Week 2:
In-class exercise and test info

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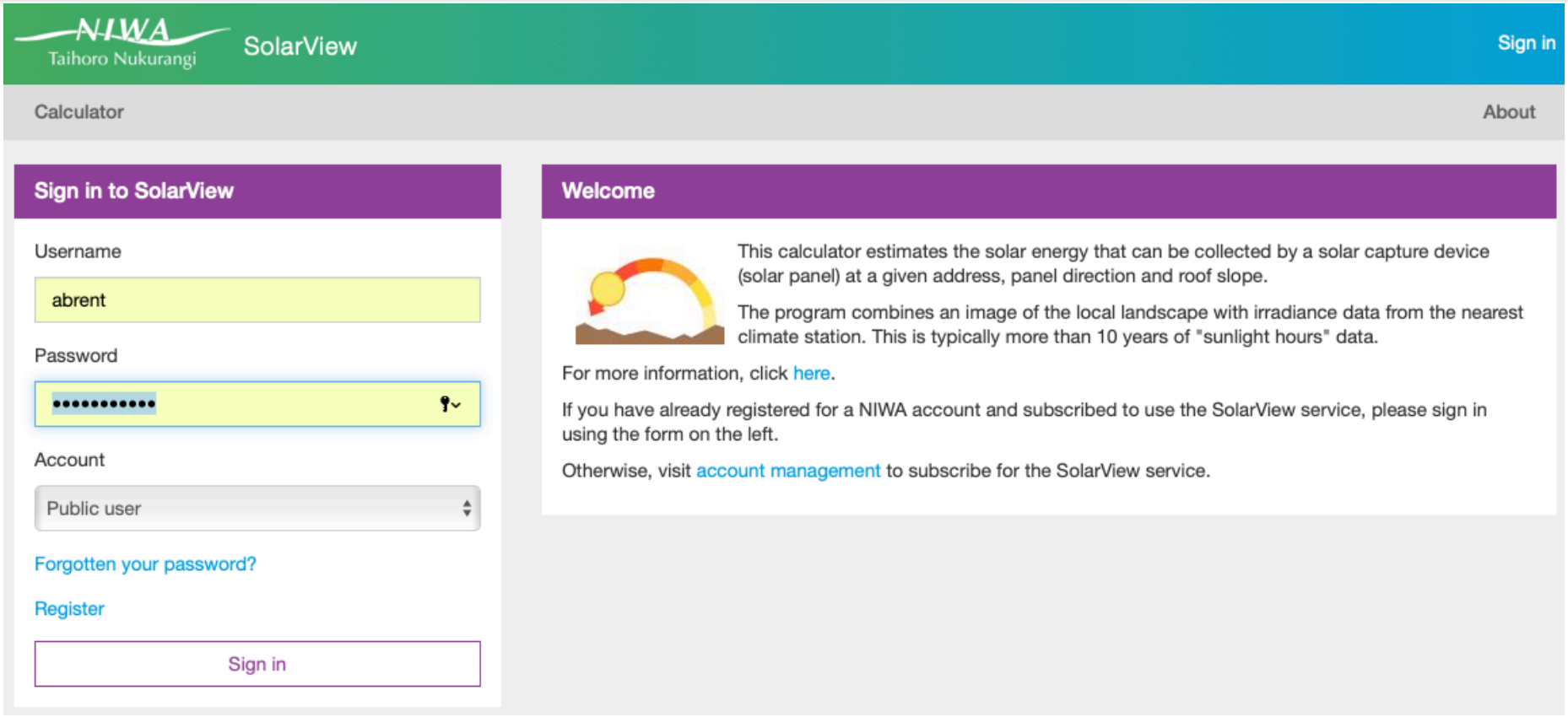
Capital thinking.
Globally minded.

Log into SolarView



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KAITIAKITANGA WHAKAPAPA MAURI

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Find your location

Find address

Address

Kelburn parade

Find address

Create SolarView

Latitude

-41.2893345

Longitude

174.76731189999998

Panel tilt (degrees)-optional

Default = latitude

Panel bearing (degrees)-optional

Default = 0 North

Image title

Kelburn parade

Create SolarView

Find location on map

Create SolarView

Create SolarView

Latitude

-41.2893345

Longitude

174.76731189999998

Panel tilt (degrees)-optional

Default = latitude

Panel bearing (degrees)-optional

Default = 0 North

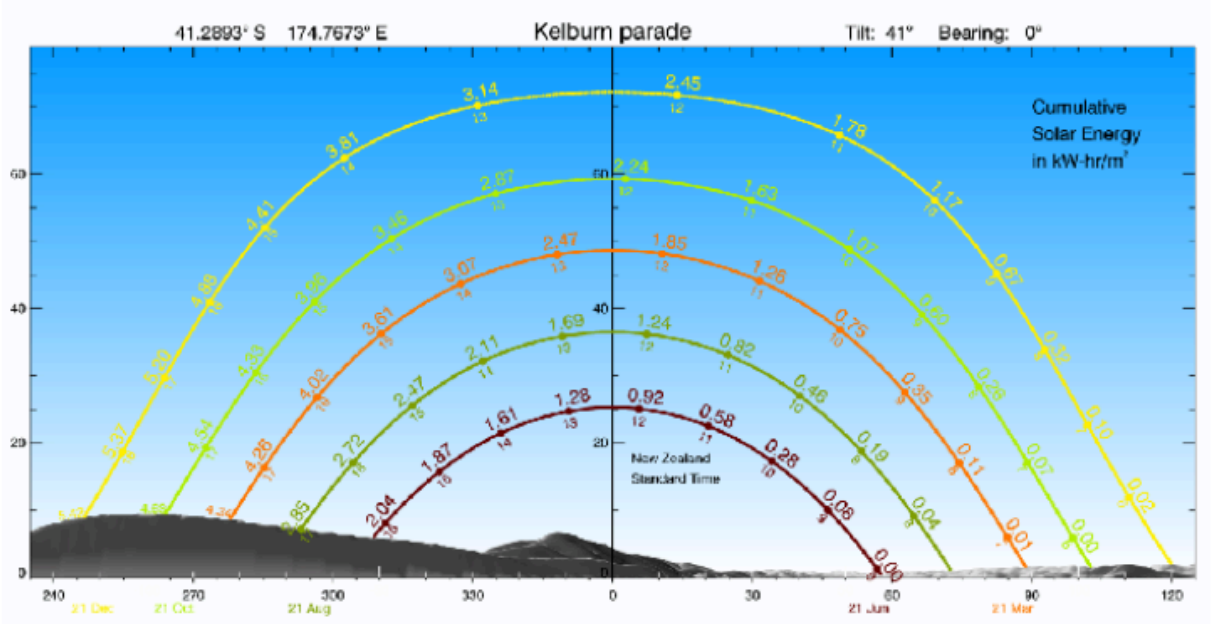
Image title

Kelburn parade

Create SolarView

Results

To see a larger image, please click on the image below.



Solarview Calculations

Download table as csv

Download data for each hour of an average year (csv)

Month & hour	Elevation	Azimuth	Hourly W/m2	Cumulative kWh/m2	Cloudless W/m2
Jan 0:00	-28.6	-179.5	0	0.00	0
Jan 1:00	-27.1	164.7	0	0.00	0

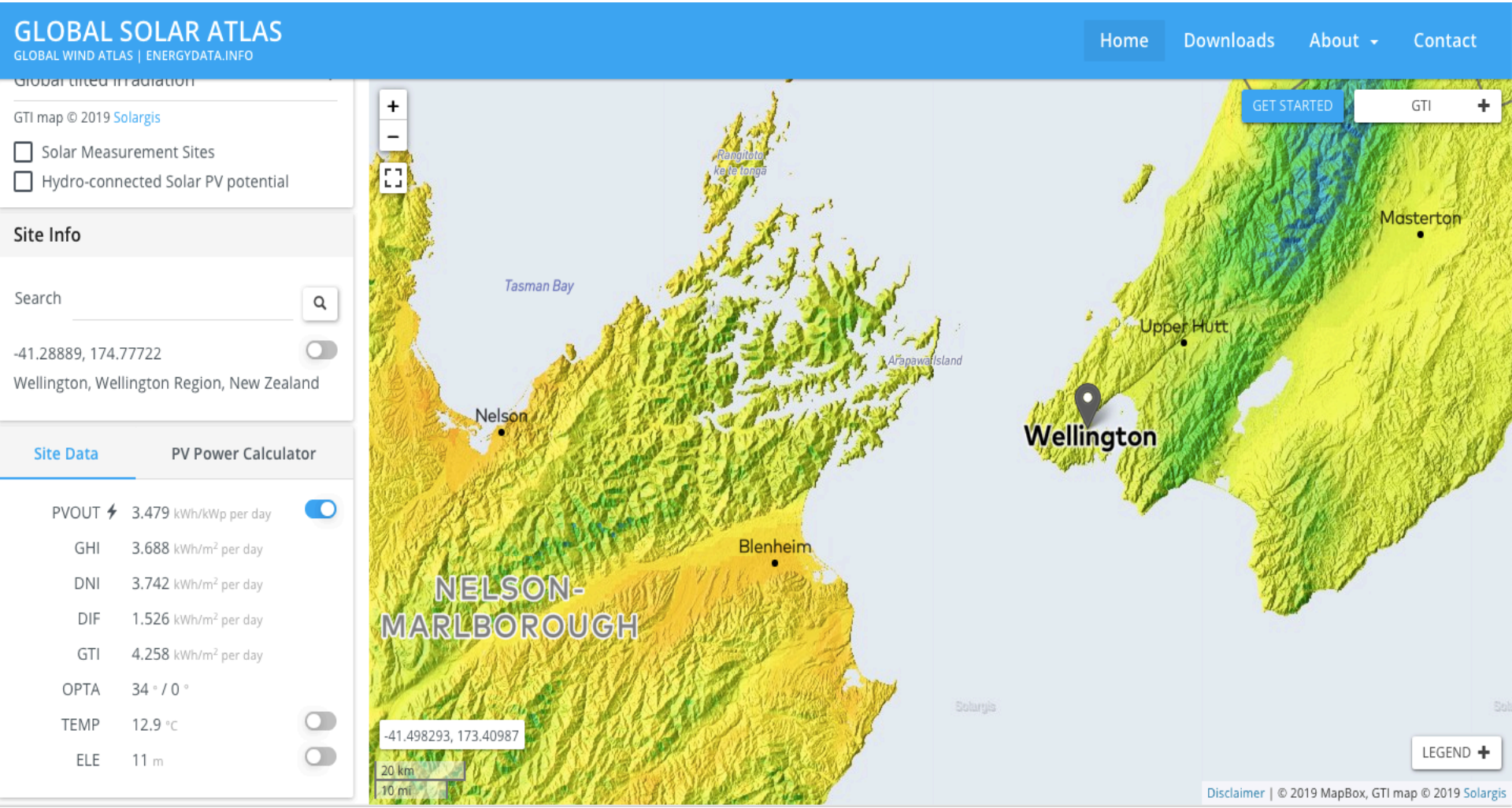
SolarView calculations for north panel: Kelburn Parade – 21 March at 11h00

NIWA SolarView Calculations										
16-Jul-19										
Description	kelburn parade									
Latitude	-41.29									
Longitude	174.77									
Panel Tilt	41									
Bearing	0									
Ground Albe	0.1									
Climate Zone	WN	Wellington								
Years of Data	18									
Month	Day	Hour	Temperature	Rel. Hum.	Wind speed	Global Irr.	Diffuse Irr.	Tilted Irr.	Elevation	Azimuth
3	21	9	11.5	68	15.4	106	106	94	32	56
3	21	10	12	68	14.4	172	165	156	41	41
3	21	11	13.5	77	14.9	331	289	314	47	21
3	21	12	13	66	14.4	375	361	340	49	359
3	21	13	12.5	70	13.3	400	342	382	46	337
3	21	14	14.8	64	13.3	167	164	149	40	318

SolarView calculations for west panel: Kelburn Parade – 21 June at 11h00

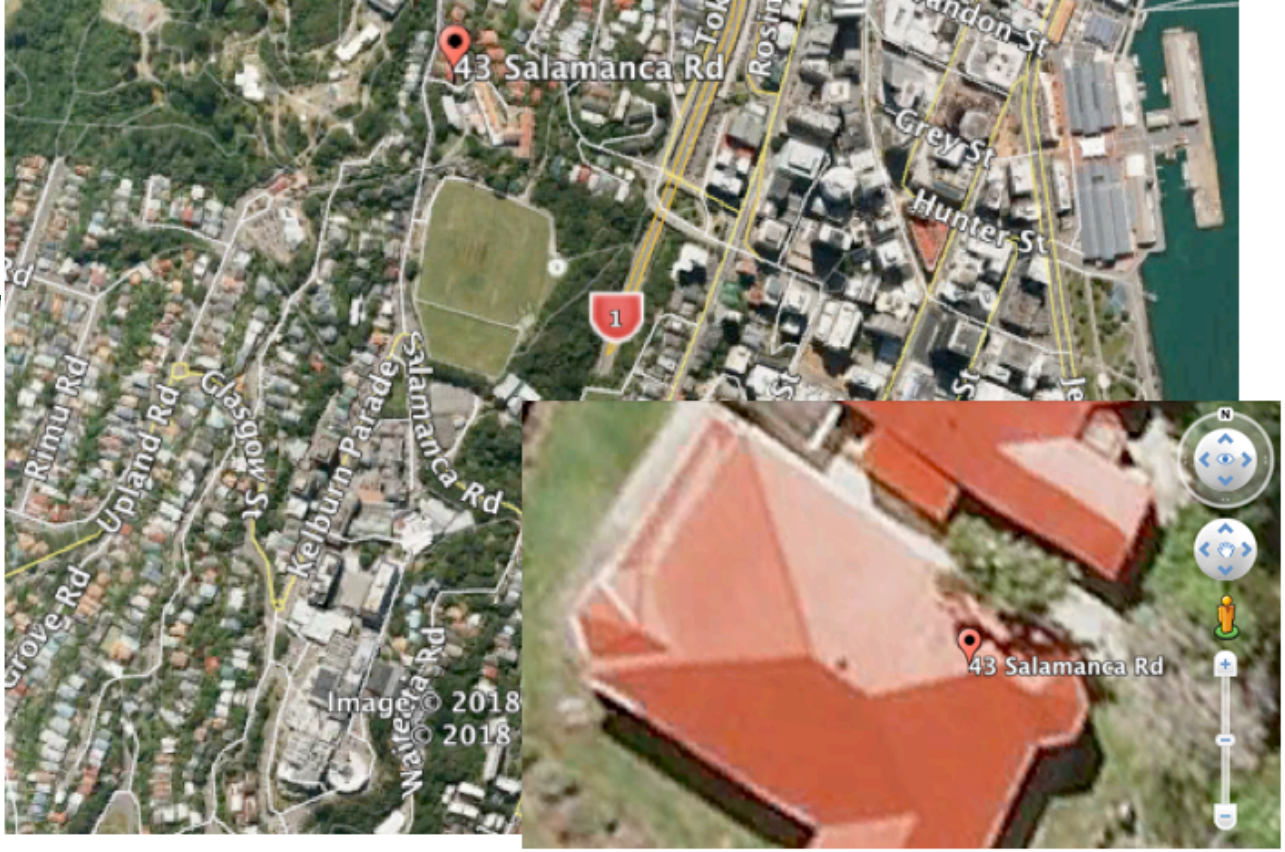
NIWA SolarView Calculations										
16-Jul-19										
Description	kelburn parade									
Latitude	-41.29									
Longitude	174.77									
Panel Tilt	41									
Bearing	270									
Ground Albe	0.1									
Climate Zone	WN	Wellington								
Years of Data	18									
Month	Day	Hour	Temperature	Rel. Hum.	Wind speed	Global Irr.	Diffuse Irr.	Tilted Irr.	Elevation	Azimuth
6	21	9	12.7	73	9.2	61	61	54	14	40
6	21	10	13.4	74	9.2	114	114	101	20	27
6	21	11	13	78	12.3	64	63	57	24	13
6	21	12	13.2	79	9.7	94	94	84	25	358
6	21	13	13.1	81	8.2	84	81	75	23	343
6	21	14	12.7	86	5.1	103	90	102	19	329

Global Solar Atlas comparison



Resources you will need for the test

- https://www.pveducation.org/pvcdrom/welcome-to-pvcdrom/properties-of-sunlight
  - Elevation angle
  - Azimuth angle



The University, as part of its sustainability vision and strategy, is considering installing solar energy systems on the rooftops of the student housing that is part of the University asset portfolio. One of the student residences that is being considered is the house situated at 43 Salamanca Road in Kelburn (latitude of 41°South and longitude of 175 °East). As is shown in the Google Earth imagery, the house has a northwest-southeast orientation, with two suitable rooftop spaces; one that faces directly northwest, and one that faces northeast.

The SolarView tool of NIWA provides the information on the following page (as average values over 14 years of data) for the property, for the month of June.

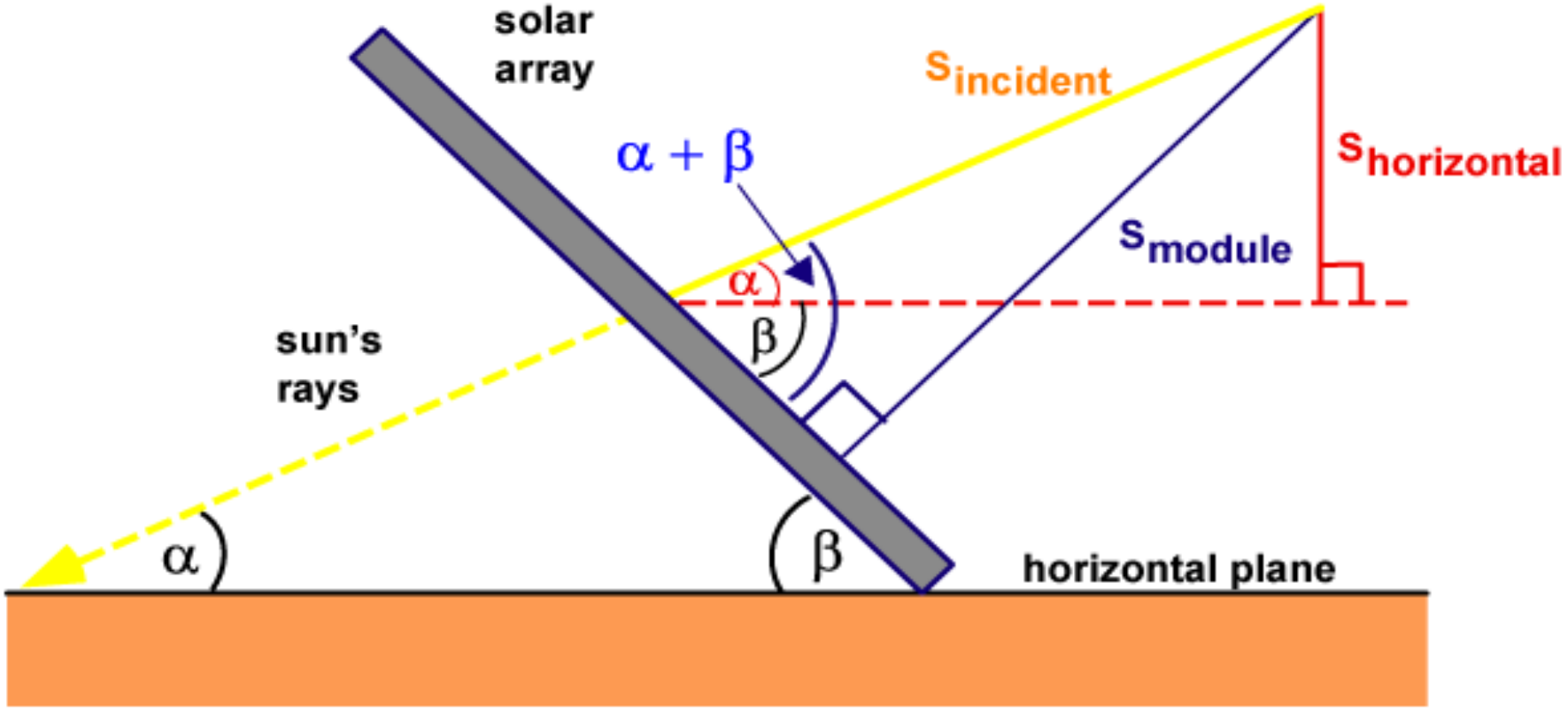
1. If there are no risks of shadowing on the two available roofspaces, and the incline of the roof is (more-or-less) optimal, which of the two roofspaces (northwest or northeast) would be the most effective from a cumulative energy potential?

A typical equation you will need

- $S_{module} = S_{incident} \times (\cos(\alpha) \times \sin(\beta) \times \cos(\psi - \theta) + \sin(\alpha) \times \cos(\beta))$ in W/m^2
  - Where:
  - α is the sun elevation angle;
  - θ is the sun azimuth angle;
  - β is the module tilt angle; and
  - Ψ is the azimuth angle that the module faces.

The parameters you need to understand

- https://www.pveducation.org/pvcdrom/properties-of-sunlight/solar-radiation-on-a-tilted-surface



Discussion

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