# Scenario — PV
# GEMINI-60-house-part-of-a-settlement  Mexico - Mexico city  19.294, -99.201

| Name | Slope ° | Azimuth ° | Wp | Wall d/h m | Face | Bifacial | Wp counted |
|---|---|---|---|---|---|---|---|
| Roof East | 22 | -90 | 19,800 | — | front | — | yes |
| Roof West | 22 | 90 | 19,800 | — | front | — | yes |
| Terrace railing south | 90 | 0 | 4,620 | 5 / 4 | front | — | yes |
| Terrace railing north | 90 | 180 | 4,620 | 5 / 4 | front | — | yes |
| share central structure east part | 8 | -90 | 20,460 | — | front | — | yes |
| share central strucure west part | 8 | 90 | 20,460 | — | front | — | yes |
| Total counted | | | 89,760 | | | | |

Location: A big city high in the mountains. Very sunny and dry.
Database PVGIS-ERA5  2005–2023  loss 14 %  azimuth 0 = south, 90 = west, −90 = east.
Price bands and charts use UTC-7 from longitude (15° per hour), not the political time zone.
Peak hour 2016-03-11 11:30 local (18:30 UTC)  70,041 W  0.780 W/Wp of 89,760 Wp.
Database gaps: 0 days with 0 yield while the sun reached the horizon at noon.  Yield charts skip them. The simulation uses the lowest-yield day of that month.
Sell when the export price is above 0. At 0 cent export PV yield only, not the battery. Do not sell when the earning is negative. At 15:00 import/export scheduling.

Click here to work on this simulation. If the click does nothing, copy the address below and paste it in the browser. PEGE energy sim server has to run.

http://127.0.0.1:8765/form?name=Mexico+-+Mexico+city&simname=with+40+kW+grid&lat=19.294&lon=-99.201&startyear=2005&endyear=2023&loss=14.0&raddatabase=auto&usehorizon=1&outdir=%2Fhome%2Ffounder%2Finternet%2Fgemini-next-generation

# Scenario — house, heat pump, battery
# GEMINI-60-house-part-of-a-settlement  Mexico - Mexico city  19.294, -99.201

| Chapter | Parameter | Value |
|---|---|---|
| Building | Design out / in / heat | -10.0 °C / 20.0 °C / 1,600 W |
| | Heat on / cool on / ground | 22.0 °C / 25.0 °C / 10.0 °C |
| | Curve / flow min / max | 0.3 / 25.0 °C / 55.0 °C |
| | Thermal mass of the house | 25.0 kWh/K |
| | Household only | 4.0 kWh/day |
| DHW | Litres at 40 °C / tank | 200 L  tank 42.0 °C  8–18 h |
| | Water out of the pipe Q1–Q4 | 10 °C  13 °C  15 °C  12 °C |
| Heat pump | Source | air and ground |
| | COP −10/0/10 @ 35 °C | 2.4  3.4  4.5 |
| | COP −10/0/10 @ 50 °C | 1.9  2.6  3.3 |
| | kW −10/0/10 @ 35 °C | 4.0  5.0  6.0 |
| | kW −10/0/10 @ 50 °C | 3.5  4.5  5.0 |
| Battery | kWh / C-rate / SOC min–max–start | 257.2 kWh  C 0.5  5 / 95 / 50 % |
| | Nameplate | — |
| | Charge / discharge η | 95 % / 90 % |
| Grid | Inverter / grid connection | 54.0 kW / 40.0 kW |
| | Max export | 40.0 kW |
| | Import cap Jan–Jun kW | Jan 2  Feb 2  Mar 2  Apr 2  May 2  Jun 2 |
| | Import cap Jul–Dec kW | Jul 2  Aug 2  Sep 2  Oct 2  Nov 2  Dec 2 |
| Cars | Lunch DC / night AC | 0.0 kWh @ 100.0 kW  night 10.0 kWh @ 11.0 kW |

Clock is winter time UTC+1. Emergency import is an hour above the monthly kW cap.

# Records 1–10 contribution of each PV
# Mexico - Mexico city  19.294, -99.201

| PV | 2016-03-11 18:30 | 2012-04-24 18:30 | 2019-04-12 18:30 | 2013-04-13 18:30 | 2012-04-25 18:30 | 2007-04-10 18:30 | 2016-03-11 19:30 | 2007-04-12 18:30 | 2010-04-30 18:30 | 2017-04-02 18:30 |
|---|---|---|---|---|---|---|---|---|---|---|
| Roof East | 16,698 | 16,489 | 16,450 | 16,435 | 16,427 | 16,421 | 14,809 | 16,405 | 16,371 | 16,343 |
| Roof West | 15,753 | 16,247 | 16,057 | 16,055 | 16,192 | 16,004 | 17,101 | 16,020 | 16,178 | 15,794 |
| Terrace railing south | 2,145 | 763 | 1,061 | 1,030 | 733 | 1,131 | 2,104 | 1,077 | 633 | 1,363 |
| Terrace railing north | 152 | 146 | 141 | 143 | 146 | 149 | 148 | 154 | 145 | 144 |
| share central structure east part | 17,823 | 17,813 | 17,742 | 17,735 | 17,763 | 17,691 | 16,947 | 17,678 | 17,711 | 17,574 |
| share central strucure west part | 17,469 | 17,722 | 17,595 | 17,592 | 17,675 | 17,535 | 17,806 | 17,534 | 17,639 | 17,368 |
| Watt at record | 70,041 | 69,181 | 69,047 | 68,990 | 68,937 | 68,931 | 68,915 | 68,870 | 68,678 | 68,585 |
| Percent of installed peak | 78.0 | 77.1 | 76.9 | 76.9 | 76.8 | 76.8 | 76.8 | 76.7 | 76.5 | 76.4 |

Values are watts at that hour. Date and time are UTC. Record 70,041 W  (78.0 % of 89,760 Wp).

## Hours at or above a share of the record
## Mexico - Mexico city  19.294, -99.201

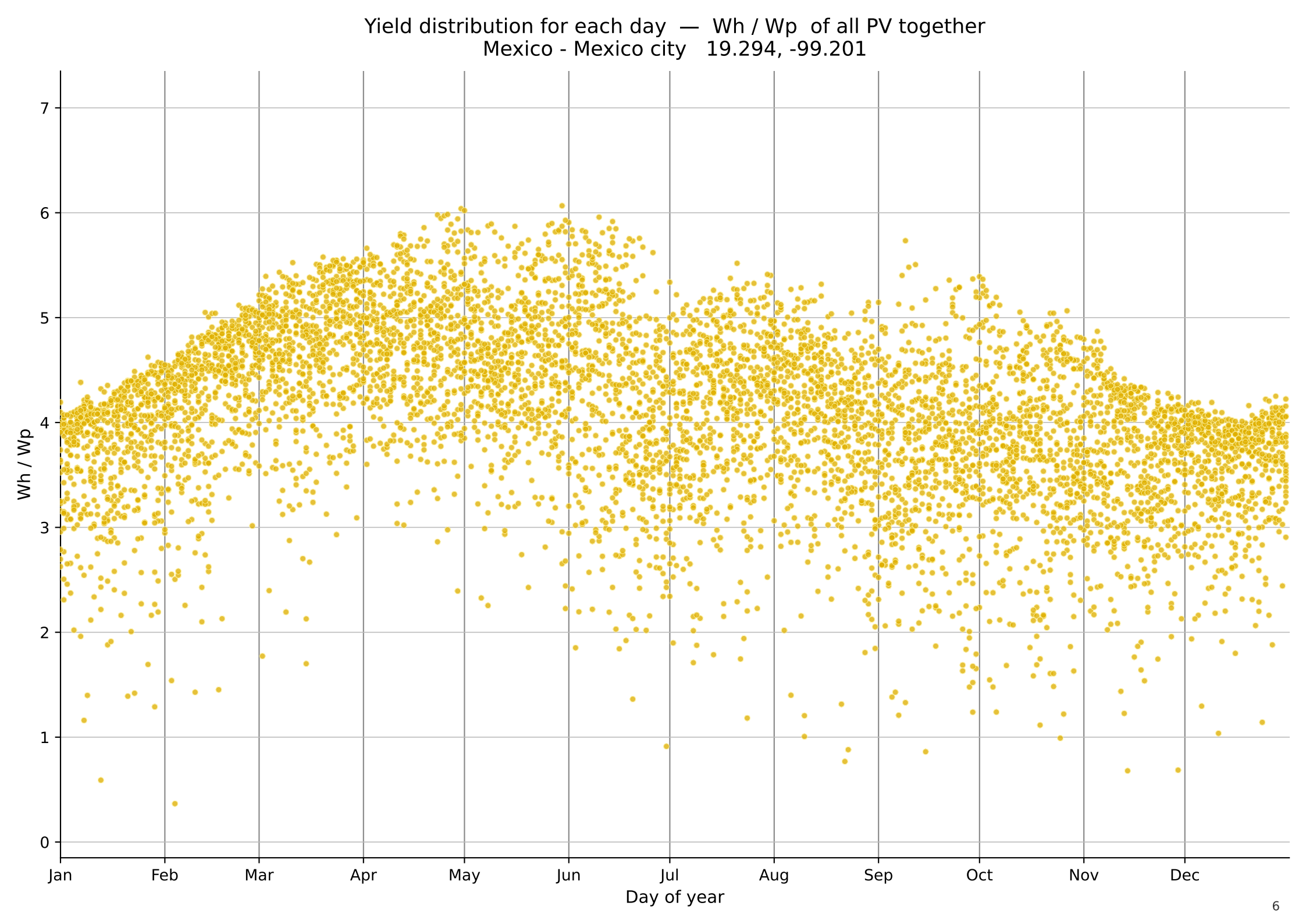
| Of the record | Hours | Watts |
|---|---|---|
| 98 % | 9 | 68,640 W |
| 96 % | 61 | 67,239 W |
| 94 % | 201 | 65,838 W |
| 92 % | 546 | 64,437 W |
| 90 % | 1,138 | 63,037 W |

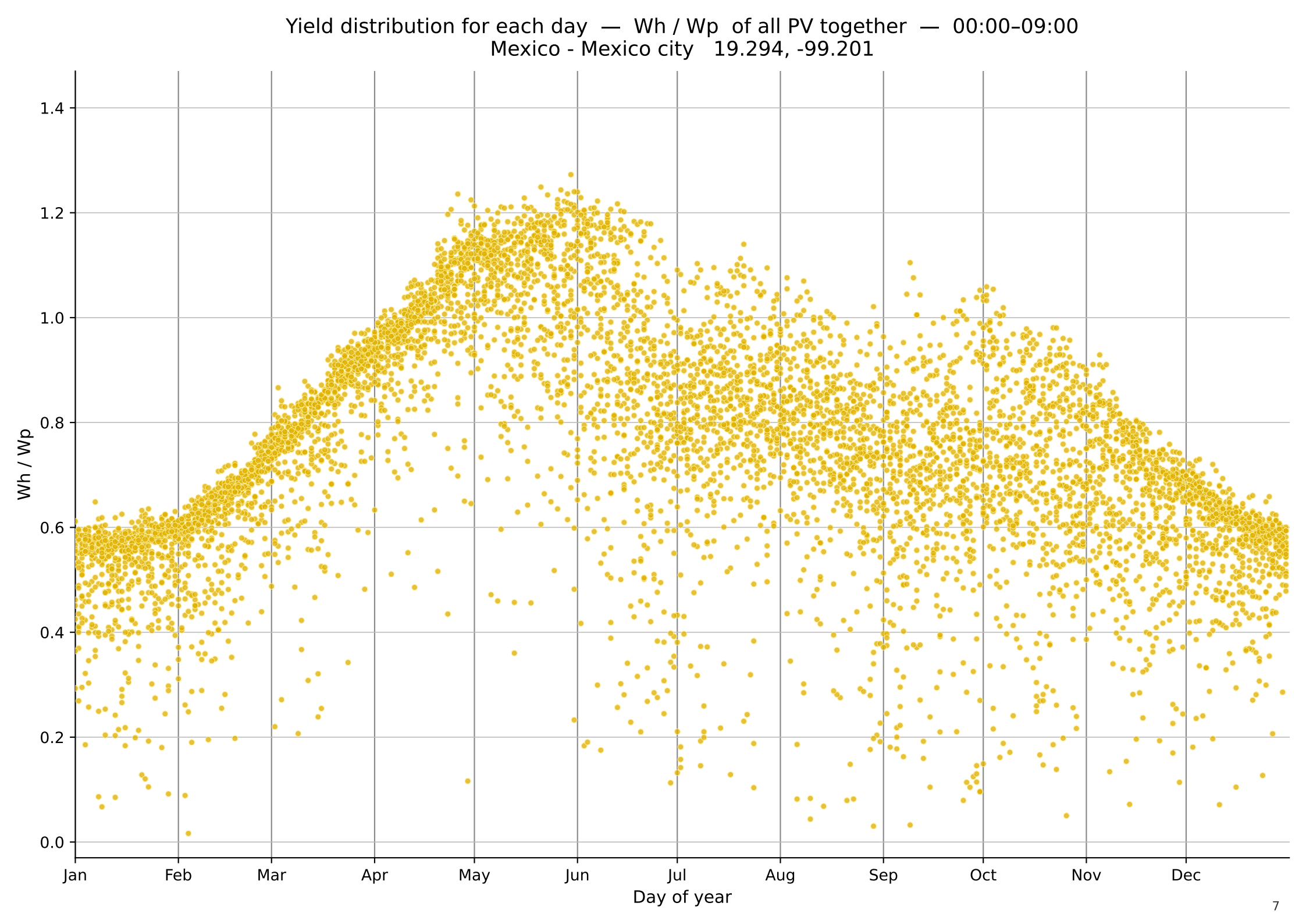
Record hour = 70,041 W combined.

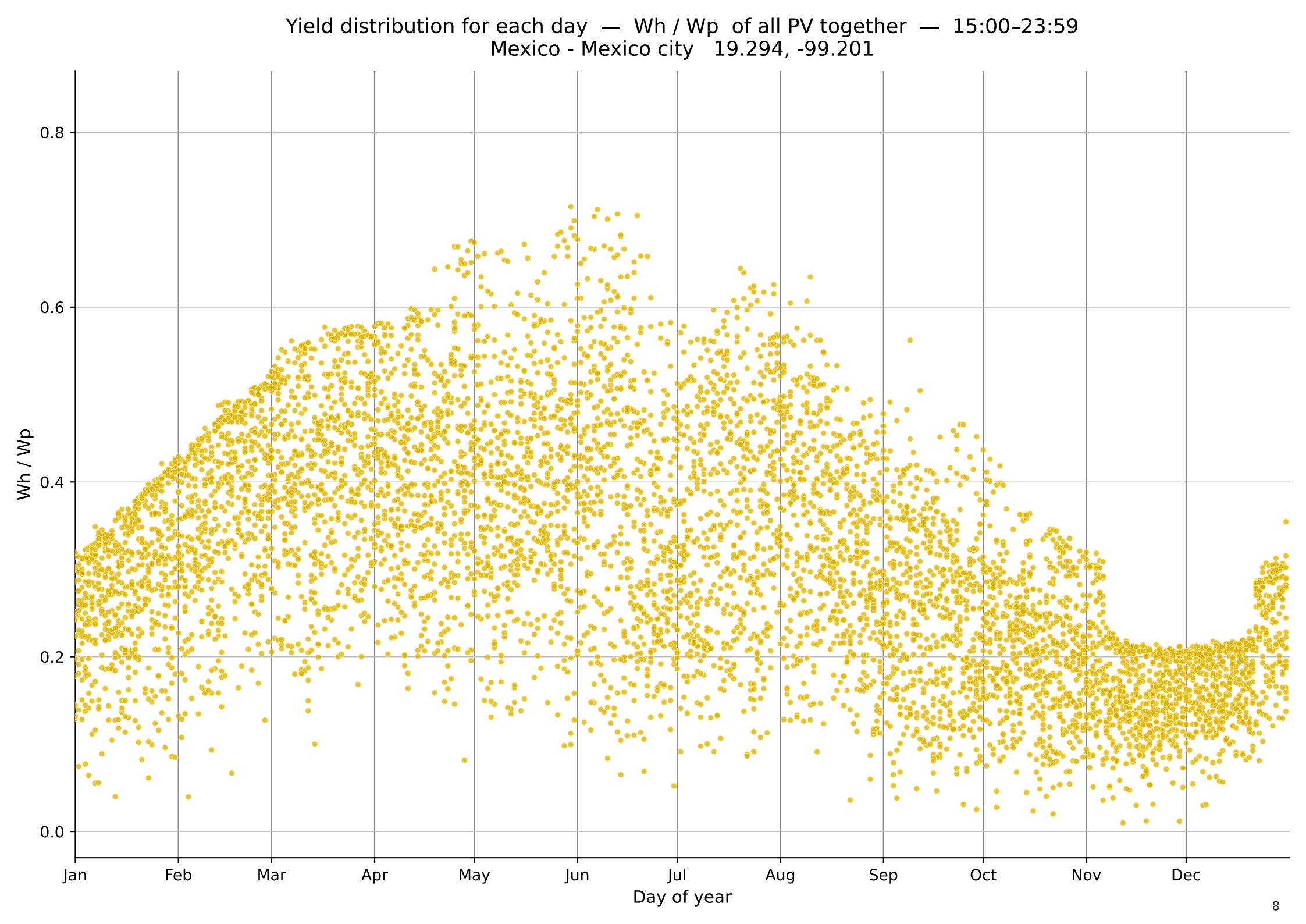
# Records of each photovoltaic field
# Mexico - Mexico city  19.294, -99.201

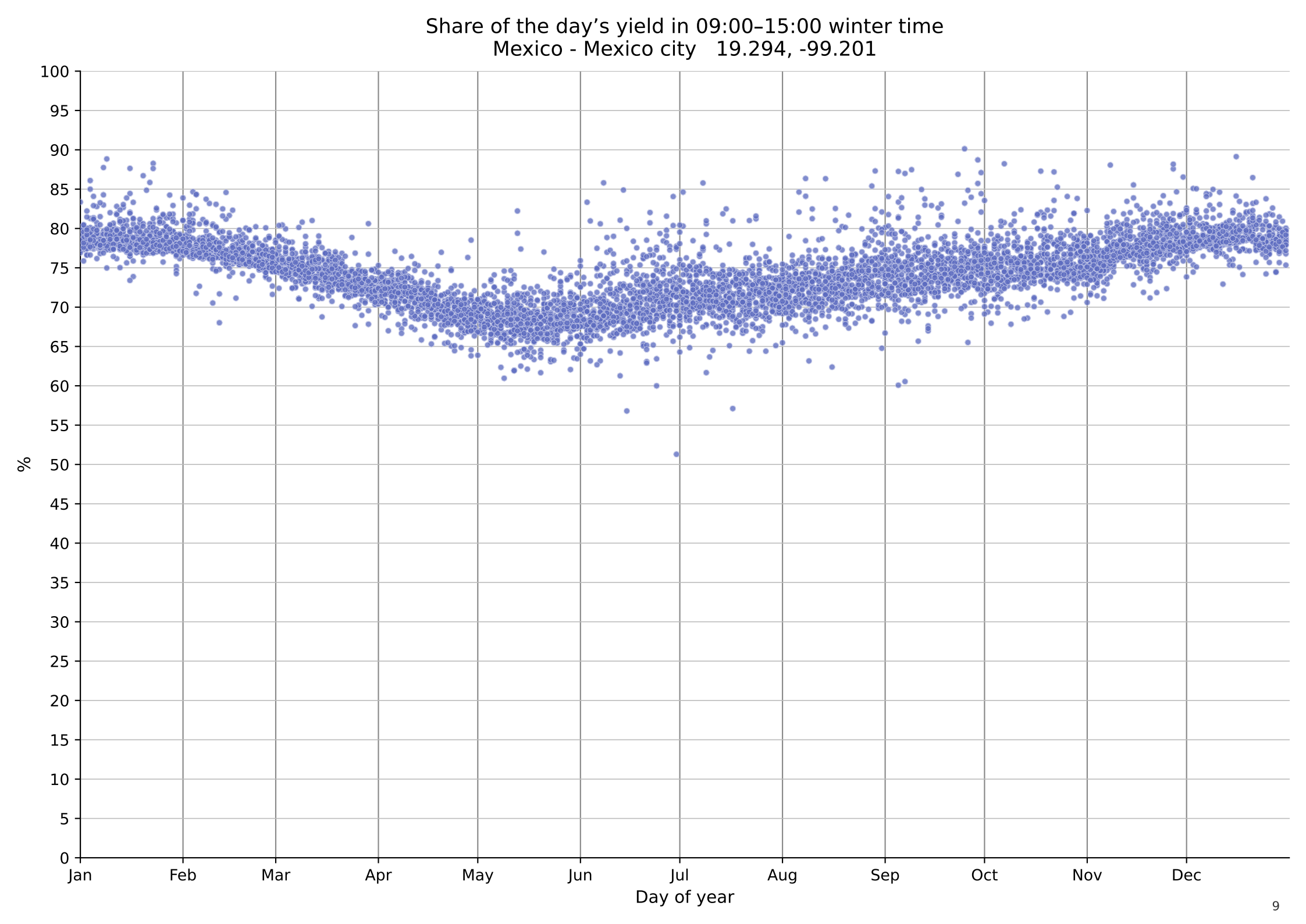
| PV | Date | Watts | % | h ≥98% | h ≥96% | h ≥94% | h ≥92% | h ≥90% |
|---|---|---|---|---|---|---|---|---|
| Roof East | 2012-04-24 17:30 | 17,465 | 88.2 | 11 | 65 | 240 | 661 | 1444 |
| Roof West | 2012-04-25 19:30 | 17,364 | 87.7 | 12 | 48 | 172 | 412 | 721 |
| Terrace railing south | 2006-12-28 18:30 | 3,299 | 71.4 | 7 | 47 | 184 | 586 | 1213 |
| Terrace railing north | 2012-06-15 17:30 | 1,146 | 24.8 | 1 | 1 | 3 | 6 | 19 |
| share central structure east part | 2012-04-24 17:30 | 17,901 | 87.5 | 20 | 99 | 324 | 729 | 1361 |
| share central strucure west part | 2012-04-25 19:30 | 17,952 | 87.7 | 16 | 60 | 228 | 527 | 943 |

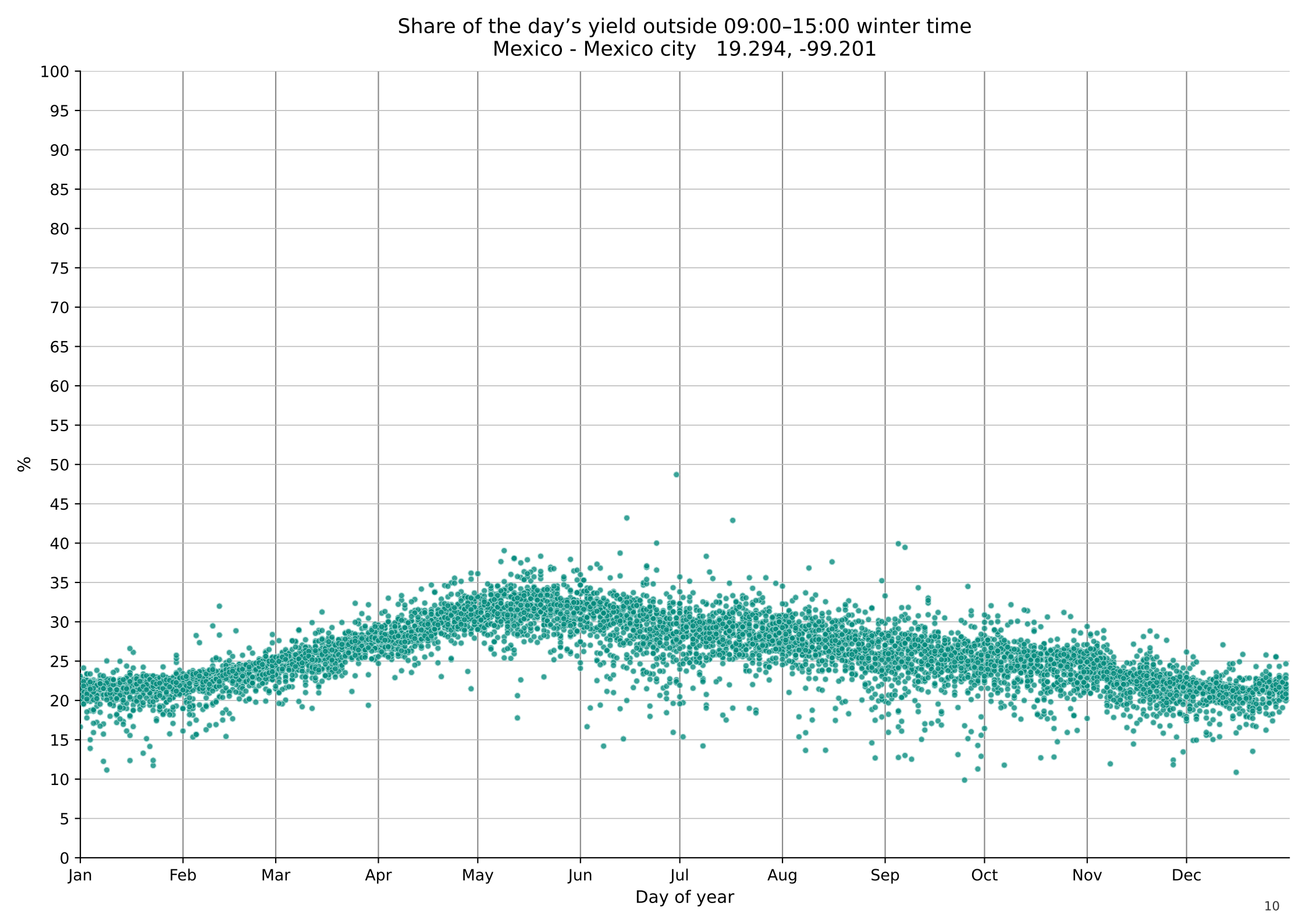
Watts is the highest hour of that field. % is of its own Wp. Hours are the count of hours at or above that share of its own record. Use this to size the MPPT or the inverter for that field.

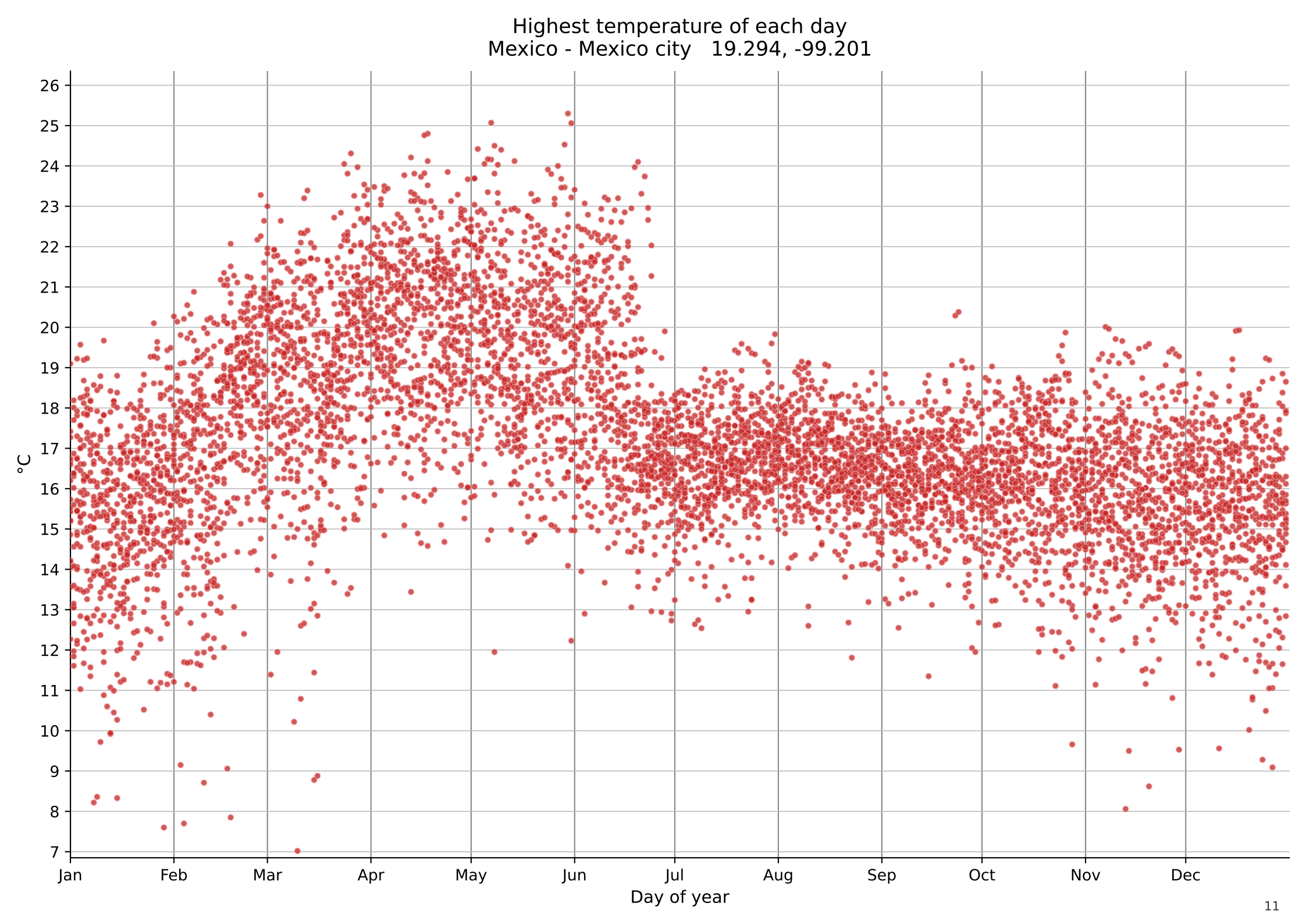

Yield distribution for each day — Wh / Wp of all PV together
Mexico - Mexico city 19.294, -99.201
Wh / Wp
0
1
2
3
4
5
6
7
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year

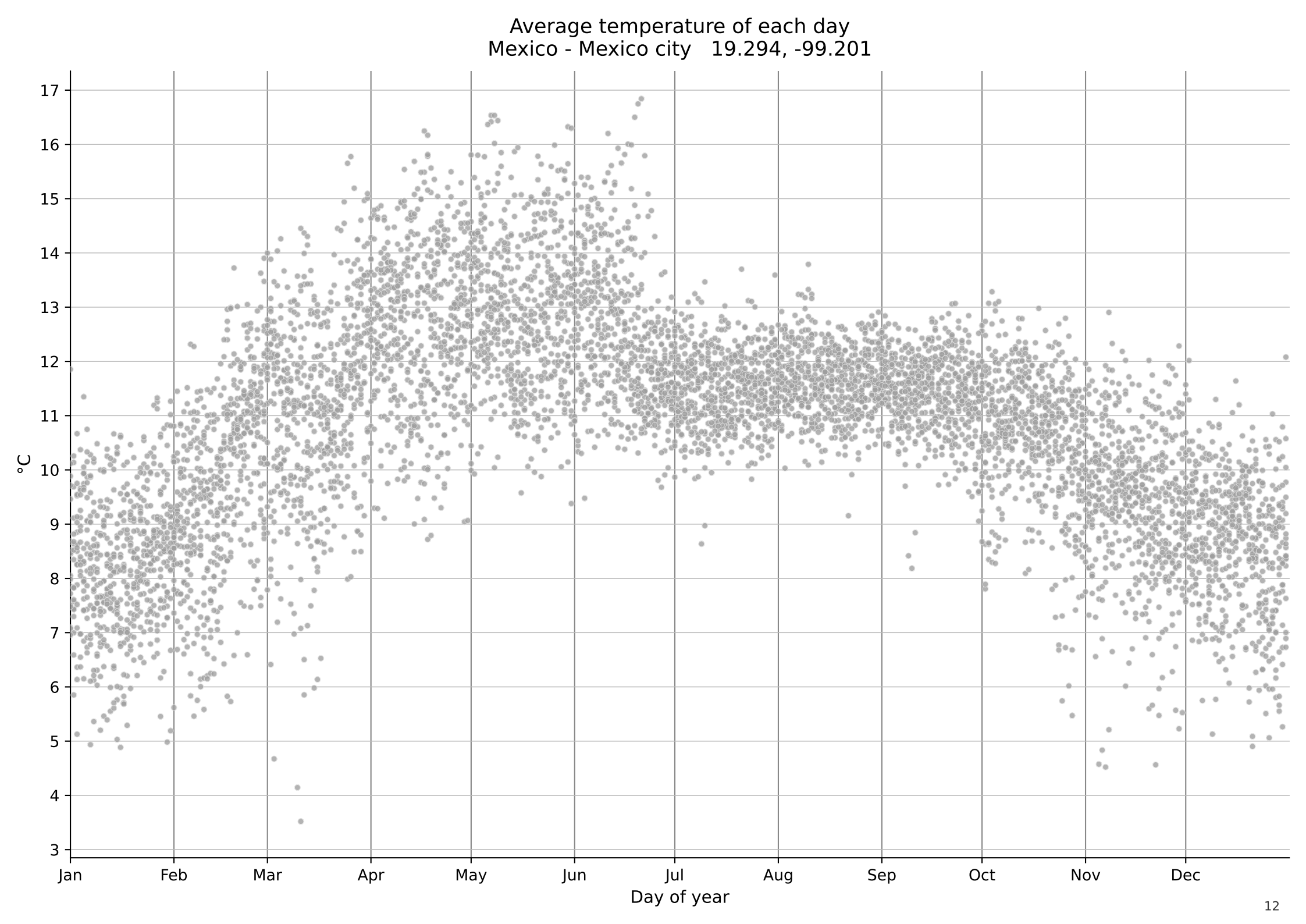

Yield distribution for each day — Wh / Wp of all PV together — 00:00–09:00
Mexico - Mexico city 19.294, -99.201
Wh / Wp
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year

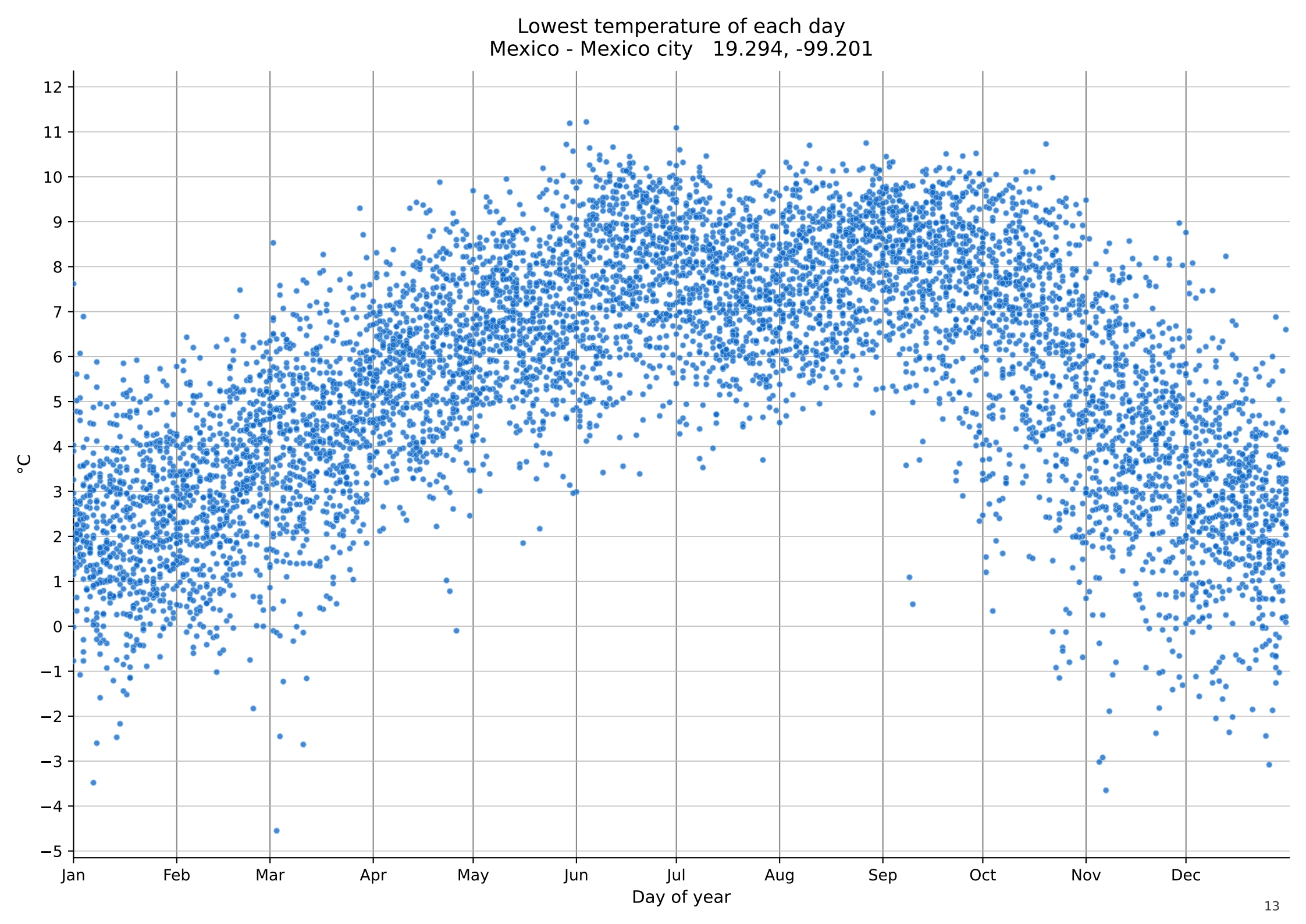

Yield distribution for each day — Wh / Wp of all PV together — 15:00–23:59
Mexico - Mexico city 19.294, -99.201
Wh / Wp
0.0
0.2
0.4
0.6
0.8
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year

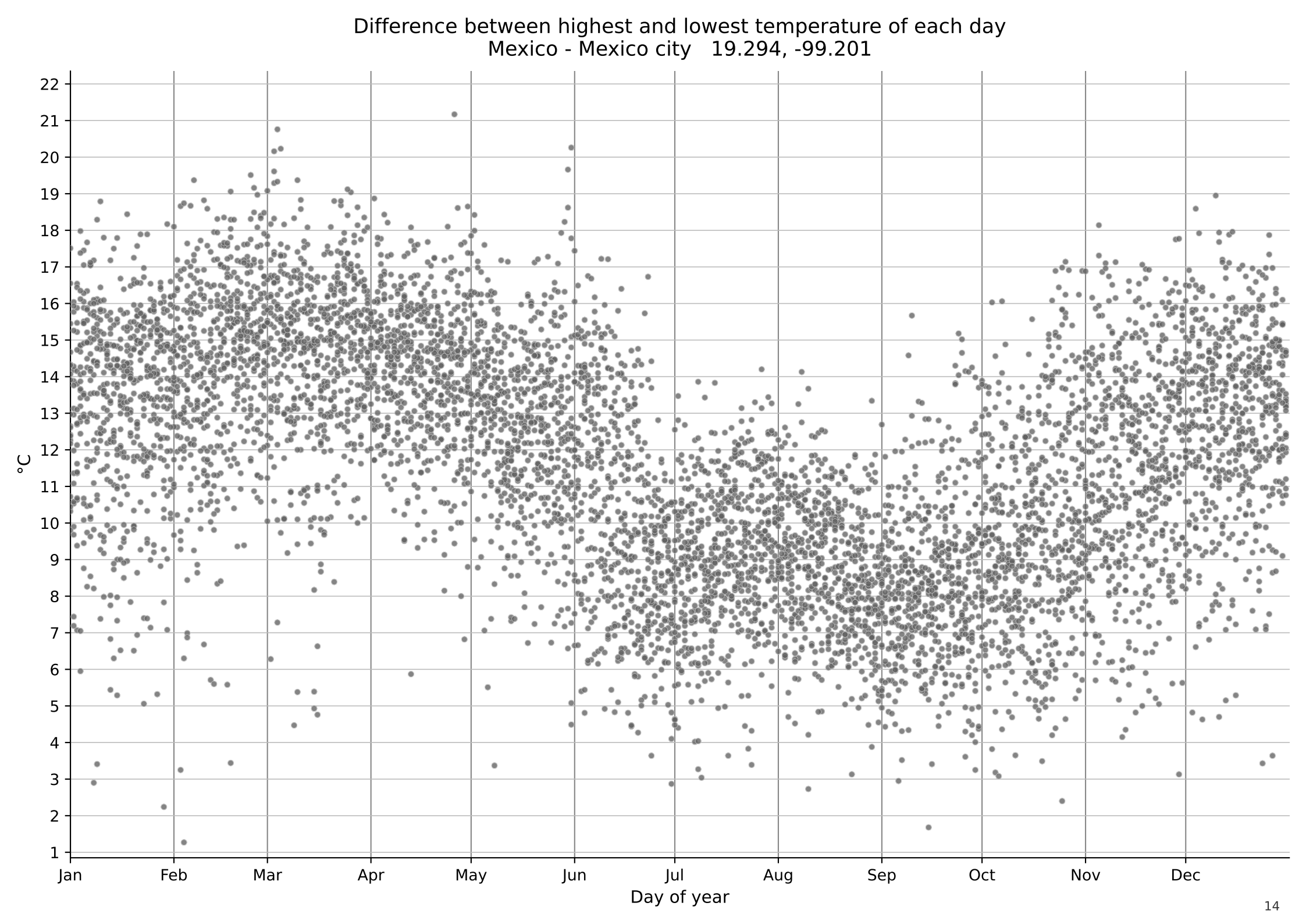

Share of the day’s yield in 09:00–15:00 winter time
Mexico - Mexico city 19.294, -99.201
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
%
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year


Share of the day’s yield outside 09:00–15:00 winter time
Mexico - Mexico city 19.294, -99.201
%
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year


Highest temperature of each day
Mexico - Mexico city 19.294, -99.201
°C
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year


Average temperature of each day
Mexico - Mexico city 19.294, -99.201
°C
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year


Lowest temperature of each day
Mexico - Mexico city 19.294, -99.201
°C
12
11
10
9
8
7
6
5
4
3
2
1
0
−1
−2
−3
−4
−5
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year


Difference between highest and lowest temperature of each day
Mexico - Mexico city 19.294, -99.201
°C
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year

# Monthly and yearly specific yield (kWh/kWp = Wh/Wp)
# Mexico - Mexico city 19.294, -99.201

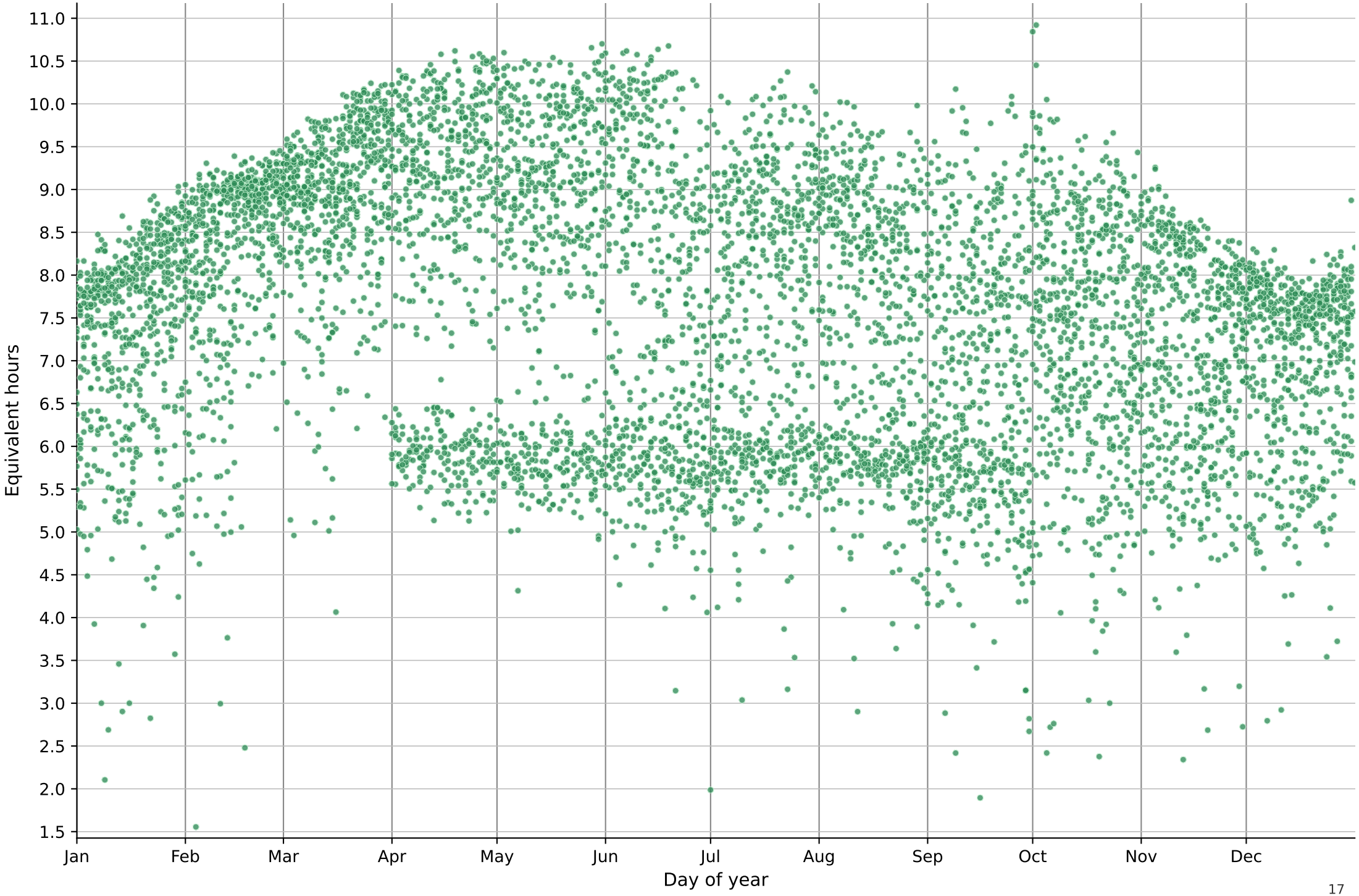
| Month / year | | Roof East 22°/-90° 19,800 Wp | Roof West 22°/90° 19,800 Wp | Terrace railing south 90°/0° 4,620 Wp | Terrace railing north 90°/180° 4,620 Wp | share central structure east 8°/-90° 20,460 Wp | share central strucure west p 8°/90° 20,460 Wp | All together |
|---|---|---|---|---|---|---|---|---|
| January | Maximum | 136.94 | 129.57 | 82.22 | 13.27 | 137.48 | 134.99 | 125.49 |
| | average | 126.73 | 117.50 | 76.53 | 10.14 | 126.81 | 123.49 | 115.39 |
| | minimum | 108.20 | 102.93 | 66.27 | 7.49 | 109.36 | 107.55 | 100.10 |
| February | Maximum | 141.77 | 133.01 | 82.50 | 15.67 | 143.15 | 139.99 | 129.82 |
| | average | 132.49 | 121.64 | 77.19 | 10.45 | 133.01 | 128.95 | 120.28 |
| | minimum | 116.70 | 105.45 | 68.79 | 8.06 | 116.86 | 112.52 | 105.64 |
| March | Maximum | 171.00 | 156.68 | 78.92 | 17.67 | 172.79 | 166.61 | 154.06 |
| | average | 162.11 | 145.64 | 75.63 | 13.60 | 163.14 | 156.50 | 145.34 |
| | minimum | 143.84 | 132.51 | 69.72 | 11.29 | 145.60 | 141.12 | 130.75 |
| April | Maximum | 170.03 | 154.51 | 42.02 | 20.59 | 171.57 | 165.28 | 151.33 |
| | average | 162.49 | 144.11 | 39.83 | 18.79 | 162.74 | 155.38 | 143.16 |
| | minimum | 153.45 | 132.84 | 38.70 | 17.35 | 152.49 | 144.35 | 133.95 |
| May | Maximum | 178.30 | 159.39 | 23.56 | 38.14 | 178.25 | 170.85 | 156.82 |
| | average | 162.12 | 143.50 | 20.86 | 36.46 | 161.60 | 154.40 | 142.40 |
| | minimum | 143.05 | 126.75 | 17.89 | 35.38 | 143.82 | 138.29 | 127.67 |
| June | Maximum | 167.93 | 155.47 | 21.33 | 43.18 | 170.08 | 165.18 | 150.59 |
| | average | 140.78 | 129.73 | 17.93 | 42.08 | 142.64 | 138.41 | 126.82 |
| | minimum | 121.02 | 112.69 | 12.74 | 40.36 | 123.09 | 119.98 | 110.21 |
| July | Maximum | 156.39 | 143.46 | 22.18 | 41.66 | 158.33 | 153.46 | 140.21 |
| | average | 142.10 | 130.54 | 19.67 | 40.21 | 143.99 | 139.63 | 127.87 |
| | minimum | 120.89 | 110.08 | 16.56 | 38.57 | 122.07 | 118.00 | 108.83 |
| August | Maximum | 149.23 | 140.35 | 34.51 | 27.07 | 152.88 | 149.50 | 135.62 |
| | average | 137.46 | 128.06 | 32.23 | 25.33 | 140.02 | 136.45 | 124.55 |
| | minimum | 129.25 | 116.97 | 30.04 | 23.27 | 131.42 | 126.24 | 116.51 |
| September | Maximum | 146.66 | 138.75 | 58.41 | 19.06 | 150.73 | 147.78 | 134.63 |
| | average | 120.21 | 114.04 | 52.20 | 16.99 | 123.28 | 121.00 | 110.91 |
| | minimum | 99.63 | 93.86 | 46.90 | 12.18 | 101.74 | 99.65 | 91.97 |
| October | Maximum | 148.75 | 142.53 | 81.00 | 15.26 | 151.49 | 149.58 | 137.28 |
| | average | 124.45 | 119.86 | 69.82 | 13.59 | 127.81 | 126.05 | 116.05 |
| | minimum | 111.08 | 110.07 | 64.08 | 9.83 | 115.62 | 115.10 | 105.61 |
| November | Maximum | 134.27 | 126.15 | 88.40 | 12.56 | 136.99 | 133.65 | 124.03 |
| | average | 117.69 | 108.82 | 77.70 | 10.01 | 119.42 | 115.87 | 108.11 |
| | minimum | 104.13 | 98.45 | 70.81 | 6.69 | 106.41 | 104.24 | 96.94 |
| December | Maximum | 134.23 | 124.75 | 83.66 | 12.15 | 135.38 | 131.66 | 122.63 |
| | average | 121.53 | 111.97 | 76.51 | 8.86 | 122.21 | 118.48 | 110.76 |
| | minimum | 101.26 | 97.03 | 65.11 | 6.35 | 103.10 | 101.54 | 94.36 |
| | | | | | | | | |
| All years | Maximum | 1,699.4 | 1,567.4 | 658.0 | 257.1 | 1,714.6 | 1,665.3 | 1,533.5 |
| | average | 1,650.1 | 1,515.4 | 636.1 | 246.5 | 1,666.7 | 1,614.6 | 1,491.7 |
| | minimum | 1,580.4 | 1,440.6 | 609.4 | 236.3 | 1,592.7 | 1,539.3 | 1,424.9 |

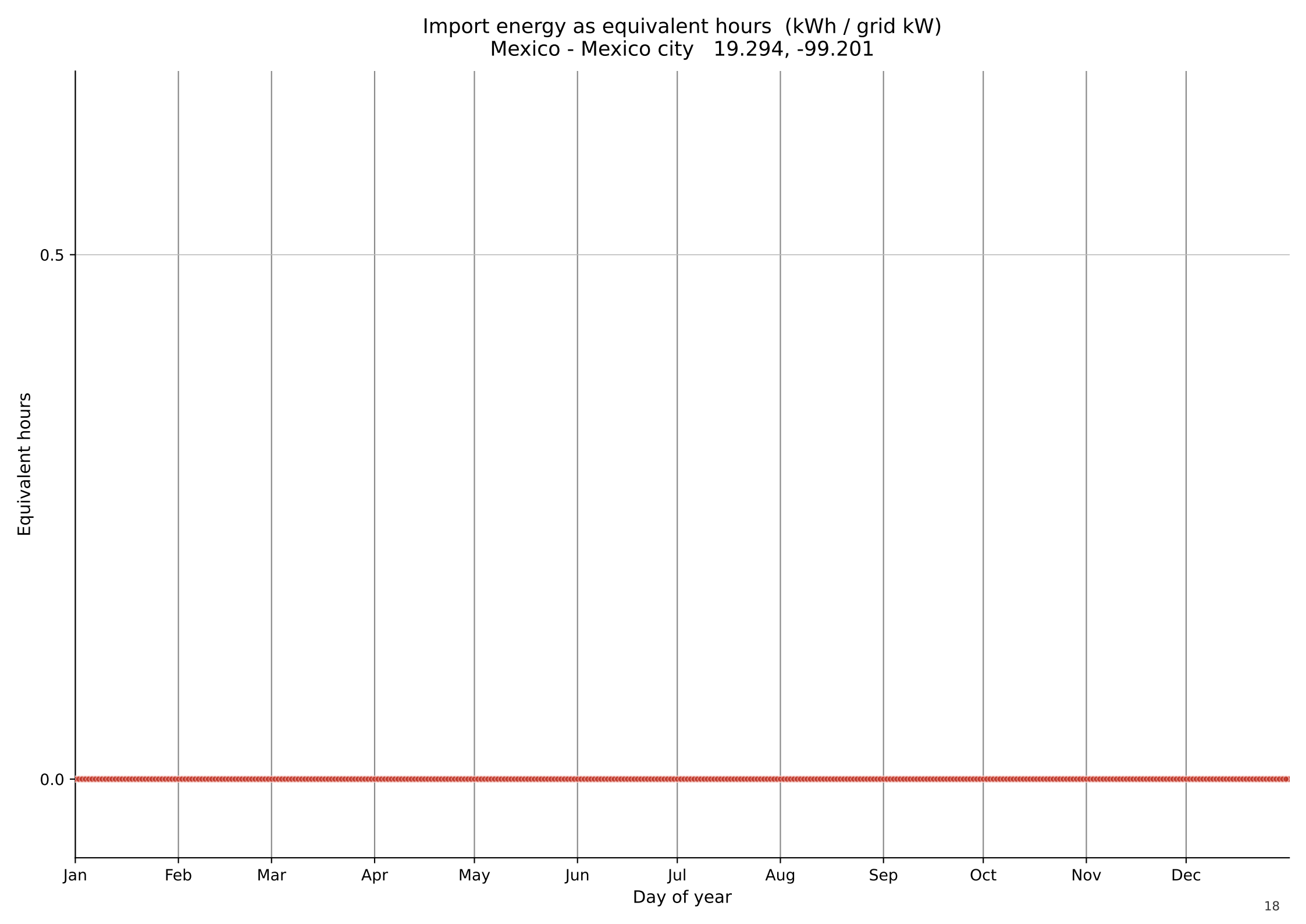
Highest combined yield hour: 2016-03-11 18:30 UTC 70,040.7 W (0.780 W/Wp) of 89,760 Wp installed. Use this hour to size battery charge power.

# Monthly and yearly total yield (kWh)
# Mexico - Mexico city 19.294, -99.201

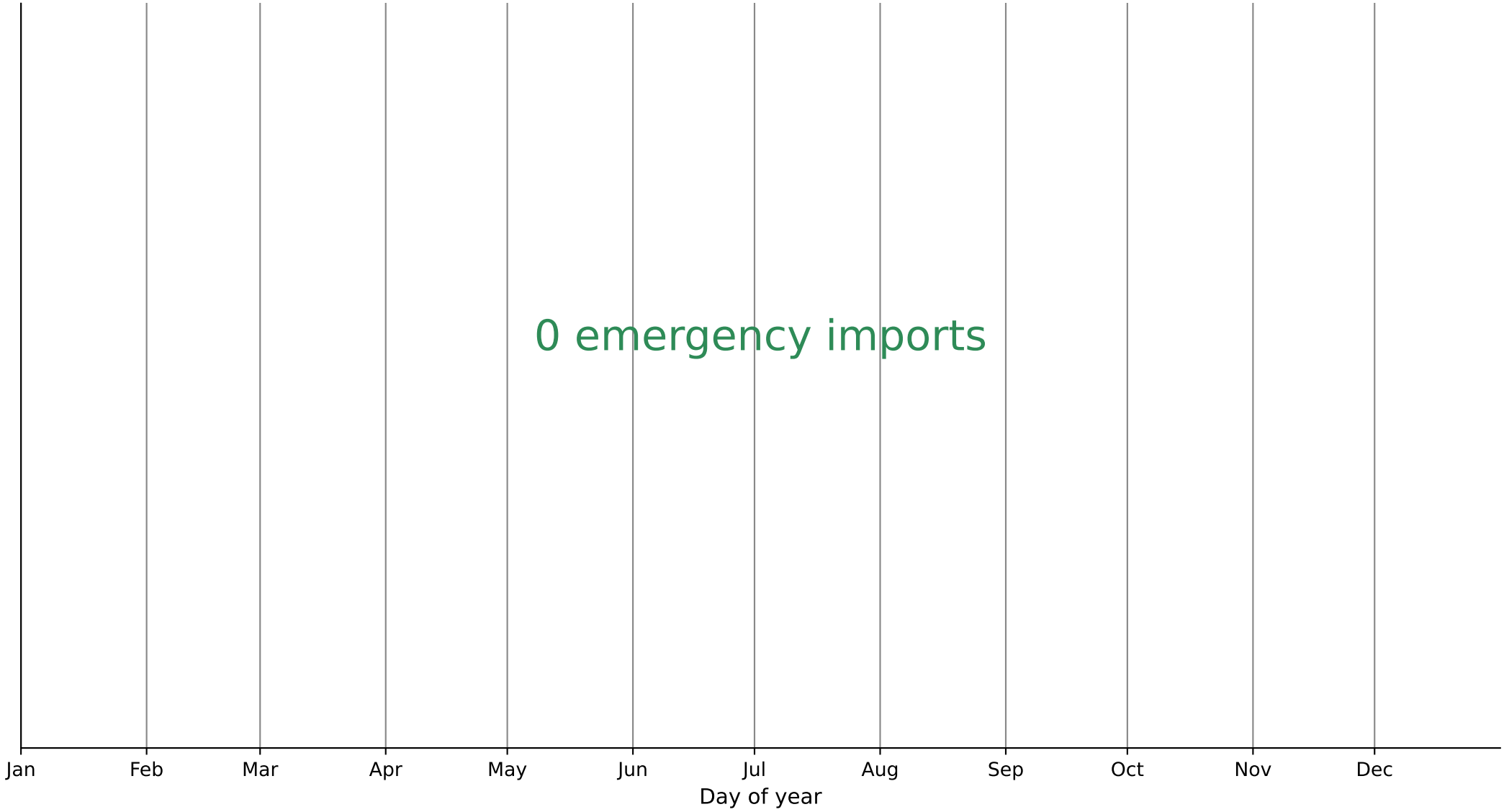
| Month / year | | Roof East 22°/-90° 19,800 Wp | Roof West 22°/90° 19,800 Wp | Terrace railing south 90°/0° 4,620 Wp | Terrace railing north 90°/180° 4,620 Wp | share central structure east 8°/-90° 20,460 Wp | share central strucure west p 8°/90° 20,460 Wp | All together |
|---|---|---|---|---|---|---|---|---|
| January | Maximum | 2,711.47 | 2,565.56 | 379.87 | 61.31 | 2,812.85 | 2,761.89 | 11,263.95 |
| | average | 2,509.29 | 2,326.51 | 353.56 | 46.85 | 2,594.43 | 2,526.57 | 10,357.22 |
| | minimum | 2,142.40 | 2,038.00 | 306.15 | 34.59 | 2,237.46 | 2,200.46 | 8,985.16 |
| February | Maximum | 2,807.09 | 2,633.62 | 381.17 | 72.38 | 2,928.93 | 2,864.28 | 11,652.33 |
| | average | 2,623.33 | 2,408.48 | 356.62 | 48.29 | 2,721.48 | 2,638.35 | 10,796.55 |
| | minimum | 2,310.75 | 2,088.00 | 317.80 | 37.24 | 2,390.98 | 2,302.09 | 9,482.01 |
| March | Maximum | 3,385.76 | 3,102.19 | 364.60 | 81.61 | 3,535.25 | 3,408.89 | 13,828.50 |
| | average | 3,209.70 | 2,883.73 | 349.40 | 62.84 | 3,337.92 | 3,202.00 | 13,045.59 |
| | minimum | 2,847.93 | 2,623.68 | 322.09 | 52.14 | 2,979.05 | 2,887.40 | 11,736.54 |
| April | Maximum | 3,366.55 | 3,059.26 | 194.15 | 95.11 | 3,510.42 | 3,381.69 | 13,583.30 |
| | average | 3,217.24 | 2,853.29 | 184.00 | 86.82 | 3,329.73 | 3,179.04 | 12,850.13 |
| | minimum | 3,038.33 | 2,630.20 | 178.79 | 80.17 | 3,119.89 | 2,953.31 | 12,023.09 |
| May | Maximum | 3,530.37 | 3,155.93 | 108.87 | 176.23 | 3,647.02 | 3,495.52 | 14,076.12 |
| | average | 3,209.88 | 2,841.32 | 96.37 | 168.47 | 3,306.28 | 3,159.07 | 12,781.39 |
| | minimum | 2,832.38 | 2,509.71 | 82.65 | 163.47 | 2,942.51 | 2,829.41 | 11,459.47 |
| June | Maximum | 3,325.00 | 3,078.40 | 98.55 | 199.47 | 3,479.82 | 3,379.62 | 13,516.92 |
| | average | 2,787.44 | 2,568.75 | 82.83 | 194.40 | 2,918.38 | 2,831.91 | 11,383.71 |
| | minimum | 2,396.21 | 2,231.27 | 58.87 | 186.46 | 2,518.33 | 2,454.87 | 9,892.64 |
| July | Maximum | 3,096.55 | 2,840.55 | 102.47 | 192.46 | 3,239.43 | 3,139.70 | 12,585.62 |
| | average | 2,813.55 | 2,584.61 | 90.89 | 185.77 | 2,945.97 | 2,856.87 | 11,477.66 |
| | minimum | 2,393.56 | 2,179.58 | 76.51 | 178.21 | 2,497.60 | 2,414.34 | 9,768.68 |
| August | Maximum | 2,954.69 | 2,778.98 | 159.45 | 125.07 | 3,128.02 | 3,058.77 | 12,173.51 |
| | average | 2,721.80 | 2,535.64 | 148.90 | 117.04 | 2,864.82 | 2,791.75 | 11,179.95 |
| | minimum | 2,559.08 | 2,315.97 | 138.77 | 107.52 | 2,688.91 | 2,582.85 | 10,457.71 |
| September | Maximum | 2,903.92 | 2,747.17 | 269.85 | 88.06 | 3,083.88 | 3,023.51 | 12,084.60 |
| | average | 2,380.09 | 2,258.07 | 241.15 | 78.50 | 2,522.30 | 2,475.60 | 9,955.71 |
| | minimum | 1,972.76 | 1,858.47 | 216.70 | 56.28 | 2,081.59 | 2,038.77 | 8,254.94 |
| October | Maximum | 2,945.15 | 2,822.01 | 374.21 | 70.49 | 3,099.49 | 3,060.34 | 12,321.89 |
| | average | 2,464.15 | 2,373.22 | 322.59 | 62.78 | 2,615.04 | 2,578.98 | 10,416.76 |
| | minimum | 2,199.42 | 2,179.45 | 296.05 | 45.40 | 2,365.59 | 2,354.88 | 9,479.31 |
| November | Maximum | 2,658.60 | 2,497.85 | 408.40 | 58.02 | 2,802.82 | 2,734.45 | 11,133.01 |
| | average | 2,330.18 | 2,154.66 | 358.95 | 46.26 | 2,443.41 | 2,370.64 | 9,704.10 |
| | minimum | 2,061.86 | 1,949.36 | 327.12 | 30.90 | 2,177.24 | 2,132.68 | 8,701.46 |
| December | Maximum | 2,657.79 | 2,470.00 | 386.51 | 56.13 | 2,769.87 | 2,693.79 | 11,007.30 |
| | average | 2,406.24 | 2,216.94 | 353.48 | 40.95 | 2,500.38 | 2,424.17 | 9,942.16 |
| | minimum | 2,005.01 | 1,921.20 | 300.80 | 29.35 | 2,109.44 | 2,077.42 | 8,469.99 |
| | | | | | | | | |
| All years | Maximum | 33,647.2 | 31,035.1 | 3,039.9 | 1,187.6 | 35,081.3 | 34,071.9 | 137,645.6 |
| | average | 32,672.9 | 30,005.2 | 2,938.8 | 1,139.0 | 34,100.1 | 33,035.0 | 133,890.9 |
| | minimum | 31,291.7 | 28,523.3 | 2,815.2 | 1,091.8 | 32,587.3 | 31,493.1 | 127,895.7 |

Highest combined yield hour: 2016-03-11 18:30 UTC 70,040.7 W (0.780 W/Wp) of 89,760 Wp installed. Use this hour to size battery charge power.


Export energy as equivalent hours (kWh / grid kW)
Mexico - Mexico city 19.294, -99.201
Equivalent hours
11.0
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year


Import energy as equivalent hours (kWh / grid kW)
Mexico - Mexico city 19.294, -99.201
0.5
0.0
Equivalent hours
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year

Emergency import hours: 0  days with an emergency: 0
Mexico - Mexico city  19.294, -99.201




Emergency = this hour’s grid import is above the month’s max import kW. 2 kW means up to 48 kWh in 24 hours. More than 2 kW in an hour is the higher grid fee.
Import inside that cap is not an emergency. Preferred cheap hours are 00:00–06:00 and 09:00–15:00 winter time.

Energy in kWh
Mexico - Mexico city  19.294, -99.201

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | All |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Export to grid** | | | | | | | | | | | | | |
| month Maximum | 9,851 | 9,954 | 11,581 | 10,380 | 10,736 | 10,244 | 10,025 | 9,628 | 9,446 | 10,686 | 9,788 | 9,662 | 114,114 |
| month average | 9,011 | 9,332 | 11,048 | 9,930 | 10,056 | 9,045 | 9,182 | 9,059 | 8,120 | 9,072 | 8,461 | 8,674 | 110,991 |
| month minimum | 7,706 | 8,230 | 10,156 | 9,362 | 9,199 | 8,144 | 8,088 | 8,632 | 6,790 | 8,307 | 7,553 | 7,299 | 106,812 |
| day Maximum | 361.4 | 378.1 | 409.6 | 424.8 | 428.0 | 427.0 | 414.9 | 400.9 | 406.9 | 436.8 | 370.3 | 354.9 | 436.8 |
| day average | 290.7 | 330.8 | 356.4 | 331.0 | 324.4 | 301.5 | 296.2 | 292.2 | 270.7 | 292.7 | 282.0 | 279.8 | 303.9 |
| day minimum | 84.2 | 62.2 | 162.6 | 205.1 | 172.5 | 125.9 | 79.5 | 116.1 | 75.8 | 95.1 | 93.7 | 111.8 | 62.2 |
| **Import from grid** | | | | | | | | | | | | | |
| month Maximum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month minimum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| day Maximum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day average | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Total energy used for house** | | | | | | | | | | | | | |
| month Maximum | 617 | 567 | 591 | 553 | 562 | 548 | 570 | 568 | 557 | 589 | 581 | 607 | 6,822 |
| month average | 604 | 536 | 575 | 537 | 549 | 538 | 563 | 561 | 546 | 577 | 571 | 597 | 6,753 |
| month minimum | 595 | 520 | 555 | 519 | 533 | 518 | 553 | 552 | 537 | 565 | 557 | 588 | 6,674 |
| day Maximum | 20.6 | 20.5 | 21.1 | 23.7 | 23.4 | 23.3 | 23.3 | 23.3 | 23.9 | 20.3 | 20.5 | 20.5 | 23.9 |
| day average | 19.5 | 19.0 | 18.5 | 17.9 | 17.7 | 17.9 | 18.2 | 18.1 | 18.2 | 18.6 | 19.0 | 19.3 | 18.5 |
| day minimum | 15.6 | 17.7 | 17.1 | 15.3 | 15.2 | 15.3 | 15.3 | 15.3 | 15.3 | 15.5 | 17.9 | 18.2 | 15.2 |

Month rows: kWh in that month.  Day rows: best / average / worst day.
Total energy used for house = household + car + heating + cooling + DHW + direct electric.
PV not exported and not marked wasted is still in the battery, or could not leave because the grid was already full. It is not house use.

# Energy by price
## Mexico - Mexico city  19.294, -99.201

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | All |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Export** | | | | | | | | | | | | | |
| month Maximum | 1,372 | 1,299 | 1,412 | 1,156 | 1,171 | 1,149 | 1,202 | 1,211 | 1,166 | 1,327 | 1,297 | 1,357 | 14,768 |
| month average | 1,321 | 1,249 | 1,369 | 1,130 | 1,145 | 1,124 | 1,166 | 1,183 | 1,135 | 1,260 | 1,223 | 1,289 | 14,593 |
| month minimum | 1,205 | 1,143 | 1,322 | 1,100 | 1,110 | 1,074 | 1,106 | 1,153 | 1,062 | 1,188 | 1,158 | 1,138 | 14,417 |
| day Maximum | 54.0 | 54.3 | 56.5 | 49.9 | 49.7 | 51.4 | 50.5 | 51.3 | 51.3 | 54.5 | 51.7 | 52.0 | 56.5 |
| day average | 42.6 | 44.3 | 44.2 | 37.7 | 36.9 | 37.5 | 37.6 | 38.2 | 37.8 | 40.6 | 40.8 | 41.6 | 40.0 |
| day minimum | 7.3 | 12.8 | 16.7 | 20.7 | 20.5 | 17.9 | 14.0 | 12.4 | 15.0 | 17.3 | 20.2 | 16.3 | 7.3 |
| **Import** | | | | | | | | | | | | | |
| month Maximum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month minimum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| day Maximum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day average | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Peak grid fee** | | | | | | | | | | | | | |
| month Maximum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month minimum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| day Maximum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day average | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Import incl. peak fee** | | | | | | | | | | | | | |
| month Maximum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month minimum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| day Maximum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day average | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Balance** | | | | | | | | | | | | | |
| month Maximum | 1,372 | 1,299 | 1,412 | 1,156 | 1,171 | 1,149 | 1,202 | 1,211 | 1,166 | 1,327 | 1,297 | 1,357 | 14,768 |
| month average | 1,321 | 1,249 | 1,369 | 1,130 | 1,145 | 1,124 | 1,166 | 1,183 | 1,135 | 1,260 | 1,223 | 1,289 | 14,593 |
| month minimum | 1,205 | 1,143 | 1,322 | 1,100 | 1,110 | 1,074 | 1,106 | 1,153 | 1,062 | 1,188 | 1,158 | 1,138 | 14,417 |
| day Maximum | 54.0 | 54.3 | 56.5 | 49.9 | 49.7 | 51.4 | 50.5 | 51.3 | 51.3 | 54.5 | 51.7 | 52.0 | 56.5 |
| day average | 42.6 | 44.3 | 44.2 | 37.7 | 36.9 | 37.5 | 37.6 | 38.2 | 37.8 | 40.6 | 40.8 | 41.6 | 40.0 |
| day minimum | 7.3 | 12.8 | 16.7 | 20.7 | 20.5 | 17.9 | 14.0 | 12.4 | 15.0 | 17.3 | 20.2 | 16.3 | 7.3 |

Currency in Your units. Import and export use the cent/kWh of that hour. Peak fee 6.33 / kW / month is the highest import hour of the month (hourly stand-in for the 15-minute peak) and is added to that month's
Sell only when export is above 0. At 0 cent, export PV yield only, not the battery. Do not sell when the earning is negative.

# Export in kWh during price hours
# Mexico - Mexico city  19.294, -99.201

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | All |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Export total** | | | | | | | | | | | | | |
| month Maximum | 9,851 | 9,954 | 11,581 | 10,380 | 10,736 | 10,244 | 10,025 | 9,628 | 9,446 | 10,686 | 9,788 | 9,662 | 114,114 |
| month average | 9,011 | 9,332 | 11,048 | 9,930 | 10,056 | 9,045 | 9,182 | 9,059 | 8,120 | 9,072 | 8,461 | 8,674 | 110,991 |
| month minimum | 7,706 | 8,230 | 10,156 | 9,362 | 9,199 | 8,144 | 8,088 | 8,632 | 6,790 | 8,307 | 7,553 | 7,299 | 106,812 |
| day Maximum | 361.4 | 378.1 | 409.6 | 424.8 | 428.0 | 427.0 | 414.9 | 400.9 | 406.9 | 436.8 | 370.3 | 354.9 | 436.8 |
| day average | 290.7 | 330.8 | 356.4 | 331.0 | 324.4 | 301.5 | 296.2 | 292.2 | 270.7 | 292.7 | 282.0 | 279.8 | 303.9 |
| day minimum | 84.2 | 62.2 | 162.6 | 205.1 | 172.5 | 125.9 | 79.5 | 116.1 | 75.8 | 95.1 | 93.7 | 111.8 | 62.2 |
| **Export during high price hours** | | | | | | | | | | | | | |
| month Maximum | 6,026 | 5,354 | 5,449 | 4,785 | 5,025 | 5,118 | 5,262 | 5,421 | 5,397 | 5,582 | 5,562 | 5,903 | 63,276 |
| month average | 5,865 | 5,161 | 5,206 | 4,659 | 4,692 | 4,832 | 5,104 | 5,246 | 5,223 | 5,336 | 5,333 | 5,780 | 62,438 |
| month minimum | 5,615 | 4,849 | 5,109 | 4,591 | 4,508 | 4,450 | 4,941 | 5,101 | 4,980 | 5,020 | 5,138 | 5,553 | 61,291 |
| day Maximum | 212.1 | 211.6 | 212.1 | 201.5 | 208.3 | 213.9 | 211.9 | 213.4 | 212.4 | 210.3 | 207.5 | 211.3 | 213.9 |
| day average | 189.2 | 182.9 | 167.9 | 155.3 | 151.4 | 161.1 | 164.6 | 169.2 | 174.1 | 172.1 | 177.8 | 186.5 | 171.0 |
| day minimum | 0.0 | 62.2 | 116.0 | 138.7 | 135.3 | 94.5 | 62.8 | 65.5 | 64.5 | 66.5 | 81.7 | 94.4 | 0.0 |
| **Export during medium price hours** | | | | | | | | | | | | | |
| month Maximum | 1,426 | 1,717 | 2,483 | 2,717 | 2,974 | 2,896 | 2,462 | 2,209 | 1,987 | 2,116 | 1,684 | 1,437 | 22,519 |
| month average | 1,161 | 1,478 | 2,229 | 2,523 | 2,639 | 2,165 | 2,086 | 1,889 | 1,437 | 1,527 | 1,236 | 1,132 | 21,501 |
| month minimum | 762 | 1,074 | 1,870 | 2,297 | 2,202 | 1,649 | 1,561 | 1,633 | 933 | 1,168 | 889 | 731 | 19,598 |
| day Maximum | 64.1 | 85.2 | 106.1 | 122.9 | 128.3 | 127.4 | 119.1 | 104.3 | 99.7 | 131.3 | 92.1 | 79.7 | 131.3 |
| day average | 37.4 | 52.4 | 71.9 | 84.1 | 85.1 | 72.2 | 67.3 | 60.9 | 47.9 | 49.2 | 41.2 | 36.5 | 58.9 |
| day minimum | 0.0 | 0.0 | 0.0 | 32.7 | 7.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Export during low price hours** | | | | | | | | | | | | | |
| month Maximum | 2,573 | 3,188 | 4,021 | 3,114 | 3,254 | 2,898 | 2,621 | 2,290 | 2,479 | 3,463 | 2,915 | 2,546 | 29,479 |
| month average | 1,985 | 2,693 | 3,613 | 2,748 | 2,725 | 2,048 | 1,992 | 1,924 | 1,460 | 2,210 | 1,892 | 1,761 | 27,052 |
| month minimum | 1,284 | 1,816 | 2,838 | 2,288 | 1,972 | 1,207 | 1,264 | 1,545 | 698 | 1,589 | 1,164 | 1,015 | 23,930 |
| day Maximum | 157.2 | 128.4 | 157.8 | 160.5 | 166.1 | 163.0 | 160.0 | 157.4 | 160.0 | 160.0 | 135.5 | 101.2 | 166.1 |
| day average | 64.0 | 95.5 | 116.6 | 91.6 | 87.9 | 68.3 | 64.3 | 62.1 | 48.7 | 71.3 | 63.1 | 56.8 | 74.1 |
| day minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

kWh exported while that price band was active. Not the money. Winter time. High 06:00–09:00 and 17:00–20:00, sold first. Low 09:00–15:00, sold last. Medium is the rest.

# Heat pump
# Mexico - Mexico city  19.294, -99.201

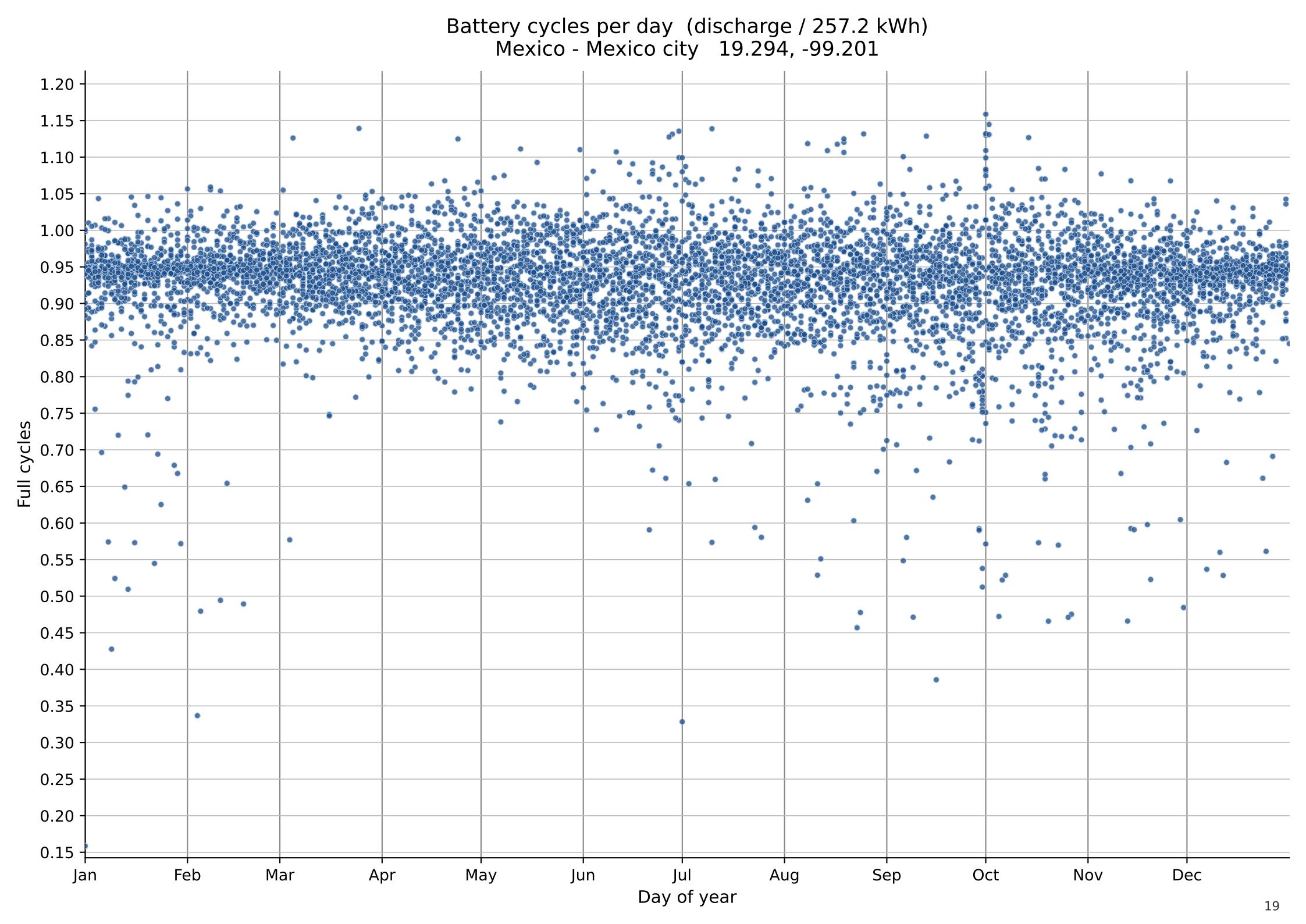
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | All |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Heating** | | | | | | | | | | | | | |
| month Maximum | 130 | 114 | 107 | 91 | 84 | 85 | 94 | 93 | 97 | 108 | 114 | 125 | 1,164 |
| month average | 118 | 96 | 93 | 76 | 73 | 76 | 88 | 85 | 86 | 96 | 105 | 115 | 1,108 |
| month minimum | 111 | 85 | 75 | 60 | 59 | 58 | 78 | 77 | 77 | 85 | 92 | 107 | 1,028 |
| day Maximum | 4.8 | 4.7 | 5.3 | 8.3 | 7.9 | 7.8 | 7.9 | 7.9 | 8.6 | 4.7 | 4.9 | 4.9 | 8.6 |
| day average | 3.8 | 3.4 | 3.0 | 2.5 | 2.4 | 2.5 | 2.8 | 2.8 | 2.9 | 3.1 | 3.5 | 3.7 | 3.0 |
| day minimum | 0.0 | 2.2 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.5 | 2.7 | 0.0 |
| **Cooling** | | | | | | | | | | | | | |
| month Maximum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month minimum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| day Maximum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day average | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **DHW** | | | | | | | | | | | | | |
| month Maximum | 53 | 48 | 50 | 42 | 44 | 43 | 42 | 42 | 41 | 48 | 47 | 49 | 538 |
| month average | 51 | 45 | 48 | 41 | 42 | 42 | 41 | 41 | 40 | 47 | 46 | 48 | 533 |
| month minimum | 50 | 43 | 46 | 40 | 41 | 40 | 41 | 41 | 39 | 46 | 44 | 46 | 525 |
| day Maximum | 1.8 | 1.8 | 1.8 | 1.5 | 1.6 | 1.5 | 1.4 | 1.5 | 1.4 | 1.7 | 1.7 | 1.7 | 1.8 |
| day average | 1.7 | 1.6 | 1.6 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.5 | 1.5 | 1.5 | 1.5 |
| day minimum | 1.5 | 1.5 | 1.4 | 1.3 | 1.2 | 1.3 | 1.3 | 1.3 | 1.2 | 1.4 | 1.4 | 1.4 | 1.2 |
| **Direct electric** | | | | | | | | | | | | | |
| month Maximum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| month minimum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| day Maximum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day average | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| day minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

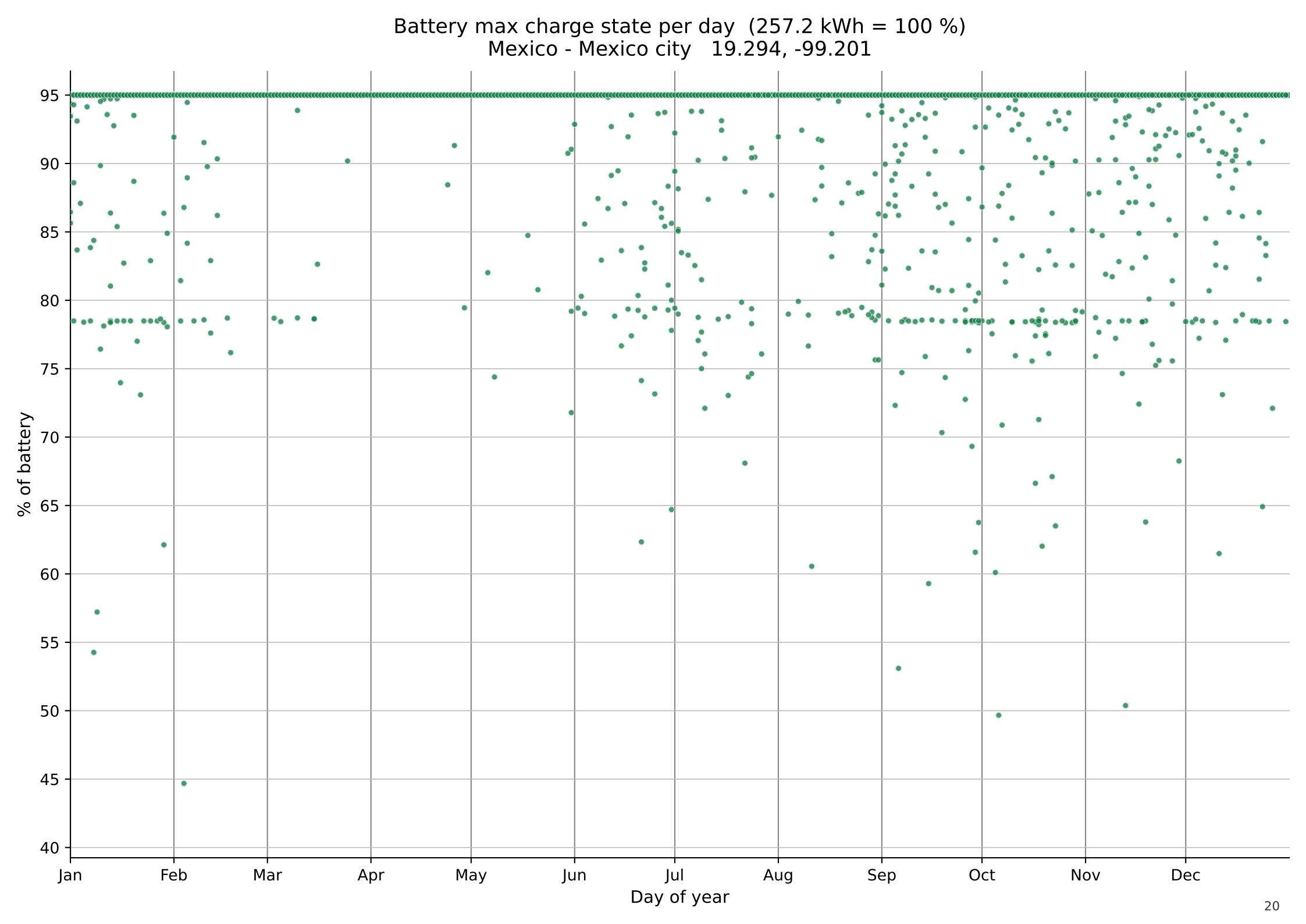
Heating, cooling and DHW are electricity.  Direct electric is the part the heat pump could not cover.

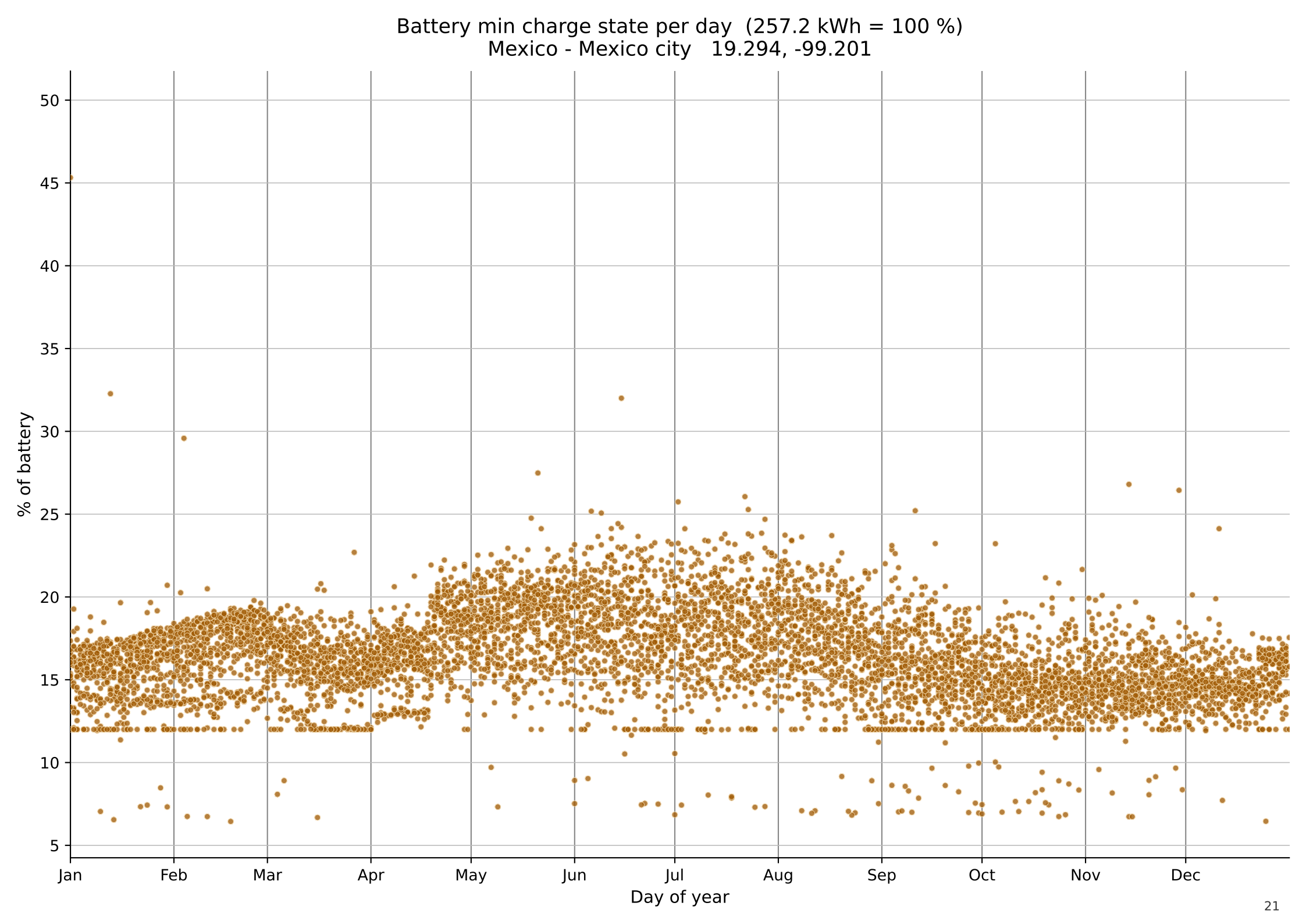
# Battery
## Mexico - Mexico city  19.294, -99.201

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | All |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Wasted** | | | | | | | | | | | | | |
| month Maximum | 204 | 644 | 1,094 | 2,099 | 2,191 | 2,173 | 1,609 | 1,398 | 1,483 | 534 | 211 | 111 | 10,881 |
| month average | 134 | 388 | 817 | 1,801 | 1,569 | 1,225 | 1,121 | 962 | 694 | 194 | 90 | 58 | 9,053 |
| month minimum | 84 | 167 | 396 | 1,338 | 1,002 | 600 | 557 | 577 | 292 | 25 | 16 | 18 | 7,269 |
| day Maximum | 34.1 | 46.4 | 57.5 | 222.2 | 236.3 | 223.5 | 204.6 | 184.4 | 205.0 | 44.7 | 30.1 | 8.8 | 236.3 |
| day average | 4.3 | 13.8 | 26.3 | 60.0 | 50.6 | 40.8 | 36.2 | 31.0 | 23.1 | 6.3 | 3.0 | 1.9 | 24.8 |
| day minimum | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Full cycles** | | | | | | | | | | | | | |
| month Maximum | 29 | 27 | 29 | 28 | 29 | 28 | 29 | 29 | 28 | 29 | 28 | 29 | 342 |
| month average | 29 | 27 | 29 | 28 | 29 | 28 | 29 | 29 | 27 | 29 | 28 | 29 | 339 |
| month minimum | 27 | 25 | 28 | 28 | 29 | 27 | 28 | 28 | 26 | 28 | 26 | 27 | 336 |
| day Maximum | 1.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.2 | 1.1 | 1.0 | 1.2 |
| day average | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| day minimum | 0.2 | 0.3 | 0.6 | 0.8 | 0.7 | 0.6 | 0.3 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.2 |
| **Charge C** | | | | | | | | | | | | | |
| month Maximum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| month average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| month minimum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| day Maximum | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 |
| day average | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| day minimum | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 |
| **Discharge C** | | | | | | | | | | | | | |
| month Maximum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| month average | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| month minimum | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| day Maximum | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| day average | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| day minimum | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 |

Wasted = PV left when the export price is negative and the battery is full.  Full cycles = discharge kWh / 257.2 kWh.  Battery export only into hours whose export price is above 0, highest price first. At 0 cent on


Battery cycles per day (discharge / 257.2 kWh)
Mexico - Mexico city 19.294, -99.201
Full cycles
1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year


Battery max charge state per day (257.2 kWh = 100 %)
Mexico - Mexico city 19.294, -99.201
% of battery
95
90
85
80
75
70
65
60
55
50
45
40
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year


Battery min charge state per day (257.2 kWh = 100 %)
Mexico - Mexico city 19.294, -99.201
% of battery
50
45
40
35
30
25
20
15
10
5
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day of year