

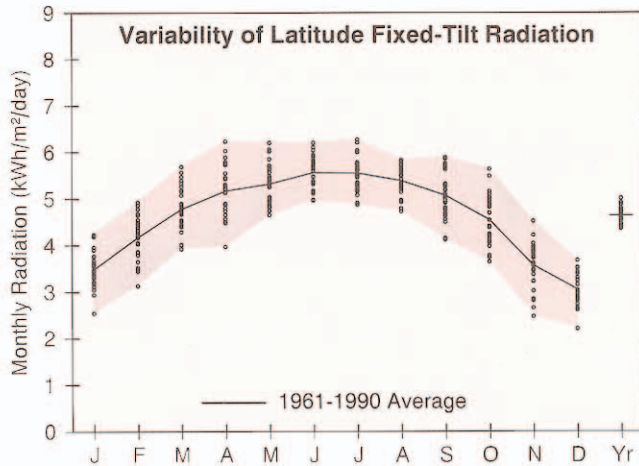
LATITUDE: 39.18° N

LONGITUDE: 76.67° W

ELEVATION: 47 meters

MEAN PRESSURE: 1012 millibars

STATION TYPE: Secondary



Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±9%

Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	2.1	2.9	3.9	4.9	5.6	6.2	6.0	5.3	4.4	3.3	2.2	1.8	4.0
	Min/Max	1.7/2.4	2.4/3.2	3.4/4.5	3.9/5.8	5.0/6.5	5.5/6.9	5.3/6.8	4.7/5.7	3.7/5.0	2.9/3.9	1.8/2.6	1.5/2.0	3.8/4.3
Latitude -15	Average	3.1	3.8	4.6	5.3	5.7	6.0	6.0	5.6	5.0	4.3	3.2	2.7	4.6
	Min/Max	2.3/3.7	3.0/4.4	3.8/5.4	4.1/6.3	5.0/6.6	5.4/6.7	5.2/6.7	4.9/6.0	4.1/5.8	3.5/5.2	2.3/4.0	2.0/3.2	4.3/4.9
Latitude	Average	3.5	4.2	4.8	5.2	5.3	5.6	5.5	5.4	5.1	4.6	3.6	3.1	4.6
	Min/Max	2.5/4.2	3.1/4.9	3.9/5.7	4.0/6.2	4.7/6.2	5.0/6.2	4.9/6.3	4.7/5.8	4.1/5.9	3.6/5.6	2.5/4.5	2.2/3.7	4.4/5.0
Latitude +15	Average	3.7	4.3	4.7	4.8	4.7	4.8	4.9	4.9	4.8	4.6	3.7	3.3	4.4
	Min/Max	2.6/4.6	3.2/5.1	3.8/5.6	3.7/5.8	4.1/5.5	4.3/5.3	4.3/5.5	4.3/5.3	3.9/5.7	3.6/5.7	2.5/4.8	2.3/4.0	4.1/4.8
90	Average	3.4	3.7	3.5	3.0	2.6	2.4	2.5	2.9	3.3	3.7	3.3	3.0	3.1
	Min/Max	2.3/4.4	2.7/4.5	2.8/4.2	2.4/3.6	2.3/2.9	2.2/2.6	2.3/2.8	2.6/3.1	2.7/3.9	2.8/4.6	2.2/4.3	2.0/3.7	2.9/3.4

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±9%

Axis Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	3.0	4.0	5.3	6.4	7.1	7.8	7.7	6.9	5.8	4.6	3.2	2.5	5.4
	Min/Max	2.3/3.7	3.0/4.8	4.2/6.4	4.8/8.1	6.1/8.5	6.5/9.0	6.3/8.9	5.7/7.5	4.7/6.9	3.6/5.7	2.2/4.0	1.9/3.0	5.0/5.9
Latitude -15	Average	3.7	4.7	5.9	6.8	7.2	7.8	7.7	7.1	6.3	5.3	3.9	3.2	5.8
	Min/Max	2.7/4.6	3.4/5.7	4.6/7.2	4.9/8.6	6.1/8.6	6.5/9.0	6.3/9.0	5.9/7.8	5.1/7.5	4.2/6.7	2.6/5.0	2.3/3.9	5.4/6.4
Latitude	Average	4.1	5.0	6.0	6.7	7.0	7.5	7.4	7.0	6.4	5.5	4.2	3.5	5.9
	Min/Max	2.9/5.1	3.6/6.1	4.7/7.3	4.9/8.5	5.9/8.4	6.2/8.6	6.1/8.6	5.8/7.7	5.1/7.6	4.3/7.0	2.8/5.4	2.4/4.3	5.4/6.4
Latitude +15	Average	4.3	5.1	5.9	6.4	6.6	7.0	6.9	6.6	6.2	5.6	4.3	3.7	5.7
	Min/Max	3.0/5.3	3.6/6.3	4.6/7.3	4.7/8.2	5.5/7.9	5.8/8.1	5.6/8.1	5.4/7.3	4.9/7.4	4.3/7.1	2.8/5.6	2.5/4.6	5.3/6.3

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±9%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	4.3	5.1	6.0	6.8	7.3	8.0	7.8	7.2	6.4	5.6	4.3	3.7	6.0
	Min/Max	3.0/5.4	3.6/6.3	4.7/7.3	5.0/8.6	6.2/8.7	6.7/9.2	6.4/9.1	5.9/7.8	5.1/7.6	4.3/7.1	2.8/5.7	2.5/4.6	5.6/6.7

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±8%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average	2.5	2.8	3.0	3.1	3.3	3.7	3.6	3.2	3.0	3.0	2.5	2.2	3.0
	Min/Max	1.4/3.5	1.5/3.7	1.8/4.1	1.6/4.4	2.5/4.4	2.7/4.6	2.5/4.6	2.3/3.8	2.0/3.9	2.0/4.2	1.3/3.6	1.2/3.0	2.7/3.5
1-Axis, N-S Horiz Axis	Average	1.9	2.5	3.4	4.0	4.3	4.8	4.7	4.2	3.6	3.0	2.0	1.5	3.3
	Min/Max	1.1/2.5	1.4/3.4	2.1/4.7	2.2/5.8	3.3/5.8	3.4/6.1	3.1/6.0	2.9/5.0	2.5/4.7	1.9/4.2	1.0/2.9	0.8/2.1	2.9/3.9
1-Axis, N-S Tilt=Latitude	Average	2.8	3.4	3.9	4.2	4.2	4.5	4.5	4.2	4.1	3.8	2.8	2.4	3.7
	Min/Max	1.6/3.8	1.8/4.5	2.4/5.4	2.3/6.1	3.2/5.6	3.2/5.7	3.0/5.7	3.0/5.0	2.8/5.2	2.5/5.3	1.4/4.1	1.3/3.2	3.3/4.4
2-Axis	Average	3.0	3.4	4.0	4.3	4.4	4.9	4.8	4.4	4.1	3.8	3.0	2.6	3.9
	Min/Max	1.7/4.1	1.9/4.6	2.4/5.5	2.4/6.2	3.4/5.9	3.5/6.2	3.2/6.1	3.1/5.2	2.8/5.3	2.5/5.3	1.5/4.3	1.4/3.5	3.5/4.6

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-0.1	1.6	6.7	11.9	17.4	22.5	25.0	24.2	20.3	13.7	8.2	2.6	12.8
Daily Minimum Temp	-4.8	-3.4	1.2	5.8	11.4	16.6	19.3	18.7	14.7	7.7	2.8	-2.1	7.3
Daily Maximum Temp	4.6	6.5	12.2	17.9	23.4	28.4	30.7	29.7	25.8	19.6	13.6	7.3	18.3
Record Minimum Temp	-21.7	-19.4	-14.4	-6.7	0.0	4.4	10.0	7.2	1.7	-3.9	-10.6	-17.8	-21.7
Record Maximum Temp	23.9	26.1	30.6	34.4	36.7	37.8	40.0	40.6	37.8	33.3	28.3	25.0	40.6
HDD, Base 18.3°C	572	470	360	193	60	0	0	0	16	153	303	487	2615
CDD, Base 18.3°C	0	0	0	0	33	126	207	183	74	9	0	0	632
Relative Humidity (%)	63	61	59	59	66	68	69	71	71	69	67	66	66
Wind Speed (m/s)	4.2	4.4	4.6	4.6	3.9	3.6	3.4	3.4	3.5	3.7	4.0	4.1	3.9