

Scenario — PV
Old house to improve Austria - Inning 48.182, 15.417

Name	Slope °	Azimuth °	Wp	Wall d/h m	Face	Bifacial	Wp counted
Total counted			0				

Location: My most visited location in “lower Austria”, just at the Tesla SuC.
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 2005-01-01 01:10 local (00:10 UTC) 0 W 0.000 W/Wp of 0 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 winter time, battery export is only the kWh that would not fit in the next 72 h.



Scenario — house, heat pump, battery
 Old house to improve Austria - Inning 48.182, 15.417

Chapter	Parameter	Value
Building	Design out / in / heat	-10.0 °C / 20.0 °C / 4000.0 W
	Heat on / cool on / ground	20.0 °C / 25.0 °C / 10.0 °C
	Curve / flow min / max	1.0 / 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 62.0 °C 8-18 h
	Water out of the pipe Q1-Q4	8 °C 10 °C 12 °C 10 °C
Heat pump	Source	air
	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	0.0 kWh C 0.5 5 / 95 / 50 %
	Nameplate	—
	Charge / discharge η	95 % / 90 %
Grid	Inverter / grid connection	5.0 kW / 5.0 kW
	Max export	17.0 kW
	Import cap Jan-Jun kW	Jan 11 Feb 11 Mar 11 Apr 11 May 11 Jun 11
	Import cap Jul-Dec kW	Jul 11 Aug 11 Sep 11 Oct 11 Nov 11 Dec 11
Cars	Lunch DC / night AC	0.0 kWh @ 30.0 kW night 10.0 kWh @ 4.0 kW

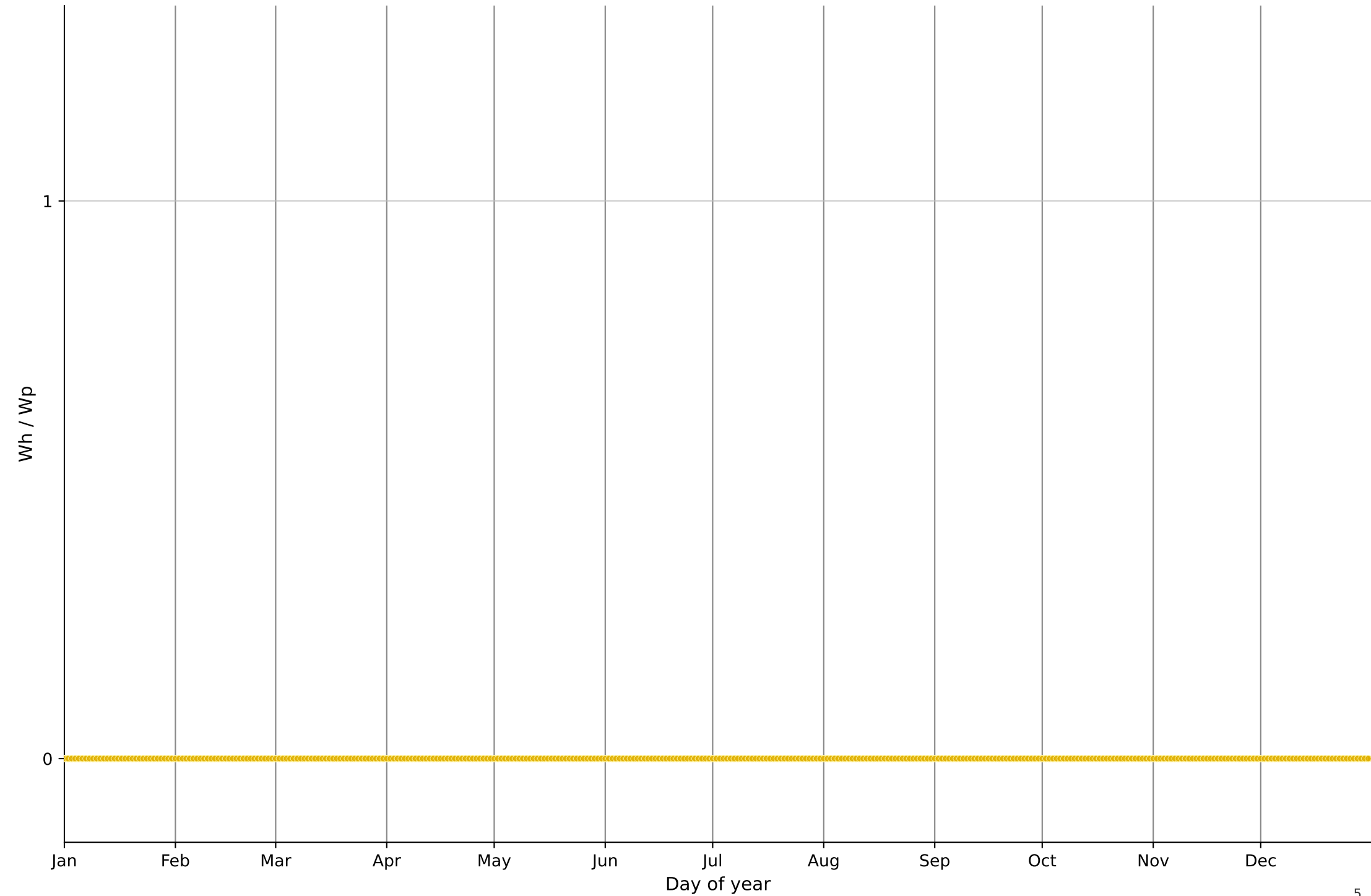
Records 1-10
Austria - Inning 48.182, 15.417

No photovoltaic installed.

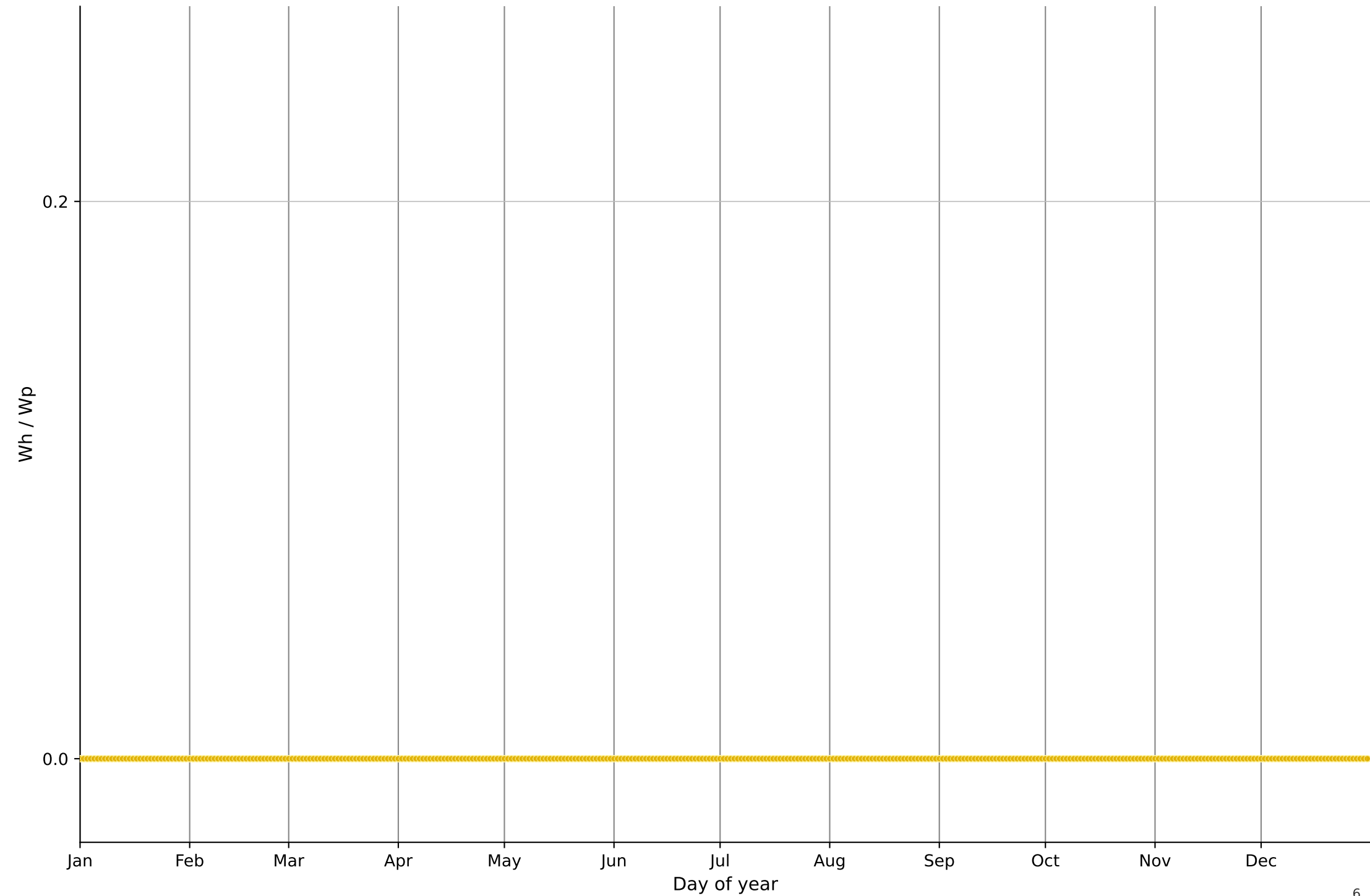
Records of each photovoltaic field
Austria - Inning 48.182, 15.417

No photovoltaic installed.

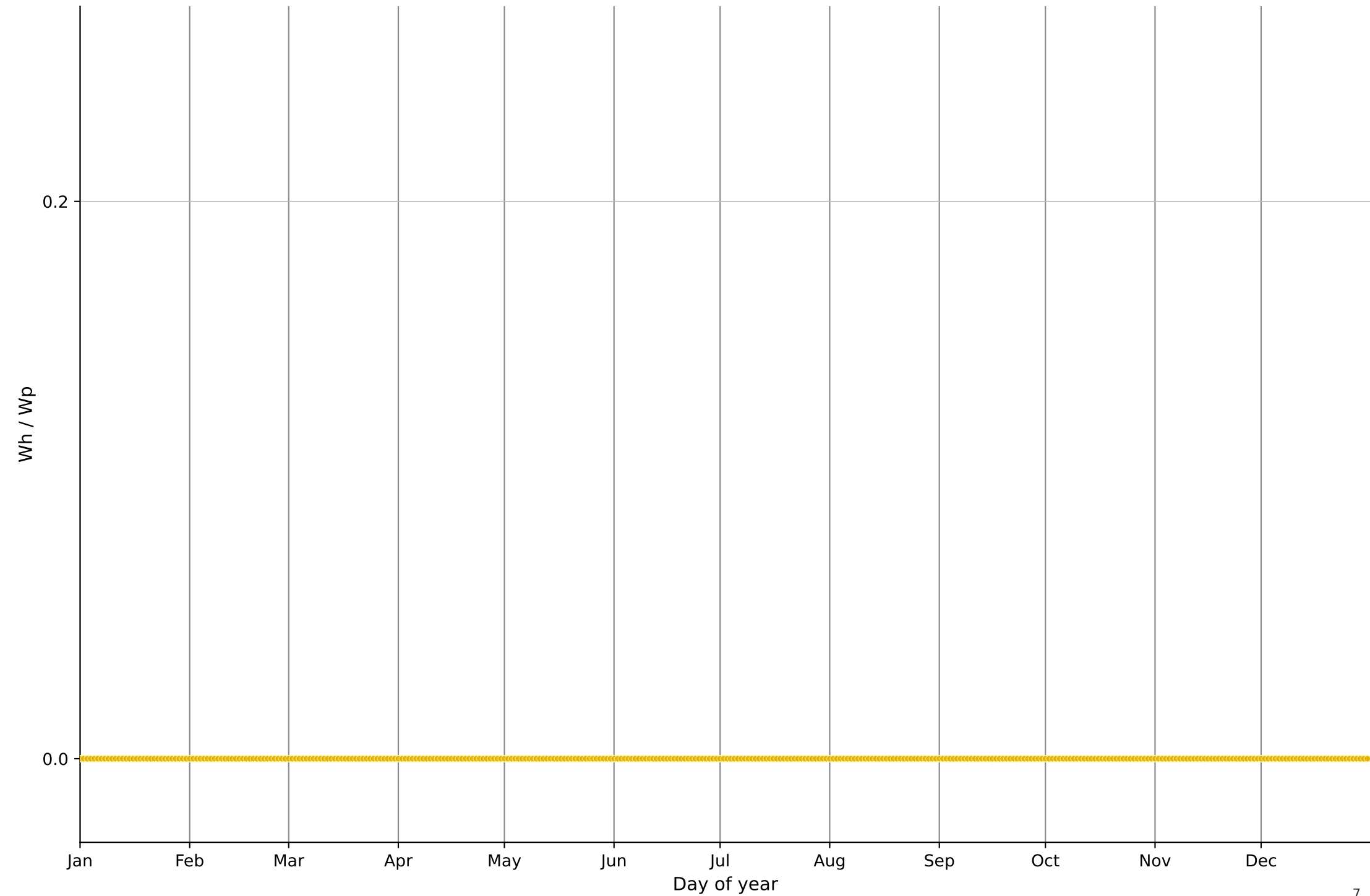
Yield distribution for each day — Wh / Wp of all PV together
Austria - Inning 48.182, 15.417



Yield distribution for each day — Wh / Wp of all PV together — 00:00-09:00
Austria - Inning 48.182, 15.417

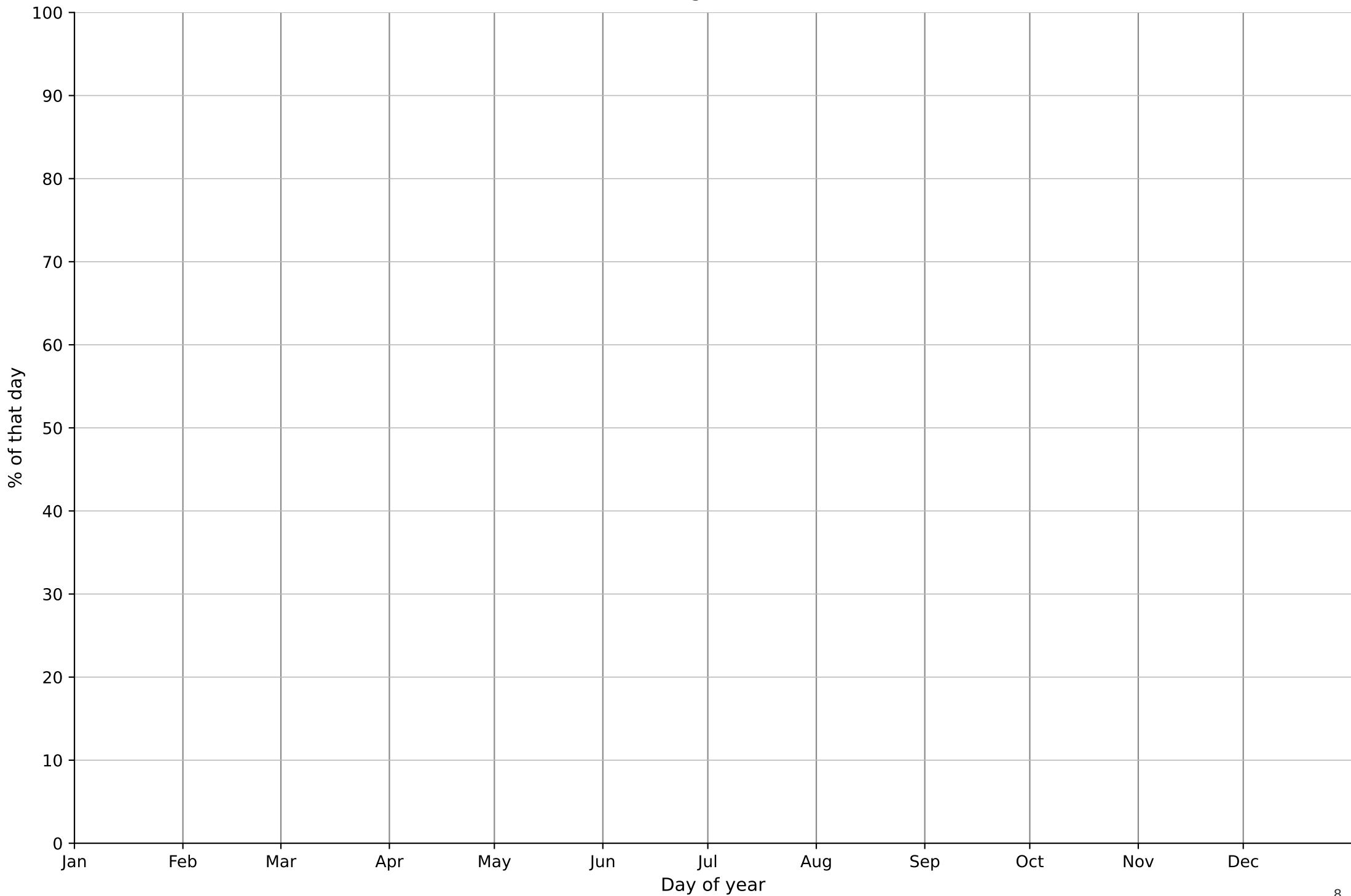


Yield distribution for each day — Wh / Wp of all PV together — 15:00-23:59
Austria - Inning 48.182, 15.417

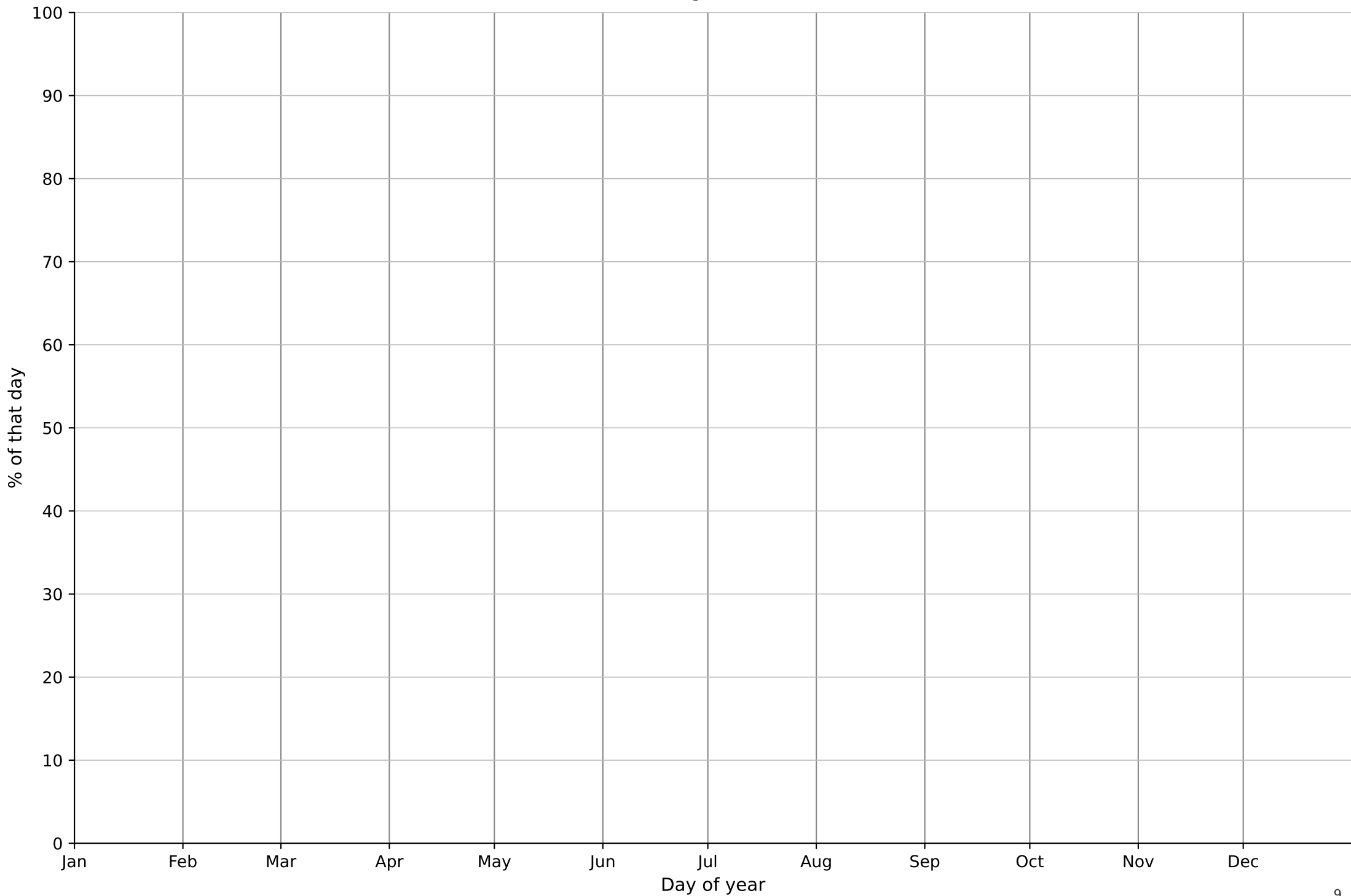


Share of the day's yield in 09:00-15:00 winter time

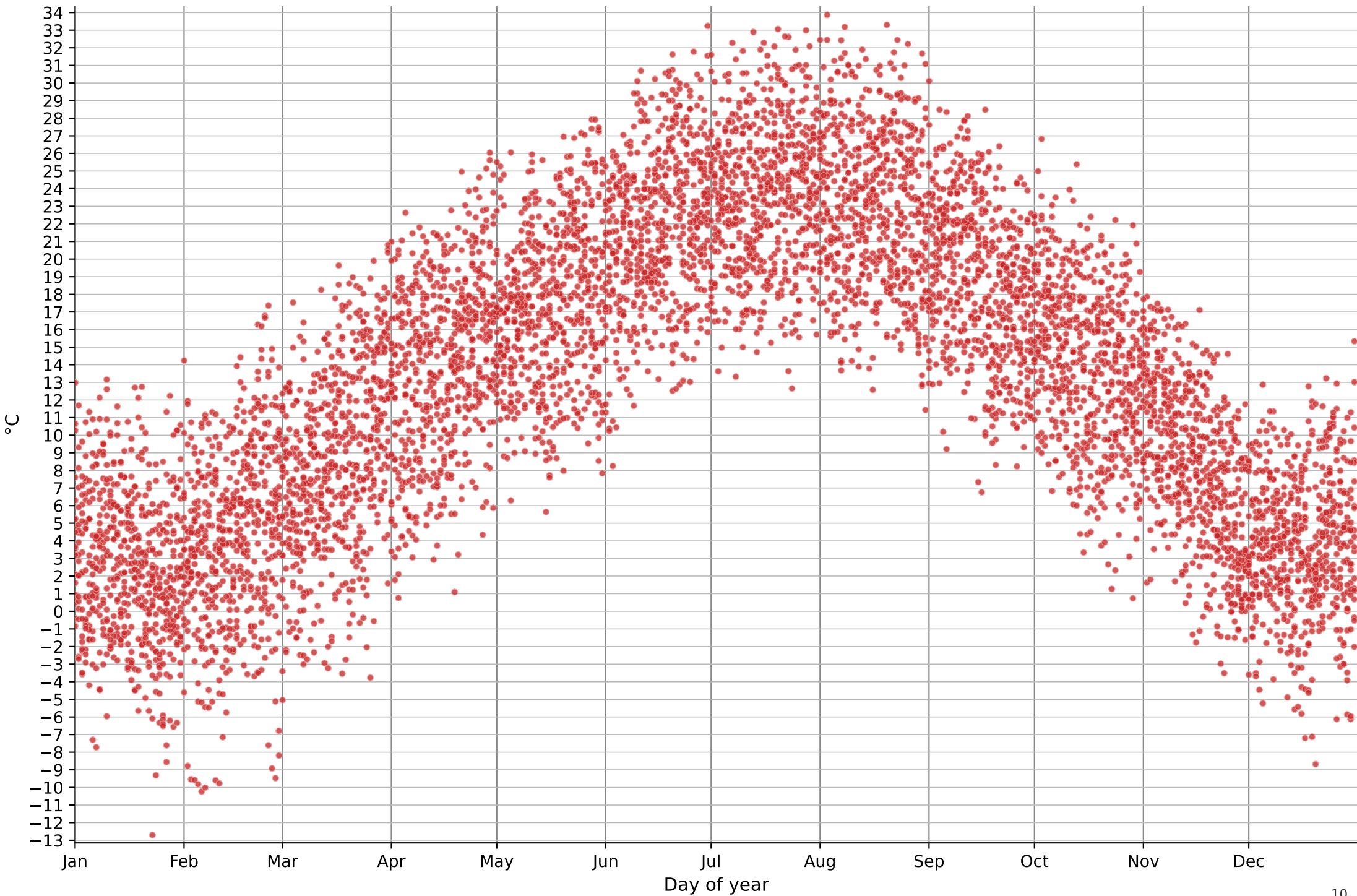
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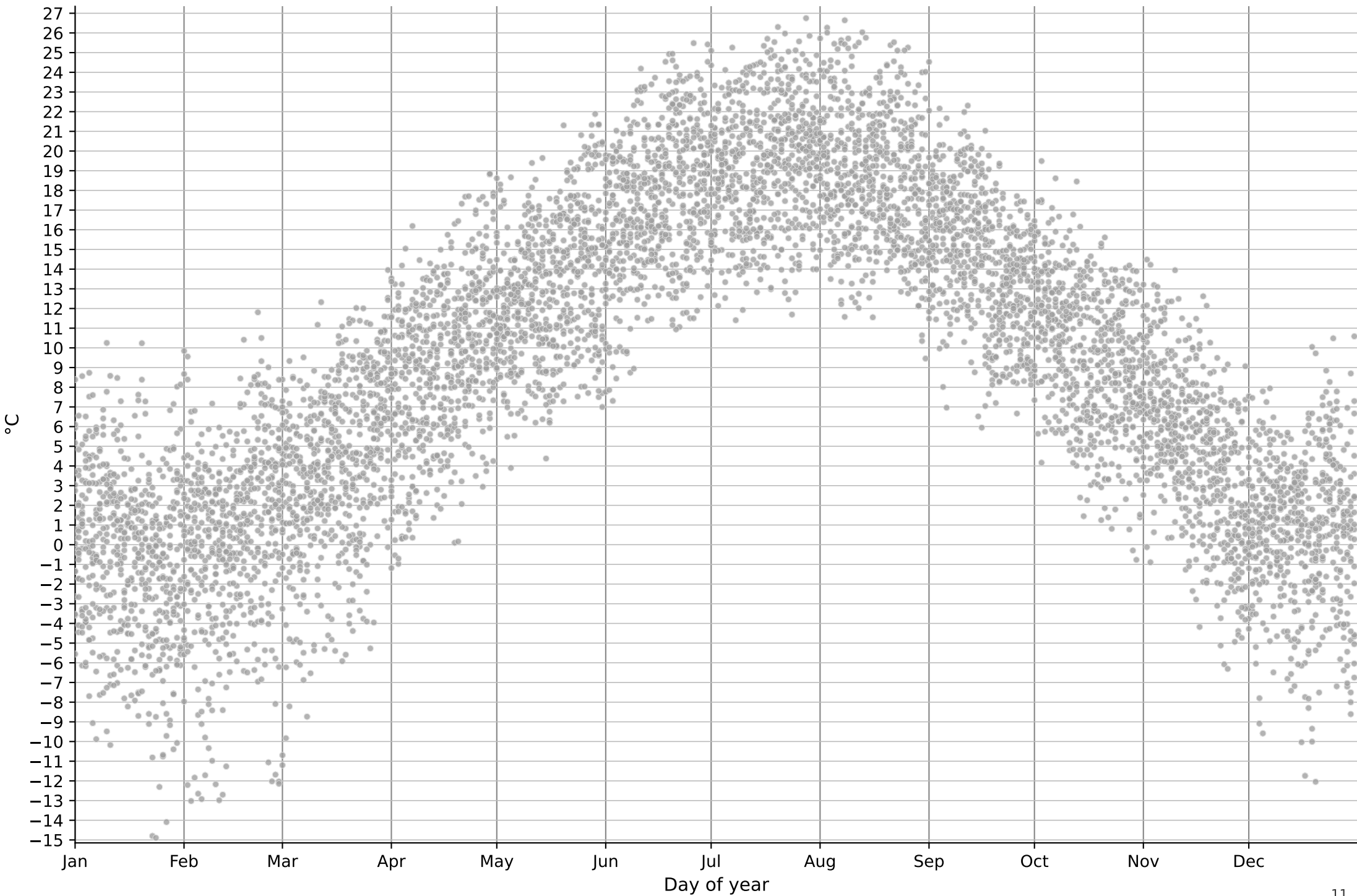
Share of the day's yield outside 09:00-15:00 winter time
Austria - Inning 48.182, 15.417



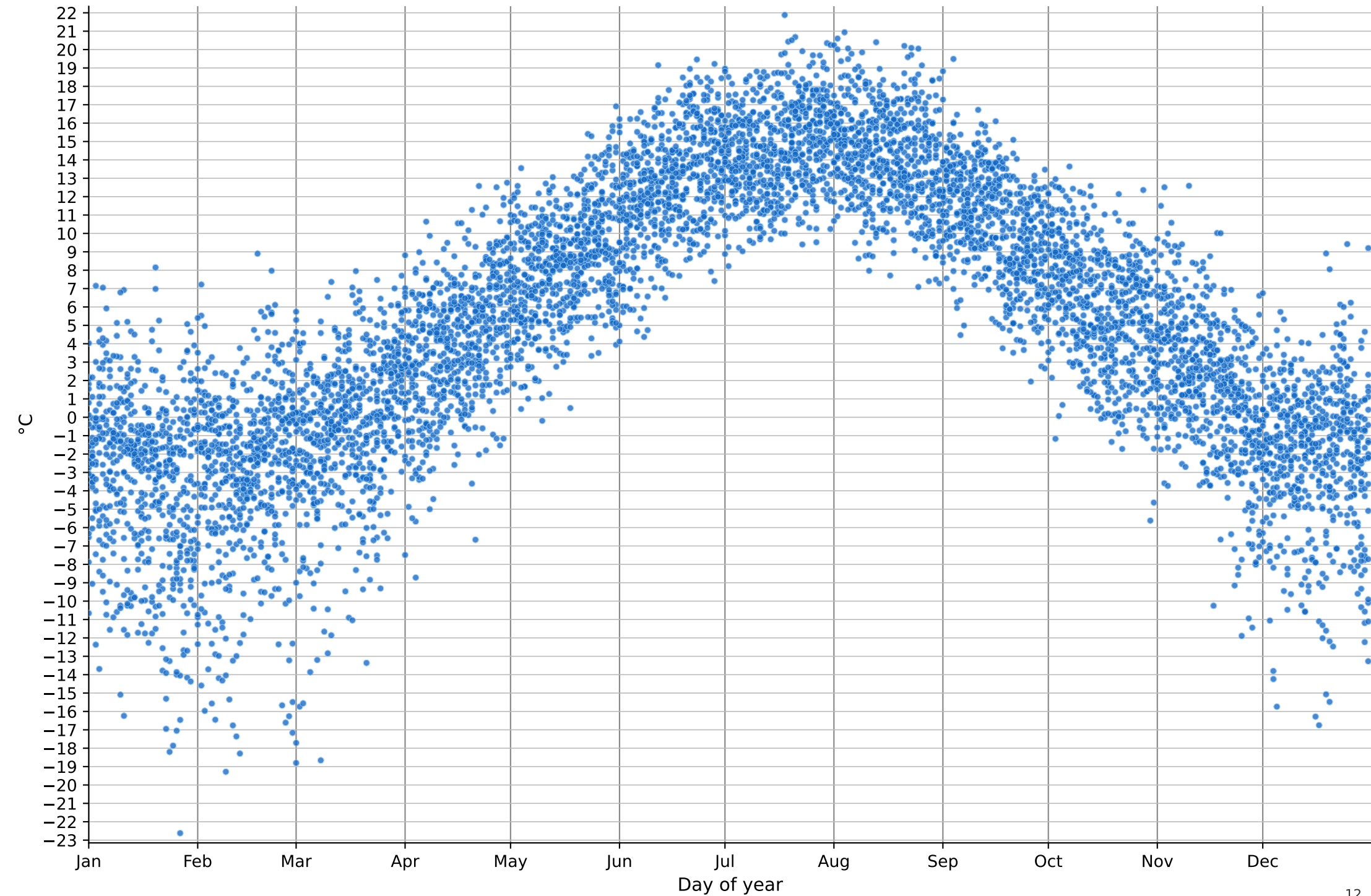
Highest temperature of each day
Austria - Inning 48.182, 15.417



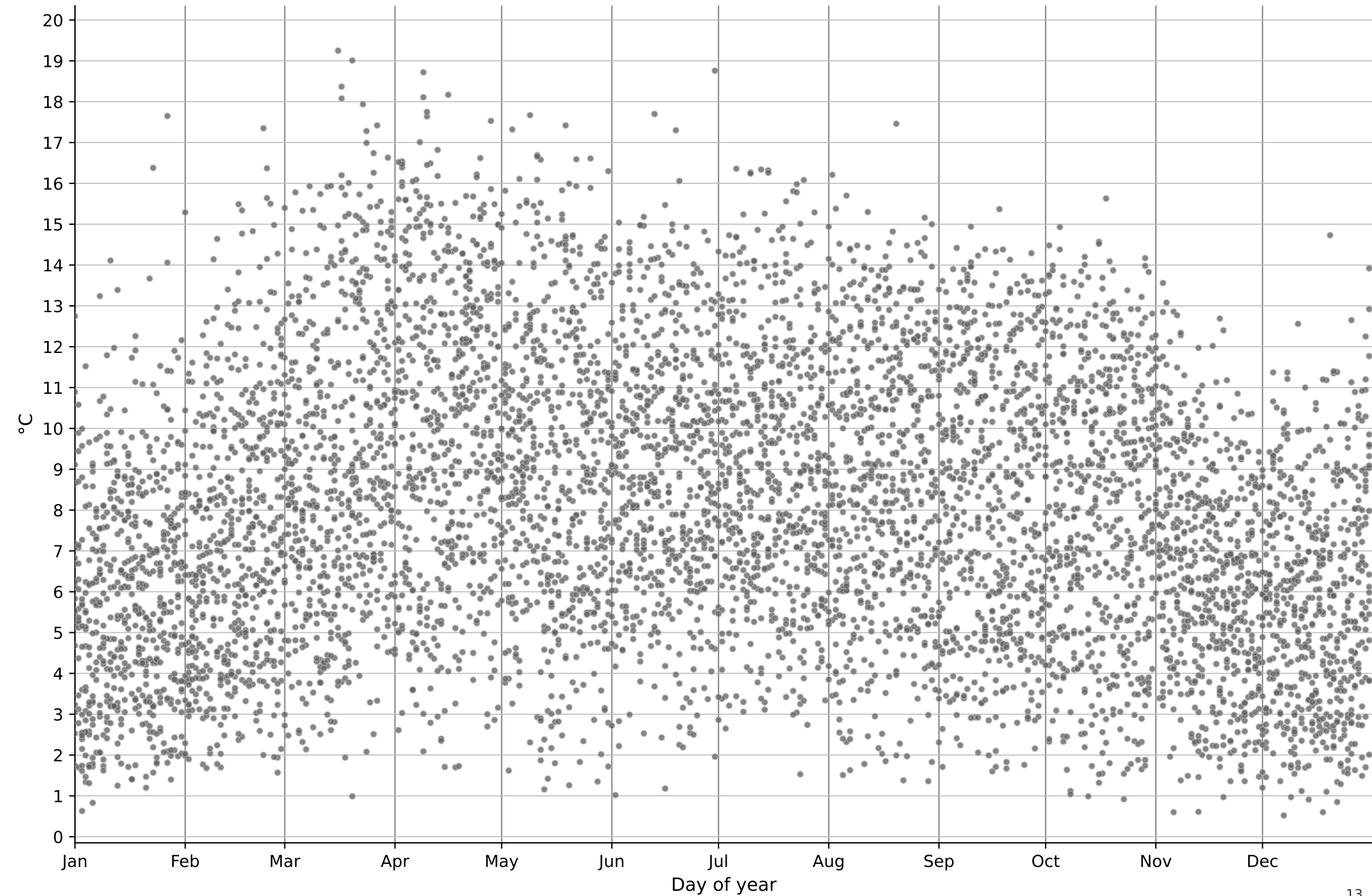
Average temperature of each day
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Lowest temperature of each day
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Difference between highest and lowest temperature of each day
Austria - Inning 48.182, 15.417



Monthly and yearly specific yield (kWh/kWp = Wh/Wp)
Austria - Inning 48.182, 15.417

Month / year		All together
January	Maximum	0.00
	average	0.00
	minimum	0.00
February	Maximum	0.00
	average	0.00
	minimum	0.00
March	Maximum	0.00
	average	0.00
	minimum	0.00
April	Maximum	0.00
	average	0.00
	minimum	0.00
May	Maximum	0.00
	average	0.00
	minimum	0.00
June	Maximum	0.00
	average	0.00
	minimum	0.00
July	Maximum	0.00
	average	0.00
	minimum	0.00
August	Maximum	0.00
	average	0.00
	minimum	0.00
September	Maximum	0.00
	average	0.00
	minimum	0.00
October	Maximum	0.00
	average	0.00
	minimum	0.00
November	Maximum	0.00
	average	0.00
	minimum	0.00
December	Maximum	0.00
	average	0.00
	minimum	0.00
All years	Maximum	0.0
	average	0.0
	minimum	0.0

Highest combined yield hour: 2005-01-01 00:10 UTC 0.0 W (0.000 W/Wp) of 0 Wp installed. Use this hour to size battery charge power.

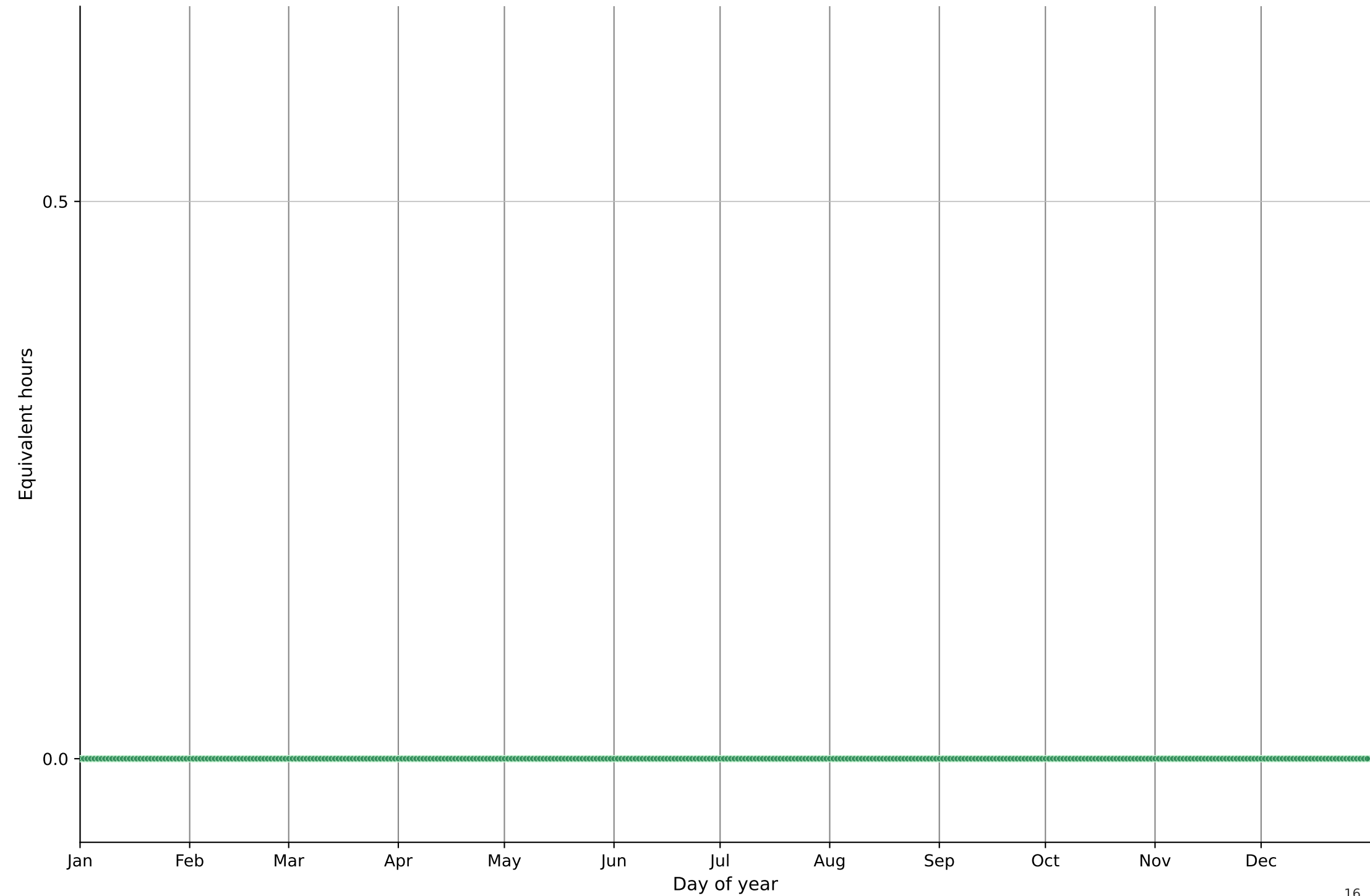
Monthly and yearly total yield (kWh)
Austria - Inning 48.182, 15.417

Month / year		All together
January	Maximum	0.0
	average	0.0
	minimum	0.0
February	Maximum	0.0
	average	0.0
	minimum	0.0
March	Maximum	0.0
	average	0.0
	minimum	0.0
April	Maximum	0.0
	average	0.0
	minimum	0.0
May	Maximum	0.0
	average	0.0
	minimum	0.0
June	Maximum	0.0
	average	0.0
	minimum	0.0
July	Maximum	0.0
	average	0.0
	minimum	0.0
August	Maximum	0.0
	average	0.0
	minimum	0.0
September	Maximum	0.0
	average	0.0
	minimum	0.0
October	Maximum	0.0
	average	0.0
	minimum	0.0
November	Maximum	0.0
	average	0.0
	minimum	0.0
December	Maximum	0.0
	average	0.0
	minimum	0.0
All years	Maximum	0
	average	0
	minimum	0

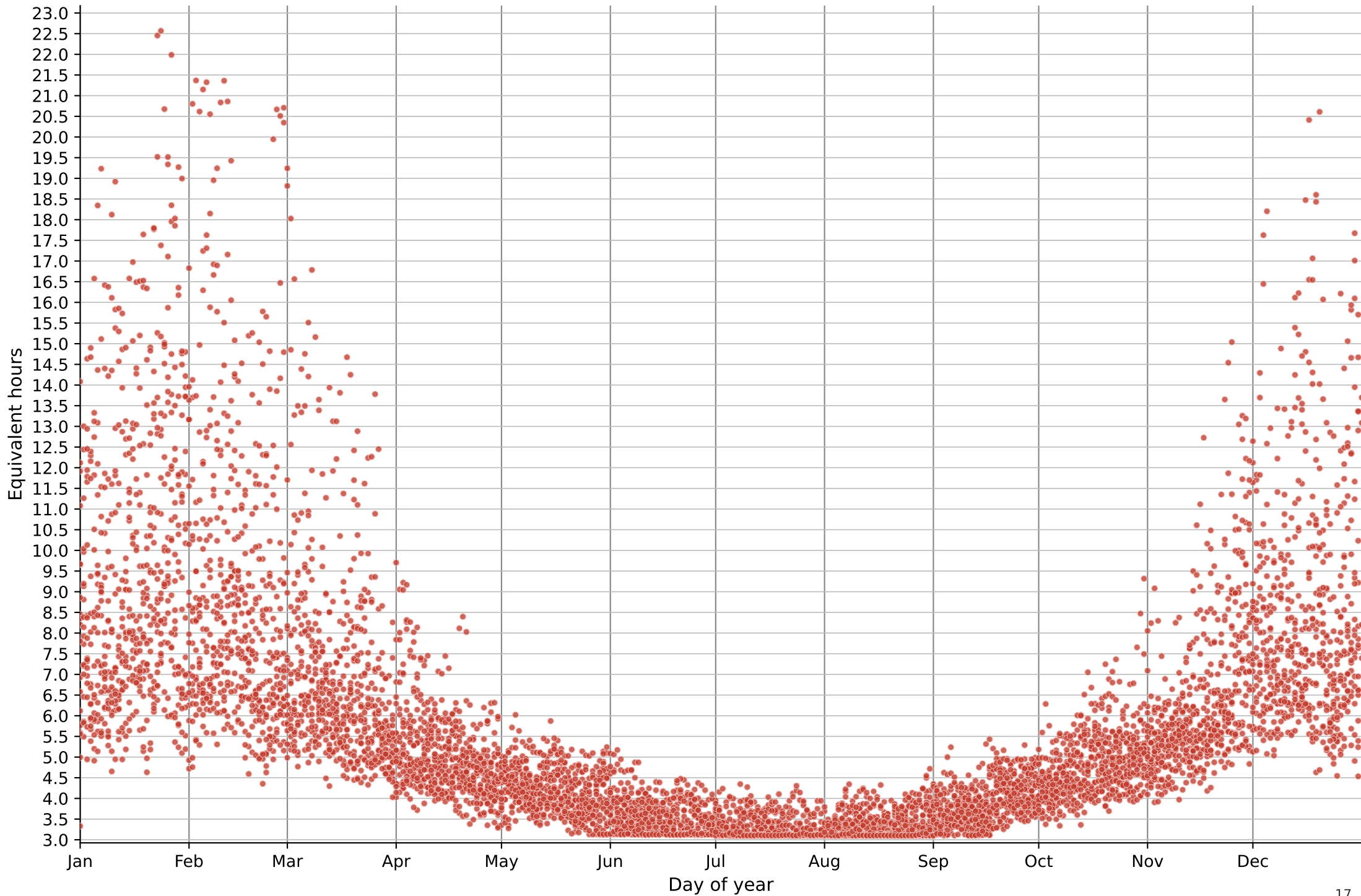
Highest combined yield hour: 2005-01-01 00:10 UTC 0.0 W (0.000 W/Wp) of 0 Wp installed. Use this hour to size battery charge power.

Export energy as equivalent hours (kWh / grid kW)

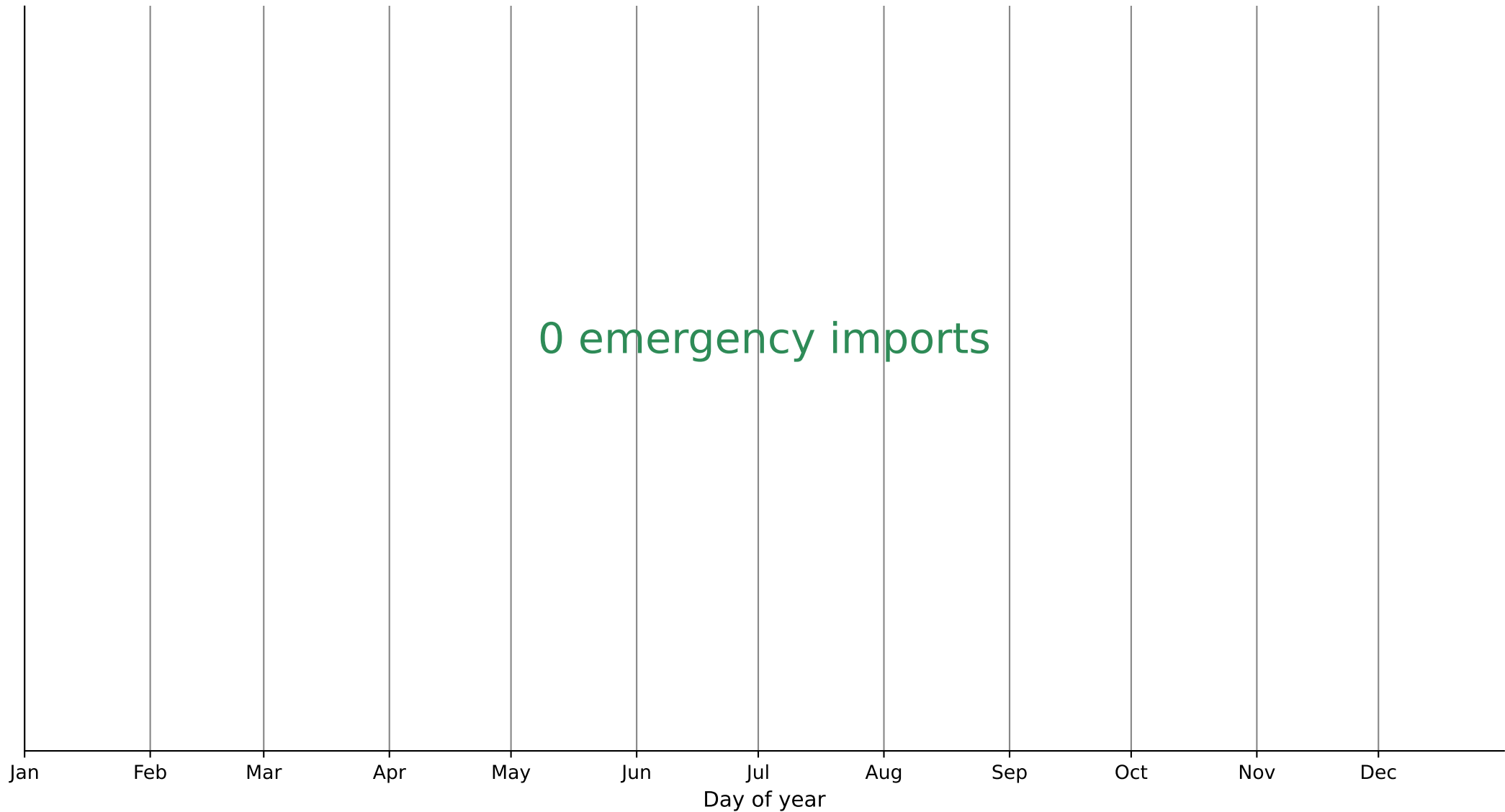
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Import energy as equivalent hours (kWh / grid kW)
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Emergency import hours: 0 days with an emergency: 0
Austria - Inning 48.182, 15.417



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
Austria - Inning 48.182, 15.417

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Export to 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
Import from grid													
month Maximum	2147	1974	1408	872	713	571	552	573	643	843	1209	2035	12231
month average	1479	1259	1073	752	646	529	509	520	585	743	948	1303	10347
month minimum	1074	886	853	621	573	479	484	488	512	649	815	976	9382
day Maximum	112.8	106.8	96.2	48.5	30.1	25.9	21.7	23.6	27.2	46.6	75.2	103.0	112.8
day average	47.7	44.6	34.6	25.1	20.8	17.6	16.4	16.8	19.5	24.0	31.6	42.0	28.3
day minimum	16.7	21.8	20.2	16.4	15.6	15.6	15.5	15.5	15.5	16.7	19.5	22.7	15.5
Total energy used for house													
month Maximum	2147	1974	1408	872	713	571	552	573	643	843	1209	2035	12231
month average	1479	1259	1073	752	646	529	509	520	585	743	948	1303	10347
month minimum	1074	886	853	621	573	479	484	488	512	649	815	976	9382
day Maximum	112.8	106.8	96.2	48.5	30.1	25.9	21.7	23.6	27.2	46.6	75.2	103.0	112.8
day average	47.7	44.6	34.6	25.1	20.8	17.6	16.4	16.8	19.5	24.0	31.6	42.0	28.3
day minimum	16.7	21.8	20.2	16.4	15.6	15.6	15.5	15.5	15.5	16.7	19.5	22.7	15.5

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
Austria - Inning 48.182, 15.417

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Export													
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													
month Maximum	601	555	394	222	180	143	137	144	162	232	339	569	3325
month average	413	351	299	191	163	133	128	131	148	206	264	364	2790
month minimum	301	246	235	157	145	119	121	122	128	180	224	275	2515
day Maximum	33.1	31.3	28.1	13.1	7.8	6.9	5.7	6.3	7.2	13.7	21.9	29.8	33.1
day average	13.3	12.5	9.7	6.4	5.3	4.4	4.1	4.2	4.9	6.6	8.8	11.7	7.6
day minimum	4.1	5.6	5.4	3.7	3.4	3.4	3.4	3.4	3.4	4.3	5.3	6.1	3.4
Peak grid fee													
month Maximum	66	61	61	43	18	14	11	12	15	31	49	58	384
month average	47	44	39	26	15	12	10	11	13	19	33	42	309
month minimum	32	25	23	16	11	10	9	9	10	13	19	28	254
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	661	616	454	253	196	156	148	155	176	255	388	627	3704
month average	459	395	338	216	178	145	138	141	160	225	297	406	3099
month minimum	341	270	260	177	156	129	130	132	139	195	243	303	2783
day Maximum	33.1	31.3	28.1	13.1	7.8	6.9	5.7	6.3	7.2	13.7	21.9	29.8	33.1
day average	13.3	12.5	9.7	6.4	5.3	4.4	4.1	4.2	4.9	6.6	8.8	11.7	7.6
day minimum	4.1	5.6	5.4	3.7	3.4	3.4	3.4	3.4	3.4	4.3	5.3	6.1	3.4
Balance													
month Maximum	-341	-270	-260	-177	-156	-129	-130	-132	-139	-195	-243	-303	-2783
month average	-459	-395	-338	-216	-178	-145	-138	-141	-160	-225	-297	-406	-3099
month minimum	-661	-616	-454	-253	-196	-156	-148	-155	-176	-255	-388	-627	-3704
day Maximum	-4.1	-5.6	-5.4	-3.7	-3.4	-3.4	-3.4	-3.4	-3.4	-4.3	-5.3	-6.1	-3.4
day average	-13.3	-12.5	-9.7	-6.4	-5.3	-4.4	-4.1	-4.2	-4.9	-6.6	-8.8	-11.7	-7.6
day minimum	-33.1	-31.3	-28.1	-13.1	-7.8	-6.9	-5.7	-6.3	-7.2	-13.7	-21.9	-29.8	-33.1

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
Austria - Inning 48.182, 15.417

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Export total													
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
Export during high price hours													
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
Export during medium price hours													
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
Export during low price hours													
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

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

Austria - Inning 48.182, 15.417

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Heating													
month Maximum	1582	1434	883	387	217	96	66	86	169	341	712	1483	6246
month average	949	780	562	271	153	57	26	36	113	246	459	786	4437
month minimum	560	425	348	145	84	9	2	6	44	156	328	470	3506
day Maximum	91.4	85.4	77.1	31.9	13.7	9.7	5.8	7.6	11.0	30.0	57.0	82.1	91.4
day average	30.6	27.7	18.1	9.0	4.9	1.9	0.8	1.2	3.8	7.9	15.3	25.4	12.1
day minimum	0.0	5.7	4.2	0.7	0.0	0.0	0.0	0.0	0.0	1.0	3.7	6.6	0.0
Cooling													
month Maximum	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
month average	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
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
day average	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 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	131	135	91	65	62	55	52	53	54	67	77	118	875
month average	96	83	78	61	59	53	49	50	52	63	70	83	797
month minimum	80	70	71	56	55	50	48	48	48	59	66	72	762
day Maximum	7.4	7.4	5.4	2.7	2.4	2.2	1.9	2.0	2.1	2.7	4.2	7.0	7.4
day average	3.1	3.0	2.5	2.0	1.9	1.8	1.6	1.6	1.7	2.0	2.3	2.7	2.2
day minimum	2.2	2.1	1.9	1.6	1.6	1.6	1.5	1.5	1.5	1.7	1.9	2.1	1.5
Direct electric													
month Maximum	957	885	411	59	0	0	0	0	0	32	268	868	2612
month average	408	312	143	15	0	0	0	0	0	4	76	270	1228
month minimum	116	31	10	0	0	0	0	0	0	0	6	45	547
day Maximum	69.3	63.3	55.5	13.6	0.4	0.0	0.0	0.0	0.0	12.1	36.4	60.0	69.3
day average	13.2	11.1	4.6	0.5	0.0	0.0	0.0	0.0	0.0	0.1	2.5	8.7	3.4
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

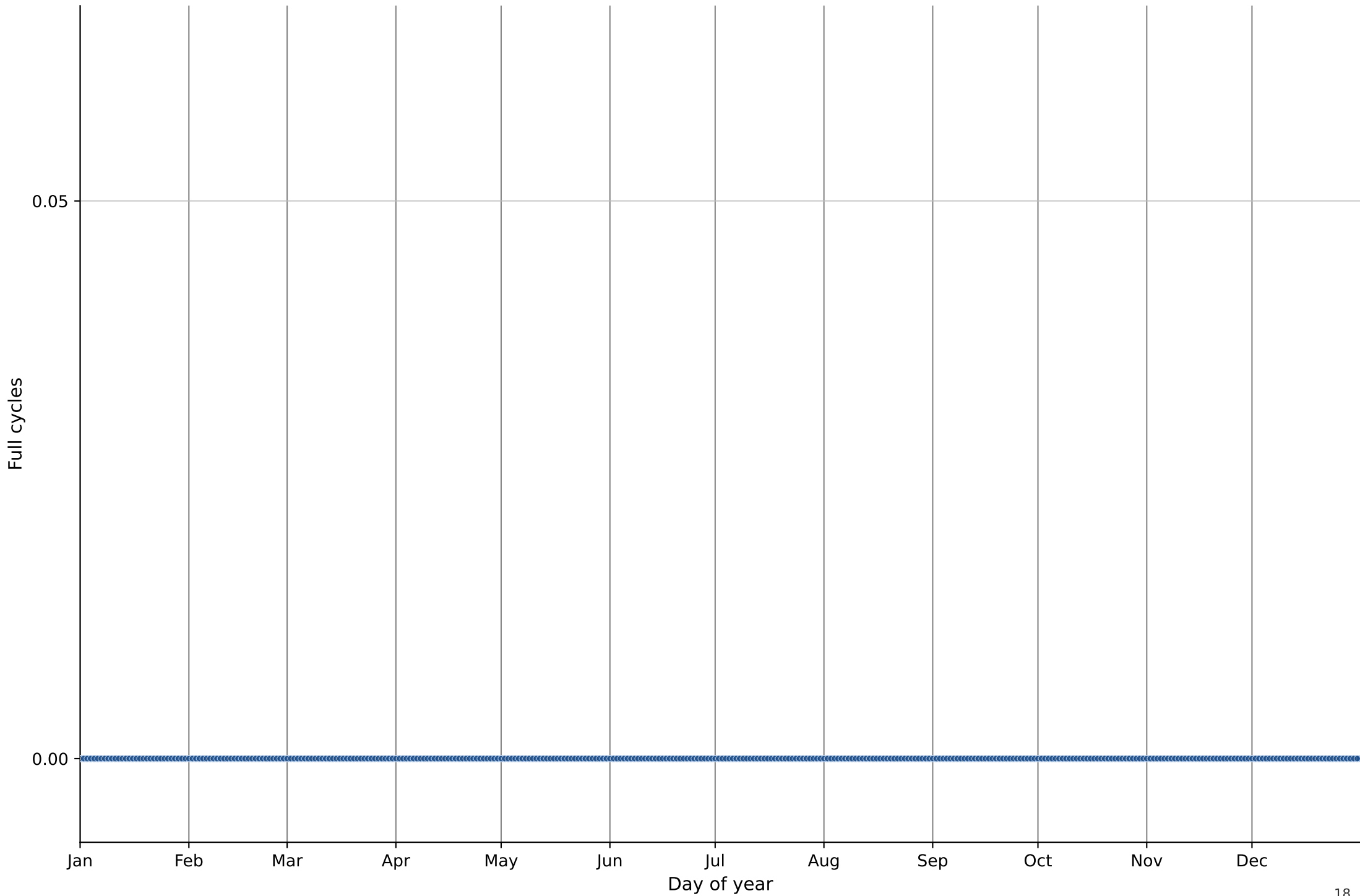
Heating, cooling and DHW are electricity. Direct electric is the part the heat pump could not cover.

Battery
Austria - Inning 48.182, 15.417

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	All
Wasted													
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
Full cycles													
month Maximum	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
month average	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
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
day average	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 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
Charge C													
month Maximum	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
month average	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
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
day average	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 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
Discharge C													
month Maximum	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
month average	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
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
day average	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 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

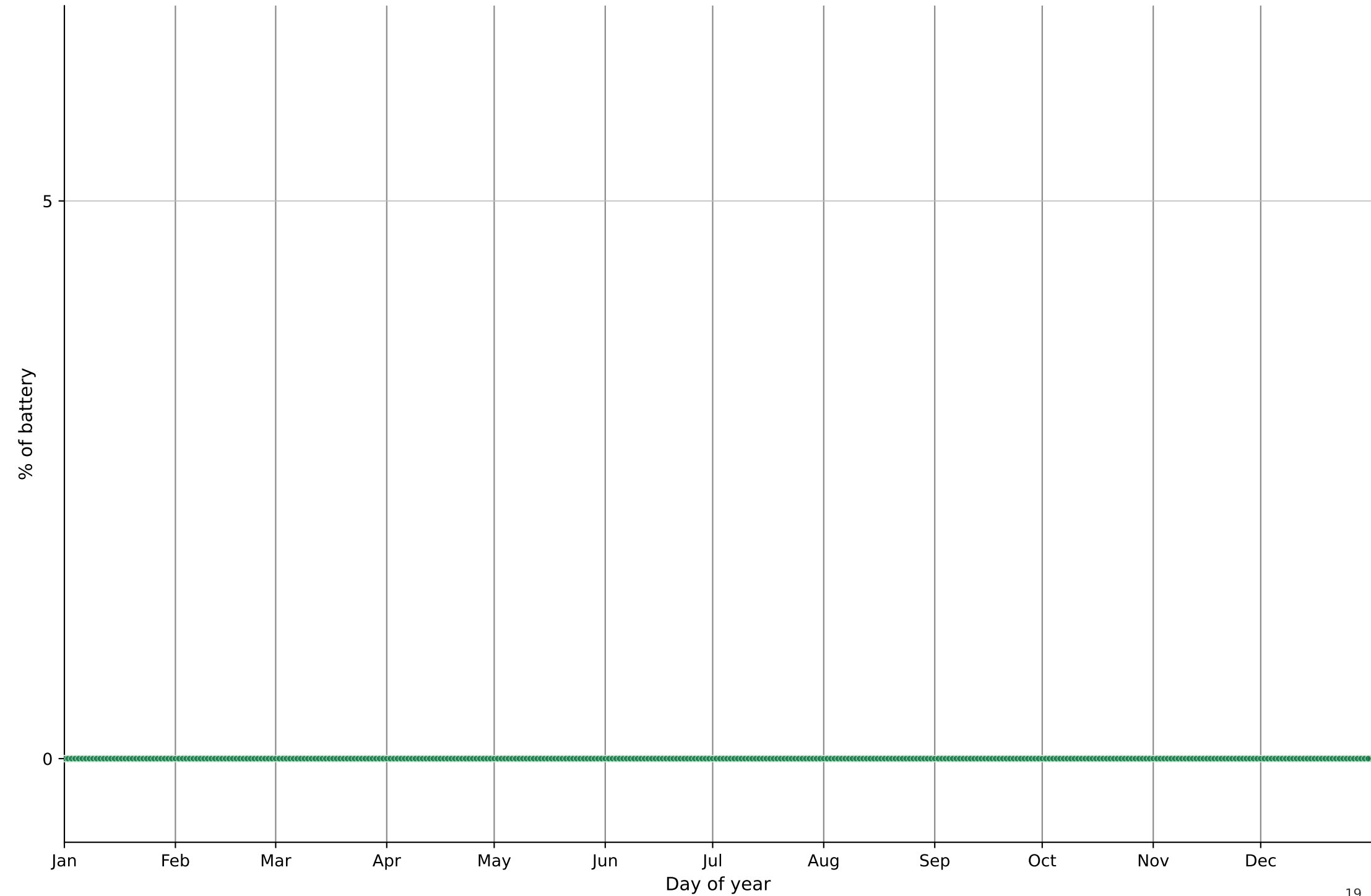
Wasted = PV left when the export price is negative and the battery is full. Full cycles = discharge kWh / 160 kWh. Battery export only into hours whose export price is above 0, highest price first. At 0 cent only

Battery cycles per day (discharge / 160 kWh)
Austria - Inning 48.182, 15.417



Battery max charge state per day (160 kWh = 100 %)

Austria - Inning 48.182, 15.417



Battery min charge state per day (160 kWh = 100 %)

Austria - Inning 48.182, 15.417

