



SolarLab

Solar facade design tool for Rhino



Introduction

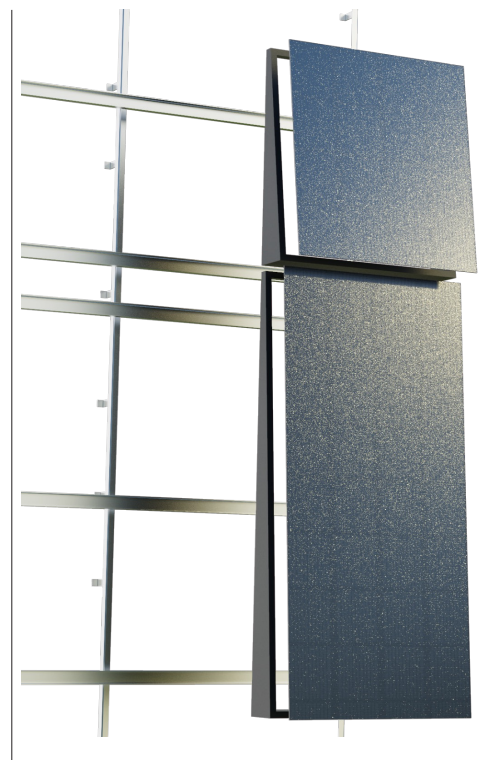
The SolarLab solar facade system is a genuine BIPV (building integrated photo voltaic) solution comparable to traditional ventilated rainscreen.

Solar facades invisibly integrates high quality PV technology in a resilient, maintenance-free and durable cladding that can pay for itself both environmentally and financially.

Solar facades are suitable for new constructions as well as renovation or transformations of existing buildings. The low weight and project specific engineering ensures local code compliance as well as fire and seismic safety. The unparalleled design freedom across dimensions, geometry, color and finish makes it easy to deploy without compromising architecturally.

To more easily design solar facades, SolarLab provides tools for Rhino, Revit and SketchUp that also makes it easy to receive project specific cost and production estimates. The tools are free to use and share, but please specify our products in your projects to ensure a low-risk and predictable result.

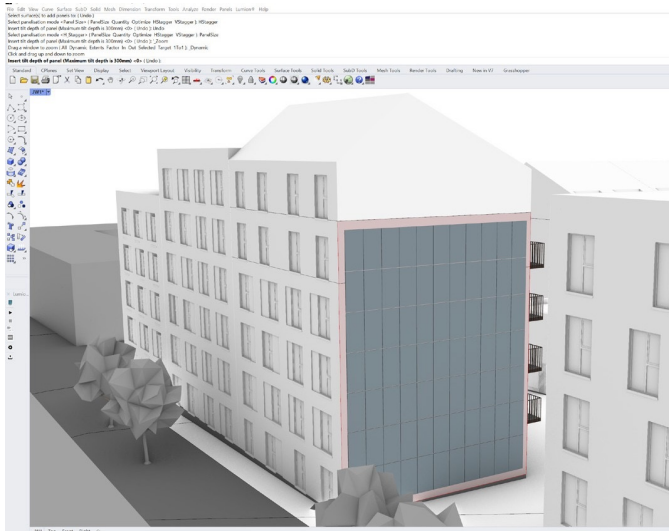
The Rhino tool uses Grasshopper Player to quickly create arrays of SolarLab panels to design your project and allows for 3D file exchange with Solarlab for simulations and estimates.





SolarLab

Grasshopper Player script for Rhino



Rhino window perspective viewport

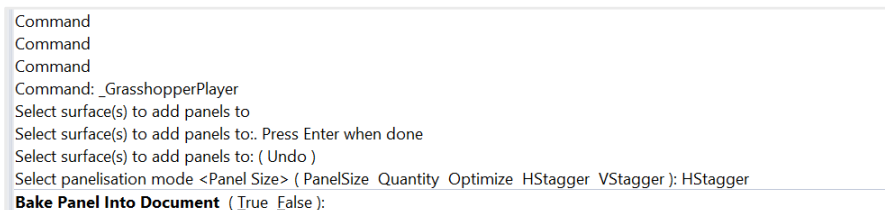
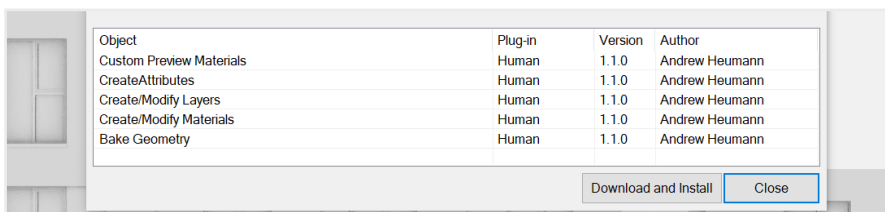
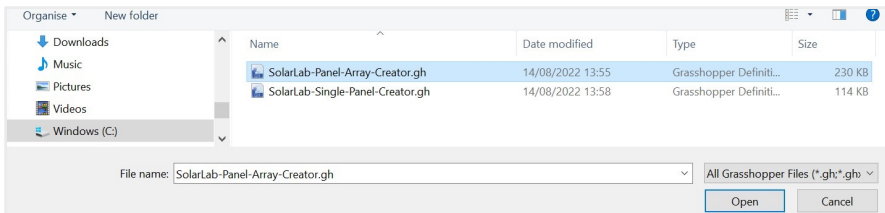


Panels placed on a facade in elevation

Installation instructions

To load and place the objects into Rhino you should:

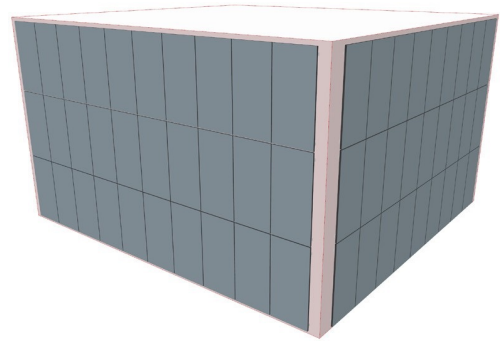
1. Type *GrasshopperPlayer* into the command line (it should autocomplete)



Panelisation modes

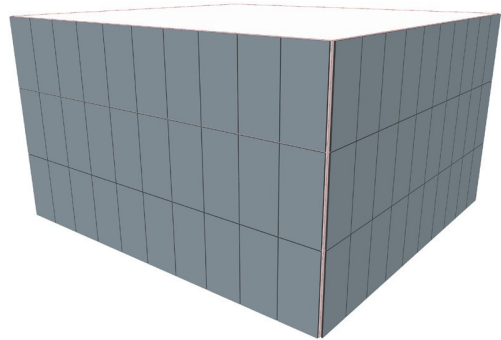
Panel Size

This mode requires a specific panel width and height, then it fits the most panels possible arrayed horizontally and vertically that it can based on the surface given. This is useful if you have a very to match the width and height of other elements in your design.



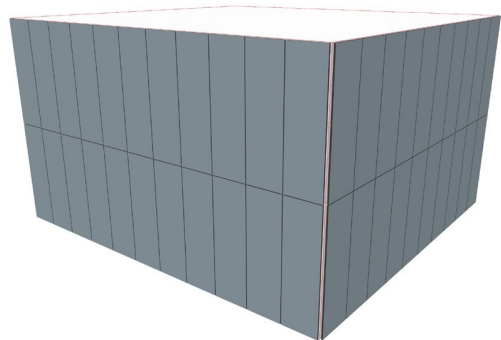
Quantity

This mode requires a horizontal and vertical quantity of panels, then it sets the panel width and height by dividing the surface given by these quantities.



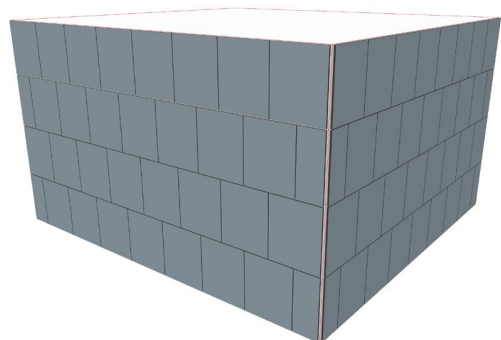
Optimize

This mode fits the least possible amount of panels based on the minimum and maximum dimensions of the SolarLab system, which can only produce panels to be from 360 x 360mm up to 1000 x 3600mm or 1400 x 2400mm.



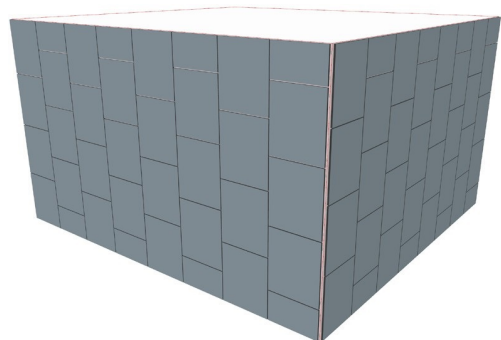
Horizontal Stagger

This mode staggers the panels in the horizontal orientation, requiring a horizontal and vertical quantity of panels, then it sets the panel width and height by dividing the surface given by these quantities. Every other row will start and end with a half panel to create this effect.



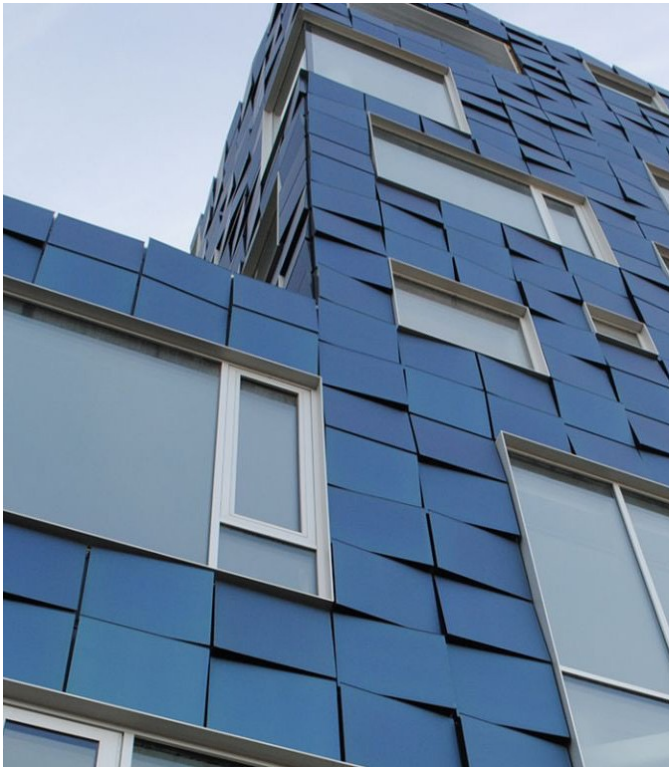
Vertical Stagger

This mode staggers the panels in the vertical orientation, requiring a horizontal and vertical quantity of panels, then it sets the panel width and height by dividing the surface given by these quantities. Every other column will start and end with a half panel to create this effect.

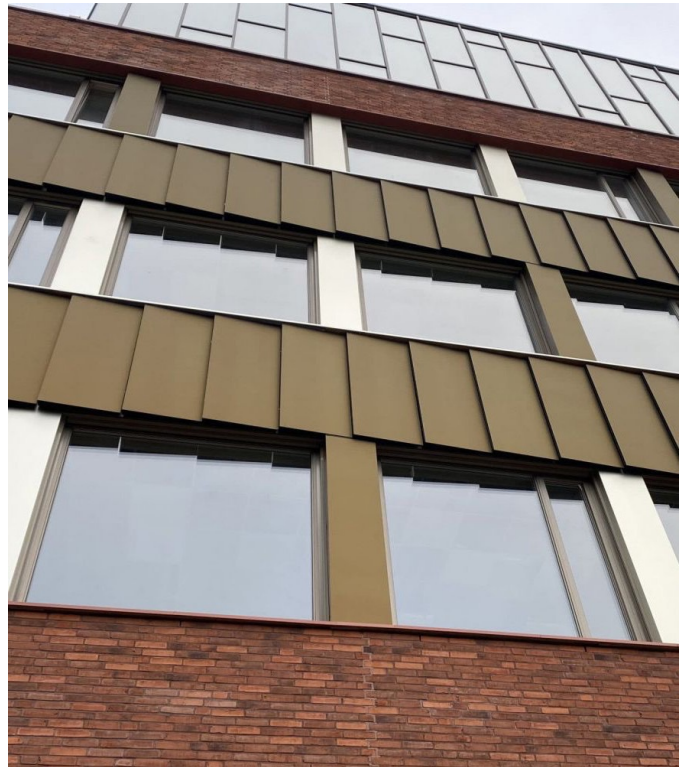




Parameters and constraints



Example of panels with randomized tilt ('Sequin' mounting system)



Example of panels with horizontal tilt ('Shingle' mounting system)

Parameters and constraints

The Grasshopper Player script has various parameters which can be used to adjust the size and appearance of the panels, including width, height tilt angle (the angle of the panel) and tilt direction (whether the panel tilts horizontally or vertically). The parameter constraints to be mindful of are:

Panel Tilt Depth

Insert tilt depth of panel. Maximum tilt depth is 300mm.

Panel Tilt Orientation

Select orientation of panel tilt (Does not apply if tilt depth is 0mm).

Panel Width

Select width of panel. Any panel size from 360 x 360mm up to 1000 x 3600mm or 1400 x 2400mm.

Panel Height

Select height of panel. Any panel size from 360 x 360mm up to 1000 x 3600mm or 1400 x 2400mm.

Vertical Quantity

Sets the panel height by dividing the wall height by a chosen quantity to create array.

Horizontal Quantity

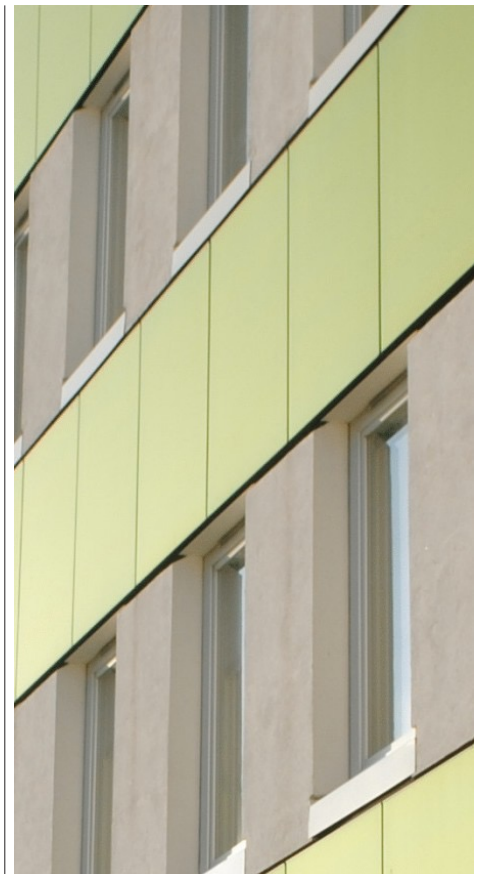
Sets the panel width by dividing the wall width by a chosen quantity to create array.

Select Panel Colour

Select a colour for the SolarLab.dk panel glass from the 'Morpho' or 'K' series ranges.

Bake Panel into Document

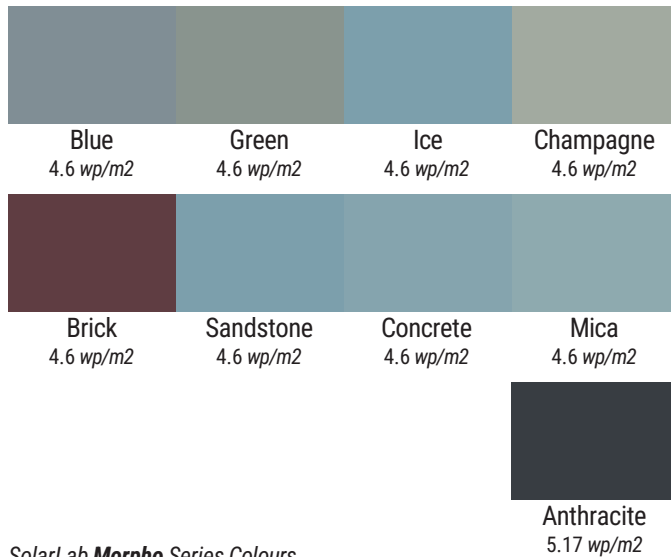
Select 'True' to bake the geometry into the model on a layer called *SolarLab.dk*



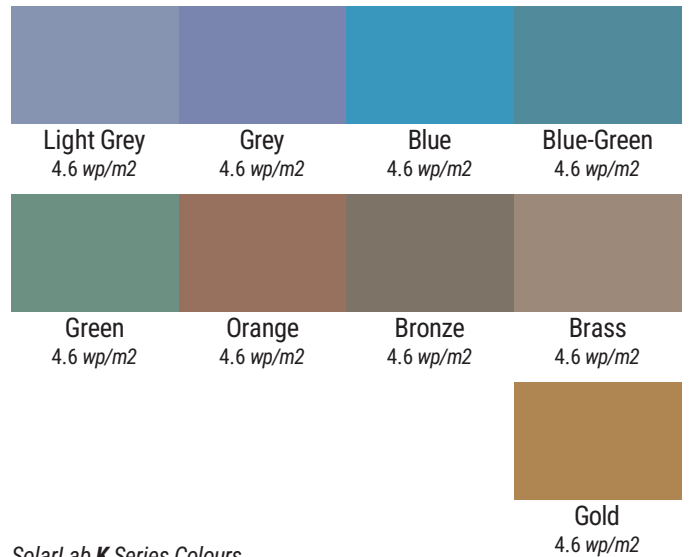
Example of panels with no tilt ('Skin' mounting system)



Colour, finish and texture



SolarLab **Morpho** Series Colours



SolarLab **K** Series Colours

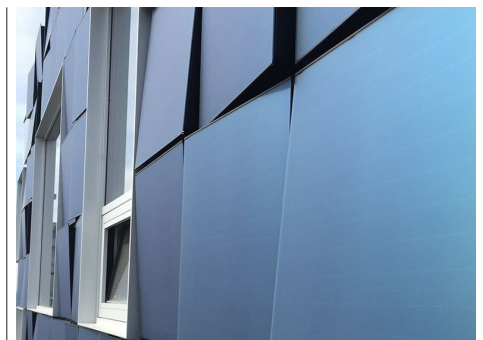
Colour

From the natural material colours and classic ceramic print to the dynamic structural colour coatings we provide a comprehensive range of colouring technologies to provide flat, metallic or chameleon style colours.

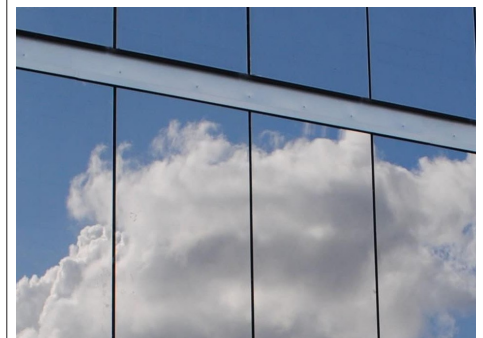
The Grasshopper Player script gives you the choice of colour including the Morpho and K series colours. Not included are the flat colours that can be provided in most

Finish

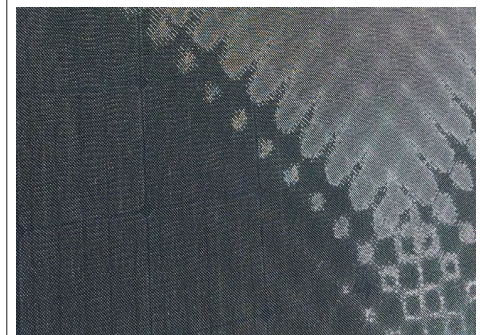
The default finish for SolarLab.dk solar facades is a low glare satinated finish that increase production. We also provide both high-gloss crystal finishes as well as a range of deeply textured surface finishes ranging from the geometric to more natural stone like patterns. These are not presented in the Rhino tool, but available upon request.



Satin finish



Crystal finish





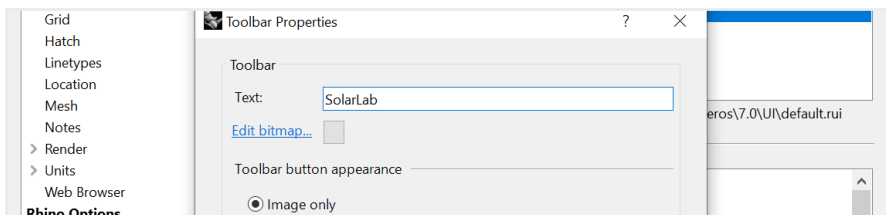
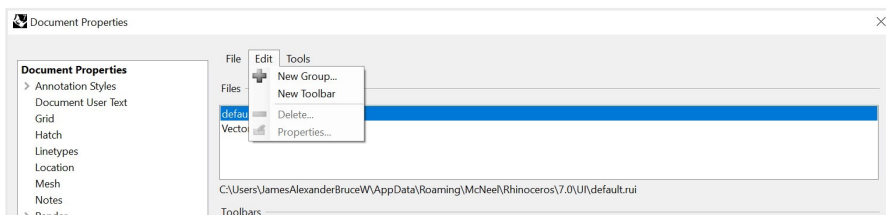
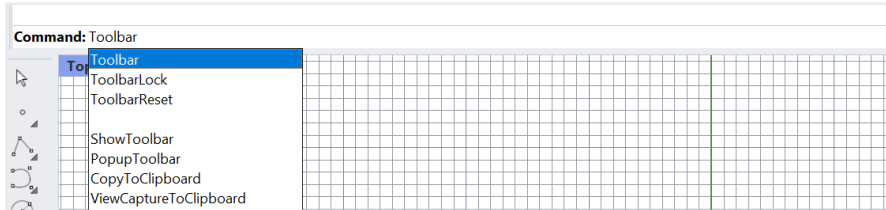
SolarLab

Create SolarLab Toolbar

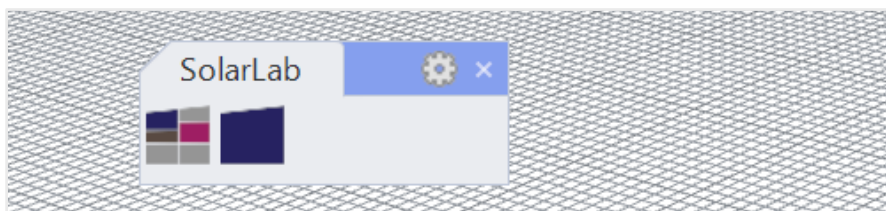
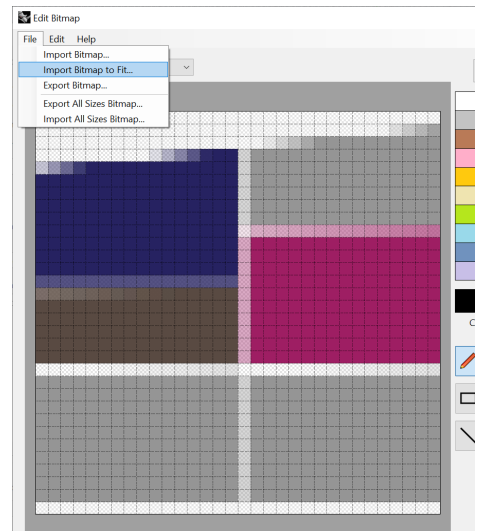
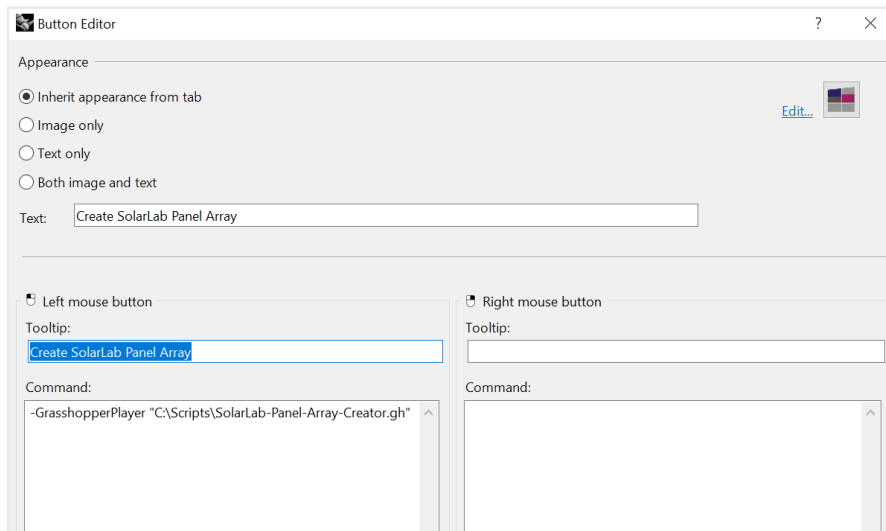
Toolbar instructions

To create your own toolbar to launch SolarLab scripts you should:

1. Type *Toolbar* into the command line (it should autocomplete)



4. Right-click your new tool bar and select *New Button*. Name the tooltips as they relate to the scripts provided. Use the Edit button in the top right to add the bitmap logos using the images provided. Use the command `-GrasshopperPlayer "[path]"` to launch the specific scripts, where [path] their location in your file directory.





Exporting 3D data for simulation

Export for analysis, simulation and cost estimates from SolarLab.dk

To export the building envelope and SolarLab.dk solar facade as a Rhinoceros 3DM file.

Panels should be made using the described processes and within SolarLab's dimensional requirements to get an accurate simulation of what can practically be produced.

Please ensure to include the bare minimum (no interior wall, stairs, furniture and fixtures etc) and include the surrounding urban context (trees, buildings and topography etc) in separate layers for a more efficient data exchange.

Please also include a north arrow as well as a geolocation (street address and/or coordinates) to ensure an accurate simulation.