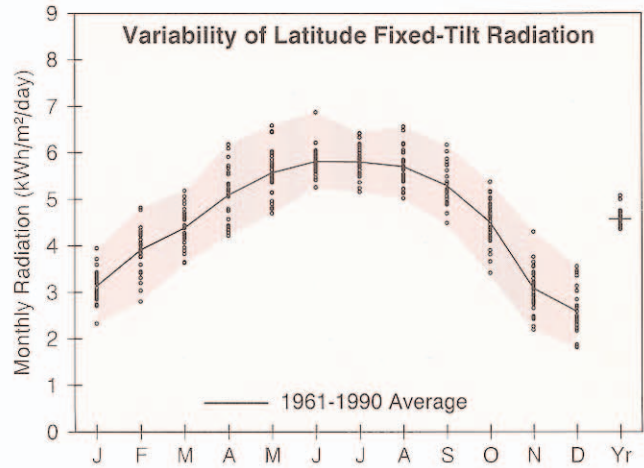


Indianapolis, IN

WBAN NO. 93819

LATITUDE: 39.73° N
 LONGITUDE: 86.28° W
 ELEVATION: 246 meters
 MEAN PRESSURE: 988 millibars

STATION TYPE: Primary



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	2.0	2.8	3.7	4.9	5.9	6.5	6.3	5.6	4.6	3.3	2.1	1.6	4.1
	Min/Max	1.6/2.3	2.3/3.3	3.2/4.1	4.1/5.7	5.1/6.9	5.9/7.7	5.6/7.0	5.0/6.4	4.0/5.2	2.8/3.8	1.7/2.5	1.3/2.0	3.9/4.5
Latitude -15	Average	2.8	3.6	4.3	5.2	5.9	6.3	6.2	5.9	5.2	4.2	2.8	2.3	4.6
	Min/Max	2.2/3.5	2.7/4.4	3.6/5.0	4.3/6.3	5.0/7.0	5.7/7.5	5.6/6.9	5.2/6.8	4.5/6.1	3.3/5.0	2.1/3.8	1.7/3.1	4.4/5.1
Latitude	Average	3.1	3.9	4.4	5.1	5.6	5.8	5.8	5.7	5.3	4.5	3.1	2.6	4.6
	Min/Max	2.3/4.0	2.8/4.8	3.6/5.2	4.2/6.2	4.7/6.6	5.3/6.9	5.2/6.4	5.0/6.6	4.5/6.2	3.4/5.4	2.2/4.3	1.8/3.5	4.3/5.1
Latitude +15	Average	3.3	4.0	4.3	4.7	4.9	5.0	5.1	5.2	5.1	4.5	3.2	2.7	4.3
	Min/Max	2.4/4.3	2.8/5.0	3.5/5.1	3.9/5.7	4.2/5.8	4.6/5.9	4.5/5.6	4.6/5.9	4.3/5.9	3.4/5.4	2.2/4.5	1.9/3.8	4.1/4.8
90	Average	3.0	3.5	3.2	3.0	2.7	2.6	2.7	3.1	3.5	3.6	2.8	2.5	3.0
	Min/Max	2.1/4.1	2.4/4.6	2.5/3.8	2.5/3.6	2.4/3.1	2.4/2.8	2.5/2.9	2.7/3.5	2.9/4.1	2.6/4.4	1.8/4.1	1.6/3.7	2.8/3.3

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	2.7	3.7	4.7	6.2	7.5	8.2	8.1	7.4	6.1	4.5	2.7	2.1	5.3
	Min/Max	2.0/3.4	2.8/4.6	3.8/5.7	4.9/7.9	6.1/9.1	7.2/10.4	6.9/9.2	6.4/8.9	5.1/7.2	3.4/5.4	1.9/3.8	1.5/2.8	5.1/6.1
Latitude -15	Average	3.3	4.3	5.2	6.5	7.6	8.2	8.1	7.7	6.6	5.2	3.3	2.7	5.7
	Min/Max	2.4/4.3	3.1/5.5	4.2/6.3	5.1/8.4	6.1/9.3	7.2/10.4	6.9/9.3	6.6/9.3	5.5/7.9	3.8/6.4	2.2/4.7	1.8/3.7	5.4/6.6
Latitude	Average	3.6	4.6	5.3	6.5	7.4	7.9	7.8	7.5	6.7	5.5	3.5	2.9	5.8
	Min/Max	2.5/4.7	3.2/5.8	4.2/6.4	4.9/8.4	5.9/9.0	6.9/10.0	6.7/9.0	6.4/9.1	5.5/8.0	3.9/6.7	2.3/5.1	1.9/4.1	5.4/6.6
Latitude +15	Average	3.7	4.7	5.2	6.2	6.9	7.3	7.3	7.1	6.5	5.5	3.6	3.0	5.6
	Min/Max	2.6/4.9	3.2/5.9	4.1/6.4	4.7/8.1	5.6/8.5	6.4/9.3	6.2/8.4	6.1/8.7	5.3/7.8	3.9/6.7	2.4/5.3	2.0/4.3	5.3/6.4

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	3.7	4.7	5.3	6.6	7.7	8.4	8.3	7.7	6.7	5.5	3.6	3.1	5.9
	Min/Max	2.6/4.9	3.2/5.9	4.2/6.5	5.1/8.5	6.2/9.4	7.3/10.6	7.1/9.5	6.6/9.4	5.6/8.1	4.0/6.7	2.4/5.3	2.0/4.4	5.6/6.8

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	2.0	2.3	2.3	2.8	3.4	3.7	3.7	3.4	3.1	2.9	1.9	1.6	2.7
	Min/Max	1.1/3.0	1.1/3.4	1.4/3.2	1.7/4.2	2.2/4.8	3.0/5.8	2.7/4.8	2.6/4.7	2.3/4.3	1.6/3.8	0.9/3.3	0.8/2.7	2.5/3.5
1-Axis, N-S Horiz Axis	Average	1.4	2.0	2.5	3.6	4.4	4.9	4.8	4.5	3.8	2.8	1.5	1.1	3.1
	Min/Max	0.8/2.2	1.0/3.1	1.5/3.6	2.1/5.5	2.9/6.4	3.9/7.6	3.6/6.3	3.5/6.3	2.8/5.1	1.6/3.8	0.7/2.6	0.5/1.8	2.8/4.0
1-Axis, N-S Tilt=Latitude	Average	2.1	2.7	3.0	3.8	4.3	4.6	4.6	4.6	4.2	3.6	2.1	1.7	3.4
	Min/Max	1.2/3.3	1.3/4.1	1.8/4.2	2.2/5.8	2.8/6.2	3.6/7.1	3.5/6.1	3.5/6.4	3.1/5.8	2.1/4.8	1.0/3.7	0.8/2.8	3.1/4.4
2-Axis	Average	2.3	2.8	3.0	3.9	4.6	5.0	5.0	4.7	4.2	3.6	2.2	1.8	3.6
	Min/Max	1.3/3.5	1.4/4.2	1.9/4.2	2.3/5.9	3.0/6.6	4.0/7.8	3.7/6.5	3.6/6.7	3.2/5.8	2.1/4.8	1.1/3.9	0.9/3.0	3.2/4.6

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-3.6	-1.3	5.2	11.3	17.1	22.2	24.1	22.9	19.2	12.6	6.1	-0.6	11.3
Daily Minimum Temp	-8.2	-6.2	-0.1	5.3	10.9	16.1	18.4	17.1	13.1	6.4	1.2	-4.9	5.8
Daily Maximum Temp	0.9	3.5	10.5	17.4	23.2	28.2	29.7	28.7	25.3	18.8	11.1	3.6	16.7
Record Minimum Temp	-30.0	-29.4	-21.7	-8.9	-2.2	3.9	6.7	5.0	-2.2	-8.3	-18.9	-30.6	-30.6
Record Maximum Temp	21.7	23.3	29.4	31.7	33.9	38.9	40.0	38.9	37.8	32.2	27.2	23.3	40.0
HDD, Base 18.3°C	681	551	407	210	92	3	0	3	32	188	367	587	3119
CDD, Base 18.3°C	0	0	0	0	53	118	179	144	59	10	0	0	563
Relative Humidity (%)	75	74	70	66	67	68	73	75	74	72	76	78	72
Wind Speed (m/s)	4.7	4.6	5.1	4.7	4.1	3.7	3.3	3.1	3.4	3.8	4.4	4.6	4.1