Site

ReThink Daylight

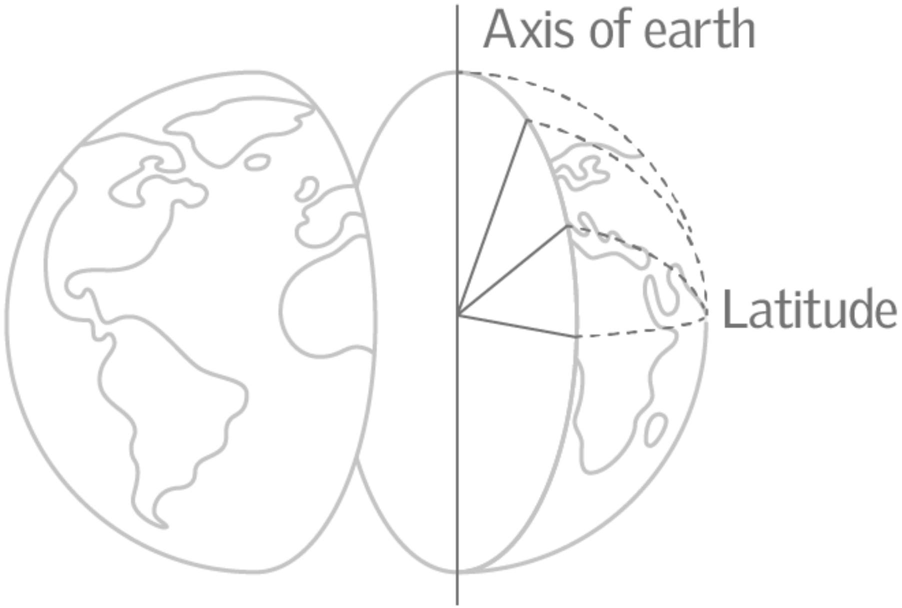
VELUX

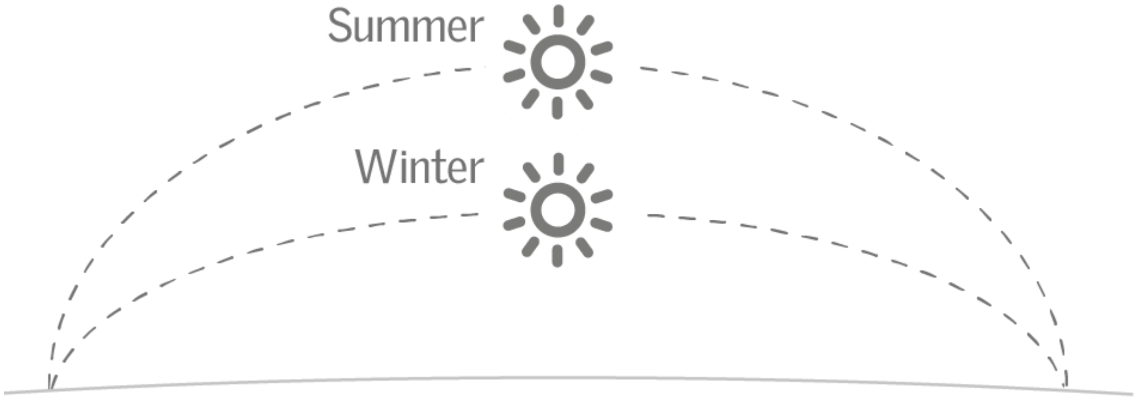
Initiated by the VELUX Group

Latitude

The latitude of a building site determines the solar altitude for a given time of day and year, as well as the length of the sun course.

The summer and winter solar altitude properties for a specific location are important design inputs for the control of direct solar radiation. Latitude will also determine the length of daytime and solar availability at different seasons of the year.



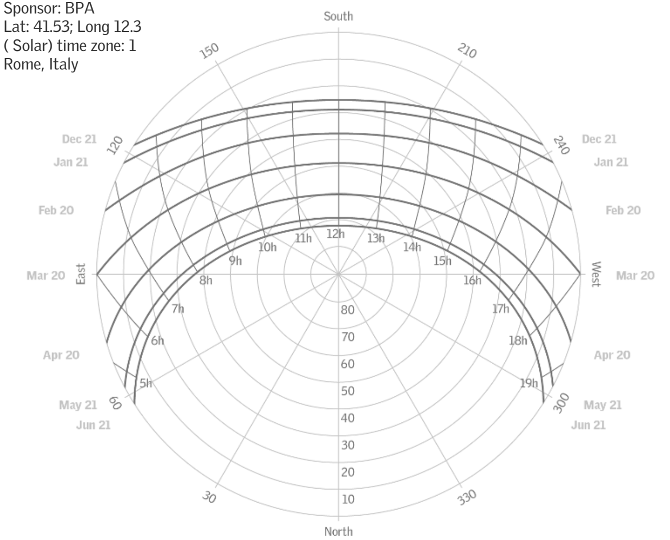


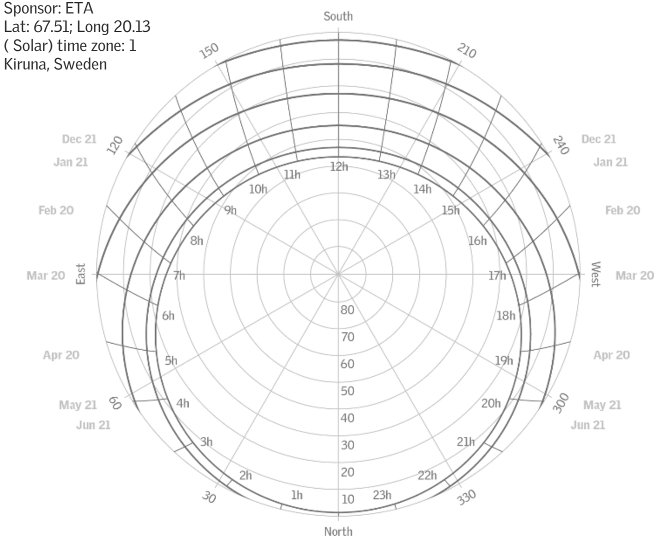
Latitude

The Maximum and minim solar elevation will depend on the latitude of the site; on moving away from the equator towards north or south, the difference between summer and winter becomes greater as latitudes increase.

The highest peak of global illuminance is during the summer (for the northern hemisphere), when the sun is at its highest level, and about two and a half times greater than the lowest peak during the winter, when the sun is at its lowest level.

Latitude



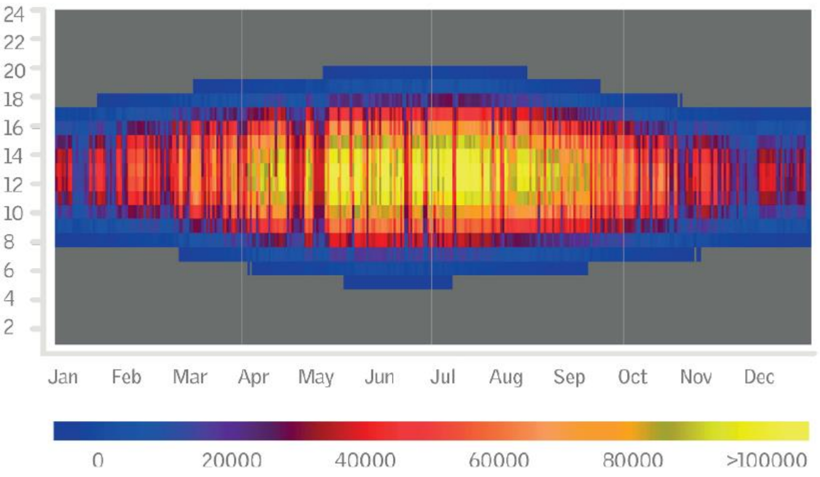


Rome, Italy
June 21 / Solar elevation 72 degree / 244 degree sun course SE to SW
December 21 / Solar elevation 25 degree / 116 degree sun course NE to NW

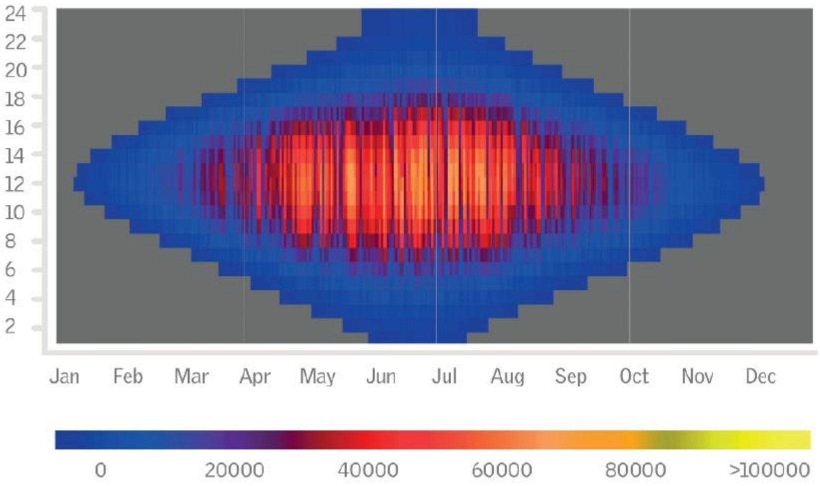
Kiruna, Sweden
June 21 / Solar elevation 46 degree / 360 degree sun course
December 21 / Solar elevation 0 degree / 0 degree sun course

Latitude

Global Illuminance – Rome, Italy (41.90°N)

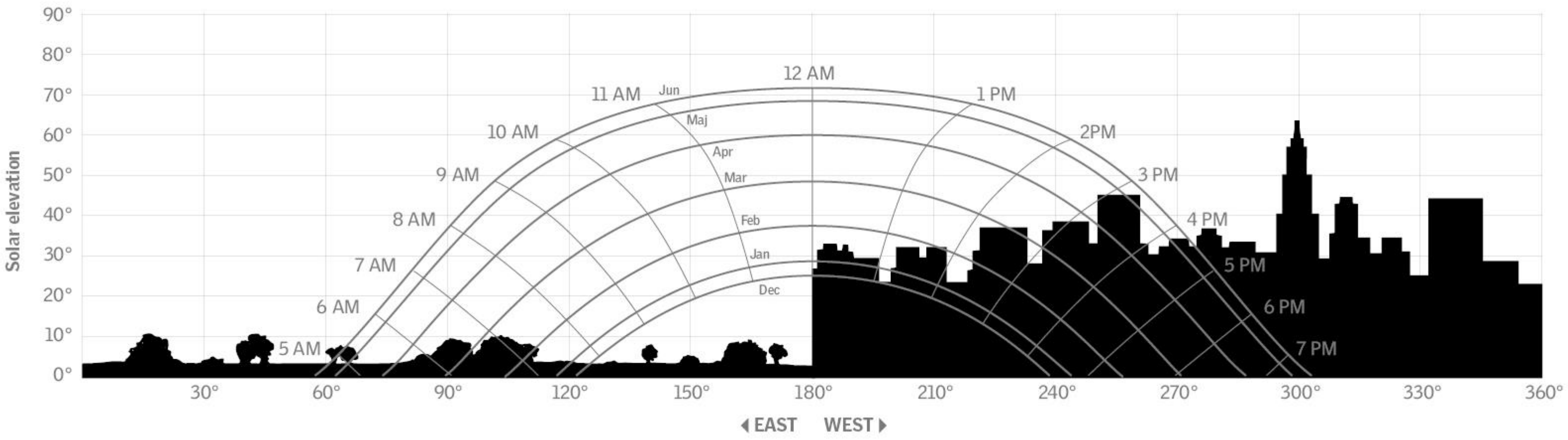


Global Illuminance – Kiruna, Sweden (67.85°N)



External obstruction

External reflections and obstructions from surrounding elements on the building site (buildings, vegetation, ground surface etc.) will influence the amount of daylight reaching the interior of a building.

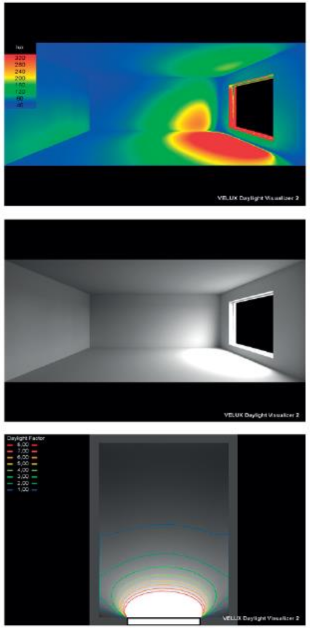


External obstruction

This example shows the effect of obstruction on daylight availability in a simple room with a vertical facade window, and the effect of adding a flat-roof window to deliver daylight deeper into the obstructed room. The results show that obstruction can greatly affect the amount of daylight that will reach the building interior, and how adding an unobstructed window on the roof can provide more daylight in the deeper part of the room, and to achieve a more uniform distribution of daylight.

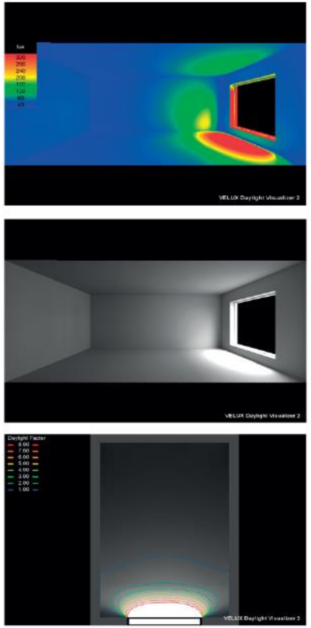
The room on the left is unobstructed by external elements, whereas the middle and right rooms are obstructed.

Unobstructed



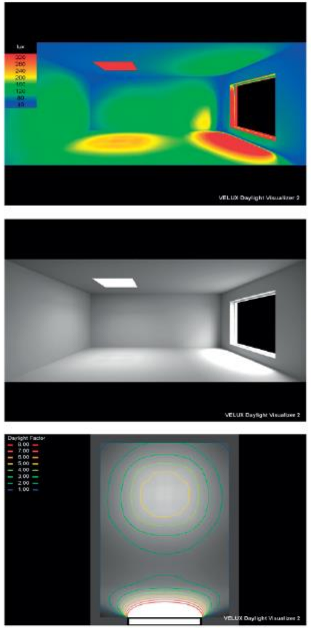
DF	2,07%
Median DF	1,05%
Uniformity Dmin/Dav	0,18

Obstructed



Average DF	1,03%
Median DF	0,58%
Uniformity Dmin/Dav	0,22

Obstructed but with roof window



Average DF	3,24%
Median DF	2,96%
Uniformity Dmin/Dav	0,41

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