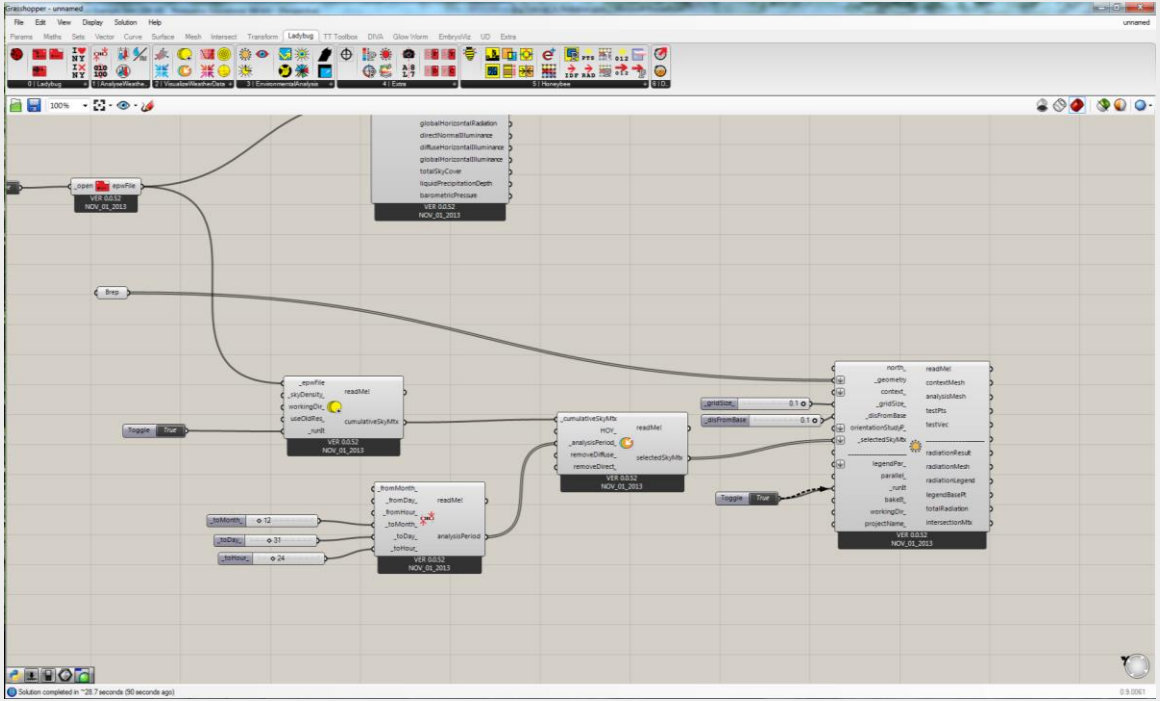

1. Connect sliders to both the “gridSize” input and the “disFromBase” of the Radiation Analysis. For out 1m x 10m solar panels, a grid resolution of 0.1m should be good (as depicted to the left).
2. Get a new boolean toggle, set it to “True” and hook it up to the component.

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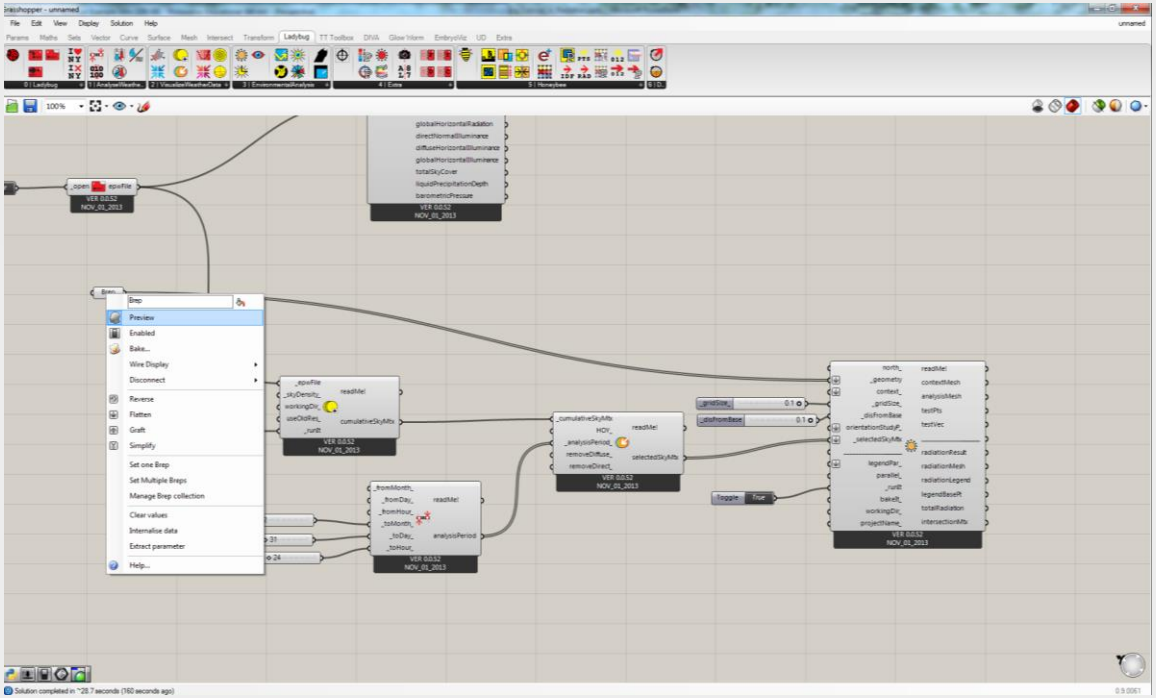

1. Turn the preview off on your grasshopper breps by right-clicking on them and choosing “Preview”

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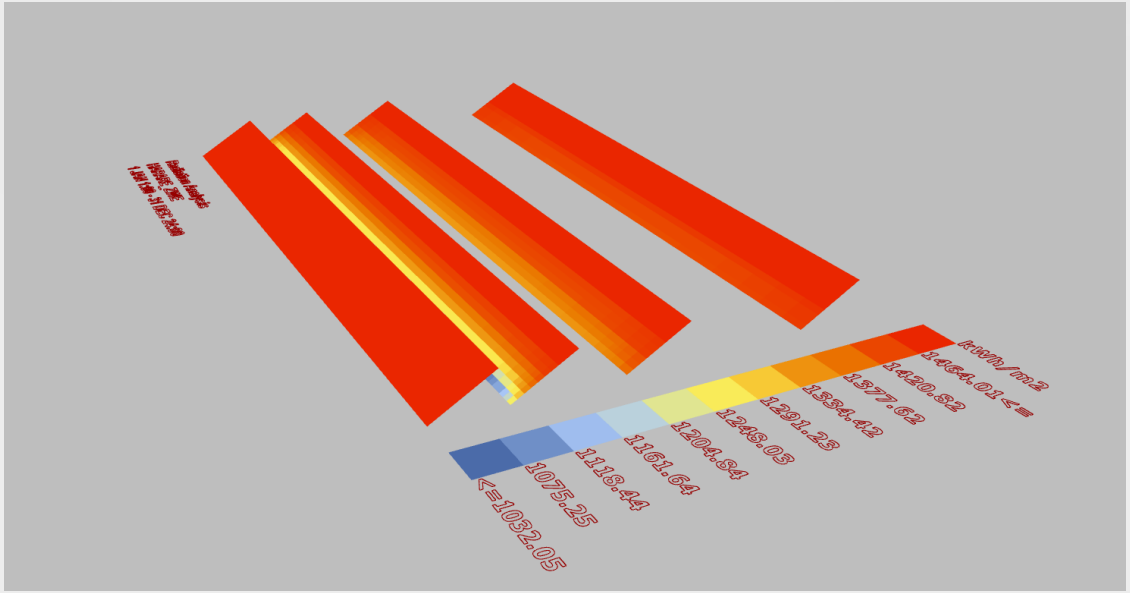

1. Go back to your Rhino window and hide your original geometry, you will see a detailed radiation study of your solar panels

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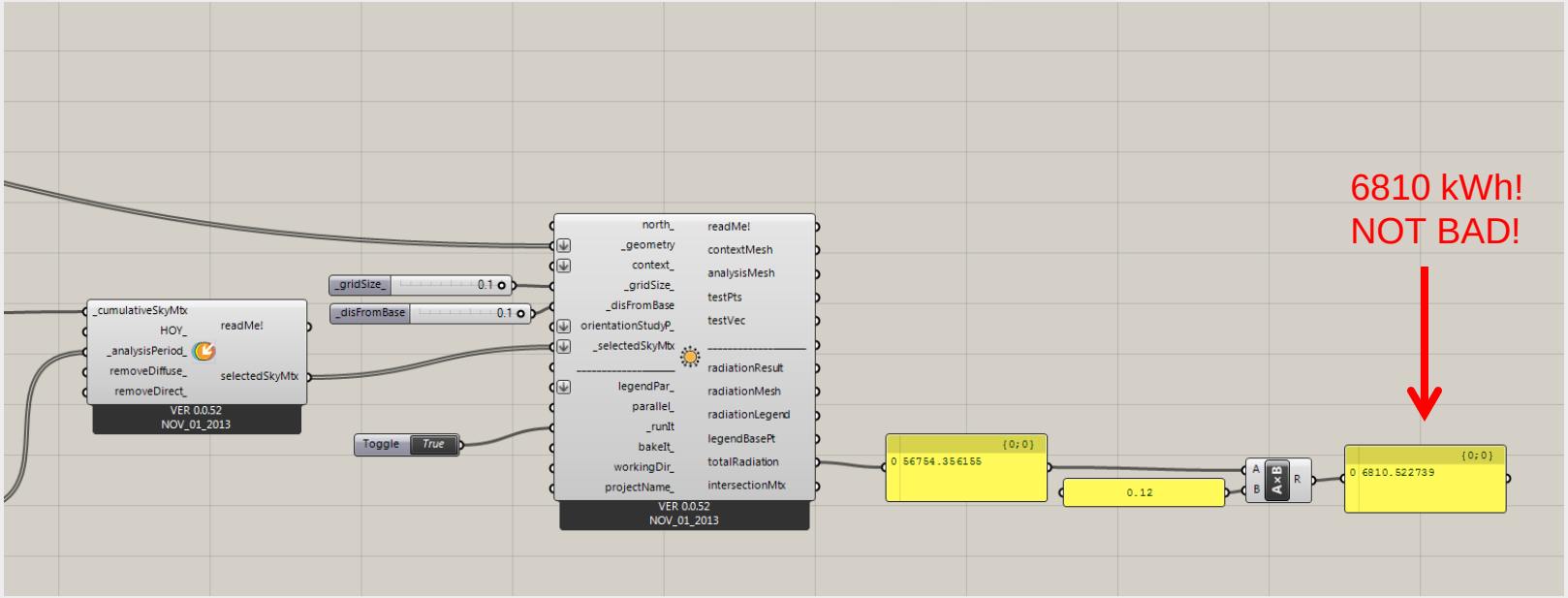

1. Go back to your grasshopper canvass and hook up a panel to the “totalRadiation” output to see the energy in kWh falling annually on the panels.
2. Multiply the result by a solar panel efficiency like 0.12 to get the total kWh harvested by the panels.