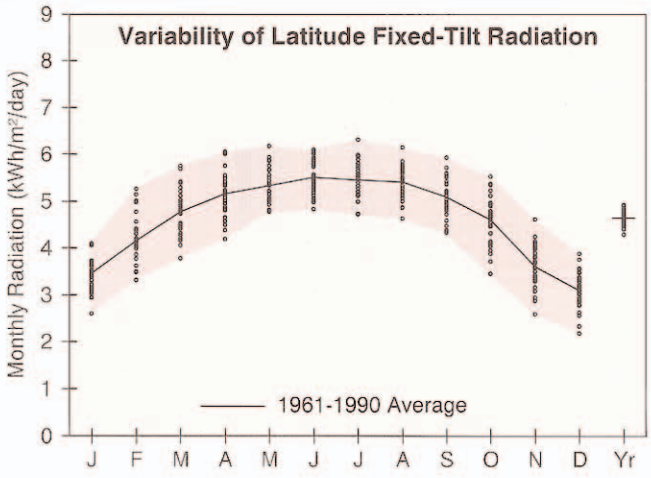
Atlantic City, NJ

WBAN NO. 93730

LATITUDE: 39.45° N
LONGITUDE: 74.57° W
ELEVATION: 20 meters
MEAN PRESSURE: 1015 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	2.0	2.8	3.9	4.9	5.6	6.1	5.9	5.3	4.4	3.3	2.2	1.8	4.0
	Min/Max	1.7/2.3	2.4/3.4	3.3/4.5	4.1/5.6	5.1/6.4	5.4/6.8	5.1/6.8	4.7/6.0	3.9/4.9	2.8/3.8	1.9/2.6	1.5/2.0	3.8/4.3
Latitude -15	Average	3.0	3.8	4.6	5.3	5.7	6.0	5.9	5.6	5.0	4.3	3.2	2.7	4.6
	Min/Max	2.4/3.5	3.1/4.7	3.7/5.5	4.3/6.1	5.1/6.6	5.2/6.6	5.1/6.8	4.8/6.4	4.3/5.8	3.3/5.1	2.4/4.0	2.0/3.3	4.3/4.9
Latitude	Average	3.5	4.1	4.8	5.2	5.3	5.5	5.5	5.4	5.1	4.6	3.6	3.1	4.6
	Min/Max	2.6/4.1	3.3/5.3	3.8/5.8	4.2/6.1	4.8/6.2	4.8/6.1	4.7/6.3	4.6/6.2	4.3/5.9	3.5/5.5	2.6/4.6	2.2/3.9	4.3/4.9
Latitude +15	Average	3.7	4.3	4.7	4.8	4.7	4.8	4.8	4.9	4.9	4.6	3.8	3.3	4.4
	Min/Max	2.7/4.4	3.4/5.5	3.6/5.7	3.9/5.6	4.2/5.5	4.2/5.3	4.2/5.5	4.2/5.6	4.1/5.7	3.4/5.6	2.7/4.9	2.3/4.2	4.1/4.7
90	Average	3.4	3.7	3.5	3.0	2.6	2.4	2.5	2.9	3.4	3.7	3.3	3.1	3.1
	Min/Max	2.4/4.2	2.8/5.0	2.7/4.2	2.5/3.5	2.4/2.9	2.2/2.6	2.3/2.8	2.5/3.3	2.8/4.0	2.7/4.5	2.3/4.4	2.0/4.0	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	3.0	4.0	5.2	6.4	7.1	7.7	7.5	6.9	5.9	4.7	3.2	2.5	5.3
	Min/Max	2.3/3.6	3.2/5.1	4.1/6.4	5.0/7.7	6.1/8.5	6.5/8.8	6.0/8.9	5.6/8.0	4.9/7.0	3.5/5.7	2.4/4.1	1.9/3.2	4.9/5.7
Latitude -15	Average	3.7	4.7	5.8	6.7	7.2	7.7	7.5	7.2	6.4	5.4	3.9	3.2	5.8
	Min/Max	2.8/4.5	3.7/6.1	4.4/7.2	5.2/8.2	6.2/8.7	6.5/8.8	6.0/8.9	5.8/8.3	5.2/7.7	3.9/6.6	2.8/5.1	2.2/4.1	5.3/6.2
Latitude	Average	4.0	5.0	5.9	6.6	7.0	7.4	7.2	7.0	6.4	5.6	4.2	3.6	5.8
	Min/Max	2.9/4.9	3.8/6.5	4.5/7.4	5.1/8.1	6.0/8.4	6.2/8.4	5.8/8.6	5.7/8.2	5.2/7.8	4.0/6.9	2.9/5.6	2.4/4.6	5.3/6.3
Latitude +15	Average	4.2	5.1	5.9	6.4	6.5	6.9	6.8	6.7	6.3	5.7	4.4	3.7	5.7
	Min/Max	3.0/5.1	3.9/6.7	4.3/7.3	4.9/7.8	5.6/7.9	5.8/7.8	5.4/8.1	5.4/7.8	5.1/7.6	4.0/7.0	3.0/5.8	2.5/4.8	5.2/6.1

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

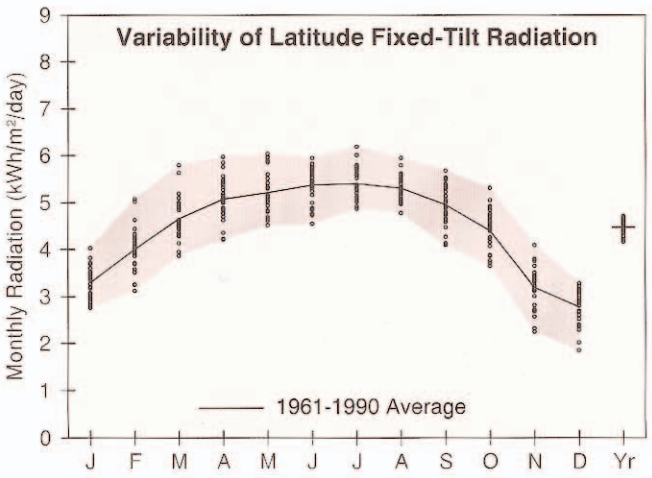
Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	4.3	5.1	6.0	6.7	7.3	7.9	7.6	7.2	6.4	5.7	4.4	3.8	6.0
	Min/Max	3.0/5.2	3.9/6.7	4.5/7.4	5.2/8.2	6.3/8.8	6.6/9.0	6.1/9.1	5.8/8.4	5.3/7.8	4.0/7.0	3.0/5.8	2.5/4.9	5.5/6.5

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	2.7	2.9	3.0	3.2	3.6	3.4	3.2	3.0	3.1	2.5	2.3	3.0
	Min/Max	1.5/3.3	1.7/3.8	1.7/4.1	1.7/4.2	2.3/4.4	2.6/4.4	2.2/4.5	2.2/4.2	2.1/4.0	1.8/4.2	1.3/3.8	1.2/3.2	2.5/3.3
1-Axis, N-S Horiz Axis	Average	1.8	2.5	3.3	3.9	4.2	4.6	4.4	4.2	3.6	3.0	2.0	1.6	3.3
	Min/Max	1.1/2.5	1.6/3.5	1.9/4.6	2.2/5.4	3.0/5.7	3.3/5.8	2.8/5.8	2.8/5.4	2.5/4.8	1.8/4.2	1.0/3.0	0.8/2.2	2.8/3.7
1-Axis, N-S Tilt=Latitude	Average	2.7	3.3	3.9	4.1	4.1	4.4	4.2	4.2	4.1	3.9	2.9	2.4	3.7
	Min/Max	1.7/3.7	2.1/4.6	2.3/5.4	2.4/5.7	3.0/5.6	3.1/5.4	2.7/5.6	2.9/5.5	2.8/5.4	2.3/5.3	1.5/4.3	1.3/3.4	3.2/4.1
2-Axis	Average	2.9	3.4	3.9	4.2	4.3	4.7	4.5	4.4	4.1	3.9	3.0	2.6	3.8
	Min/Max	1.8/3.9	2.1/4.8	2.3/5.4	2.4/5.8	3.1/5.9	3.4/5.9	2.8/6.0	3.0/5.7	2.8/5.4	2.3/5.3	1.6/4.5	1.4/3.7	3.3/4.3

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-0.6	0.6	5.3	10.0	15.8	20.8	23.7	23.0	18.9	12.7	7.7	2.1	11.7
Daily Minimum Temp	-5.9	-4.7	-0.4	4.1	9.8	14.8	18.2	17.5	13.1	6.5	2.1	-3.2	6.0
Daily Maximum Temp	4.7	5.8	10.9	15.9	21.8	26.7	29.2	28.5	24.8	18.9	13.2	7.4	17.3
Record Minimum Temp	-23.3	-23.9	-15.0	-11.1	-3.9	2.8	5.6	4.4	0.0	-6.7	-12.2	-21.7	-23.9
Record Maximum Temp	25.6	23.9	30.6	34.4	37.2	41.1	40.0	38.9	37.2	32.2	28.9	23.9	41.1
HDD, Base 18.3°C	587	498	405	250	93	7	0	0	29	180	320	503	2872
CDD, Base 18.3°C	0	0	0	0	14	80	167	144	48	6	0	0	459
Relative Humidity (%)	70	69	67	66	71	73	74	76	76	75	73	71	72
Wind Speed (m/s)	4.6	4.8	5.1	5.2	4.5	4.0	3.7	3.5	3.7	3.9	4.6	4.6	4.3



Newark, NJ

WBAN NO. 14734

LATITUDE: 40.70° N
LONGITUDE: 74.17° W
ELEVATION: 9 meters
MEAN PRESSURE: 1016 millibars

STATION TYPE: Secondary

Solar Radiation for Flat-Plate Collectors Facing South at a Fixed Tilt (kWh/m²/day), Uncertainty ±11%

Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	1.9	2.7	3.8	4.8	5.5	6.0	5.9	5.2	4.3	3.2	2.0	1.6	3.9
	Min/Max	1.7/2.2	2.3/3.2	3.3/4.4	4.1/5.5	4.8/6.3	5.1/6.6	5.3/6.7	4.8/5.8	3.7/4.7	2.8/3.7	1.7/2.4	1.3/1.8	3.7/4.1
Latitude -15	Average	2.9	3.7	4.5	5.2	5.5	5.8	5.8	5.5	4.9	4.1	2.9	2.4	4.4
	Min/Max	2.5/3.5	2.9/4.6	3.8/5.6	4.3/6.1	4.8/6.4	4.9/6.4	5.3/6.7	5.0/6.2	4.1/5.6	3.5/4.9	2.1/3.6	1.7/2.8	4.2/4.7
Latitude	Average	3.3	4.0	4.6	5.1	5.2	5.4	5.4	5.3	5.0	4.4	3.2	2.8	4.5
	Min/Max	2.8/4.0	3.1/5.1	3.9/5.8	4.2/6.0	4.5/6.0	4.6/5.9	4.9/6.2	4.8/5.9	4.1/5.7	3.7/5.3	2.3/4.1	1.9/3.3	4.2/4.7
Latitude +15	Average	3.5	4.1	4.5	4.7	4.6	4.7	4.7	4.8	4.7	4.4	3.3	3.0	4.3
	Min/Max	2.9/4.3	3.1/5.3	3.7/5.7	3.9/5.5	4.0/5.3	4.0/5.2	4.3/5.4	4.3/5.4	3.9/5.5	3.6/5.4	2.3/4.3	1.9/3.5	4.0/4.5
90	Average	3.3	3.6	3.4	3.0	2.6	2.5	2.6	2.9	3.3	3.6	2.9	2.8	3.0
	Min/Max	2.6/4.1	2.6/4.8	2.8/4.3	2.5/3.6	2.4/3.0	2.2/2.7	2.4/2.9	2.7/3.3	2.7/3.9	2.9/4.4	1.9/3.9	1.7/3.3	2.8/3.2

Solar Radiation for 1-Axis Tracking Flat-Plate Collectors with a North-South Axis (kWh/m²/day), Uncertainty ±11%

Axis Tilt (°)		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
0	Average	2.7	3.7	5.0	6.2	6.9	7.4	7.3	6.7	5.6	4.4	2.7	2.2	5.1
	Min/Max	2.3/3.4	2.9/4.7	4.1/6.4	5.0/7.4	5.7/8.2	5.9/8.3	6.4/8.5	5.8/7.5	4.5/6.3	3.6/5.3	2.0/3.5	1.5/2.6	4.7/5.4
Latitude -15	Average	3.5	4.5	5.6	6.5	7.0	7.4	7.4	6.9	6.1	5.1	3.4	2.9	5.5
	Min/Max	2.9/4.3	3.4/5.8	4.5/7.2	5.2/7.9	5.8/8.3	5.8/8.3	6.4/8.6	6.0/7.9	4.9/7.0	4.2/6.2	2.3/4.4	1.9/3.4	5.1/5.9
Latitude	Average	3.8	4.7	5.7	6.5	6.7	7.1	7.1	6.8	6.2	5.3	3.7	3.1	5.6
	Min/Max	3.1/4.7	3.5/6.2	4.6/7.4	5.1/7.8	5.6/8.1	5.6/8.0	6.2/8.3	5.9/7.7	4.9/7.1	4.3/6.5	2.4/4.8	2.0/3.8	5.1/5.9
Latitude +15	Average	4.0	4.8	5.6	6.2	6.3	6.6	6.6	6.5	6.0	5.3	3.8	3.3	5.4
	Min/Max	3.2/5.0	3.6/6.3	4.4/7.3	4.9/7.5	5.3/7.6	5.2/7.4	5.8/7.7	5.6/7.3	4.7/6.9	4.3/6.6	2.5/5.0	2.0/4.0	5.0/5.8

Solar Radiation for 2-Axis Tracking Flat-Plate Collectors (kWh/m²/day), Uncertainty ±11%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2-Axis	Average	4.0	4.8	5.7	6.6	7.0	7.5	7.5	7.0	6.2	5.4	3.8	3.3	5.7
	Min/Max	3.2/5.0	3.6/6.3	4.6/7.4	5.2/7.9	5.9/8.4	6.0/8.5	6.6/8.8	6.1/7.9	4.9/7.1	4.4/6.6	2.5/5.0	2.0/4.0	5.3/6.1

Direct Beam Solar Radiation for Concentrating Collectors (kWh/m²/day), Uncertainty ±11%

Tracker		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
1-Axis, E-W Horiz Axis	Average	2.3	2.5	2.7	2.9	3.0	3.2	3.2	3.0	2.8	2.8	2.1	1.9	2.7
	Min/Max	1.7/3.0	1.6/3.7	2.0/4.1	1.8/3.9	2.0/4.0	2.2/3.9	2.4/4.2	2.3/3.8	2.0/3.5	2.0/3.8	1.0/3.1	0.9/2.5	2.4/3.0
1-Axis, N-S Horiz Axis	Average	1.6	2.2	3.0	3.7	3.9	4.2	4.2	3.8	3.3	2.7	1.6	1.3	3.0
	Min/Max	1.2/2.2	1.4/3.2	2.1/4.6	2.4/4.9	2.7/5.2	2.8/5.1	3.0/5.4	2.9/4.8	2.3/4.1	2.0/3.7	0.8/2.3	0.6/1.6	2.6/3.3
1-Axis, N-S Tilt=Latitude	Average	2.4	3.0	3.6	3.9	3.8	3.9	4.0	3.9	3.8	3.5	2.3	2.0	3.4
	Min/Max	1.8/3.3	1.9/4.4	2.5/5.5	2.5/5.2	2.6/5.1	2.7/4.8	2.9/5.2	3.0/4.9	2.6/4.7	2.5/4.7	1.1/3.4	1.0/2.6	2.9/3.7
2-Axis	Average	2.6	3.1	3.6	4.0	4.0	4.3	4.3	4.1	3.8	3.5	2.5	2.2	3.5
	Min/Max	2.0/3.5	2.0/4.5	2.5/5.5	2.6/5.3	2.8/5.4	2.9/5.3	3.1/5.6	3.1/5.1	2.6/4.7	2.6/4.7	1.2/3.6	1.1/2.8	3.1/3.9

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-0.8	0.6	5.6	11.3	17.1	22.6	25.4	24.7	20.4	14.2	8.5	2.2	12.7
Daily Minimum Temp	-4.8	-3.7	0.8	5.9	11.8	17.1	20.3	19.7	15.5	9.0	4.0	-1.6	7.8
Daily Maximum Temp	3.2	4.7	10.4	16.6	22.4	27.9	30.6	29.7	25.3	19.3	13.0	6.1	17.4
Record Minimum Temp	-22.2	-21.7	-14.4	-8.9	0.6	6.1	11.1	7.2	1.7	-2.2	-9.4	-18.3	-22.2
Record Maximum Temp	23.3	24.4	31.7	34.4	36.7	38.9	40.6	39.4	40.6	33.3	29.4	22.2	40.6
HDD, Base 18.3°C	592	498	394	212	71	0	0	0	14	140	295	499	2716
CDD, Base 18.3°C	0	0	0	0	33	129	221	196	78	11	0	0	667
Relative Humidity (%)	66	63	60	58	62	63	64	66	68	66	66	67	64
Wind Speed (m/s)	4.9	5.1	5.4	5.2	4.6	4.3	4.0	4.0	4.2	4.2	4.7	4.8	4.6