

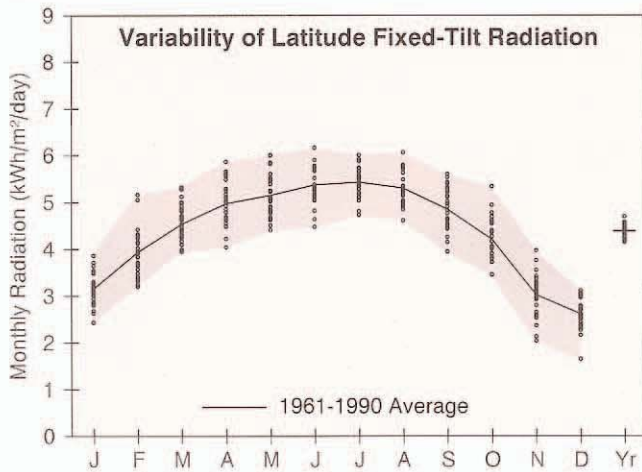
LATITUDE: 40.65° N

LONGITUDE: 75.43° W

ELEVATION: 117 meters

MEAN PRESSURE: 1003 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 | 3.7 | 4.7 | 5.4 | 6.0 | 5.9 | 5.2 | 4.2 | 3.1 | 2.0 | 1.6 | 3.9 |
| | Min/Max | 1.6/2.2 | 2.3/3.4 | 3.3/4.2 | 4.0/5.4 | 4.7/6.3 | 5.0/6.8 | 5.2/6.5 | 4.6/5.9 | 3.6/4.7 | 2.6/3.7 | 1.6/2.3 | 1.3/1.7 | 3.7/4.1 |
| Latitude -15 | Average | 2.8 | 3.6 | 4.4 | 5.1 | 5.5 | 5.8 | 5.8 | 5.5 | 4.8 | 4.0 | 2.7 | 2.3 | 4.4 |
| | Min/Max | 2.2/3.4 | 3.0/4.7 | 3.9/5.1 | 4.2/6.0 | 4.7/6.4 | 4.8/6.7 | 5.1/6.5 | 4.8/6.3 | 4.0/5.5 | 3.3/5.0 | 1.9/3.5 | 1.6/2.7 | 4.2/4.7 |
| Latitude | Average | 3.1 | 3.9 | 4.5 | 5.0 | 5.2 | 5.4 | 5.4 | 5.3 | 4.9 | 4.2 | 3.0 | 2.6 | 4.4 |
| | Min/Max | 2.4/3.9 | 3.2/5.2 | 4.0/5.3 | 4.0/5.9 | 4.4/6.0 | 4.5/6.2 | 4.7/6.0 | 4.6/6.1 | 3.9/5.6 | 3.5/5.3 | 2.0/4.0 | 1.6/3.1 | 4.2/4.7 |
| Latitude +15 | Average | 3.3 | 4.0 | 4.4 | 4.6 | 4.6 | 4.7 | 4.8 | 4.8 | 4.6 | 4.2 | 3.1 | 2.8 | 4.2 |
| | Min/Max | 2.5/4.2 | 3.3/5.4 | 3.8/5.2 | 3.7/5.5 | 3.9/5.3 | 3.9/5.3 | 4.2/5.3 | 4.2/5.5 | 3.7/5.4 | 3.4/5.4 | 2.0/4.2 | 1.7/3.3 | 3.9/4.5 |
| 90 | Average | 3.1 | 3.6 | 3.4 | 3.0 | 2.6 | 2.5 | 2.6 | 2.9 | 3.3 | 3.4 | 2.8 | 2.6 | 3.0 |
| | Min/Max | 2.4/4.0 | 2.8/5.0 | 2.8/4.0 | 2.5/3.6 | 2.3/2.9 | 2.2/2.7 | 2.4/2.8 | 2.6/3.3 | 2.6/3.8 | 2.7/4.4 | 1.7/3.8 | 1.4/3.2 | 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 | 2.6 | 3.7 | 4.9 | 6.0 | 6.8 | 7.4 | 7.3 | 6.7 | 5.5 | 4.2 | 2.6 | 2.1 | 5.0 |
| | Min/Max | 2.1/3.2 | 3.0/4.9 | 4.1/5.8 | 4.7/7.5 | 5.6/8.3 | 5.8/8.7 | 6.2/8.5 | 5.8/7.8 | 4.3/6.4 | 3.4/5.4 | 1.8/3.4 | 1.4/2.5 | 4.7/5.4 |
| Latitude -15 | Average | 3.3 | 4.4 | 5.4 | 6.4 | 6.9 | 7.4 | 7.4 | 6.9 | 6.0 | 4.8 | 3.2 | 2.7 | 5.4 |
| | Min/Max | 2.5/4.1 | 3.5/5.9 | 4.6/6.6 | 4.9/7.9 | 5.6/8.5 | 5.8/8.7 | 6.2/8.6 | 5.9/8.2 | 4.6/7.1 | 3.9/6.3 | 2.1/4.3 | 1.6/3.2 | 5.0/5.9 |
| Latitude | Average | 3.6 | 4.6 | 5.5 | 6.3 | 6.7 | 7.1 | 7.1 | 6.8 | 6.0 | 5.0 | 3.4 | 2.9 | 5.4 |
| | Min/Max | 2.7/4.5 | 3.7/6.3 | 4.6/6.7 | 4.8/7.9 | 5.4/8.3 | 5.5/8.4 | 5.9/8.3 | 5.8/8.0 | 4.6/7.1 | 4.0/6.6 | 2.2/4.7 | 1.7/3.6 | 5.0/5.9 |
| Latitude +15 | Average | 3.8 | 4.7 | 5.4 | 6.0 | 6.2 | 6.6 | 6.6 | 6.5 | 5.9 | 5.1 | 3.5 | 3.1 | 5.3 |
| | Min/Max | 2.8/4.8 | 3.7/6.4 | 4.5/6.7 | 4.6/7.6 | 5.1/7.8 | 5.1/7.8 | 5.5/7.7 | 5.5/7.6 | 4.5/7.0 | 4.0/6.7 | 2.2/4.8 | 1.8/3.8 | 4.9/5.8 |

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 | 3.8 | 4.7 | 5.6 | 6.4 | 7.0 | 7.5 | 7.5 | 7.0 | 6.0 | 5.1 | 3.6 | 3.1 | 5.6 |
| | Min/Max | 2.9/4.8 | 3.7/6.4 | 4.6/6.8 | 4.9/8.0 | 5.7/8.6 | 5.9/8.9 | 6.3/8.7 | 6.0/8.2 | 4.7/7.2 | 4.0/6.7 | 2.2/4.9 | 1.8/3.8 | 5.2/6.1 |

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 | 2.0 | 2.4 | 2.5 | 2.7 | 2.9 | 3.2 | 3.2 | 3.0 | 2.7 | 2.6 | 1.9 | 1.7 | 2.6 |
| | Min/Max | 1.4/2.8 | 1.5/3.6 | 1.9/3.6 | 1.6/3.8 | 2.0/4.2 | 1.9/4.4 | 2.2/4.1 | 2.2/3.9 | 1.7/3.5 | 1.7/3.9 | 0.8/3.0 | 0.6/2.4 | 2.2/3.0 |
| 1-Axis, N-S Horiz Axis | Average | 1.5 | 2.1 | 2.8 | 3.5 | 3.8 | 4.2 | 4.2 | 3.9 | 3.2 | 2.5 | 1.4 | 1.1 | 2.9 |
| | Min/Max | 1.0/2.0 | 1.4/3.2 | 2.1/4.0 | 2.1/5.0 | 2.6/5.5 | 2.5/5.7 | 2.8/5.4 | 2.9/5.0 | 2.0/4.2 | 1.6/3.8 | 0.6/2.3 | 0.4/1.6 | 2.5/3.3 |
| 1-Axis, N-S Tilt=Latitude | Average | 2.2 | 2.8 | 3.4 | 3.7 | 3.7 | 3.9 | 4.0 | 4.0 | 3.7 | 3.3 | 2.1 | 1.8 | 3.2 |
| | Min/Max | 1.5/3.0 | 1.8/4.3 | 2.5/4.7 | 2.2/5.3 | 2.5/5.4 | 2.4/5.3 | 2.7/5.2 | 3.0/5.2 | 2.3/4.8 | 2.1/4.9 | 0.9/3.3 | 0.7/2.5 | 2.8/3.7 |
| 2-Axis | Average | 2.4 | 2.9 | 3.4 | 3.8 | 3.9 | 4.3 | 4.3 | 4.1 | 3.7 | 3.3 | 2.2 | 2.0 | 3.4 |
| | Min/Max | 1.6/3.2 | 1.9/4.4 | 2.5/4.7 | 2.3/5.4 | 2.7/5.7 | 2.6/5.8 | 2.9/5.6 | 3.1/5.3 | 2.3/4.8 | 2.1/5.0 | 1.0/3.5 | 0.7/2.7 | 2.9/3.8 |

Average Climatic Conditions

| Element | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Year |
|-----------------------|-------|-------|-------|------|------|------|------|------|------|------|-------|-------|-------|
| Temperature (°C) | -3.0 | -1.5 | 4.1 | 9.8 | 15.7 | 20.8 | 23.4 | 22.3 | 18.2 | 11.8 | 6.2 | -0.1 | 10.7 |
| Daily Minimum Temp | -7.3 | -6.2 | -1.2 | 3.8 | 9.6 | 14.9 | 17.6 | 16.7 | 12.3 | 5.8 | 1.2 | -4.2 | 5.3 |
| Daily Maximum Temp | 1.3 | 3.2 | 9.3 | 15.8 | 21.8 | 26.7 | 29.2 | 27.9 | 23.9 | 17.7 | 11.0 | 4.0 | 16.0 |
| Record Minimum Temp | -24.4 | -21.7 | -18.3 | -8.9 | -2.2 | 3.9 | 8.9 | 5.0 | -1.1 | -6.1 | -11.7 | -22.2 | -24.4 |
| Record Maximum Temp | 22.2 | 24.4 | 30.0 | 33.9 | 36.1 | 37.8 | 40.6 | 37.8 | 37.2 | 32.2 | 27.2 | 22.2 | 40.6 |
| HDD, Base 18.3°C | 661 | 556 | 441 | 255 | 102 | 6 | 0 | 4 | 46 | 207 | 365 | 572 | 3214 |
| CDD, Base 18.3°C | 0 | 0 | 0 | 0 | 21 | 79 | 157 | 128 | 41 | 4 | 0 | 0 | 429 |
| Relative Humidity (%) | 69 | 67 | 62 | 61 | 66 | 68 | 69 | 72 | 74 | 72 | 70 | 71 | 68 |
| Wind Speed (m/s) | 4.6 | 4.6 | 4.9 | 4.8 | 4.1 | 3.7 | 3.2 | 3.2 | 3.3 | 3.6 | 4.3 | 4.4 | 4.1 |