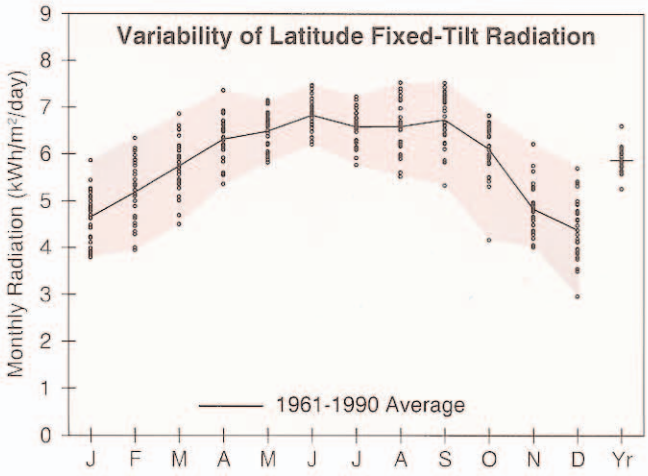


Cedar City, UT

WBAN NO. 93129

LATITUDE: 37.70° N
LONGITUDE: 113.10° W
ELEVATION: 1712 meters
MEAN PRESSURE: 829 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	2.7	3.5	4.6	6.0	7.0	7.8	7.3	6.5	5.7	4.3	2.9	2.4	5.0
	Min/Max	2.3/3.1	2.9/4.0	3.9/5.4	5.2/6.8	6.3/7.6	7.0/8.6	6.3/8.0	5.5/7.4	4.7/6.3	3.2/4.7	2.6/3.5	1.9/2.8	4.7/5.5
Latitude -15	Average	4.0	4.7	5.5	6.4	7.0	7.5	7.1	6.8	6.6	5.6	4.2	3.7	5.8
	Min/Max	3.3/4.9	3.7/5.6	4.4/6.5	5.5/7.4	6.2/7.6	6.8/8.2	6.2/7.9	5.7/7.8	5.3/7.3	3.9/6.3	3.6/5.4	2.6/4.8	5.2/6.4
Latitude	Average	4.6	5.2	5.7	6.3	6.5	6.8	6.6	6.6	6.7	6.1	4.8	4.4	5.9
	Min/Max	3.8/5.9	4.0/6.3	4.5/6.9	5.4/7.4	5.8/7.2	6.2/7.5	5.8/7.2	5.5/7.5	5.3/7.5	4.2/6.8	4.0/6.2	3.0/5.7	5.3/6.6
Latitude +15	Average	5.0	5.4	5.7	5.9	5.7	5.9	5.7	6.0	6.5	6.2	5.1	4.8	5.7
	Min/Max	4.0/6.5	4.0/6.7	4.4/6.8	5.0/6.8	5.2/6.3	5.4/6.4	5.0/6.3	5.0/6.8	5.1/7.3	4.2/7.0	4.2/6.7	3.2/6.3	5.0/6.4
90	Average	4.7	4.7	4.2	3.6	2.8	2.6	2.6	3.3	4.3	5.0	4.6	4.6	3.9
	Min/Max	3.7/6.4	3.3/5.8	3.3/5.0	3.1/4.0	2.6/3.1	2.5/2.7	2.4/2.8	2.8/3.6	3.4/4.8	3.3/5.6	3.7/6.1	2.9/6.0	3.4/4.5

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	4.2	5.2	6.6	8.4	9.6	10.8	10.1	9.2	8.4	6.6	4.5	3.8	7.3
	Min/Max	3.4/5.3	3.8/6.4	5.1/8.1	6.8/9.9	8.4/10.8	9.3/12.2	8.3/11.5	7.3/10.8	6.3/9.6	4.4/7.4	3.7/5.8	2.5/4.9	6.4/8.2
Latitude -15	Average	5.1	6.1	7.3	8.8	9.7	10.8	10.1	9.5	9.1	7.5	5.4	4.7	7.9
	Min/Max	4.1/6.6	4.4/7.6	5.5/9.0	7.1/10.4	8.5/10.9	9.3/12.2	8.4/11.5	7.6/11.2	6.8/10.5	4.9/8.5	4.4/7.2	3.1/6.3	6.8/8.9
Latitude	Average	5.6	6.5	7.5	8.7	9.4	10.3	9.7	9.4	9.3	7.9	5.9	5.3	8.0
	Min/Max	4.5/7.3	4.6/8.2	5.6/9.3	7.1/10.4	8.3/10.6	8.9/11.7	8.1/11.1	7.4/11.1	6.8/10.6	5.1/8.9	4.8/7.8	3.3/7.0	6.9/9.1
Latitude +15	Average	5.9	6.6	7.4	8.4	8.9	9.7	9.1	9.0	9.1	8.0	6.1	5.6	7.8
	Min/Max	4.7/7.8	4.6/8.4	5.5/9.2	6.8/10.0	7.8/10.1	8.3/10.9	7.6/10.4	7.1/10.6	6.6/10.4	5.1/9.1	5.0/8.2	3.5/7.4	6.7/9.0

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	6.0	6.6	7.5	8.8	9.9	11.0	10.3	9.6	9.3	8.0	6.2	5.7	8.3
	Min/Max	4.7/7.8	4.7/8.4	5.6/9.3	7.2/10.5	8.6/11.1	9.5/12.5	8.5/11.7	7.6/11.3	6.8/10.6	5.1/9.1	5.0/8.2	3.6/7.6	7.1/9.4

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	3.7	3.8	3.8	4.5	5.1	6.2	5.5	5.1	5.1	4.8	3.9	3.7	4.6
	Min/Max	2.5/5.2	2.3/5.4	2.1/5.4	3.0/5.9	4.1/6.2	4.8/7.5	4.1/6.9	3.6/6.6	3.2/6.3	2.3/5.8	2.8/5.8	1.9/5.6	3.6/5.6
1-Axis, N-S Horiz Axis	Average	2.9	3.6	4.6	6.0	7.0	8.3	7.5	6.9	6.6	5.1	3.3	2.7	5.4
	Min/Max	2.0/4.1	2.0/5.2	2.6/6.5	4.1/7.9	5.6/8.5	6.3/10.1	5.5/9.4	4.8/9.0	4.0/8.1	2.5/6.1	2.3/4.9	1.4/4.1	4.2/6.5
1-Axis, N-S Tilt=Latitude	Average	4.2	4.7	5.3	6.3	6.8	7.8	7.1	7.0	7.2	6.3	4.5	4.0	5.9
	Min/Max	2.8/5.8	2.7/6.7	3.0/7.5	4.3/8.2	5.5/8.3	6.0/9.5	5.2/9.0	4.9/9.1	4.4/9.0	3.0/7.5	3.2/6.8	2.0/6.0	4.6/7.2
2-Axis	Average	4.5	4.8	5.3	6.4	7.2	8.5	7.7	7.2	7.2	6.4	4.7	4.4	6.2
	Min/Max	3.0/6.2	2.8/6.9	3.0/7.5	4.3/8.4	5.8/8.7	6.5/10.3	5.6/9.6	5.0/9.4	4.4/9.0	3.1/7.6	3.4/7.1	2.2/6.6	4.8/7.5

Average Climatic Conditions

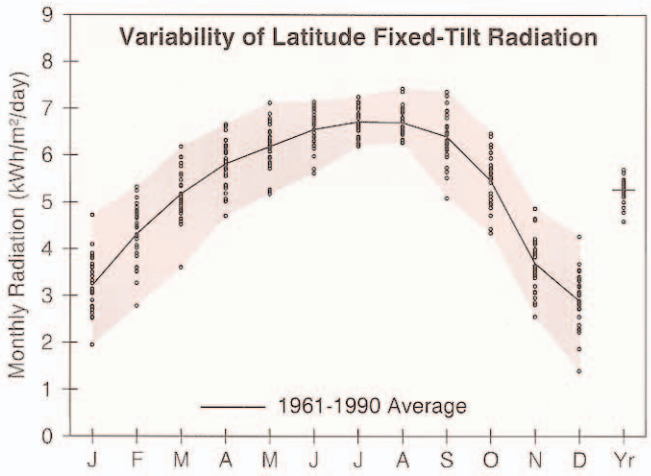
Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-1.4	1.4	4.4	8.6	13.6	19.3	23.4	22.2	17.2	10.9	4.3	-0.8	10.3
Daily Minimum Temp	-8.2	-5.5	-2.7	0.8	5.1	9.8	14.4	13.6	8.4	2.3	-2.9	-7.7	2.3
Daily Maximum Temp	5.4	8.3	11.6	16.4	22.2	28.7	32.3	30.8	26.1	19.4	11.5	6.1	18.2
Record Minimum Temp	-26.7	-30.6	-16.1	-12.2	-5.6	0.0	5.6	3.9	-4.4	-20.0	-20.0	-30.6	-30.6
Record Maximum Temp	19.4	22.2	23.9	27.8	33.3	38.3	39.4	37.2	33.9	29.4	23.3	18.9	39.4
HDD, Base 18.3°C	612	473	431	292	153	33	0	0	72	234	422	592	3312
CDD, Base 18.3°C	0	0	0	0	7	62	157	122	38	3	0	0	388
Relative Humidity (%)	66	62	56	46	40	31	35	40	41	47	58	65	49
Wind Speed (m/s)	2.7	3.1	3.7	4.0	3.9	3.8	3.6	3.4	3.4	3.0	3.3	2.7	3.4

Salt Lake City, UT

WBAN NO. 24127

LATITUDE: 40.77° N
LONGITUDE: 111.97° W
ELEVATION: 1288 meters
MEAN PRESSURE: 872 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	1.9	2.9	4.1	5.4	6.5	7.4	7.3	6.5	5.2	3.7	2.2	1.7	4.6
	Min/Max	1.5/2.4	2.2/3.3	3.0/4.7	4.5/6.1	5.5/7.5	6.2/8.1	6.7/7.9	6.0/7.2	4.3/5.9	3.1/4.2	1.8/2.7	1.1/2.1	4.2/4.9
Latitude -15	Average	2.9	4.0	5.0	5.9	6.6	7.2	7.3	7.0	6.3	5.0	3.3	2.5	5.2
	Min/Max	1.9/4.1	2.7/4.8	3.5/5.9	4.8/6.8	5.5/7.6	6.1/7.9	6.7/7.9	6.5/7.7	5.0/7.2	4.1/5.9	2.3/4.3	1.3/3.6	4.6/5.6
Latitude	Average	3.2	4.3	5.2	5.8	6.2	6.6	6.7	6.7	6.4	5.4	3.7	2.9	5.3
	Min/Max	2.0/4.7	2.8/5.3	3.6/6.2	4.7/6.7	5.2/7.1	5.6/7.1	6.2/7.2	6.3/7.4	5.1/7.3	4.3/6.5	2.5/4.9	1.4/4.3	4.6/5.7
Latitude +15	Average	3.4	4.4	5.1	5.4	5.5	5.6	5.8	6.1	6.1	5.5	3.9	3.1	5.0
	Min/Max	2.0/5.1	2.8/5.6	3.5/6.1	4.3/6.2	4.6/6.3	4.9/6.1	5.4/6.3	5.7/6.7	4.8/7.1	4.4/6.6	2.6/5.2	1.4/4.6	4.3/5.5
90	Average	3.2	3.9	3.9	3.5	3.0	2.8	2.9	3.6	4.3	4.5	3.5	2.9	3.5
	Min/Max	1.6/4.8	2.4/5.0	2.6/4.7	2.9/4.0	2.6/3.3	2.5/2.9	2.7/3.2	3.3/3.9	3.4/5.0	3.6/5.5	2.2/4.7	1.3/4.4	2.9/3.9

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	4.0	5.6	7.3	8.8	10.0	10.1	9.2	7.6	5.5	3.2	2.3	6.4
	Min/Max	1.7/3.8	2.7/5.0	3.7/6.8	5.9/8.6	6.9/10.5	8.0/11.6	8.8/11.3	8.1/10.6	5.9/9.1	4.2/6.7	2.3/4.1	1.2/3.3	5.4/7.0
Latitude -15	Average	3.4	4.8	6.3	7.7	8.9	10.0	10.2	9.6	8.5	6.5	4.0	3.0	6.9
	Min/Max	2.0/5.1	3.0/6.1	4.1/7.7	6.2/9.2	7.1/10.8	8.0/11.6	8.9/11.4	8.5/11.1	6.4/10.0	4.9/7.9	2.7/5.3	1.4/4.5	5.9/7.6
Latitude	Average	3.7	5.1	6.5	7.7	8.7	9.6	9.8	9.4	8.6	6.8	4.3	3.3	7.0
	Min/Max	2.0/5.6	3.1/6.5	4.1/7.9	6.1/9.1	6.8/10.4	7.7/11.1	8.6/11.1	8.3/10.9	6.5/10.2	5.2/8.4	2.9/5.8	1.5/5.0	5.8/7.6
Latitude +15	Average	3.8	5.2	6.4	7.4	8.2	9.0	9.2	9.0	8.4	6.9	4.5	3.4	6.8
	Min/Max	2.1/5.9	3.1/6.7	4.1/7.9	5.8/8.8	6.4/9.9	7.1/10.4	8.0/10.4	7.9/10.4	6.3/10.0	5.2/8.4	2.9/6.0	1.5/5.3	5.6/7.5

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	3.9	5.2	6.5	7.8	9.1	10.3	10.4	9.6	8.6	6.9	4.5	3.5	7.2
	Min/Max	2.1/5.9	3.1/6.7	4.2/8.0	6.2/9.2	7.1/10.9	8.2/11.9	9.0/11.7	8.5/11.1	6.5/10.2	5.2/8.5	2.9/6.1	1.5/5.4	6.0/7.9

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	2.7	3.2	3.7	4.5	5.6	5.8	5.2	4.8	4.1	2.6	1.9	3.8
	Min/Max	0.6/4.0	0.9/4.0	1.6/4.3	2.5/4.8	3.1/5.9	3.8/6.8	4.7/6.8	4.3/6.4	3.4/6.1	2.9/5.3	1.4/3.9	0.3/3.6	3.1/4.4
1-Axis, N-S Horiz Axis	Average	1.4	2.4	3.6	4.8	6.1	7.4	7.6	6.9	5.8	4.1	2.0	1.2	4.5
	Min/Max	0.5/2.8	0.9/3.5	1.7/4.9	3.3/6.2	4.1/8.0	5.0/9.2	6.3/9.1	5.5/8.6	4.1/7.5	2.7/5.4	1.1/3.0	0.2/2.4	3.6/5.1
1-Axis, N-S Tilt=Latitude	Average	2.2	3.3	4.2	5.1	5.9	7.0	7.3	7.1	6.6	5.2	2.9	2.0	4.9
	Min/Max	0.7/4.3	1.1/4.8	2.0/5.8	3.5/6.6	4.0/7.8	4.7/8.7	6.0/8.7	5.7/8.8	4.5/8.5	3.5/6.8	1.6/4.4	0.3/3.8	3.9/5.6
2-Axis	Average	2.3	3.3	4.3	5.2	6.3	7.6	7.9	7.3	6.6	5.3	3.1	2.2	5.1
	Min/Max	0.8/4.6	1.2/4.9	2.0/5.8	3.6/6.7	4.2/8.2	5.1/9.5	6.5/9.4	5.8/9.0	4.6/8.5	3.6/6.9	1.7/4.6	0.4/4.1	4.0/5.9

Average Climatic Conditions

Element	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
Temperature (°C)	-2.3	1.2	5.4	9.8	14.9	20.6	25.5	24.2	18.4	11.8	4.9	-1.3	11.1
Daily Minimum Temp	-7.1	-4.1	-0.3	3.3	7.6	13.0	17.6	16.6	10.6	4.6	-0.6	-5.8	4.6
Daily Maximum Temp	2.4	6.4	11.2	16.3	22.2	28.2	33.4	31.9	26.2	18.9	10.4	3.2	17.6
Record Minimum Temp	-30.0	-34.4	-16.7	-10.0	-3.9	1.7	4.4	2.8	-2.8	-8.9	-25.6	-29.4	-34.4
Record Maximum Temp	16.7	20.6	25.6	29.4	33.9	40.0	41.7	40.0	37.8	31.7	23.9	19.4	41.7
HDD, Base 18.3°C	639	481	399	258	119	28	0	0	60	207	403	608	3203
CDD, Base 18.3°C	0	0	0	0	13	97	222	183	63	4	0	0	582
Relative Humidity (%)	74	70	60	53	49	41	36	39	46	56	66	74	55
Wind Speed (m/s)	3.5	3.8	4.3	4.4	4.2	4.2	4.3	4.3	4.2	3.8	3.8	3.4	4.0