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SunCast

# SunCast: For Solar Shading

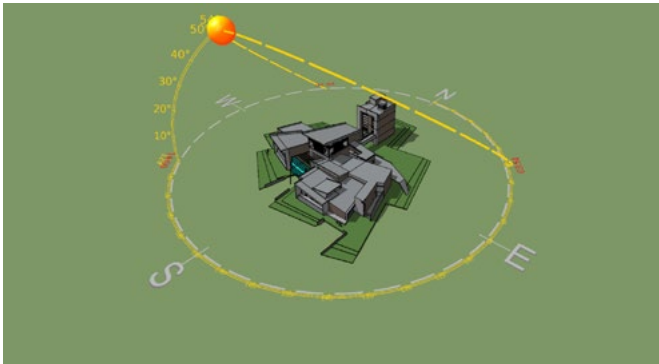
SunCast is used to calculate the position of the sun in the sky, track solar penetration throughout the building interior and calculate shadows.

- It carries out solar shading calculations for use with the Apache Dynamic Simulation application.
- It is also used to assess the shading / right to light impact of surrounding buildings & terrain
- It generates animated, visual, graphical and numerical outputs.

SunCast enables you to optimise your building form, position and orientation early on, by examining the impact of shade from neighbouring buildings, self-shading forms, and shading devices, because you can evaluate:

- Sun position and path at any date, time and location
- How sunlight enters and penetrates spaces, including through transparent shades and neighbouring spaces
- Gains/losses from sunlight, linked to HVAC if desired
- Solar exposure of windows and surface intensity over any period

## Quick Check



Before running SunCast, you can also do a very quick check of the shading by launching ModelViewer within ModelIT.



Make sure that you have turned on the button to see shadows



Choose whether or not you want to see the solar arc, and if it is on, set the arc and sun sizes, and toggle the solstice and equinox lines on/off.




Choose an exact time and date to view



Toggle an animation of the solar path on and off with various options, including

- for daylight hours on a single day, or 24 hours on a single day
- at a fixed time across every day of a month
- at a fixed time and day across each month
- at a fixed time across each day of the year

## Solar Shading Calculations

 Solar Shading calculations can be run and saved prior to running a simulation to see the impact of solar gain on internal loads. Set the simulation to use as many cores as you have available on your local machine. This will speed up the simulation.

When complete, you can view a table of solar altitudes at the location, or insolation on any part of the model.

These tables are easily exported to Excel if desired.

Month	01 00	02 00	03 00	04 00	05 00	06 00	07 00	08 00	09 00	10 00	11 00	12 00	13 00	14 00	15 00	16 00	17 00	18 00	19 00	20 00	21 00	22 00	23 00	24 00
Jan	-	-	-	-	-	-	-	6.10	11.78	15.59	17.21	16.46	13.43	8.39	1.74	-	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	4.87	12.53	18.79	23.13	25.13	24.54	21.43	16.15	9.20	1.05	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	5.29	14.19	22.26	28.94	33.61	35.64	34.72	31.00	25.01	17.40	8.76	-	-	-	-	-	-	-
Apr	-	-	-	-	-	7.04	16.36	25.49	33.95	41.09	46.05	47.93	46.29	41.51	34.49	26.09	16.99	7.66	-	-	-	-	-	-
May	-	-	-	-	5.98	14.89	24.17	33.45	42.26	49.92	55.37	57.31	55.10	49.47	41.71	32.85	23.56	14.30	5.43	-	-	-	-	-
Jun	-	-	-	1.10	9.02	17.73	26.92	36.24	45.27	53.36	59.40	61.83	59.70	53.05	45.86	36.87	27.55	18.34	9.59	1.61	-	-	-	-
Jul	-	-	-	-	6.83	15.56	24.76	34.00	43.09	51.18	57.30	60.00	58.34	52.93	45.21	36.35	27.06	17.80	8.93	0.78	-	-	-	-
Aug	-	-	-	-	0.86	9.84	19.14	28.38	37.09	44.61	50.04	52.29	50.76	45.88	38.68	30.15	20.98	11.65	2.58	-	-	-	-	-
Sep	-	-	-	-	-	2.34	11.63	20.52	28.54	35.06	39.35	40.73	38.95	34.33	27.57	19.41	10.44	1.13	-	-	-	-	-	-
Oct	-	-	-	-	-	-	3.57	11.93	19.15	24.72	28.09	28.86	26.91	22.51	16.15	8.37	-	-	-	-	-	-	-	-
Nov	-	-	-	-	-	-	-	3.78	10.50	15.59	18.63	19.32	17.59	13.62	7.77	0.48	-	-	-	-	-	-	-	-
Dec	-	-	-	-	-	-	-	-	5.63	10.03	14.11	15.18	13.95	10.53	5.21	-	-	-	-	-	-	-	-	-

Table of Solar Altitudes

Month	01 00	02 00	03 00	04 00	05 00	06 00	07 00	08 00	09 00	10 00	11 00	12 00	13 00	14 00	15 00	16 00	17 00	18 00	19 00	20 00	21 00	22 00	23 00	24 00
Jan									2.77	12.81	21.00	21.00	0.00	0.00	0.00	0.00								
Feb								0.00	0.00	8.73	21.00	21.00	0.00	0.00	0.00	0.00	0.00							
Mar							4.84	1.31	0.00	5.90	21.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00						
Apr						2.39	6.18	2.75	0.43	6.09	21.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
May					4.91	0.00	6.39	10.09	7.28	19.54	21.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Jun					6.79	1.42	3.31	13.47	10.26	21.00	21.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Jul					6.80	1.36	5.47	12.58	9.39	18.26	21.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Aug						0.00	6.27	6.05	3.91	9.68	21.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00				
Sep							4.82	1.10	0.00	7.53	21.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00					
Oct								0.00	2.54	14.04	21.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00						
Nov									5.25	18.03	21.00	21.00	0.00	0.00	0.00	0.00	0.00							
Dec									5.01	16.91	21.00	21.00	0.00	0.00	0.00	0.00								

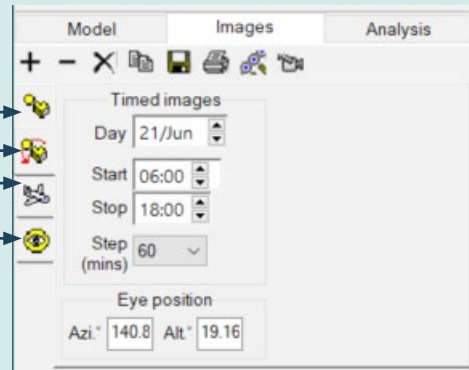
Table of External Insolation

The shading calculations will need to be re-run if there are any changes to the geometry or location.

If preferred, shading calculations do not need to be run in advance: simply tick the option to run SunCast when you start your simulation, so that the shading impact is included in the analysis.

Images showing the shading on the building can be created minute by minute for specific dates. Switch to the images tab and choose which of the 4 types of images you would like to create:

- A single image for the selected time, date and eye position
- Timed images for a selected day
- Fly-round images on a chosen time and date
- Sun-view images for a selected day - note that no shading is visible on these images - any part of the building that is visible is fully exposed to the sun at that time.

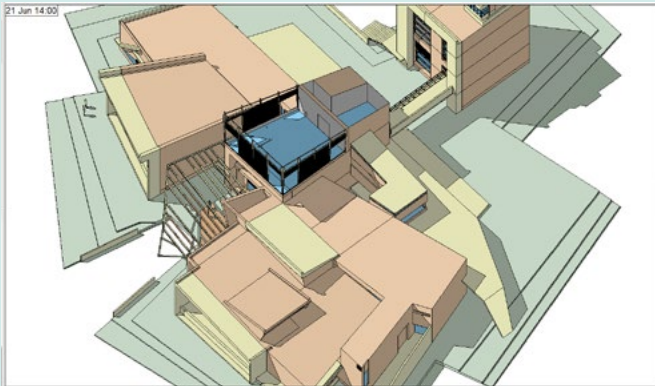




The eye position can be set by typing in the numerical altitude and azimuth, or you can use the **get camera position using Modelviewer** icon at the top of the screen, which opens a window where you can use the left mouse button to orbit and set the angle of view you want. (Click and hold to orbit.)

Note that the icon is used to toggle this view on and off.

The degree of zoom is set after the images are generated.



Surface visibility can be set to opaque or invisible for each surface of each space, by right clicking on the space in the model tree whilst in the model tab in SunCast. You can then switch to the Images tab, and generate a shading image (or series of images) where you can see inside the model.

This allows internal shadows to be viewed, enabling informed decisions on internal layouts.



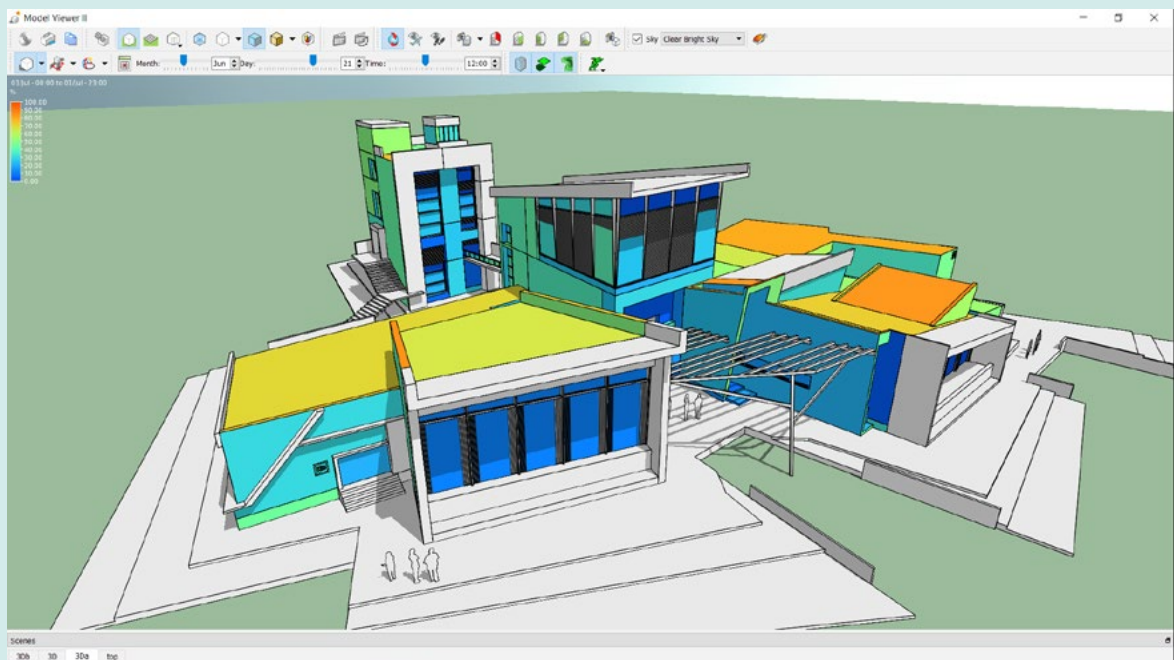
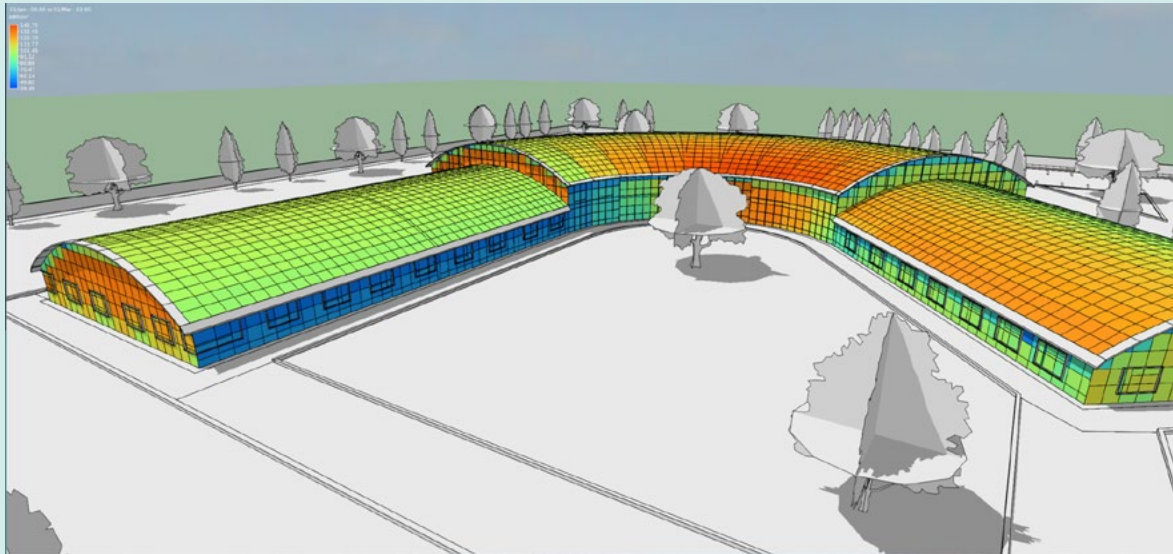
Once generated, if you wish to change the zoom, you can change it on one image by using the scroll button on the mouse. Scroll to zoom in/out and click and hold the scroll wheel to pan. Thereafter you can click on **“apply zoom to all other images”**.



To create a short video clip if desired, select the images to be included and then click on the **“Create video”** icon. This is used to create simple, effective presentations, showing the shading in an animated format.

## SunCast: Solar Energy and Solar Exposure Analysis

The analysis tab in SunCast gives the option to perform either a solar energy analysis or a solar exposure analysis, for selected dates. The results can then be viewed in Model Viewer



Solar Exposure Analysis can be viewed either as total number of hours of sunlight that the façade receives for the chosen date range, or as a percentage of what is available, viewed on the model itself. There are various different display options to choose from.

This is useful for a quick visual analysis of the effectiveness of proposed shading devices, or to select the best location for PV panels etc.

The Solar Energy Analysis calculation uses SunCast and Apache to generate hourly solar shading and external incident solar flux data which is then used to produce the energy results in kWh or kWh/m<sup>2</sup> for the specified period, which is shown graphically on the building façade in the same way.

Find out more at [https://help.iesve.com/ve2019/the\\_analysis\\_view.htm#](https://help.iesve.com/ve2019/the_analysis_view.htm#)