

Scenario — PV

GEMINI-60-house-with-garage Germany - Grünheide 52.401, 13.842

Name	Slope °	Azimuth °	Wp	Wall d/h m	Face	Bifacial	Wp counted
Roof East	22	-90	19800	—	front	—	yes
Roof West	22	90	19800	—	front	—	yes
Terrace railing south	90	0	4620	5 / 4	front	—	yes
Terrace railing north	90	180	4620	5 / 4	front	—	yes
Garage roof	1	0	10740	—	front	—	yes
Garage side wall south	90	0	3475	5 / 4	front	—	yes
Garage side wall north	90	180	3475	5 / 4	front	—	yes
Garage door side west	90	90	700	5 / 4	front	—	yes
Garage back side east	90	-90	2540	5 / 4	front	—	yes
Garden fence east	90	-90	6000	5 / 4	face 1	—	yes
Garden fence east face2	90	90	4800	5 / 4	face 2	80 %	no
Total counted			75770				

Location: A workers' village just near the Tesla giga factory would be great. Compare this location with Austria - Fürstenbrunn. What has more effect? More in the north or in the shadow of a mountain?

Database PVGIS-SARAH3 2005-2023 loss 14 % azimuth 0 = south, 90 = west, -90 = east.

Price bands and charts use UTC+1 from longitude (15° per hour), not the political time zone.

Peak hour 2023-05-08 11:11 local (10:11 UTC) 42037 W 0.555 W/Wp of 75770 Wp.

Database gaps: 10 days with 0 yield while the sun reached the horizon at noon. 2008-01-23, 2008-03-01, 2008-03-06, 2008-05-17, 2008-05-18, 2009-04-18, 2009-04-19, 2009-08-15, 2009-08-16, 2016-10-16. 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 winter time, battery export is only the kWh that would not fit in the next 72 h.



Scenario — house, heat pump, battery
GEMINI-60-house-with-garage Germany - Grünheide 52.401, 13.842

Chapter	Parameter	Value
Building	Design out / in / heat	-10.0 °C / 20.0 °C / 1600.0 W
	Heat on / cool on / ground	22.0 °C / 25.0 °C / 10.0 °C
	Curve / flow min / max	0.4 / 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	200.0 L tank 42.0 °C 8-18 h
	Water out of the pipe Q1-Q4	8 °C 10 °C 12 °C 10 °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 5 6
	kW -10/0/10 @ 50 °C	3.5 4.5 5
Battery	kWh / C-rate / SOC min-max-start	176.8 kWh C 0.5 5 / 95 / 50 %
	Nameplate	—
	Charge / discharge η	95 % / 90 %
Grid	Inverter / grid connection	34.0 kW / 17.0 kW
	Max export	17.0 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 @ 40.0 kW night 10.0 kWh @ 11.0 kW

Records 1-10 — contribution of each PV
Germany - Grünheide 52.401, 13.842

PV	2023-05-08 10:11	2009-06-13 10:11	2021-05-30 10:11	2009-06-13 11:11	2023-05-09 10:11	2023-05-17 10:11	2023-05-08 11:11	2011-05-03 10:11	2023-05-17 11:11	2020-05-15 10:11
Roof East	14769	14948	14835	13969	14639	14600	13423	14265	13413	14337
Roof West	12194	12487	12462	14276	12098	12217	13930	11752	13894	12006
Terrace railing south	2697	2232	2347	2339	2651	2505	2767	2723	2583	2504
Terrace railing north	150	185	161	157	149	190	149	207	189	171
Garage roof	7876	7979	7940	8211	7809	7806	7976	7587	7938	7665
Garage side wall south	2029	1679	1766	1759	1994	1884	2082	2048	1943	1884
Garage side wall north	113	139	121	118	112	143	112	156	143	129
Garage door side west	23	28	24	70	23	29	71	31	77	26
Garage back side east	604	616	596	87	596	604	82	626	104	595
Garden fence east	1427	1456	1408	204	1408	1426	194	1479	246	1405
Garden fence east face2	156	192	168	478	155	197	487	215	531	178
Watt at record	42037	41943	41829	41669	41633	41600	41274	41089	41062	40901
Percent of installed peak	55.5	55.4	55.2	55.0	54.9	54.9	54.5	54.2	54.2	54.0

Hours at or above a share of the record
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Of the record	Hours	Watts
98 %	7	41196 W
96 %	34	40355 W
94 %	130	39514 W
92 %	359	38674 W
90 %	732	37833 W

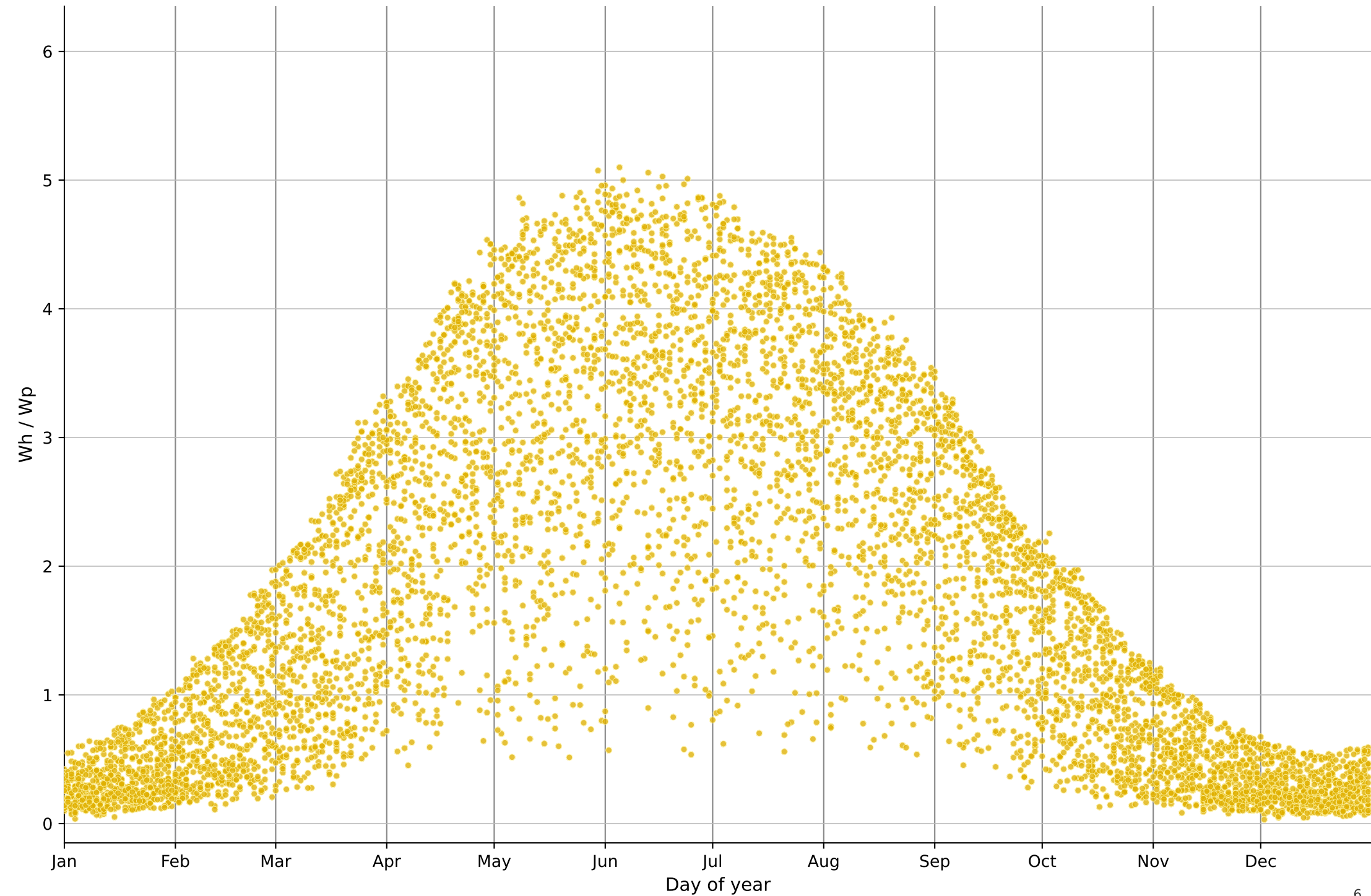
Records of each photovoltaic field

Germany - Grünheide 52.401, 13.842

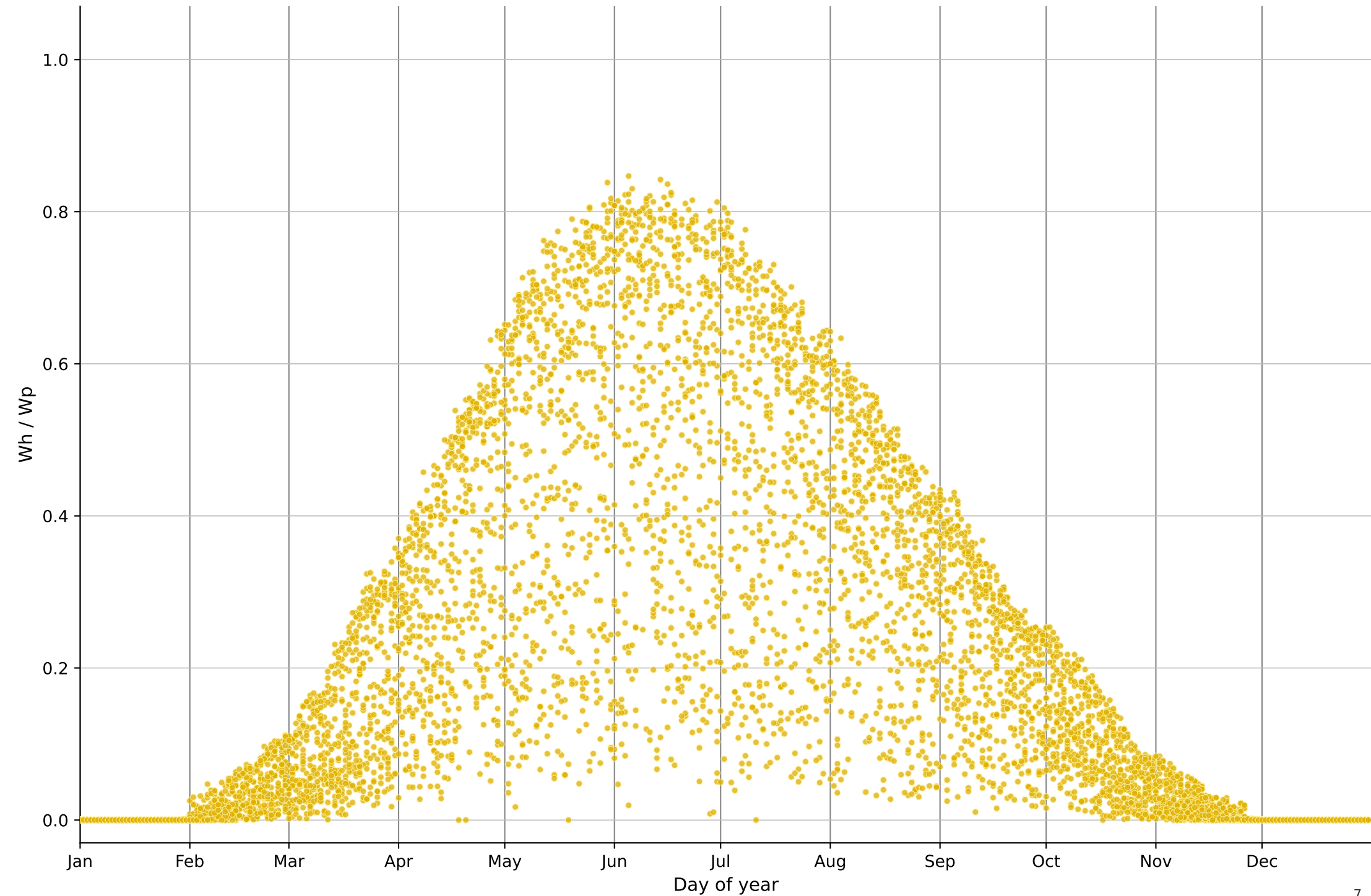
PV	Date	Watts	%	h ≥98%	h ≥96%	h ≥94%	h ≥92%	h ≥90%
Roof East	2009-06-13 09:11	15293	77.2	4	21	82	211	424
Roof West	2014-05-31 13:11	15107	76.3	5	25	92	197	400
Terrace railing south	2013-03-26 11:11	3634	78.7	1	1	6	6	17
Terrace railing north	2018-07-01 05:11	793	17.2	7	17	37	61	97
Garage roof	2009-06-13 11:11	8211	76.5	1	7	31	105	253
Garage side wall south	2013-03-26 11:11	2733	78.7	1	1	6	6	17
Garage side wall north	2018-07-01 05:11	596	17.2	7	17	37	61	97
Garage door side west	2023-05-08 14:11	449	64.2	3	6	18	42	79
Garage back side east	2023-05-08 08:11	1584	62.4	4	12	24	78	181
Garden fence east	2023-05-08 08:11	3899	65.0	4	15	40	130	261

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.

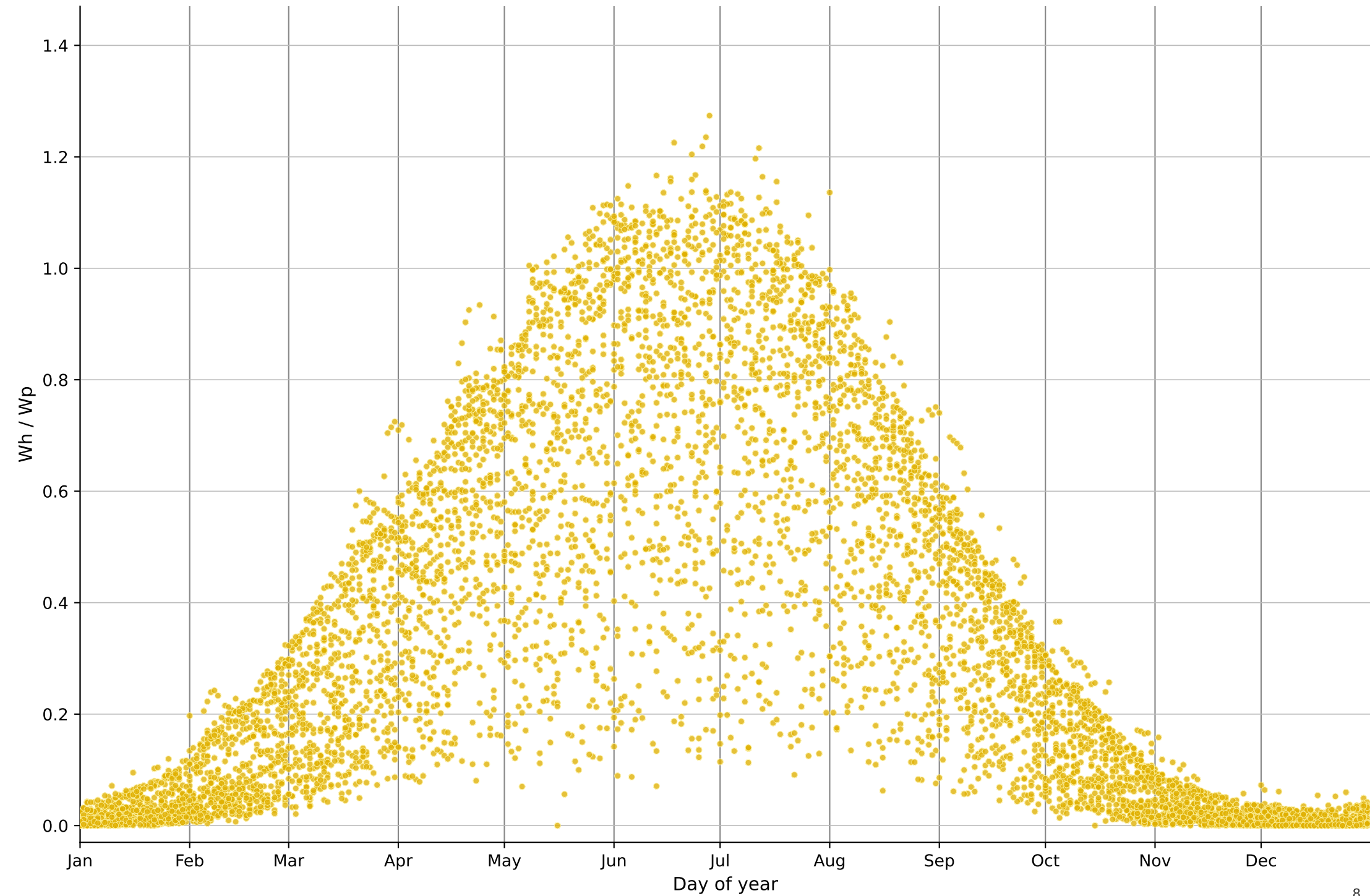
Yield distribution for each day — Wh / Wp of all PV together
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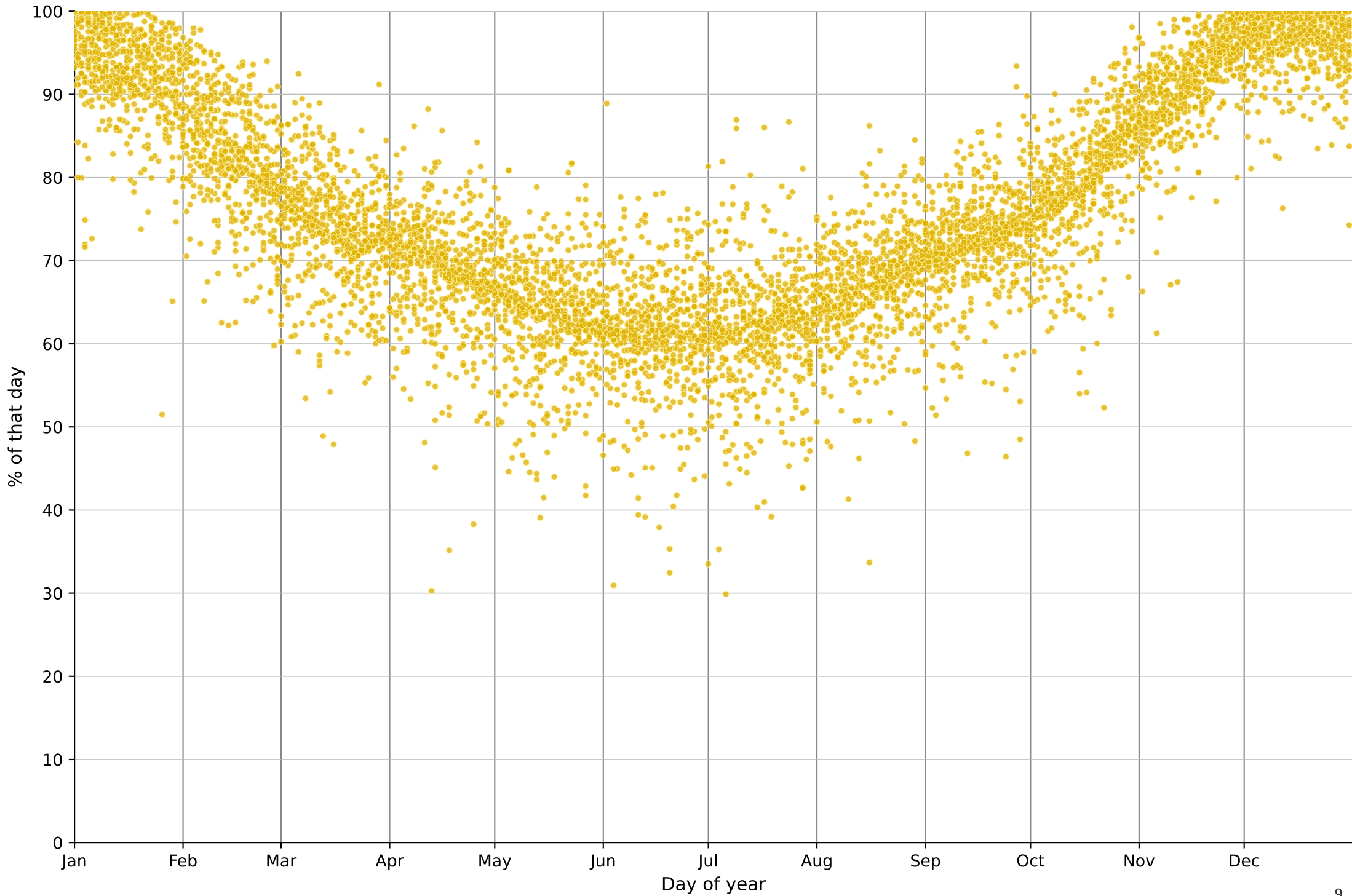
Yield distribution for each day — Wh / Wp of all PV together — 00:00-09:00
Germany - Grünheide 52.401, 13.842



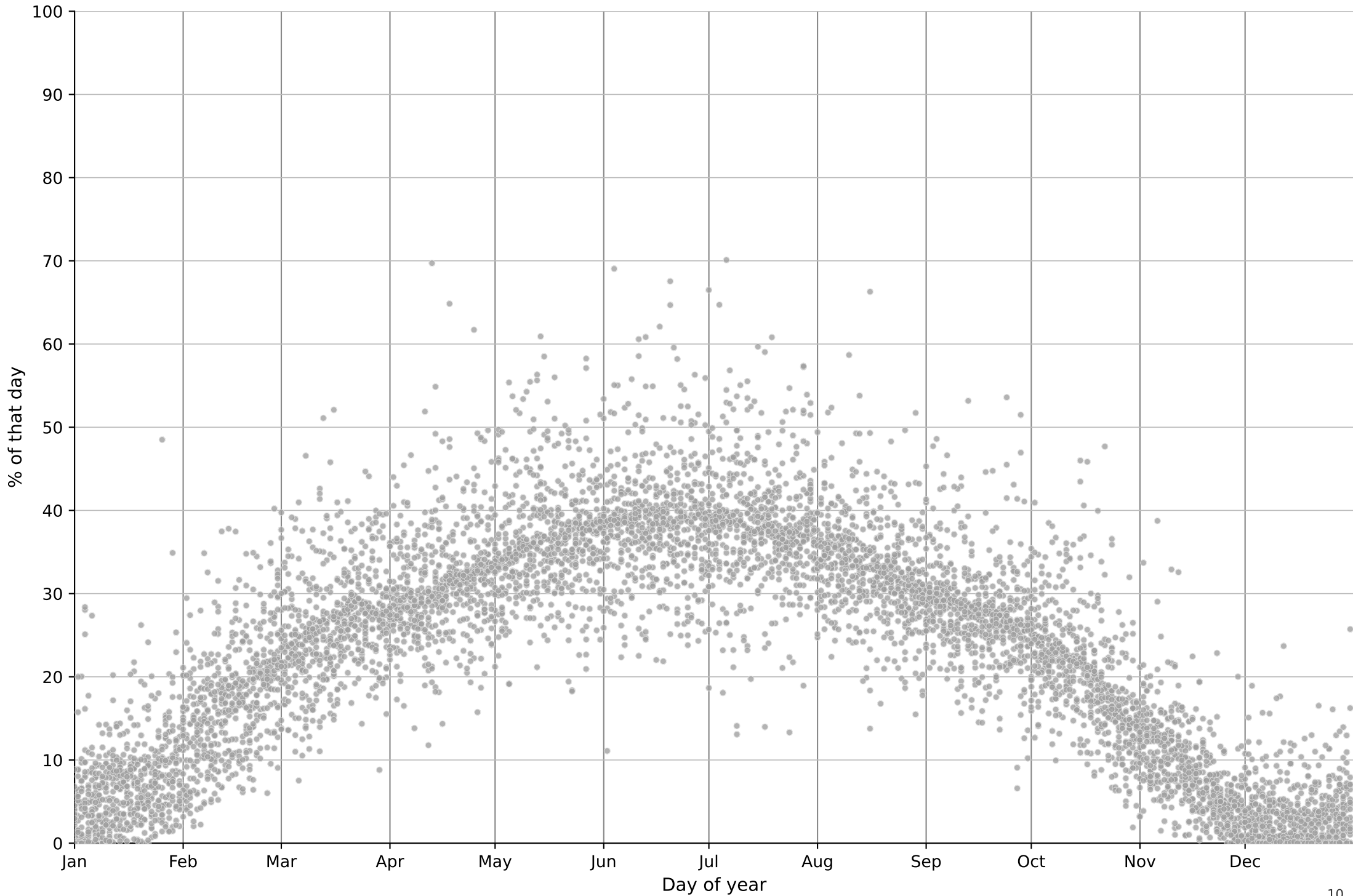
Yield distribution for each day — W_h / W_p of all PV together — 15:00–23:59
Germany - Grünheide 52.401, 13.842



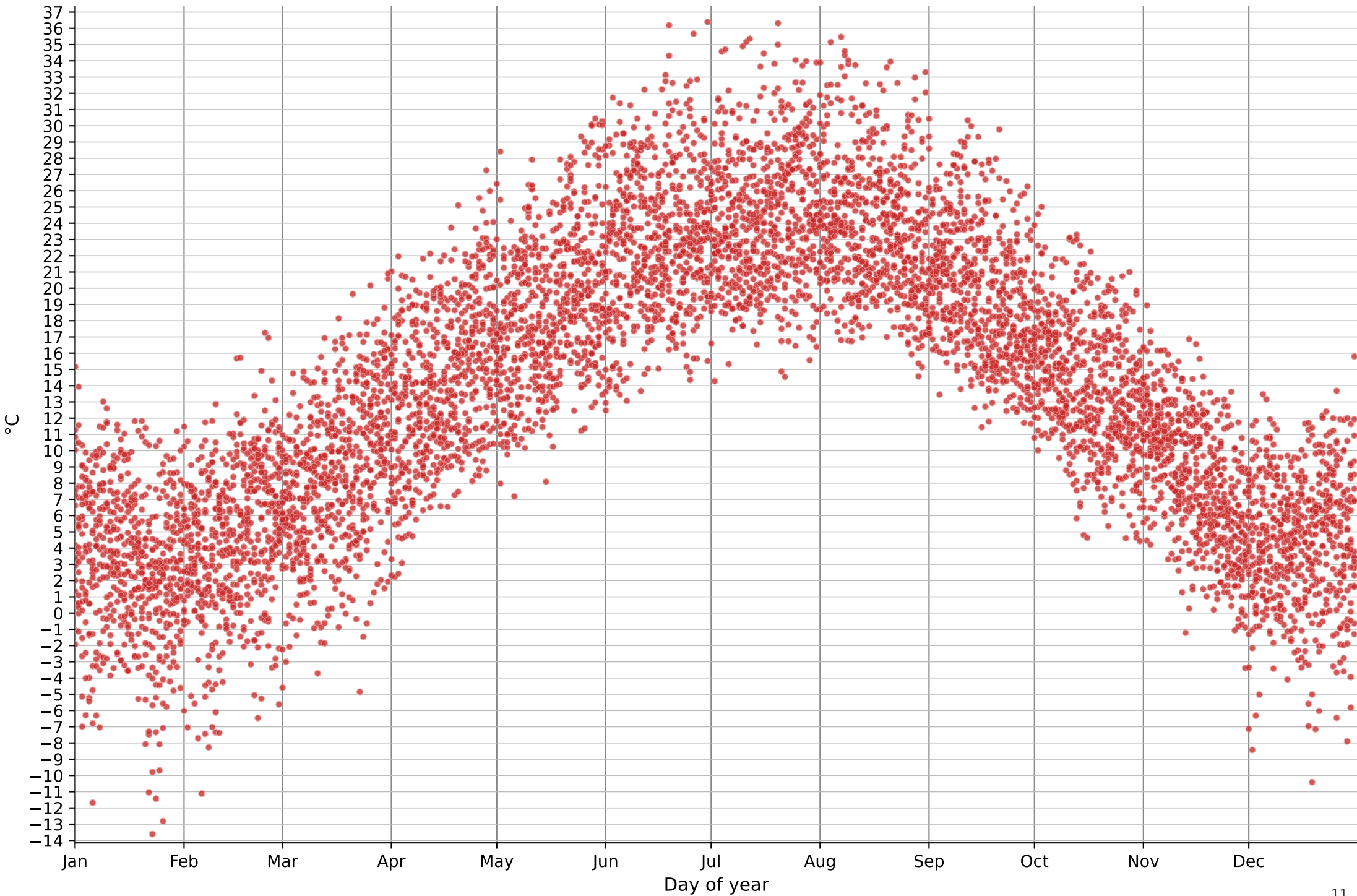
Share of the day's yield in 09:00-15:00 winter time
Germany - Grünheide 52.401, 13.842



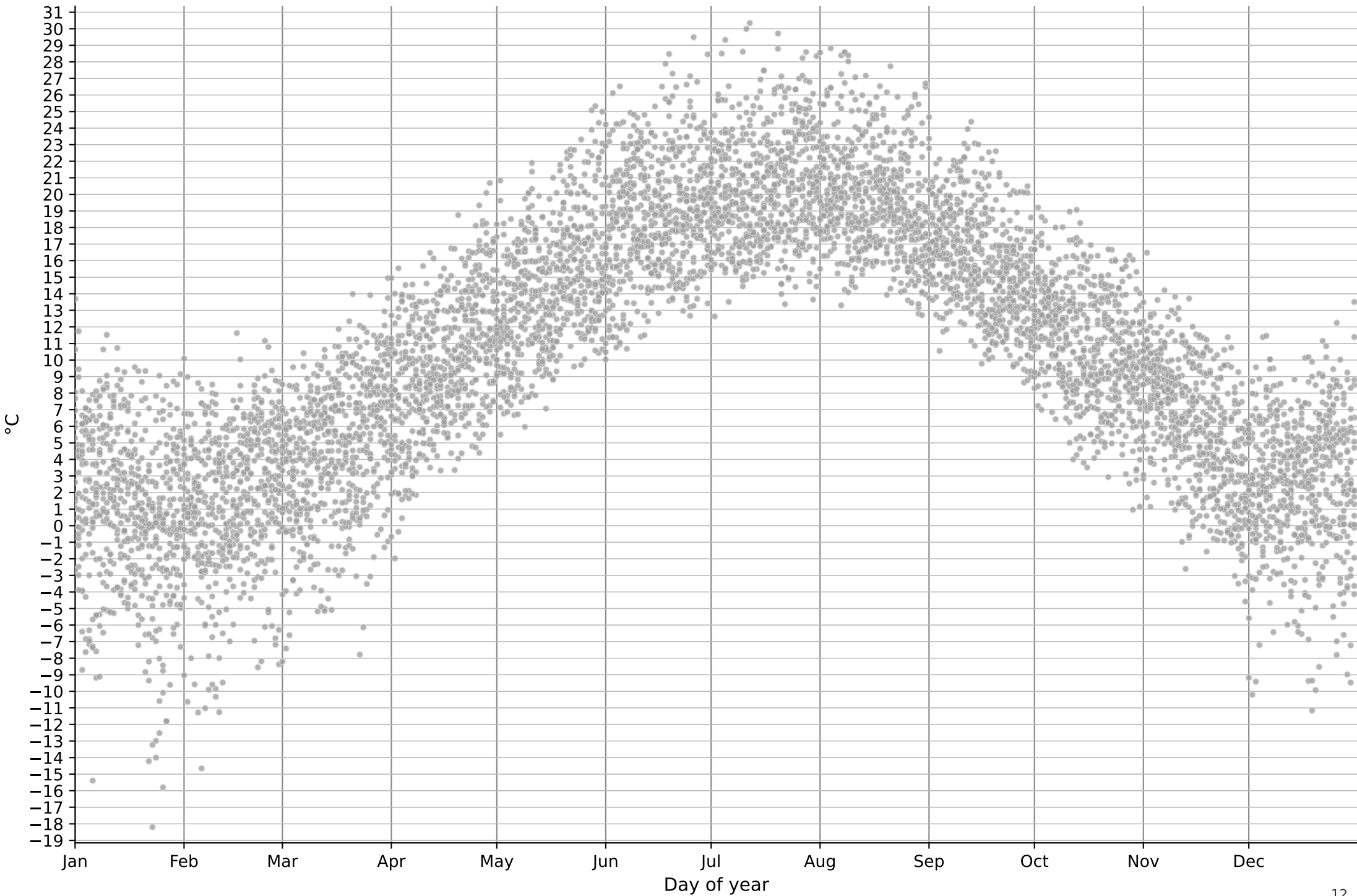
Share of the day's yield outside 09:00-15:00 winter time
Germany - Grünheide 52.401, 13.842



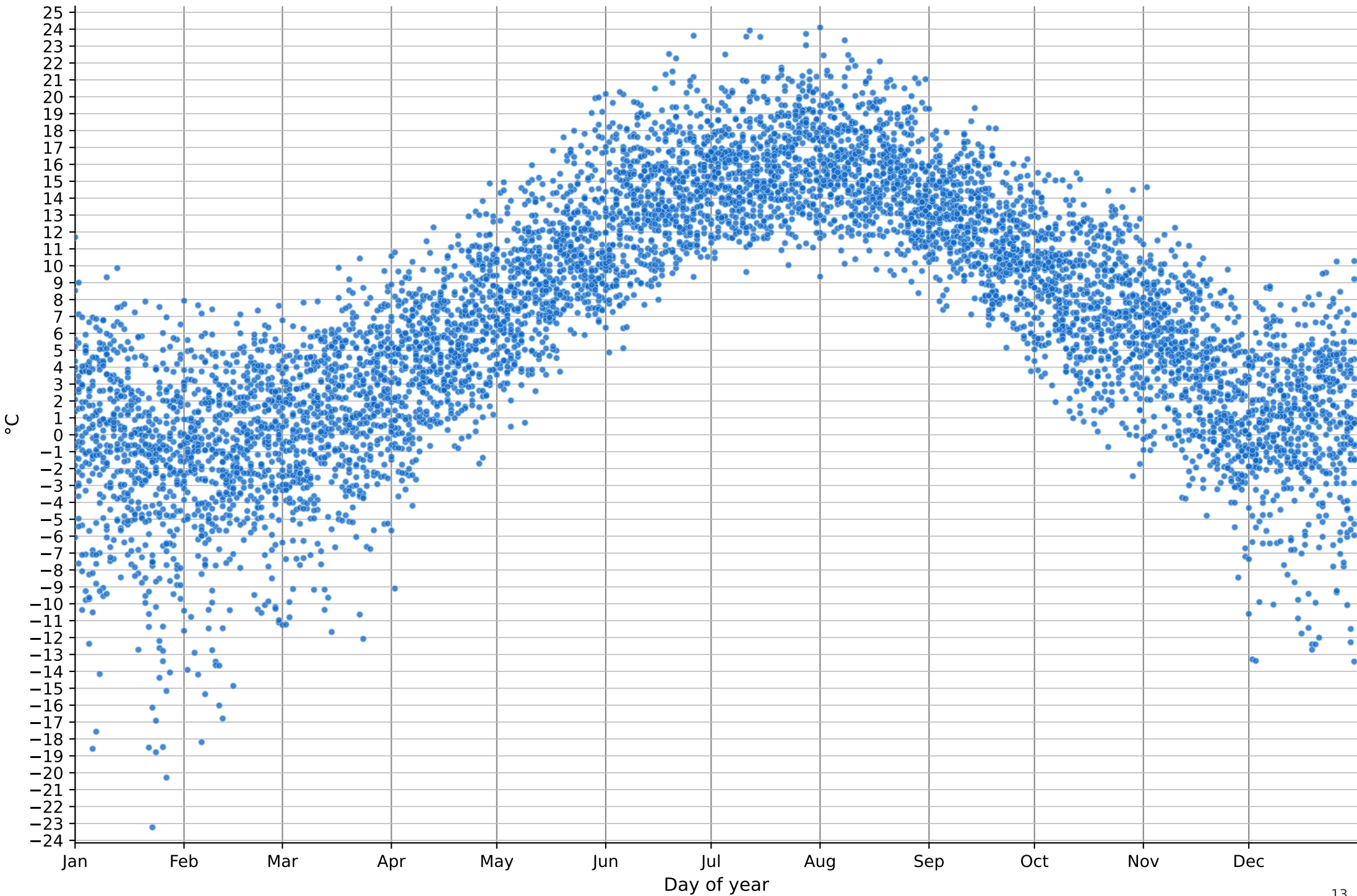
Highest temperature of each day
Germany - Grünheide 52.401, 13.842



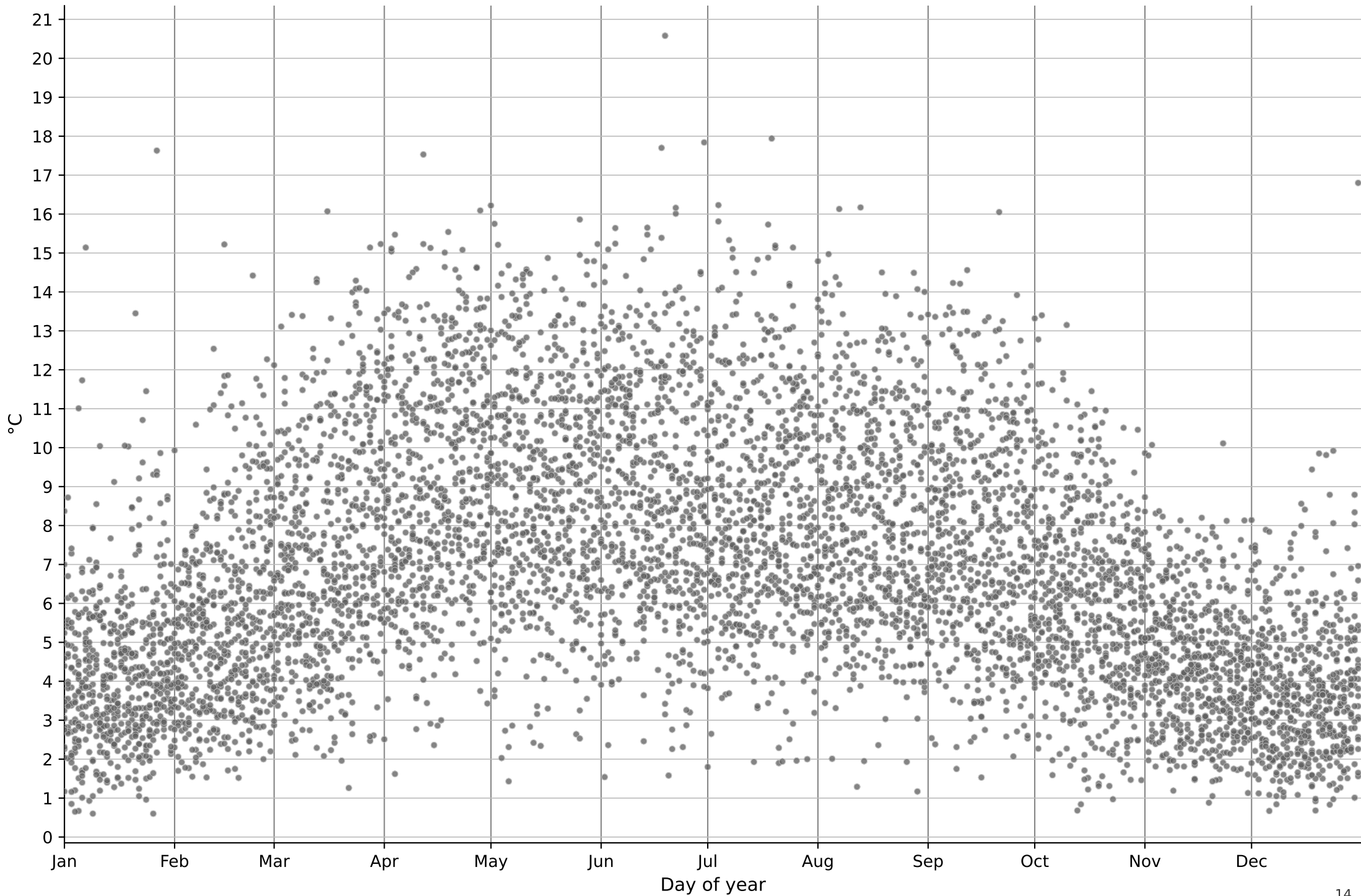
Average temperature of each day
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Lowest temperature of each day
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Difference between highest and lowest temperature of each day
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Monthly and yearly specific yield (kWh/kWp = Wh/Wp)
Germany - Grünheide 52.401, 13.842

Month / year		Roof East 22°/-90° 19800 Wp	Roof West 22°/90° 19800 Wp	Terrace railing south 90°/0° 4620 Wp	Terrace railing north 90°/180° 4620 Wp	Garage roof 1°/0° 10740 Wp	Garage side wall south 90°/0° 3475 Wp	All together
January	Maximum	20.16	18.91	3.76	3.76	19.70	3.76	14.40
	average	14.84	14.23	3.30	3.30	14.72	3.30	11.10
	minimum	10.53	11.23	2.31	2.31	11.07	2.31	8.25
February	Maximum	44.95	41.24	7.15	7.15	43.98	7.15	31.60
	average	30.54	29.64	5.98	5.98	30.56	5.98	22.64
	minimum	21.53	19.68	5.16	5.16	20.52	5.16	16.16
March	Maximum	87.48	84.29	23.43	13.84	88.81	23.43	63.30
	average	62.69	61.94	18.39	12.22	64.12	18.39	47.67
	minimum	49.45	47.99	14.69	10.63	50.29	14.69	38.37
April	Maximum	124.16	123.55	77.10	21.79	128.82	77.10	98.74
	average	100.05	97.80	60.12	19.65	102.54	60.12	80.08
	minimum	81.51	79.77	45.74	15.53	83.24	45.74	65.66
May	Maximum	153.12	144.55	88.40	30.15	155.08	88.40	120.65
	average	121.83	118.06	71.07	26.56	124.57	71.07	98.63
	minimum	73.62	76.00	42.22	23.70	77.15	42.22	62.65
June	Maximum	152.64	151.42	78.56	30.50	159.19	78.56	121.81
	average	126.50	124.72	66.05	28.34	130.75	66.05	102.32
	minimum	107.53	101.58	56.73	25.71	108.35	56.73	86.67
July	Maximum	150.14	145.20	81.86	32.29	154.39	81.86	119.94
	average	122.45	121.02	67.93	29.21	126.71	67.93	100.06
	minimum	98.44	99.71	54.22	25.66	102.62	54.22	81.46
August	Maximum	122.23	123.81	83.09	25.32	128.99	83.09	100.54
	average	105.74	103.17	65.77	22.56	108.33	65.77	85.77
	minimum	90.42	87.59	53.88	19.70	91.99	53.88	73.47
September	Maximum	91.39	88.12	39.64	16.45	91.99	39.64	68.48
	average	77.01	74.54	32.67	14.24	78.25	32.67	59.05
	minimum	61.07	59.22	25.89	12.66	61.52	25.89	47.58
October	Maximum	52.17	60.38	8.98	8.96	56.82	8.98	40.79
	average	43.03	42.25	8.45	8.43	43.55	8.45	32.13
	minimum	27.53	26.07	7.12	7.11	27.43	7.12	20.90
November	Maximum	27.57	28.14	4.46	4.46	28.14	4.46	20.33
	average	18.38	18.37	3.97	3.97	18.60	3.97	13.99
	minimum	13.22	12.66	3.47	3.47	13.26	3.47	10.20
December	Maximum	14.22	13.28	2.90	2.90	13.94	2.90	10.43
	average	11.33	11.43	2.49	2.49	11.35	2.49	8.70
	minimum	8.09	7.87	2.07	2.07	7.96	2.07	6.20
All years	Maximum	910.7	895.0	444.0	183.6	936.4	444.0	718.5
	average	834.4	817.2	406.2	176.9	854.0	406.2	662.1
	minimum	780.8	761.3	379.0	168.8	796.6	379.0	621.3

Highest combined yield hour: 2023-05-08 10:11 UTC 42036.6 W (0.555 W/Wp) of 75770 Wp installed. Use this hour to size battery charge power.

Monthly and yearly specific yield (kWh/kWp = Wh/Wp)
Germany - Grünheide 52.401, 13.842

Month / year		Garage side wall north 90°/180° 3475 Wp	Garage door side west 90°/90° 700 Wp	Garage back side east 90°/90° 2540 Wp	Garden fence east 90°/-90° + 90°/90° 6000 Wp bifacial ×80%	All together
January	Maximum	3.76	4.73	4.23	7.94	14.40
	average	3.30	4.18	3.66	7.00	11.10
	minimum	2.31	2.90	2.56	4.87	8.25
February	Maximum	7.15	9.06	7.81	14.81	31.60
	average	5.98	7.70	6.64	12.80	22.64
	minimum	5.16	6.55	5.76	11.00	16.16
March	Maximum	13.84	16.65	15.82	28.78	63.30
	average	12.22	15.28	14.45	26.68	47.67
	minimum	10.63	13.99	12.99	24.18	38.37
April	Maximum	21.79	31.26	31.26	54.72	98.74
	average	19.65	28.57	28.84	51.70	80.08
	minimum	15.53	25.96	25.45	46.21	65.66
May	Maximum	30.15	48.05	48.50	85.61	120.65
	average	26.56	41.24	43.17	76.17	98.63
	minimum	23.70	30.17	29.96	54.10	62.65
June	Maximum	30.50	47.81	46.95	84.23	121.81
	average	28.34	43.37	43.49	78.19	102.32
	minimum	25.71	39.59	40.50	72.33	86.67
July	Maximum	32.29	46.98	50.06	87.64	119.94
	average	29.21	42.92	44.18	78.52	100.06
	minimum	25.66	36.25	35.22	64.23	81.46
August	Maximum	25.32	37.90	38.32	68.24	100.54
	average	22.56	34.17	34.63	61.96	85.77
	minimum	19.70	30.59	31.57	56.06	73.47
September	Maximum	16.45	19.45	21.36	36.76	68.48
	average	14.24	17.44	18.49	32.44	59.05
	minimum	12.66	16.12	16.69	29.73	47.58
October	Maximum	8.96	10.30	11.25	19.45	40.79
	average	8.43	9.59	10.33	18.01	32.13
	minimum	7.11	7.83	8.16	14.43	20.90
November	Maximum	4.46	5.37	5.77	10.06	20.33
	average	3.97	4.68	5.02	8.77	13.99
	minimum	3.47	4.01	4.29	7.50	10.20
December	Maximum	2.90	3.31	4.56	7.10	10.43
	average	2.49	2.90	3.60	5.92	8.70
	minimum	2.07	2.35	2.54	4.42	6.20
All years	Maximum	183.6	262.2	269.1	478.9	718.5
	average	176.9	252.0	256.5	458.2	662.1
	minimum	168.8	241.6	247.2	441.2	621.3

Highest combined yield hour: 2023-05-08 10:11 UTC 42036.6 W (0.555 W/Wp) of 75770 Wp installed. Use this hour to size battery charge power.

Monthly and yearly total yield (kWh) Germany - Grünheide 52.401, 13.842

Month / year		Roof East 22°/-90° 19800 Wp	Roof West 22°/90° 19800 Wp	Terrace railing south 90°/0° 4620 Wp	Terrace railing north 90°/180° 4620 Wp	Garage roof 1°/0° 10740 Wp	Garage side wall south 90°/0° 3475 Wp	All together
January	Maximum	399.1	374.4	17.4	17.4	211.5	13.1	1090.7
	average	293.8	281.8	15.2	15.2	158.1	11.5	841.2
	minimum	208.4	222.4	10.7	10.7	118.9	8.0	624.8
February	Maximum	890.0	816.5	33.0	33.0	472.3	24.8	2394.1
	average	604.6	586.8	27.6	27.6	328.2	20.8	1715.5
	minimum	426.4	389.7	23.8	23.8	220.4	17.9	1224.7
March	Maximum	1732.1	1668.9	108.3	63.9	953.8	81.4	4796.5
	average	1241.3	1226.4	85.0	56.5	688.7	63.9	3611.7
	minimum	979.2	950.2	67.9	49.1	540.1	51.0	2907.6
April	Maximum	2458.4	2446.2	356.2	100.7	1383.5	267.9	7481.3
	average	1981.0	1936.5	277.7	90.8	1101.3	208.9	6068.0
	minimum	1614.0	1579.5	211.3	71.8	894.0	159.0	4975.1
May	Maximum	3031.8	2862.0	408.4	139.3	1665.6	307.2	9141.5
	average	2412.2	2337.6	328.4	122.7	1337.9	247.0	7473.5
	minimum	1457.8	1504.8	195.0	109.5	828.6	146.7	4747.2
June	Maximum	3022.3	2998.1	363.0	140.9	1709.7	273.0	9229.8
	average	2504.8	2469.5	305.1	130.9	1404.3	229.5	7752.6
	minimum	2129.0	2011.3	262.1	118.8	1163.7	197.2	6567.3
July	Maximum	2972.7	2875.0	378.2	149.2	1658.1	284.5	9087.6
	average	2424.4	2396.3	313.8	135.0	1360.8	236.1	7581.3
	minimum	1949.0	1974.2	250.5	118.6	1102.1	188.4	6172.2
August	Maximum	2420.1	2451.4	383.9	117.0	1385.3	288.7	7618.0
	average	2093.7	2042.7	303.9	104.2	1163.5	228.5	6498.5
	minimum	1790.3	1734.2	248.9	91.0	988.0	187.2	5566.5
September	Maximum	1809.5	1744.7	183.1	76.0	988.0	137.7	5188.5
	average	1524.8	1475.8	150.9	65.8	840.4	113.5	4474.5
	minimum	1209.2	1172.6	119.6	58.5	660.7	90.0	3605.1
October	Maximum	1032.9	1195.6	41.5	41.4	610.2	31.2	3090.9
	average	852.1	836.6	39.1	39.0	467.7	29.4	2434.1
	minimum	545.2	516.1	32.9	32.8	294.6	24.7	1583.9
November	Maximum	545.9	557.2	20.6	20.6	302.2	15.5	1540.3
	average	364.0	363.7	18.3	18.3	199.7	13.8	1060.4
	minimum	261.8	250.6	16.0	16.0	142.4	12.0	773.0
December	Maximum	281.5	262.9	13.4	13.4	149.7	10.1	790.4
	average	224.3	226.4	11.5	11.5	121.9	8.6	659.4
	minimum	160.1	155.8	9.6	9.6	85.5	7.2	469.5
All years	Maximum	18032	17722	2051	848	10057	1543	54439
	average	16521	16180	1877	817	9172	1411	50171
	minimum	15459	15073	1751	780	8556	1317	47078

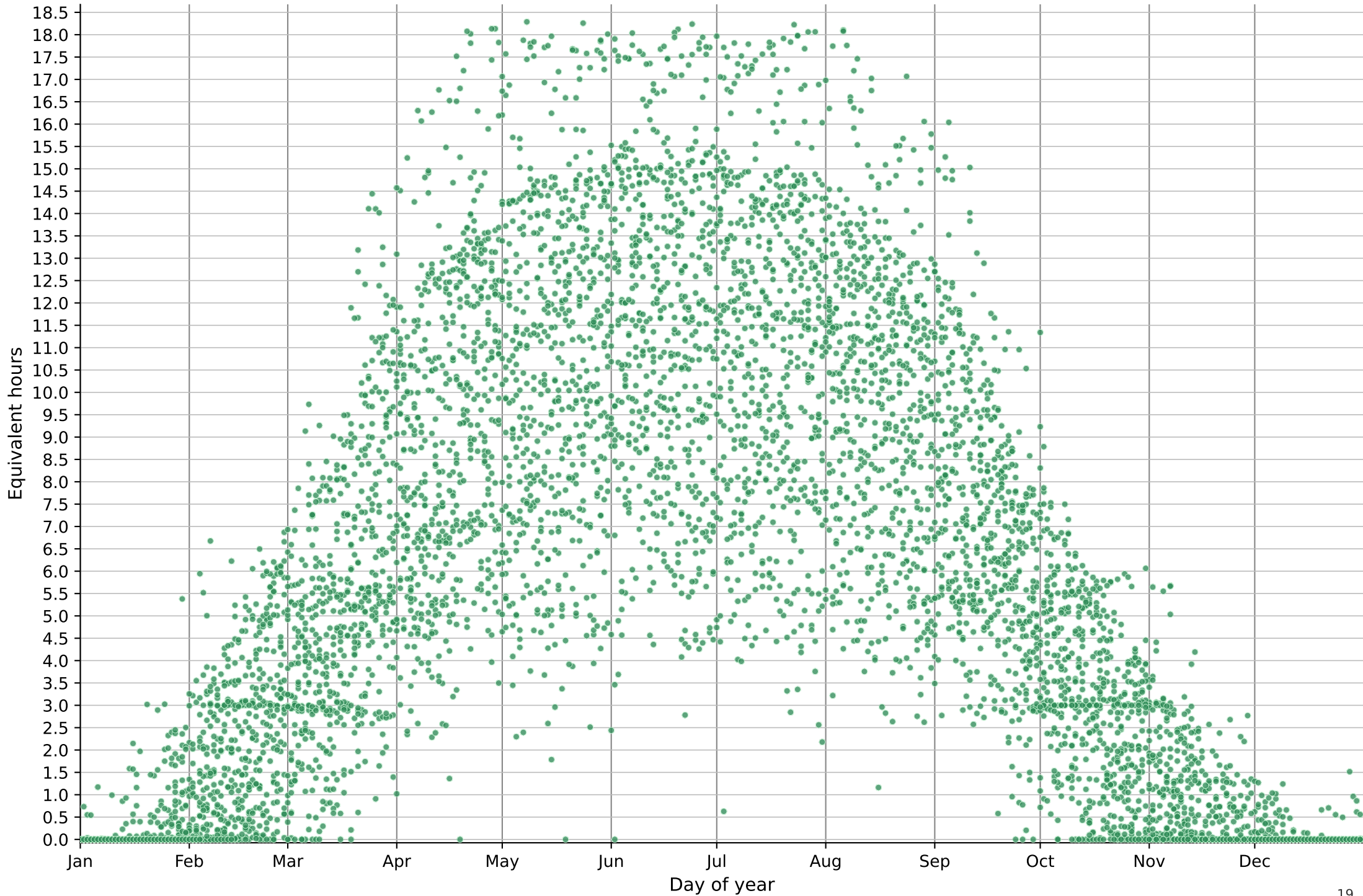
Highest combined yield hour: 2023-05-08 10:11 UTC 42036.6 W (0.555 W/Wp) of 75770 Wp installed. Use this hour to size battery charge power.

Monthly and yearly total yield (kWh) Germany - Grünheide 52.401, 13.842

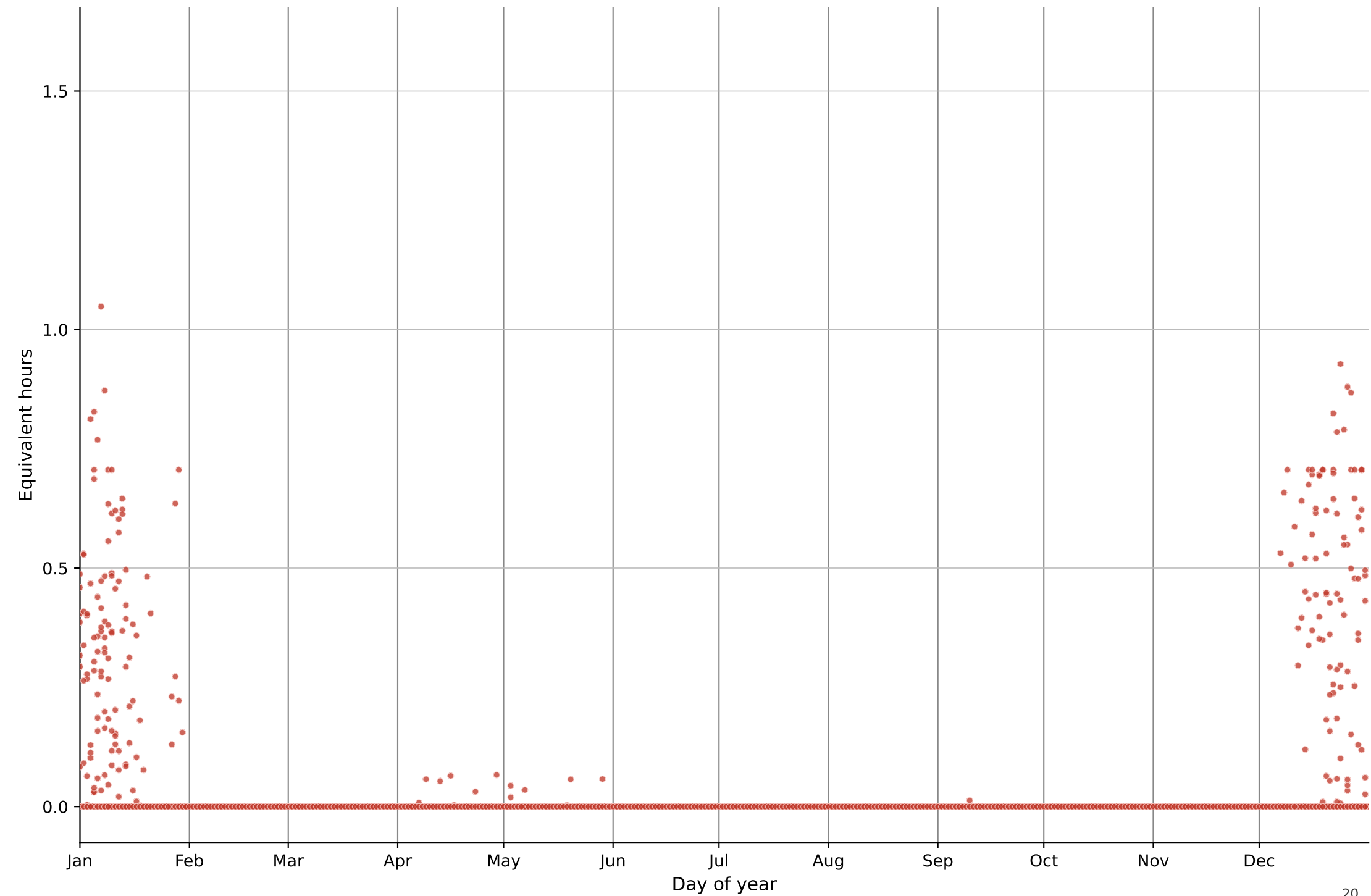
Month / year		Garage side wall north 90°/180° 3475 Wp	Garage door side west 90°/90° 700 Wp	Garage back side east 90°/-90° 2540 Wp	Garden fence east 90°/-90° + 90°/90° 6000 Wp bifacial ×80%	All together
January	Maximum	13.1	3.3	10.7	47.7	1090.7
	average	11.5	2.9	9.3	42.0	841.2
	minimum	8.0	2.0	6.5	29.2	624.8
February	Maximum	24.8	6.3	19.8	88.9	2394.1
	average	20.8	5.4	16.9	76.8	1715.5
	minimum	17.9	4.6	14.6	66.0	1224.7
March	Maximum	48.1	11.7	40.2	172.7	4796.5
	average	42.5	10.7	36.7	160.1	3611.7
	minimum	36.9	9.8	33.0	145.1	2907.6
April	Maximum	75.7	21.9	79.4	328.3	7481.3
	average	68.3	20.0	73.3	310.2	6068.0
	minimum	54.0	18.2	64.6	277.3	4975.1
May	Maximum	104.8	33.6	123.2	513.7	9141.5
	average	92.3	28.9	109.7	457.0	7473.5
	minimum	82.4	21.1	76.1	324.6	4747.2
June	Maximum	106.0	33.5	119.3	505.4	9229.8
	average	98.5	30.4	110.5	469.1	7752.6
	minimum	89.3	27.7	102.9	434.0	6567.3
July	Maximum	112.2	32.9	127.2	525.9	9087.6
	average	101.5	30.0	112.2	471.1	7581.3
	minimum	89.2	25.4	89.5	385.4	6172.2
August	Maximum	88.0	26.5	97.3	409.4	7618.0
	average	78.4	23.9	87.9	371.8	6498.5
	minimum	68.5	21.4	80.2	336.4	5566.5
September	Maximum	57.2	13.6	54.2	220.6	5188.5
	average	49.5	12.2	47.0	194.6	4474.5
	minimum	44.0	11.3	42.4	178.4	3605.1
October	Maximum	31.1	7.2	28.6	116.7	3090.9
	average	29.3	6.7	26.2	108.1	2434.1
	minimum	24.7	5.5	20.7	86.6	1583.9
November	Maximum	15.5	3.8	14.7	60.4	1540.3
	average	13.8	3.3	12.8	52.6	1060.4
	minimum	12.0	2.8	10.9	45.0	773.0
December	Maximum	10.1	2.3	11.6	42.6	790.4
	average	8.6	2.0	9.1	35.5	659.4
	minimum	7.2	1.6	6.4	26.5	469.5
All years	Maximum	638	184	683	2873	54439
	average	615	176	652	2749	50171
	minimum	587	169	628	2647	47078

Highest combined yield hour: 2023-05-08 10:11 UTC 42036.6 W (0.555 W/Wp) of 75770 Wp installed. Use this hour to size battery charge power.

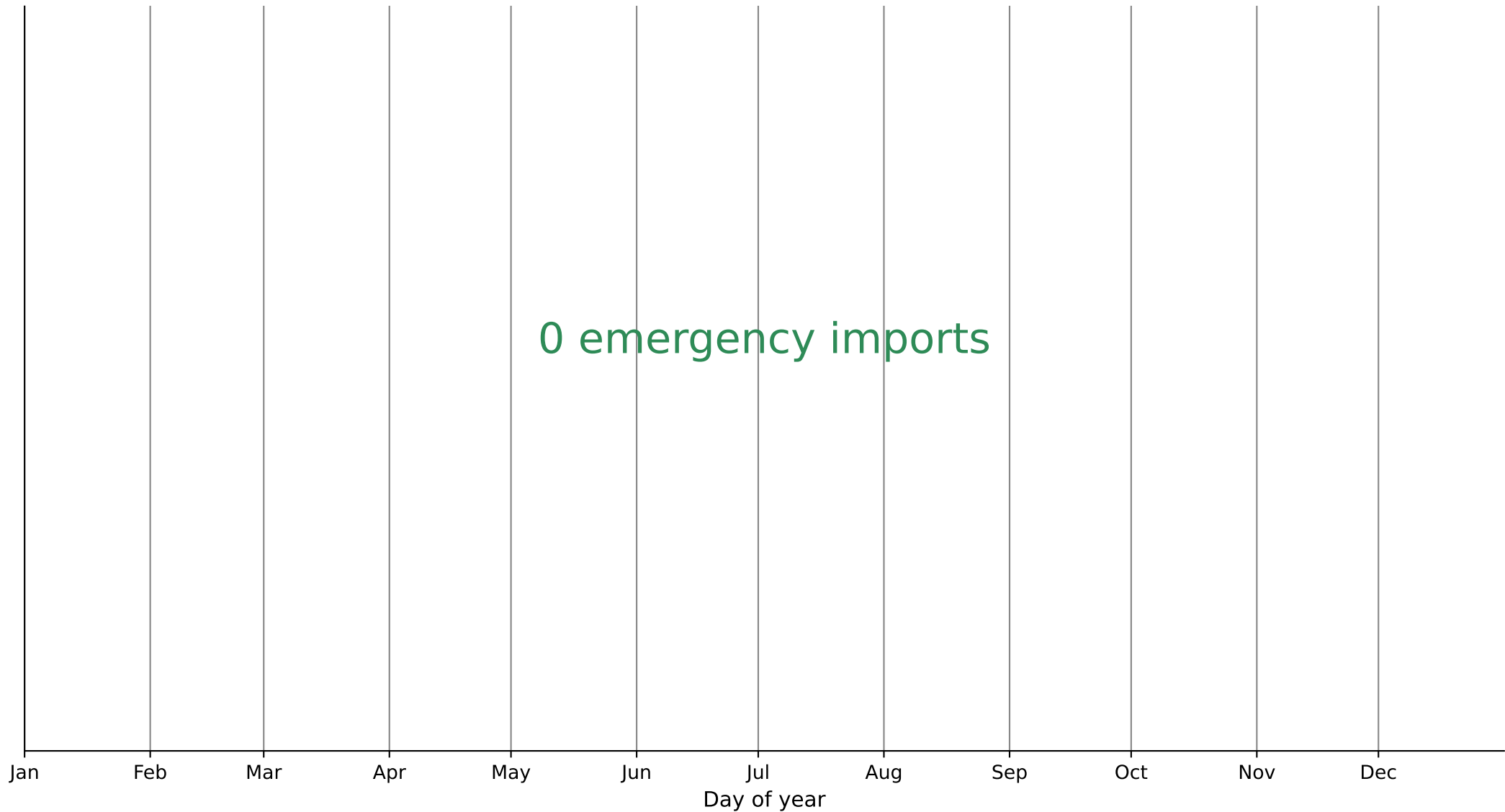
Export energy as equivalent hours (kWh / grid kW)
Germany - Grünheide 52.401, 13.842



Import energy as equivalent hours (kWh / grid kW)
Germany - Grünheide 52.401, 13.842



Emergency import hours: 0 days with an emergency: 0
Germany - Grünheide 52.401, 13.842



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
Germany - Grünheide 52.401, 13.842

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Export to grid													
month Maximum	259	1567	3836	5694	6562	6526	6711	5860	4233	2264	753	92	39497
month average	92	988	2767	4673	5565	5804	5799	5180	3556	1626	363	26	36440
month minimum	0	551	2122	3720	3640	5072	4626	4425	2700	840	147	0	33674
day Maximum	91.4	116.8	245.5	308.3	310.9	310.0	309.8	307.8	272.7	192.8	96.5	25.8	310.9
day average	3.0	35.0	89.3	155.8	179.5	193.5	187.1	167.1	118.5	52.4	12.1	0.8	99.8
day minimum	0.0	0.0	0.0	0.0	0.0	0.0	10.7	19.7	0.0	0.0	0.0	0.0	0.0
Import from grid													
month Maximum	104	0	0	2	1	0	0	0	0	0	0	170	184
month average	35	0	0	0	0	0	0	0	0	0	0	38	74
month minimum	0	0	0	0	0	0	0	0	0	0	0	0	0
day Maximum	17.8	0.0	0.0	1.1	1.0	0.0	0.0	0.0	0.2	0.0	0.0	15.8	17.8
day average	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.2
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	740	661	698	602	574	512	511	511	531	607	627	723	7126
month average	677	611	644	572	546	492	495	495	509	581	609	660	6889
month minimum	639	581	616	540	518	471	482	477	479	557	593	621	6776
day Maximum	28.0	26.6	24.5	22.6	22.0	22.1	21.1	20.1	19.6	21.7	23.3	25.2	28.0
day average	21.8	21.6	20.8	19.1	17.6	16.4	16.0	16.0	17.0	18.7	20.3	21.3	18.9
day minimum	15.9	18.7	17.5	15.4	15.3	15.3	15.2	15.2	15.2	16.1	16.9	17.9	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
Germany - Grünheide 52.401, 13.842

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Export													
month Maximum	55	301	566	578	617	588	615	610	543	419	155	19	4609
month average	18	188	448	529	563	562	581	572	492	300	74	5	4332
month minimum	0	108	378	462	451	522	507	525	403	153	27	0	4039
day Maximum	19.8	23.5	29.8	29.3	29.9	29.7	32.1	30.2	28.8	26.5	21.2	5.7	32.1
day average	0.6	6.6	14.4	17.6	18.2	18.7	18.7	18.4	16.4	9.7	2.5	0.2	11.9
day minimum	0.0	0.0	0.0	0.0	0.0	0.0	1.3	2.4	0.0	0.0	0.0	0.0	0.0
Import													
month Maximum	24	0	0	1	0	0	0	0	0	0	0	40	43
month average	8	0	0	0	0	0	0	0	0	0	0	9	17
month minimum	0	0	0	0	0	0	0	0	0	0	0	0	0
day Maximum	4.5	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.1	0.0	0.0	3.9	4.5
day average	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	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	13	0	0	7	6	0	0	0	1	0	0	13	32
month average	11	0	0	1	1	0	0	0	0	0	0	8	21
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	37	0	0	8	6	0	0	0	1	0	0	52	68
month average	19	0	0	1	1	0	0	0	0	0	0	17	38
month minimum	0	0	0	0	0	0	0	0	0	0	0	0	0
day Maximum	4.5	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.1	0.0	0.0	3.9	4.5
day average	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	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	55	301	566	578	613	588	615	610	543	419	155	19	4541
month average	-0	188	448	528	562	562	581	572	492	300	74	-11	4294
month minimum	-24	108	378	462	445	522	507	525	403	153	27	-52	4018
day Maximum	19.8	23.5	29.8	29.3	29.9	29.7	32.1	30.2	28.8	26.5	21.2	5.7	32.1
day average	0.3	6.6	14.4	17.6	18.2	18.7	18.7	18.4	16.4	9.7	2.5	-0.1	11.8
day minimum	-4.5	0.0	0.0	0.0	0.0	0.0	1.3	2.4	0.0	0.0	0.0	-3.9	-4.5

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
Germany - Grünheide 52.401, 13.842

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Export total													
month Maximum	259	1567	3836	5694	6562	6526	6711	5860	4233	2264	753	92	39497
month average	92	988	2767	4673	5565	5804	5799	5180	3556	1626	363	26	36440
month minimum	0	551	2122	3720	3640	5072	4626	4425	2700	840	147	0	33674
day Maximum	91.4	116.8	245.5	308.3	310.9	310.0	309.8	307.8	272.7	192.8	96.5	25.8	310.9
day average	3.0	35.0	89.3	155.8	179.5	193.5	187.1	167.1	118.5	52.4	12.1	0.8	99.8
day minimum	0.0	0.0	0.0	0.0	0.0	0.0	10.7	19.7	0.0	0.0	0.0	0.0	0.0
Export during high price hours													
month Maximum	249	1401	2185	2027	1931	1780	1954	2087	2232	2027	749	92	16927
month average	87	901	1940	1889	1780	1676	1804	1960	2066	1488	356	26	15973
month minimum	0	465	1693	1778	1654	1572	1666	1857	1822	776	136	0	14834
day Maximum	89.0	102.0	98.5	94.4	93.4	90.4	94.7	94.0	98.6	98.6	96.2	25.8	102.0
day average	2.8	31.9	62.6	63.0	57.4	55.9	58.2	63.2	68.9	48.0	11.9	0.8	43.7
day minimum	0.0	0.0	0.0	0.0	0.0	0.0	10.7	19.7	0.0	0.0	0.0	0.0	0.0
Export during medium price hours													
month Maximum	17	166	1624	3288	3979	4093	4191	3356	1988	283	31	2	19721
month average	5	87	790	2462	3215	3477	3455	2881	1417	138	7	0	17935
month minimum	0	38	308	1761	1662	3004	2513	2208	777	49	1	0	16014
day Maximum	4.1	23.8	167.0	203.0	203.7	203.9	202.3	203.3	185.9	122.3	6.4	2.4	203.9
day average	0.2	3.1	25.5	82.1	103.7	115.9	111.5	92.9	47.2	4.4	0.2	0.0	49.1
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
Export during low price hours													
month Maximum	0	0	99	600	930	850	854	487	138	0	0	0	3095
month average	0	0	37	323	570	651	540	339	72	0	0	0	2532
month minimum	0	0	0	96	172	312	271	196	32	0	0	0	2094
day Maximum	0.0	0.0	26.2	51.0	65.0	68.0	61.8	51.0	34.0	0.0	0.0	0.0	68.0
day average	0.0	0.0	1.2	10.8	18.4	21.7	17.4	11.0	2.4	0.0	0.0	0.0	6.9
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
Germany - Grünheide 52.401, 13.842

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Heating													
month Maximum	247	200	205	130	89	47	34	34	67	120	154	234	1414
month average	184	163	152	103	64	29	20	19	47	95	136	171	1183
month minimum	147	133	125	73	40	10	4	3	20	74	121	133	1076
day Maximum	12.1	10.7	8.6	6.9	6.4	6.5	5.8	4.7	4.1	6.0	7.5	9.5	12.1
day average	5.9	5.8	4.9	3.4	2.1	1.0	0.6	0.6	1.6	3.1	4.5	5.5	3.2
day minimum	0.0	3.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.7	1.4	2.3	0.0
Cooling													
month Maximum	0.00	0.00	0.00	0.00	0.00	1.32	6.81	6.40	1.05	0.00	0.00	0.00	9.37
month average	0.00	0.00	0.00	0.00	0.00	0.18	0.71	1.07	0.06	0.00	0.00	0.00	2.01
month minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
day Maximum	0.00	0.00	0.00	0.00	0.00	1.26	2.96	2.96	1.05	0.00	0.00	0.00	2.96
day average	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.00	0.00	0.00	0.00	0.01
day minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DHW													
month Maximum	59	55	59	52	51	45	42	42	44	54	53	55	600
month average	59	53	58	50	48	43	40	41	42	52	53	55	592
month minimum	58	52	57	47	45	40	38	39	39	49	52	55	581
day Maximum	1.9	1.9	1.9	1.8	1.8	1.7	1.6	1.5	1.6	1.8	1.8	1.8	1.9
day average	1.9	1.9	1.9	1.7	1.5	1.4	1.3	1.3	1.4	1.7	1.8	1.8	1.6
day minimum	1.7	1.7	1.6	1.3	1.3	1.3	1.2	1.2	1.2	1.4	1.5	1.6	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

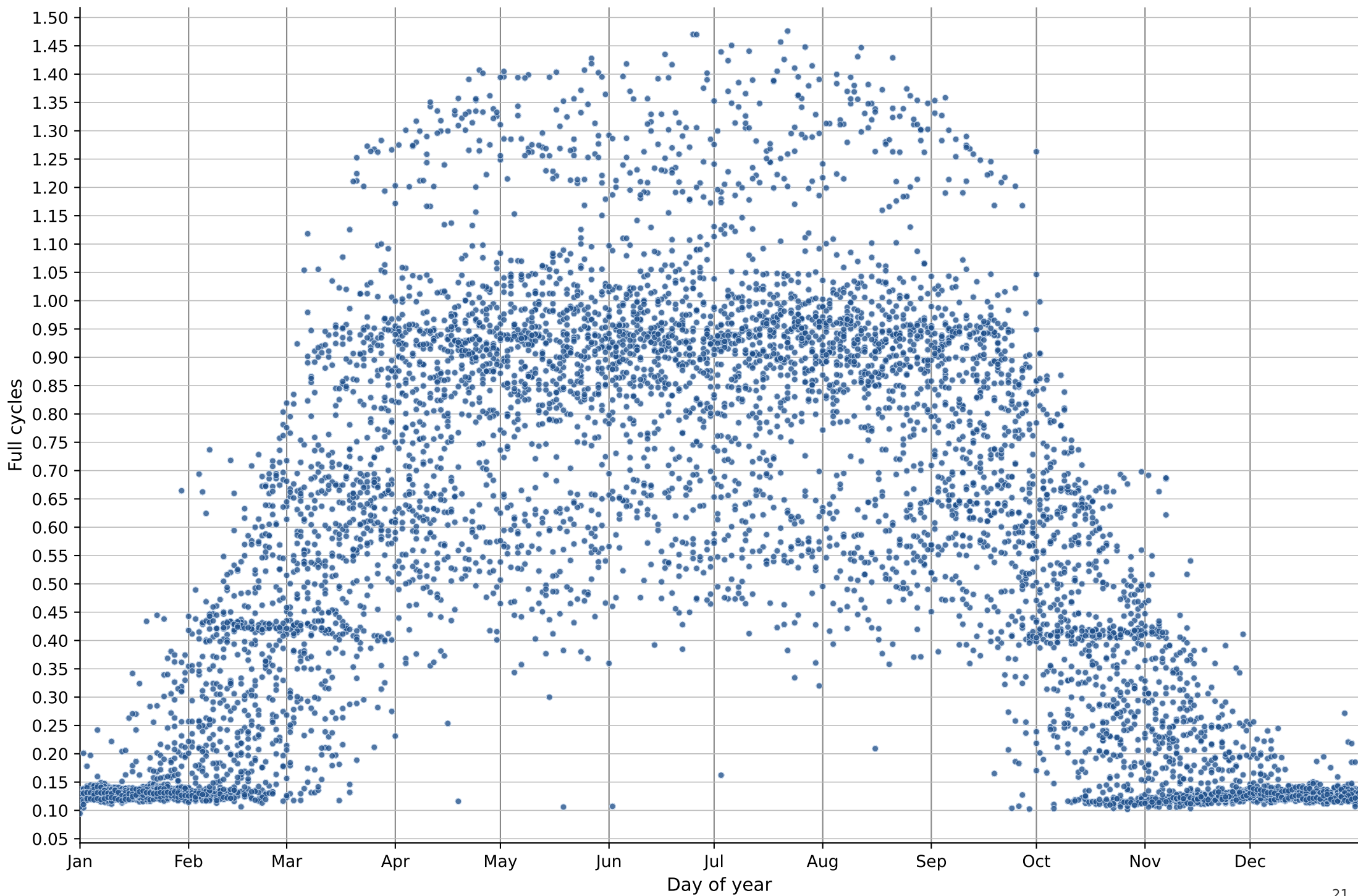
Heating, cooling and DHW are electricity. Direct electric is the part the heat pump could not cover.

Battery
Germany - Grünheide 52.401, 13.842

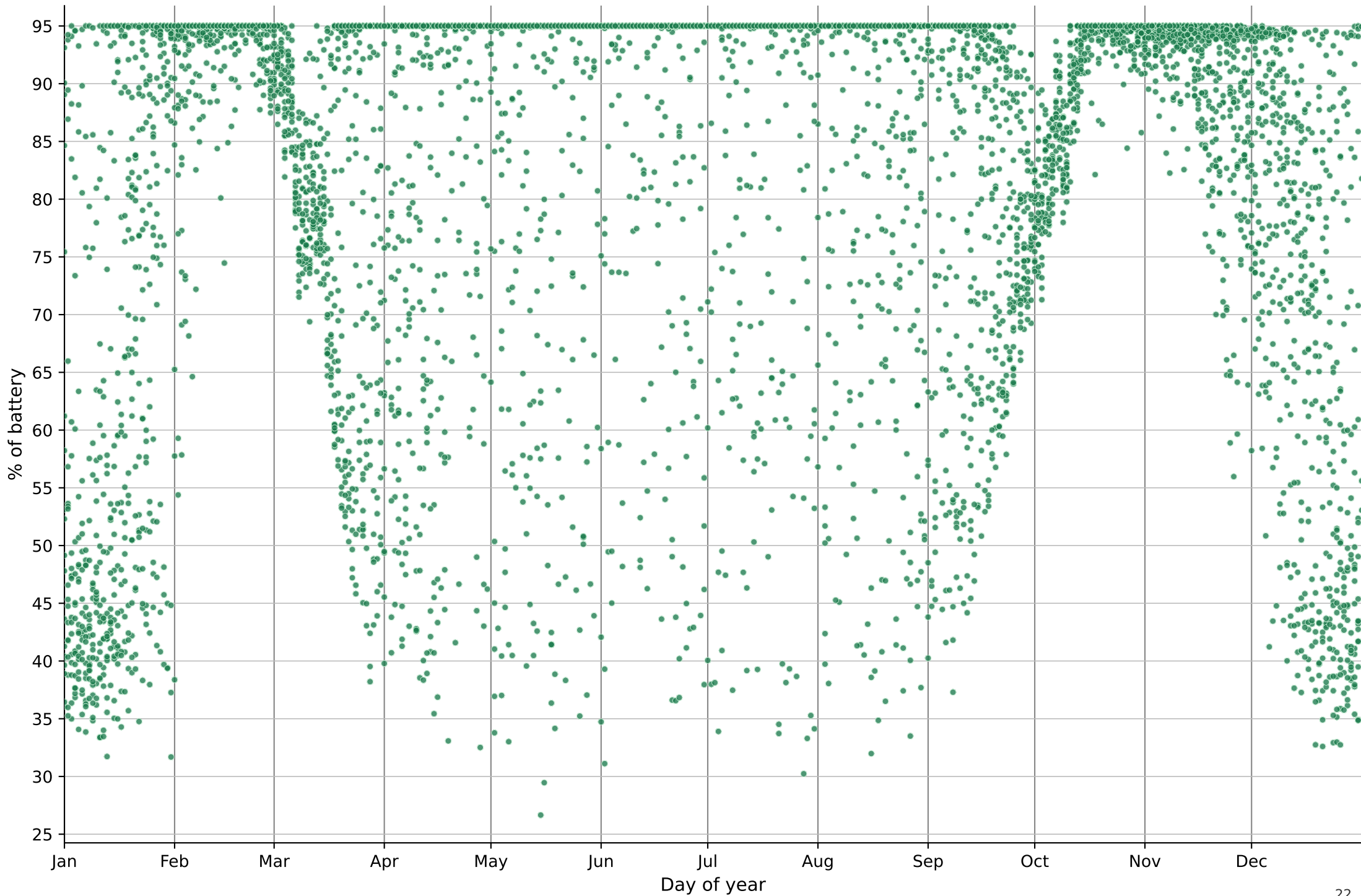
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Wasted													
month Maximum	0	0	28	871	1645	1760	1454	866	79	0	0	0	5143
month average	0	0	8	452	966	1076	884	454	43	0	0	0	3883
month minimum	0	0	0	157	263	601	599	231	9	0	0	0	3136
day Maximum	0.0	0.0	12.2	119.7	152.0	142.5	134.1	102.7	38.6	0.0	0.0	0.0	152.0
day average	0.0	0.0	0.3	15.1	31.2	35.9	28.5	14.6	1.4	0.0	0.0	0.0	10.6
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	5.65	12.11	24.52	27.49	29.37	28.09	29.12	28.98	24.99	16.32	8.12	4.39	222.14
month average	4.53	8.91	19.12	25.26	27.25	27.06	27.76	27.04	22.30	12.90	5.72	4.08	211.94
month minimum	3.86	6.32	15.89	22.76	21.97	25.59	23.29	24.73	18.08	8.48	4.45	3.85	199.63
day Maximum	0.66	0.80	1.28	1.41	1.43	1.47	1.48	1.45	1.36	1.26	0.69	0.27	1.48
day average	0.15	0.32	0.62	0.84	0.88	0.90	0.90	0.87	0.74	0.42	0.19	0.13	0.58
day minimum	0.09	0.11	0.12	0.12	0.11	0.11	0.16	0.21	0.10	0.10	0.10	0.11	0.09
Charge C													
month Maximum	0.08	0.13	0.20	0.22	0.23	0.22	0.21	0.21	0.19	0.14	0.09	0.06	1.92
month average	0.07	0.11	0.19	0.21	0.22	0.22	0.21	0.20	0.19	0.13	0.08	0.05	1.87
month minimum	0.06	0.09	0.17	0.20	0.21	0.21	0.20	0.19	0.18	0.11	0.07	0.05	1.86
day Maximum	0.08	0.13	0.20	0.22	0.23	0.22	0.21	0.21	0.19	0.14	0.09	0.06	0.23
day average	0.04	0.07	0.11	0.17	0.18	0.18	0.17	0.16	0.13	0.08	0.04	0.03	0.11
day minimum	0.00	0.01	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.01	0.01	0.01	0.00
Discharge C													
month Maximum	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	1.31
month average	0.09	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.06	1.24
month minimum	0.01	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.10	0.01	1.11
day Maximum	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
day average	0.02	0.08	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.09	0.04	0.01	0.08
day minimum	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.07	0.08	0.01	0.01	0.01	0.01

Wasted = PV left when the export price is negative and the battery is full. Full cycles = discharge kWh / 176.8 kWh. Battery export only into hours whose export price is above 0, highest price first. At 0 cent on

Battery cycles per day (discharge / 176.8 kWh)
Germany - Grünheide 52.401, 13.842



Battery max charge state per day (176.8 kWh = 100 %)
Germany - Grünheide 52.401, 13.842



Battery min charge state per day (176.8 kWh = 100 %)
Germany - Grünheide 52.401, 13.842

