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PRE-FEASIBILITY STUDIES FOR THE IMPLEMENTATION OF THE SOLAR POWER PLANT MODEL THROUGH THE ESCO MODALITY

The compilation is prepared based on the research results of the UNDP project
«Removing Barriers to Increase Investment in Energy Efficiency
in Public Buildings in Ukraine through the ESCO Modality in Small And Medium Sized Cities.»



PRE-FEASIBILITY STUDIES FOR THE IMPLEMENTATION OF THE SPP MODEL THROUGH THE ESCO MODALITY

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Author of the report: Oleg Radiichuk, project consultant

We express our gratitude for the preparation of the publication to Roman Palahusynets,

ESCO Engineering Analyst

Project manager: Anna Zhovtenko

Publication preparation coordinator: Liubov Zelenkova

Editor: Olga Makhanyova

Translator: Tetyana Lykova

Designer:

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INTRODUCTION.

ENERGY SECURITY OF CITIES

DUE TO SPP: NEW POSSIBILITIES OF ESCO

Because of the full-scale invasion and shelling of Ukraine's energy infrastructure, energy security, in particular of hospitals and water supply facilities, has become of great importance. Destruction or damage to municipal critical infrastructure and power generation facilities require rapid solutions to ensure the continuous power supply of cities in Ukraine. One solution in the context of lack of budget funds is attracting private investments in the form of energy service using renewable energy sources.

The GEF/UNDP project «Removing Barriers to Increase Investment in Energy Efficiency in Public Buildings in Ukraine through the ESCO Modality in Small And Medium Sized Cities» provides advisory support to communities to select a technical solution for the installation of solar power plants on public buildings through the new modality of energy service contract. The publication presents the results of pre-feasibility studies for 37 projects in 18 partner cities as regards the implementation of the new ESCO Solar Power Plants Model in hospitals and water supply facilities.

This energy service model includes the design, assembly, construction and installation of Solar Power Plants (SPP) with the funds of ESCO investors, and the investments will be recouped exclusively from energy savings obtained from the SPP without capital investments from the city.

The GEF/UNDP project, in cooperation with partner cities and experts, have prepared model technology solutions; the capacity of these plants for hospitals will be 20-450 kWh, for water supply companies – 50-350 kWh.

If all described projects are implemented, SPPs will be able to generate about 16 million kWh of clean energy, so the facilities of critical infrastructure will annually save 10-30% of traditional electric energy. Therefore, the annual saving of municipal budgets after the completion of ESCO contracts will reach almost 85 million UAH and will be growing as the tariff grows.

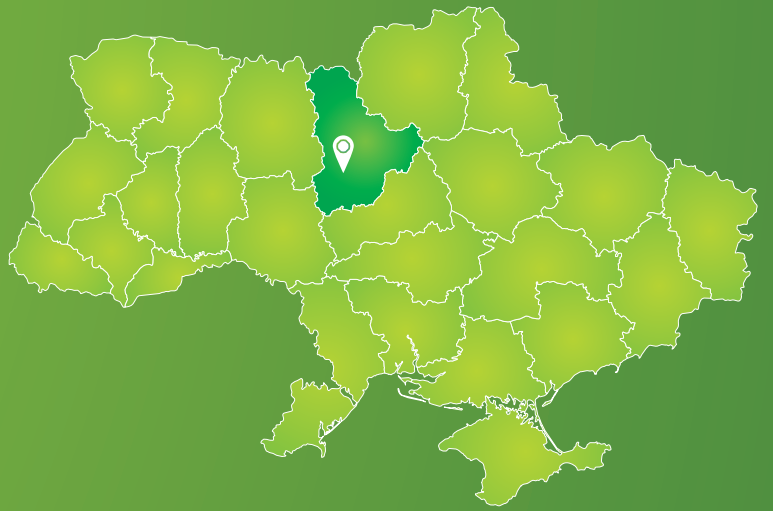
The value of ESCO investments in the implementation of these projects will be about 30 million USD.

There is a summary table with the key parameters of potential 37 projects. Below you can find a detailed description of each of the pre-feasibility study. The GEF/UNDP project has hope that this publication will be of interest for the representatives of communities and private investors and therefore will contribute to disseminating the practice of using SPPs at the facilities of critical infrastructure in Ukrainian cities.

1. Main parameters before pre-feasibility studies in partner cities

#	City	Location of SPP	Model	Annual consumption, kW	SPP capacity, kW/h	Accumulator, kW/h	Annual electric energy generation by SPP, kW	Percentage of replacement of tradit. e/e, %	Annual savings, UAH
1	Bila Tserkva	Hospital #2	Classical	1 313 503	90	-	107 753	8%	517 213
			Hybrid	1 313 503	180	90	177 800	14%	853 440
2	Vinnytsia	Clinical Hospital #1	Classical	1 454 460	105	-	124 625	9%	810 063
			Hybrid	1 454 460	125	20	148 374	10%	964 431
3	Drohobych	Hospital #1 (Maternity Department Building)	Classical	1 496 208	144	-	141 434	9%	695 855
			Hybrid	1 496 208	144	30	141 440	9%	695 885
4	Zviagel	VODOKANAL, Zhytomyrska Str., 85	Classical	342 000	80	-	65 781	19%	365 742
			Hybrid	342 000	85	15	87 454	26%	486 244
5	Kamianets-Podilskyi	Hospital, Mazepy Str., 31	Classical	469 885	40	-	42 000	9%	276 780
			Hybrid	469 885	57	20	63 372	13%	417 621
		Pumping station VNS-3	Classical	573 617	35	-	37 170	6%	222 277
			Hybrid	573 617	95	30	63 639	11%	380 561
		STP - Slobido-Kulchievetska Village Council	Classical	2 365 516	100	-	105 210	4%	629 156
			Hybrid	2 365 516	400	120	400 200	17%	2 393 196
		Pumping station I - Ruda Village Council	Classical	3 543 512	350	-	367 500	10%	1 719 900
			Hybrid	3 543 512	558	200	645 824	18%	3 022 456
		Pumping station II - Panivtsi Village Council	Classical	1 467 356	100	-	105 000	7%	491 400
			Hybrid	1 467 356	163	50	163 800	11%	766 584
6	Korosten	VODOKANAL - lift pumping station 1-2 (Hrushevskiy Str., 67)	Classical	1 134 968	210	-	230 249	20%	1 251 795
			Hybrid	1 134 968	300	60	328 927	29%	1 788 277
		VODOKANAL - sewage treatment facilities (Bekhy Village Council)	Classical	796 824	80	-	87 714	11%	476 875
			Hybrid	796 824	125	50	137 059	17%	745 149
7	Lviv	Pumping station, Pluhiv Village	Classical	3 072 745	350	-	367 500	12%	2 143 591
			Hybrid	3 072 745	558	200	502 444	16%	2 562 464
8	Novovolynsk	Central City Hospital (Peremohy Ave., 7)	Classical	294 104	80	-	86 722	29%	450 954
			Hybrid	294 104	85	5	92 139	31%	479 123
		Southern water intake Poromiv Territorial Community	Classical	1 182 709	200	-	216 069	18%	1 123 559
			Hybrid	1 182 709	240	50	259 287	22%	1 265 321
		Northern water intake, Novovolynsk Territorial Community	Classical	1 122 455	200	-	208 752	19%	1 018 710
			Hybrid	1 122 455	250	65	260 968	23%	1 273 524
		Sewage treatment facilities, Volodymyr district, Novovolynsk	Classical	1 425 869	300	-	325 180	23%	1 586 878
			Hybrid	1 425 869	410	120	444 745	31%	2 170 356
9	Slavutych	City Hospital (Zbroinyh Syl Ukr. Str., 7)	Classical	274 900	25	-	26 250	10%	148 313
			Hybrid	274 900	45	22	41 000	15%	231 650
		Sewage treatment facilities	Classical	899 580	90	-	94 500	11%	482 895
			Hybrid	899 580	180	90	165 800	18%	847 238
		Water Treatment Plant	Classical	366 260	56	-	65 000	18%	332 150
			Hybrid	366 260	56	14	81 017	22%	413 997

#	City	Location of SPP	Model	Annual consumption, kW	SPP capacity, kW/h	Accumulator, kW/h	Annual electric energy generation by SPP, kW	Percentage of replacement of tradit. e/e, %	Annual savings, UAH
10	Khmelnyskyi	VODOKANAL Water pressure booster station VNS-10 Chernylivka Village Council	Classical	10 999 988	950	-	1 003 755	9%	4 175 621
			Hybrid	10 999 988	1 140	190	1 195 130	11%	4 971 741
11	Cherkasy	City Council	Classical	239 229	15	-	15 750	7%	84 656
			Hybrid	239 229	19	10	19 200	8%	123 840
		City Children's Hospital	Classical	413 593	50	-	70 000	17%	376 250
			Hybrid	413 593	99	30	99 600	24%	684 252
		Mother and Child Center	Classical	441 227	40	-	42 000	10%	240 450
			Hybrid	441 227	100	30	100 800	23%	619 920
12	Chornomorsk	City Hospital, Vitaliia Shuma Str., 4	Classical	846 874	150	-	190 644	23%	1 262 826
			Hybrid	846 874	195	35	252 556	30%	1 672 931
		The main sewage pumping station Parkova Str., 23	Classical	623 434	85	-	109 801	18%	698 334
			Hybrid	623 434	100	30	129 154	21%	821 419
		Sewage treatment facilities, Ovidiopol district, Dalnyk Council	Classical	2 256 228	330	-	428 282	19%	2 723 874
			Hybrid	2 256 228	400	150	517 630	23%	3 292 127
13	Chortkiv	VODOKANAL Sewage treatment facilities and pumping stations	Classical	1 759 899	428	-	472 195	27%	2 460 136
			Hybrid	1 759 899	513	85	565 972	32%	2 948 714
14	Pivdennoukrainsk	Multi-Profile City Hospital	Classical	694 340	75	-	95 000	14%	584 250
			Hybrid	694 340	85	42	108 000	16%	664 200
15	Nizhyn	M. Halytskyi Hospital	Classical	368 764	22	-	23 310	6%	146 853
			Hybrid	368 764	87	20	77 136	21%	485 957
		Sewage treatment facilities	Classical	1 161 021	60	-	63 000	5%	441 000
			Hybrid	1 161 021	160	50	159 600	14%	1 117 200
16	Pervomaiskyi	Central District Hospital	Classical	444 939	70	-	80 426	18%	402 452
			Hybrid	444 939	100	30	110 702	25%	553 953
		The main sewage pumping station of CE "TEPLOMEREZHI" (heating network)	Classical	120 343	20	-	22 131	18%	122 163
			Hybrid	120 343	30	10	33 200	28%	183 264
		Sewage treatment facilities of CE "TEPLOMEREZHI" (heating network)	Classical	1 783 598	260	-	287 805	16%	1 588 684
			Hybrid	1 783 598	325	110	359 756	20%	1 985 853
		Pumping station of CE TEPLOMEREZHI" (heating network)	Classical	1 449 607	250	-	276 753	19%	1 527 677
			Hybrid	1 449 607	310	100	343 140	24%	1 894 133
17	Kryvyi Rih	City Clinical Hospital #2, 30-Richia Peremogy Ave, 2	Classical	1 595 228	450	-	536 094	34%	2 882 041
			Hybrid	1 595 228	500	50	595 660	37%	3 202 268
		City Clinical Hospital #2 Genevska Str., 6B	Classical	331 856	100	-	119 140	36%	640 497
			Hybrid	331 856	120	15	137 647	41%	739 990
		City Hospital #17 Katkova Str., 2	Classical	439 167	100	-	119 366	27%	667 495
			Hybrid	439 167	120	10	143 240	33%	800 998



**COMMUNAL NON-COMMERCIAL ENTERPRISE
“BILA TSERKVA CITY HOSPITAL #2” (90 KW)**



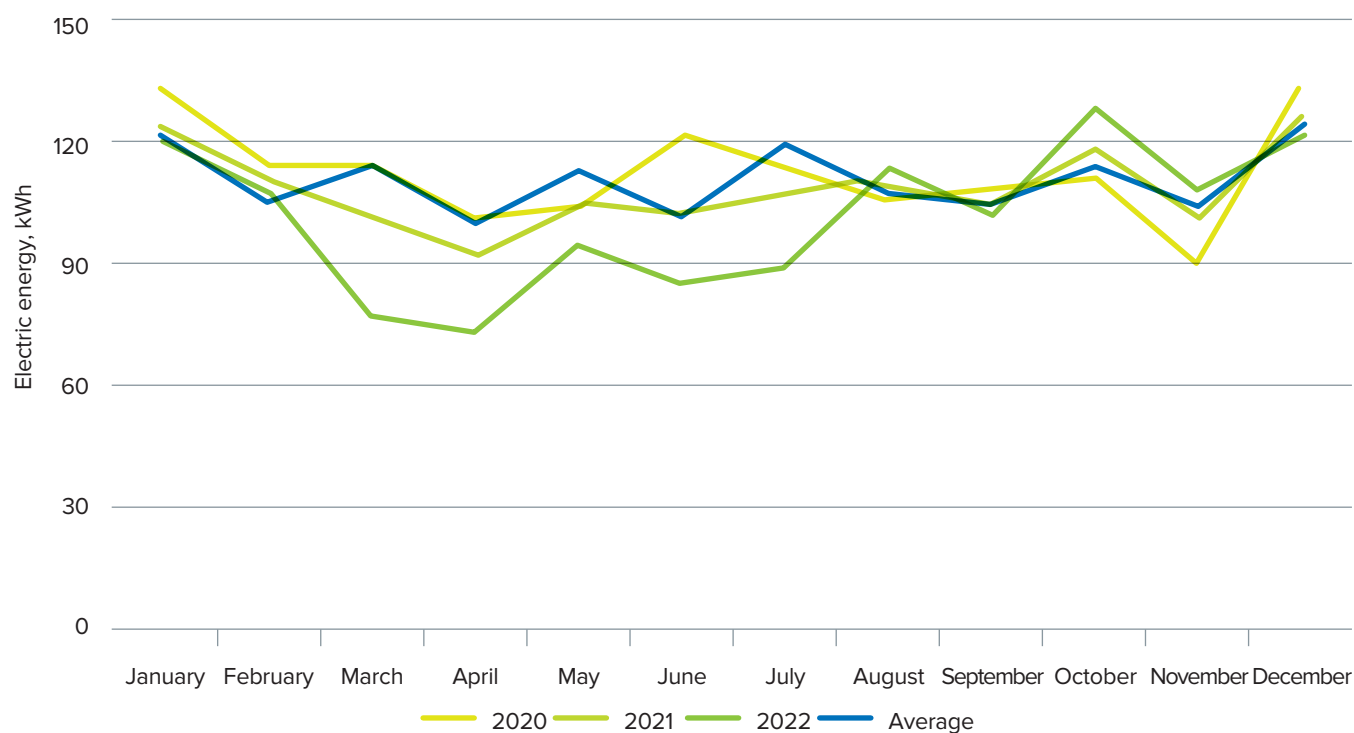
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	90 kW	-	540 m ²
Hybrid SPP	180 kW	90 kW	1 080 m ²

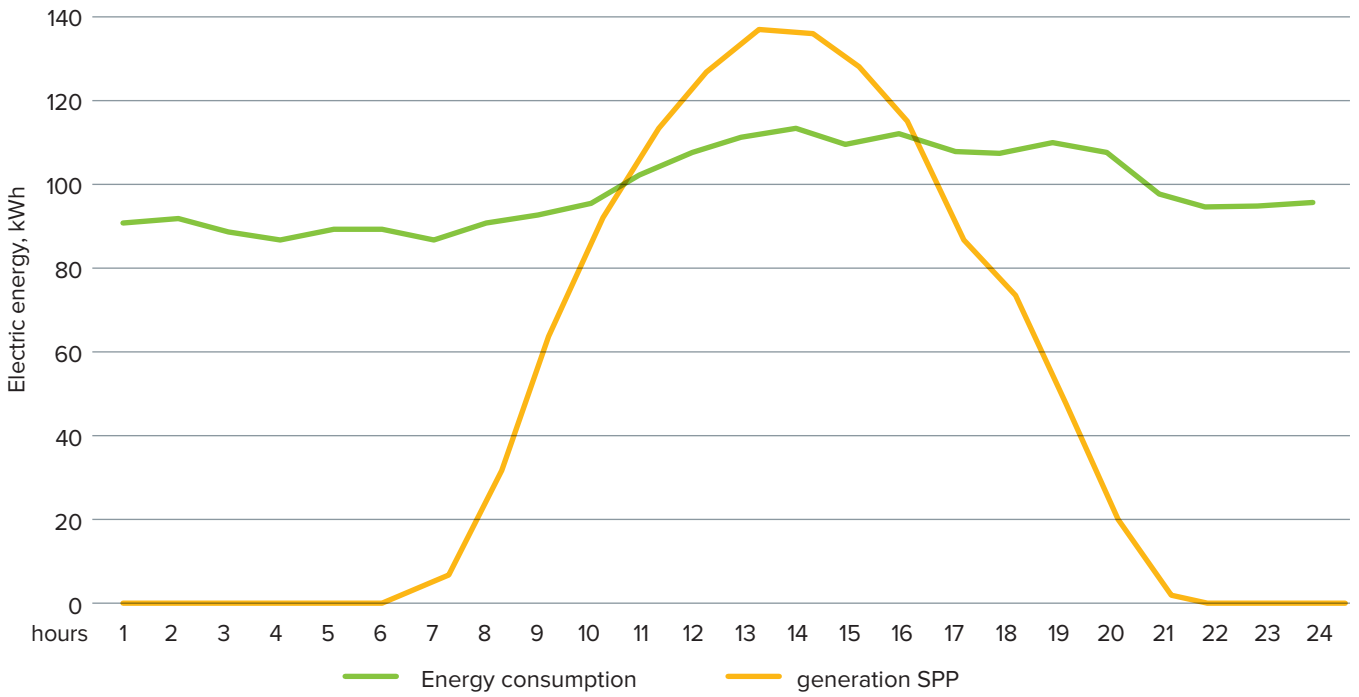
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	133 562	121 842	119 894	125 099
February	115 616	107 117	109 822	110 852
March	115 411	114 621	78 081	102 704
April	102 380	101 294	74 141	92 605
May	105 274	114 064	96 583	105 307
June	122 179	102 804	85 981	103 655
July	114 246	121 483	90 298	108 676
August	106 766	108 882	113 739	109 796
September	106 221	106 980	103 683	105 628
October	113 008	114 861	129 152	119 007
November	92 215	105 226	109 749	102 397
December	135 100	126 259	121 974	127 778
Annual	1 361 978	1 345 433	1 233 097	1 313 503

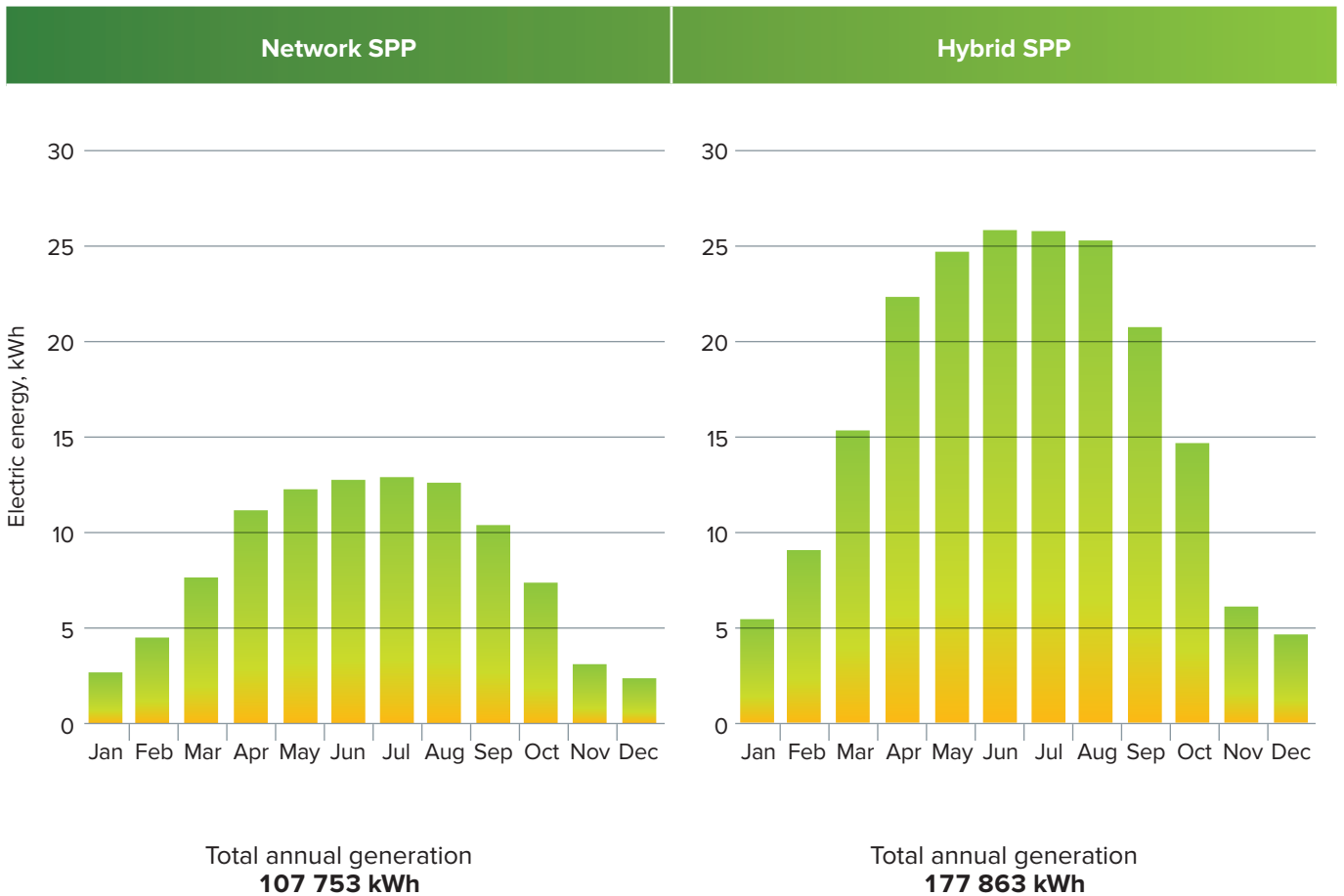
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	150	9 680	1 452 000
2	Network inverter, 30 kW	3	76 160	228 480
3	Installation, fastening and additional materials	-	504 144	504 144
TOTAL				2 184 624

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	300	9 680	2 904 000
2	Hybrid inverter, 10 kW	18	96 000	1 728 000
3	Accumulator battery, 5 kWh	18	120 000	2 160 000
4	Installation, fastening and additional materials	-	1 389 600	1 389 600
TOTAL				8 181 600

Link to indicative price offers:

solar modules

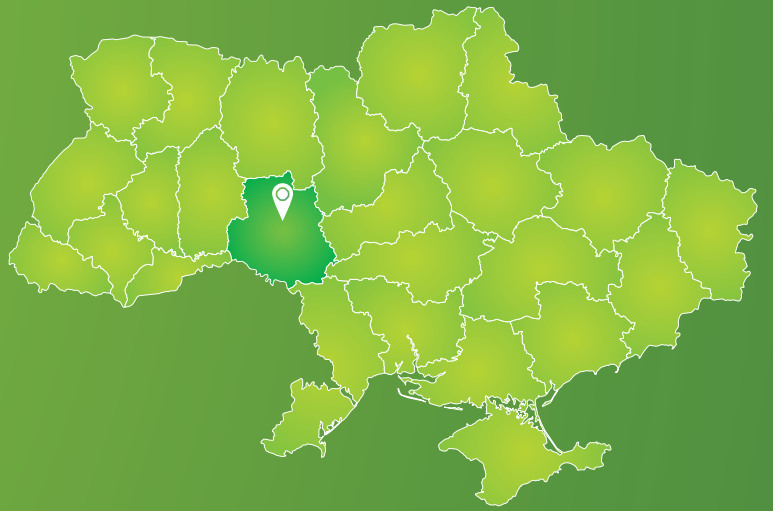
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 313 503	1 313 503
SPP capacity, kW/h	90	180
Battery, kW/h	-	90
Annual electric energy generation by the SPP, kWh	107 753.00	177 863.00
Percentage of replacement of traditional electric energy, %	8%	14%
Annual savings in electric energy costs, UAH	462 943	764 159
The cost of SPP, UAH	2 184 624	8 181 600
Simple payback period, years	4.7	10.7
Electric energy tariff, UAH/kWh, (without VAT)	4.30	4.30
Electric energy tariff, UAH/kWh, (with VAT)	6.24	6.24



VINNYTSIA CITY CLINICAL HOSPITAL #1 (105 KW)



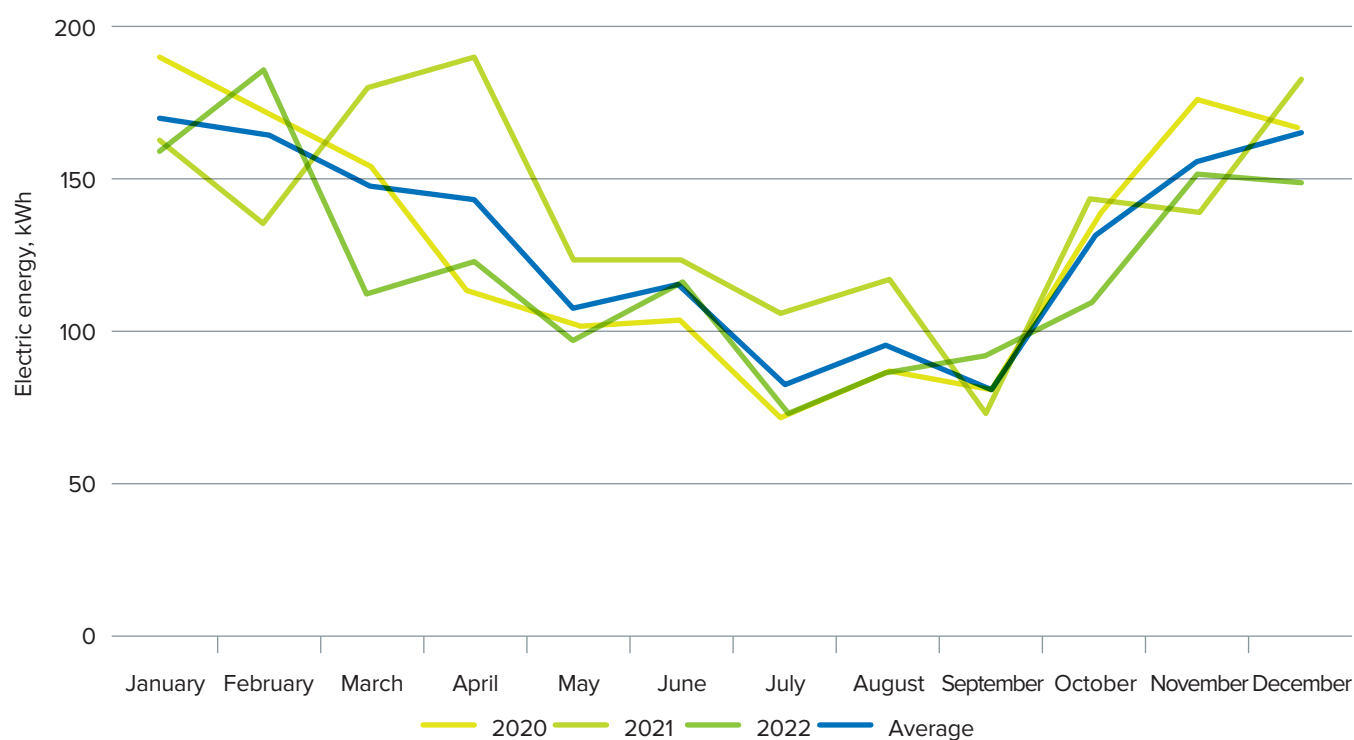
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	105 kW	-	630 m ²
Hybrid SPP	125 kW	20 kW	750 m ²

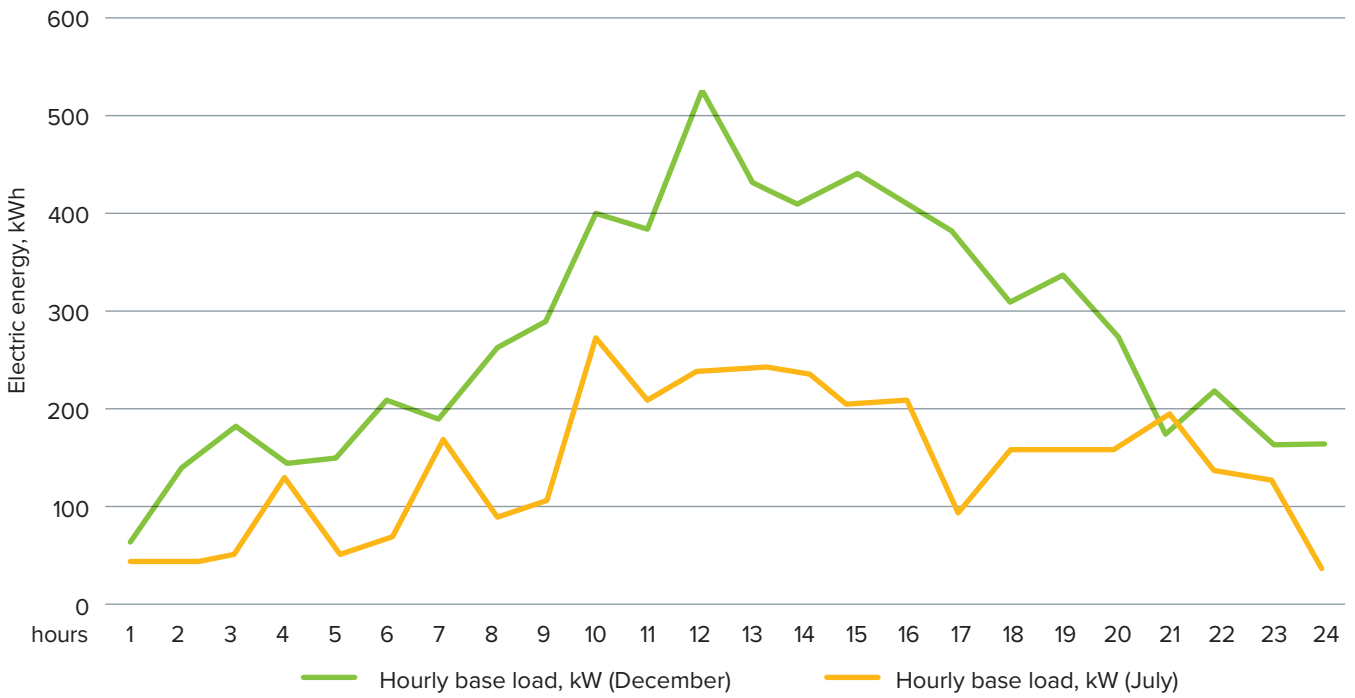
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	187 768	159 741	161 054	169 521
February	169 492	135 809	184 567	163 289
March	154 651	179 767	112 804	149 074
April	112 478	189 093	121 381	140 984
May	101 642	122 812	98 015	107 490
June	103 477	123 279	114 758	113 838
July	70 903	103 875	75 631	83 470
August	85 936	116 557	83 144	95 212
September	80 665	72 175	92 559	81 800
October	133 757	142 063	110 217	128 679
November	175 428	139 779	151 221	155 476
December	166 305	181 999	148 109	165 471
Annual	1 542 502	1 666 949	1 453 460	1 554 304

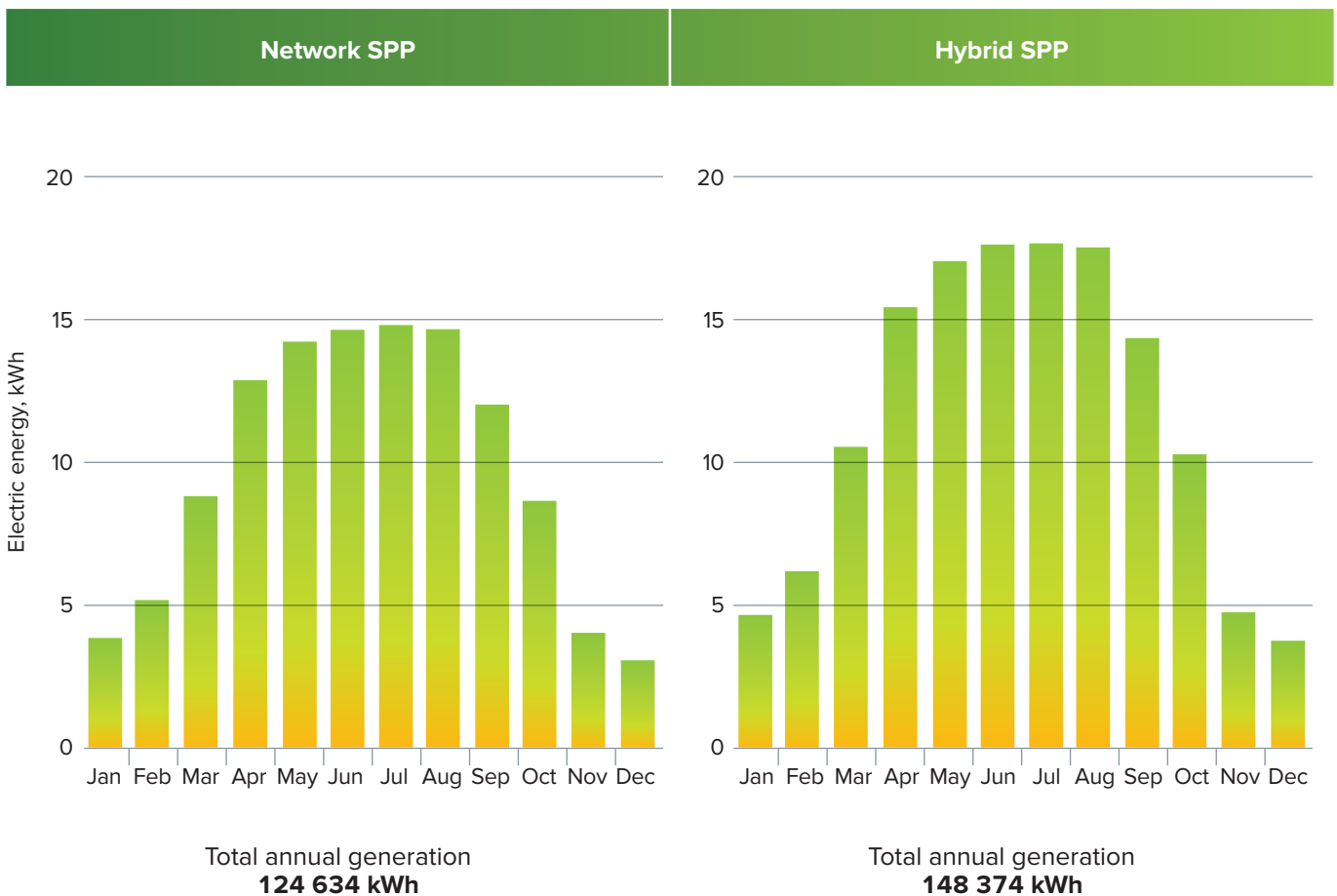
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 550 W	191	8 575	1 638 000
2	Network inverter	1	187 200	187 200
3	Installation, fastening and additional materials	-	1 044 688	1 044 688
TOTAL				2 869 888

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 550 W	227	8 575	1 946 525
2	Hybrid inverter	1	331 500	331 500
3	Accumulator battery, 20 kWh	1	468 000	468 000
4	Installation, fastening and additional materials	-	1 243 676	1 243 676
TOTAL				3 989 701

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

battery

<https://energystorage.com.ua/ua/resheniya/sistemy-akkumulirovaniya-energii/promyshlennyeot-200-kvt>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 554 304	1 554 304
SPP capacity, kW/h	105	125
Battery, kW/h	-	20
Annual electric energy generation by the SPP, kWh	124 634.00	148 374.00
Percentage of replacement of traditional electric energy, %	8%	10%
Annual savings in electric energy costs, UAH	811 367	965 915
The cost of SPP, UAH	2 869 888	3 989 701
Simple payback period, years	3.5	4.1
Electric energy tariff, UAH/kWh, (without VAT)	6.51	6.51
Electric energy tariff, UAH/kWh, (with VAT)	7.81	7.81



**COMMUNAL NON-COMMERCIAL ENTERPRISE
“DROHOBYCH CITY HOSPITAL #1”
MATERNITY DEPARTMENT (144 KW)**



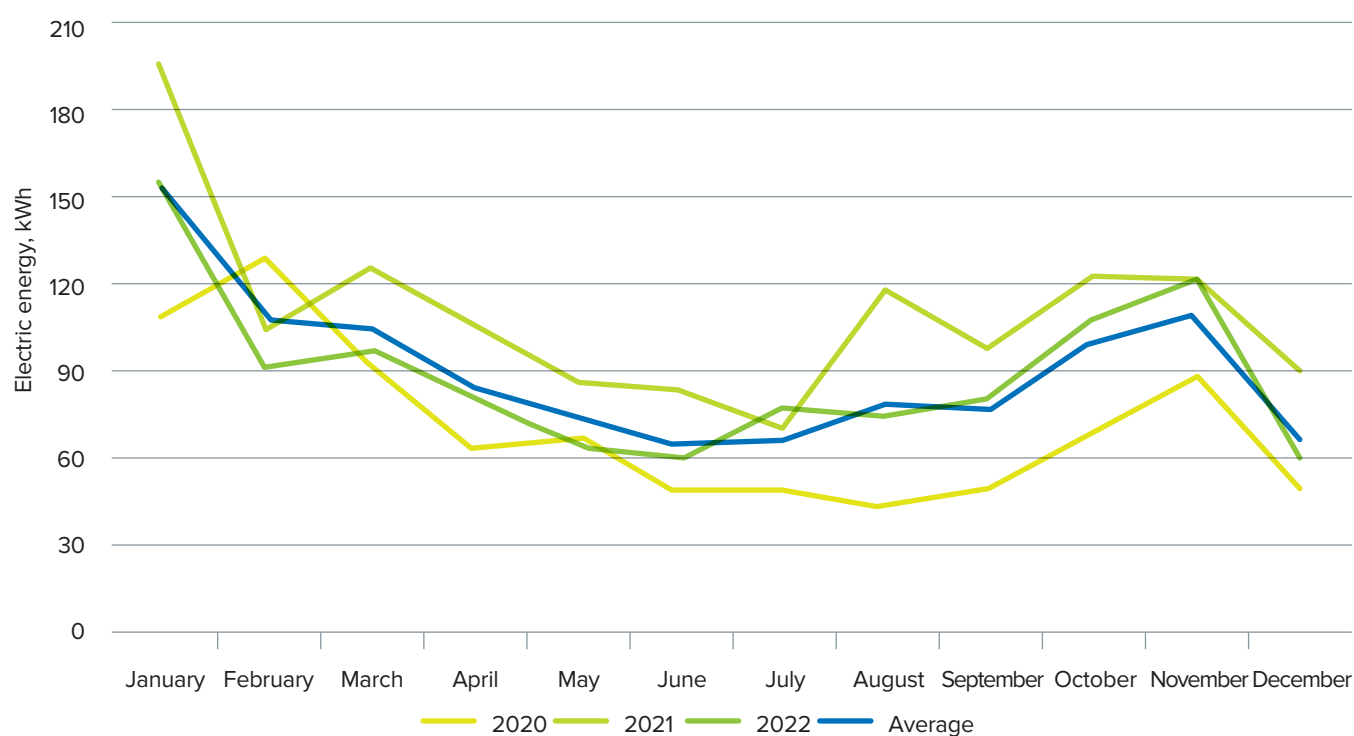
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	144 kW	-	800 m ²
Hybrid SPP	144 kW	30 kW	800 m ²

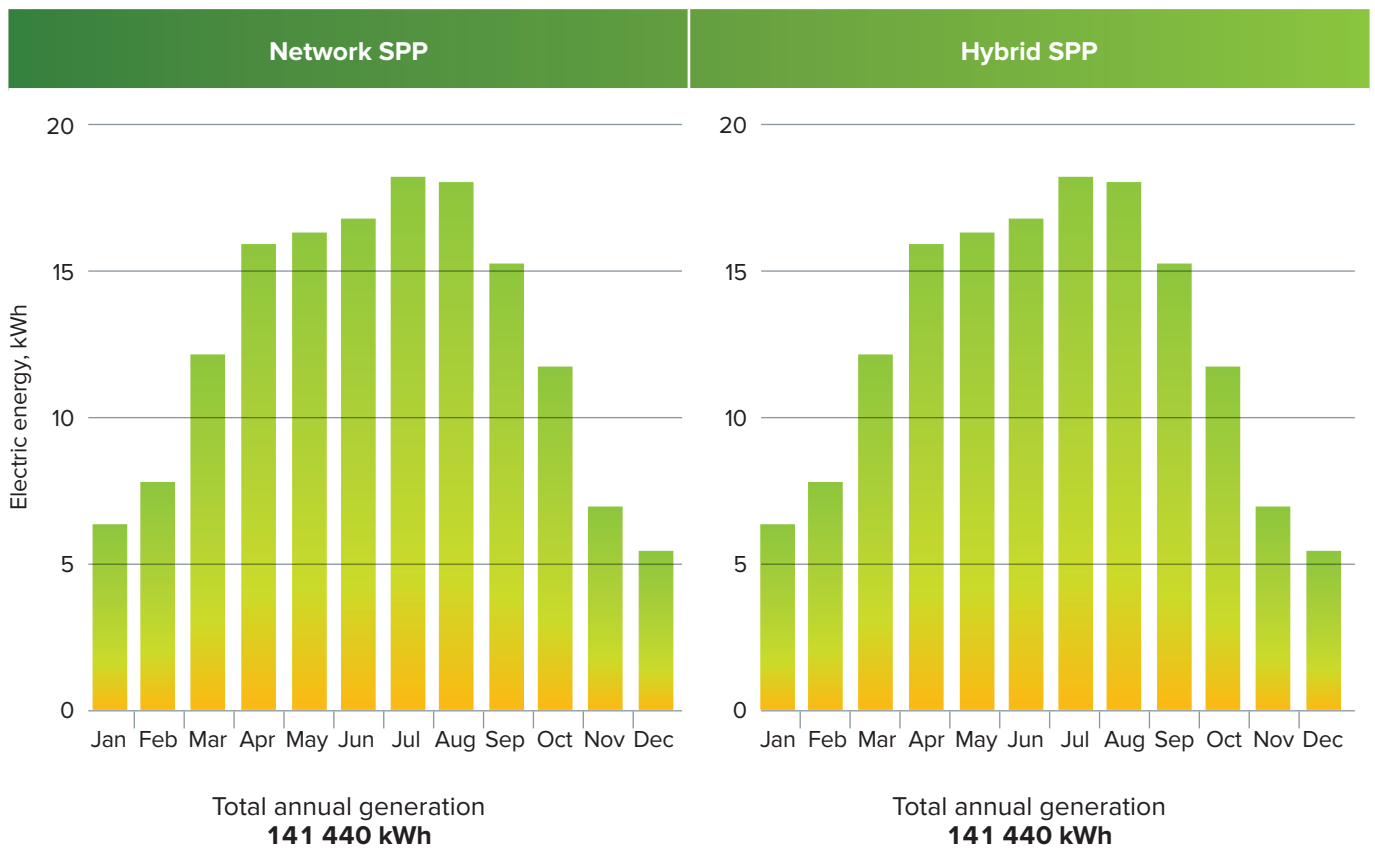
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	109 137	193 715	152 958	151 937
February	128 208	104 574	90 965	107 916
March	92 314	124 396	96 433	104 381
April	63 105	106 413	81 198	83 572
May	65 404	86 229	65 286	72 306
June	49 651	82 997	60 565	64 404
July	49 241	71 163	76 129	65 511
August	43 349	117 311	73 541	78 067
September	49 813	98 352	79 255	75 807
October	70 252	120 590	106 681	99 174
November	87 859	119 784	119 309	108 984
December	51 754	89 850	59 288	66 964
Annual	860 087	1 315 374	1 061 608	1 079 023

3. Monthly electric energy consumption according to the facility data



4. Monthly generation



5. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Number	Price per unit, UAH	Cost, UAH
1	Solar panel, 550 W	262	8 769	2 297 455
2	Network inverter, 90 kW	6	46 800	280 800
3	Installation, fastening and additional materials	-	1 351 556	1 351 556
TOTAL				3 929 811

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	262	8 769	2 297 455
2	Network inverter, 90 kW	6	46 800	280 800
3	Hybrid battery, 30 kWh	1	702 000	702 000
4	Installation, fastening and additional materials	-	1 351 556	1 351 556
TOTAL				4 631 811

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

battery

<https://energystorage.com.ua/ua/resheniya/sistemy-akkumulirovaniya-energii>

6. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 079 023	1 079 023
SPP capacity, kW/h	144	144
Battery, kW/h	-	30
Annual electric energy generation by the SPP, kWh	141 440.00	141 440.00
Percentage of replacement of traditional electric energy, %	13%	13%
Annual savings in electric energy costs, UAH	695 885	695 885
The cost of SPP, UAH	3 929 811	4 631 811
Simple payback period, years	56	67
Electric energy tariff, UAH/kWh, (without VAT)	4.92	4.92
Electric energy tariff, UAH/kWh, (with VAT)	5.90	5.90



MUNICIPAL ENTERPRISE “ZVIAGELVODOKANAL” (60 KW)



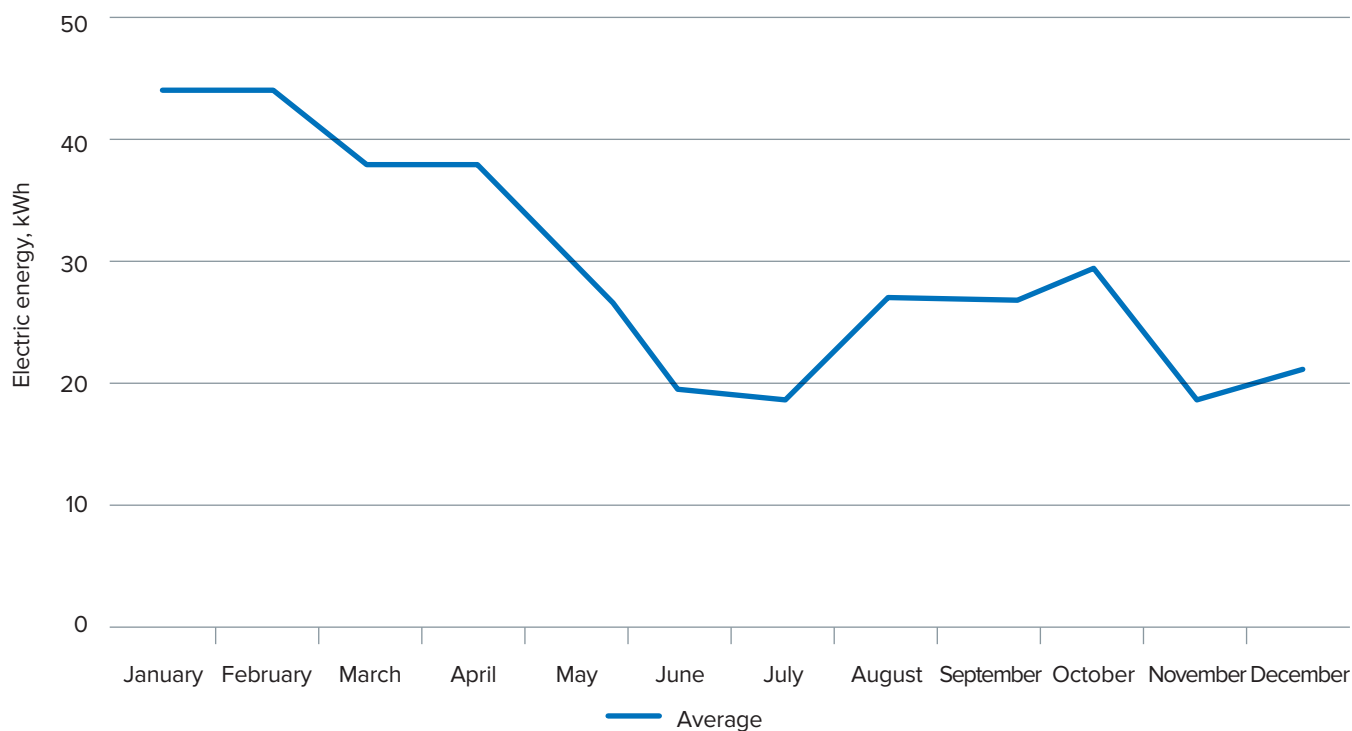
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	60 kW	-	350 m ²
Hybrid SPP	80 kW	15 kW	460 m ²

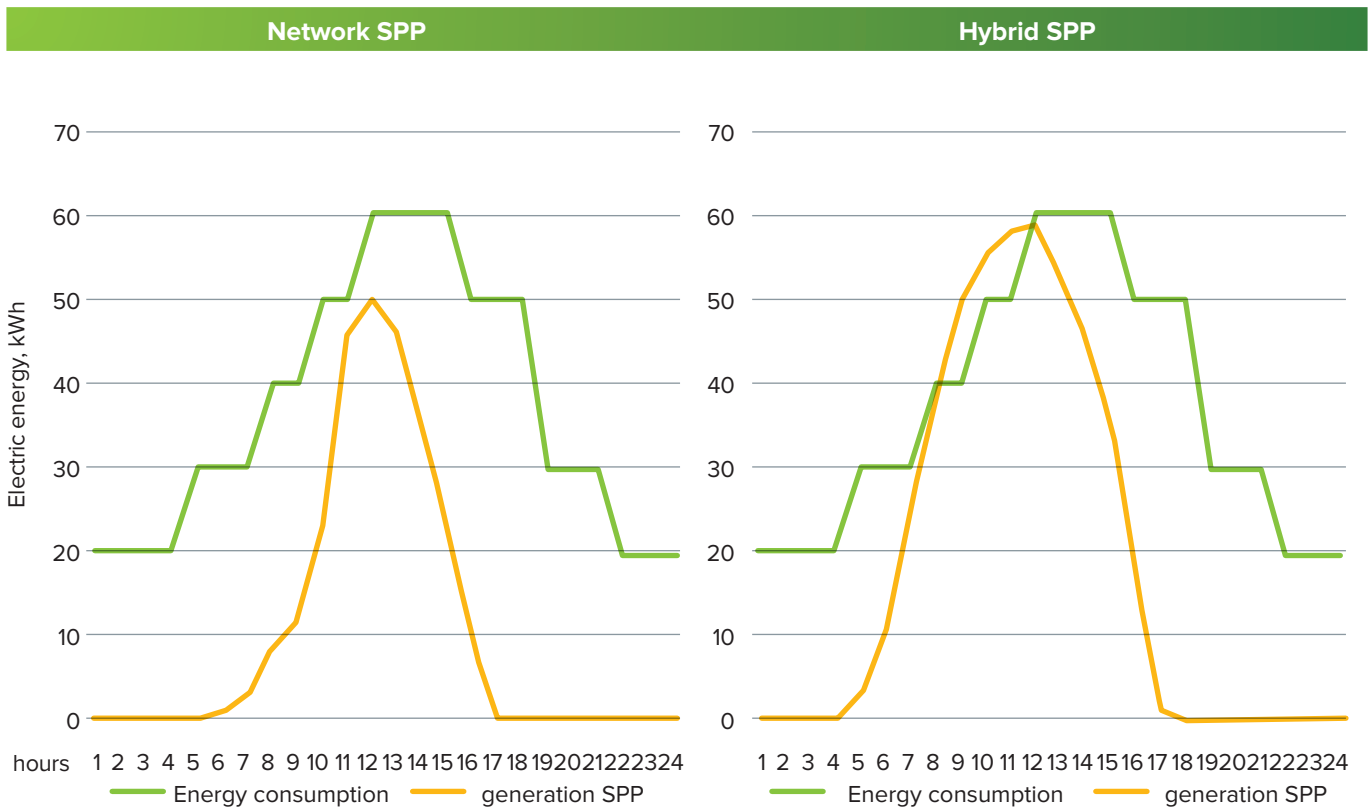
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh
	2022
January	90 475
February	81 380
March	81 851
April	88 248
May	77 369
June	68 022
July	71 900
August	55 041
September	54 113
October	55 234
November	53 385
December	66 646
Annual	843 664

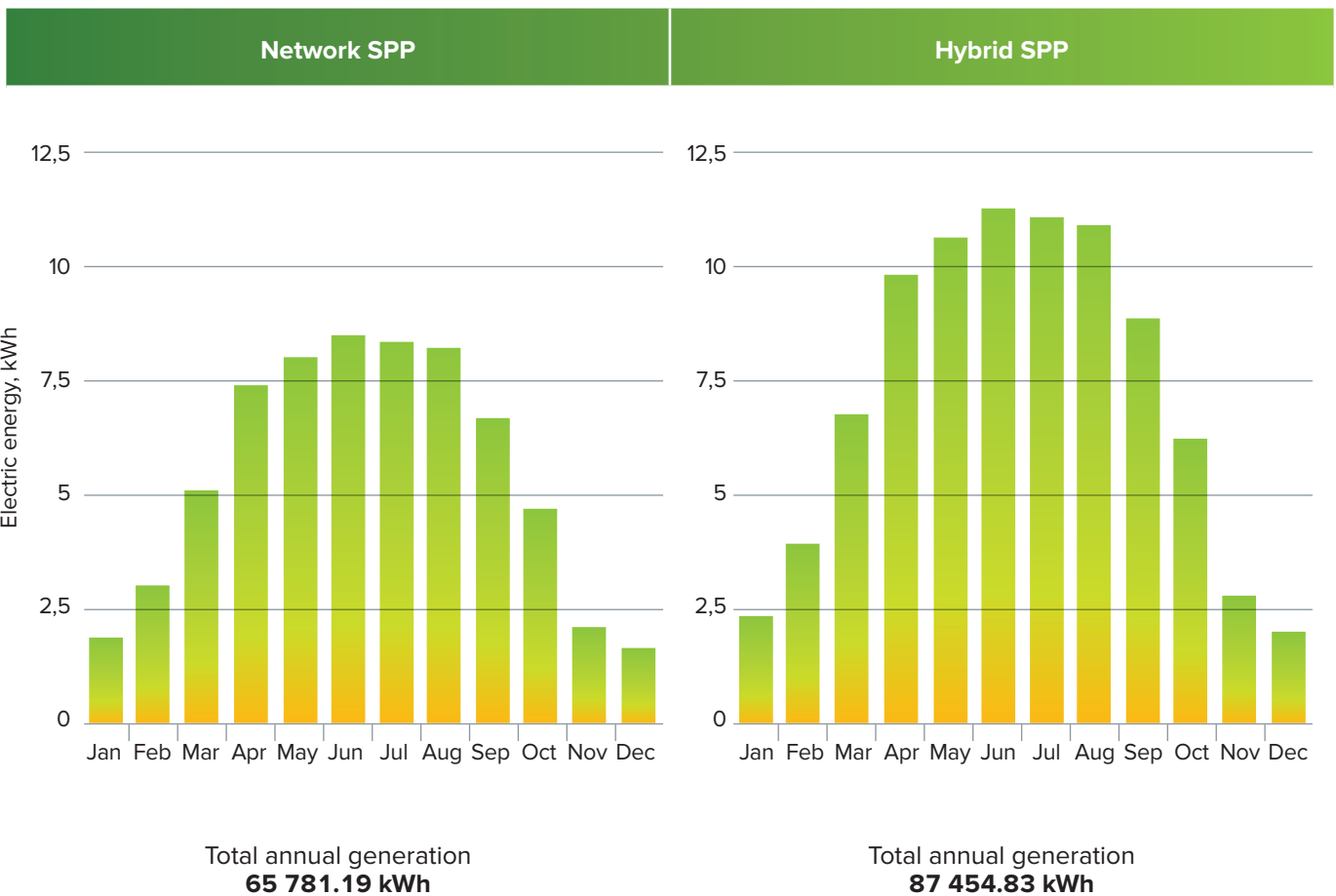
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 545 W	110	7 664	843 106
2	Network inverter, 60 kW	1	153 615	153 615
3	Installation, fastening and additional materials	-	341 240	341 240
TOTAL				1 337 961

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 545 W	148	7 664	1 134 361
2	Hybrid inverter, 50 kW	1	266 570	266 570
3	Hybrid inverter, 30 kW	1	228 000	228 000
4	Accumulator battery, 5 kWh	3	72 200	216 600
5	Installation, fastening and additional materials	-	436 772	436 772
TOTAL				2 282 303

Link to price offers for SPPs of approximate capacity (60-100) kW

SPP 60 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/SPP_60kwt_business

SPP 80 kW

<https://alton.com.ua/ua/solnechnaja-elektrostantsija-dlja-biznesa-80-kvt.html>

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_100kw_business_medium

Hybrid inverters

<https://sun-energy.com.ua/solar-power/solar-inverters/sun-30k-sg01hp3-eu-bm3>

<https://sun-energy.com.ua/solar-power/solar-inverters/sofar-solar-hyd-20-kti-3ph>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	342 000	342 000
SPP capacity, kW/h	60	80
Battery, kW/h	-	15
Annual electric energy generation by the SPP, kWh	65 781	87 455
Percentage of replacement of traditional electric energy, %	19%	26%
Annual savings in electric energy costs, UAH	366 184	486 835
The cost of SPP, UAH	1 337 961	2 282 303
Simple payback period, years	3.7	4.7
Electric energy tariff, UAH/kWh, (without VAT)	5.5 667	5.5 667
Electric energy tariff, UAH/kWh, (with VAT)	6.68 004	6.68 004



**COMMUNAL NON-COMMERCIAL ENTERPRISE
“KAMIANETS-PODILSKYI CITY HOSPITAL” (40 KW)**



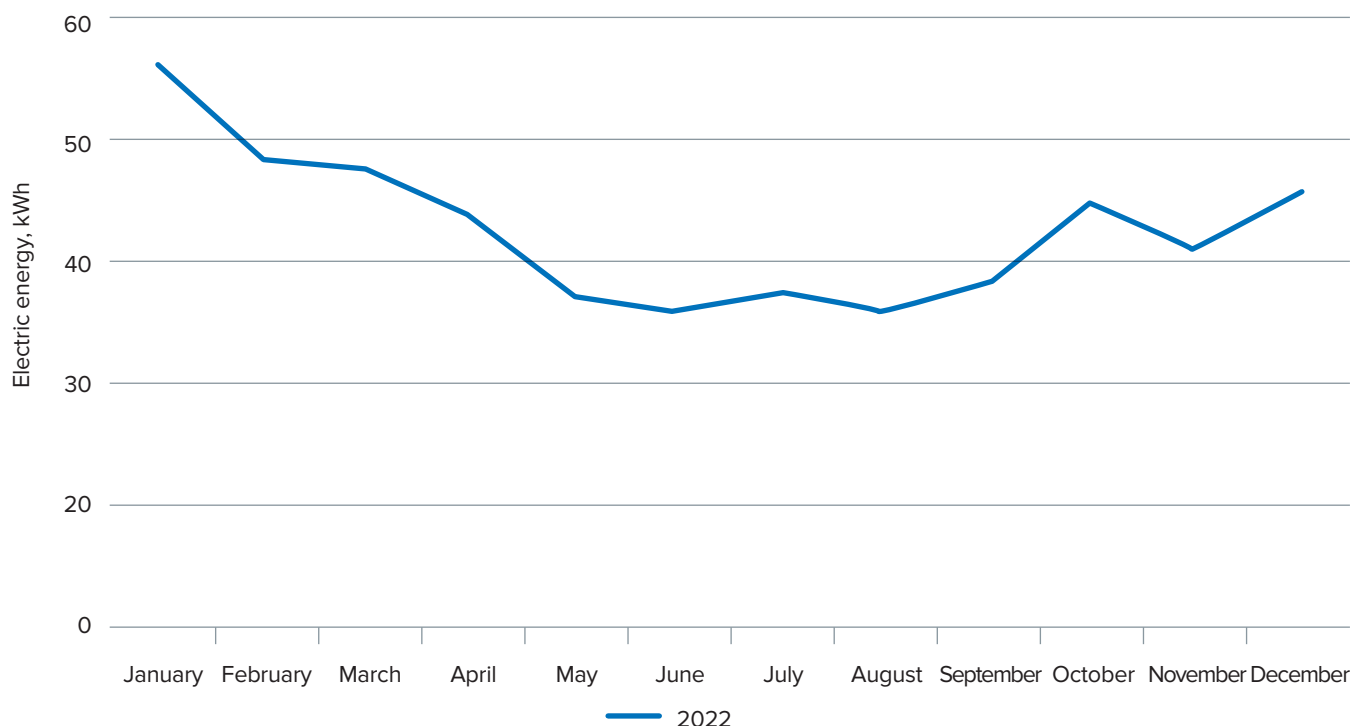
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	40 kW	-	240 m ²
Hybrid SPP	57 kW	20 kW	340 m ²

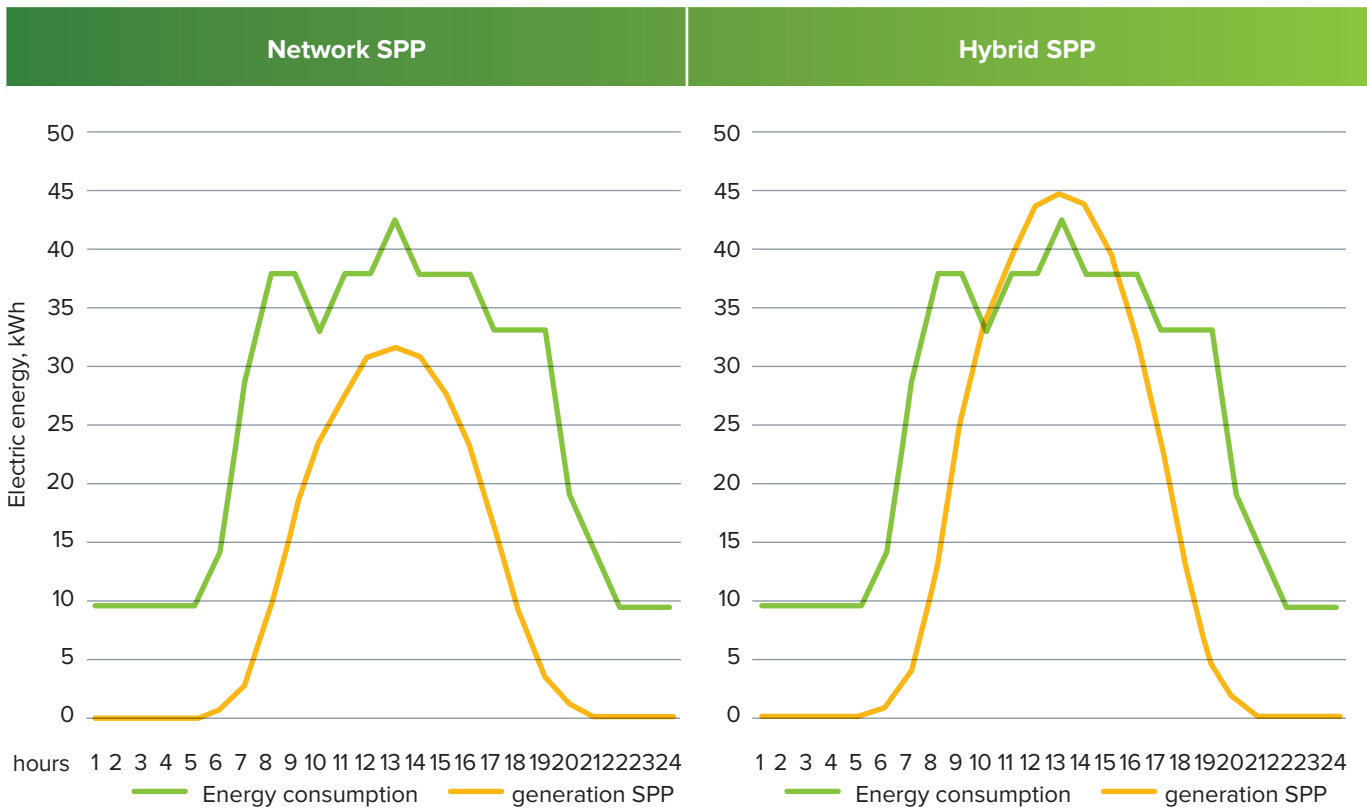
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh
	2022
January	55 190
February	46 209
March	44 860
April	40 453
May	32 528
June	31 132
July	32 660
August	30 879
September	34 299
October	41 667
November	37 248
December	42 760
Annual	469 885

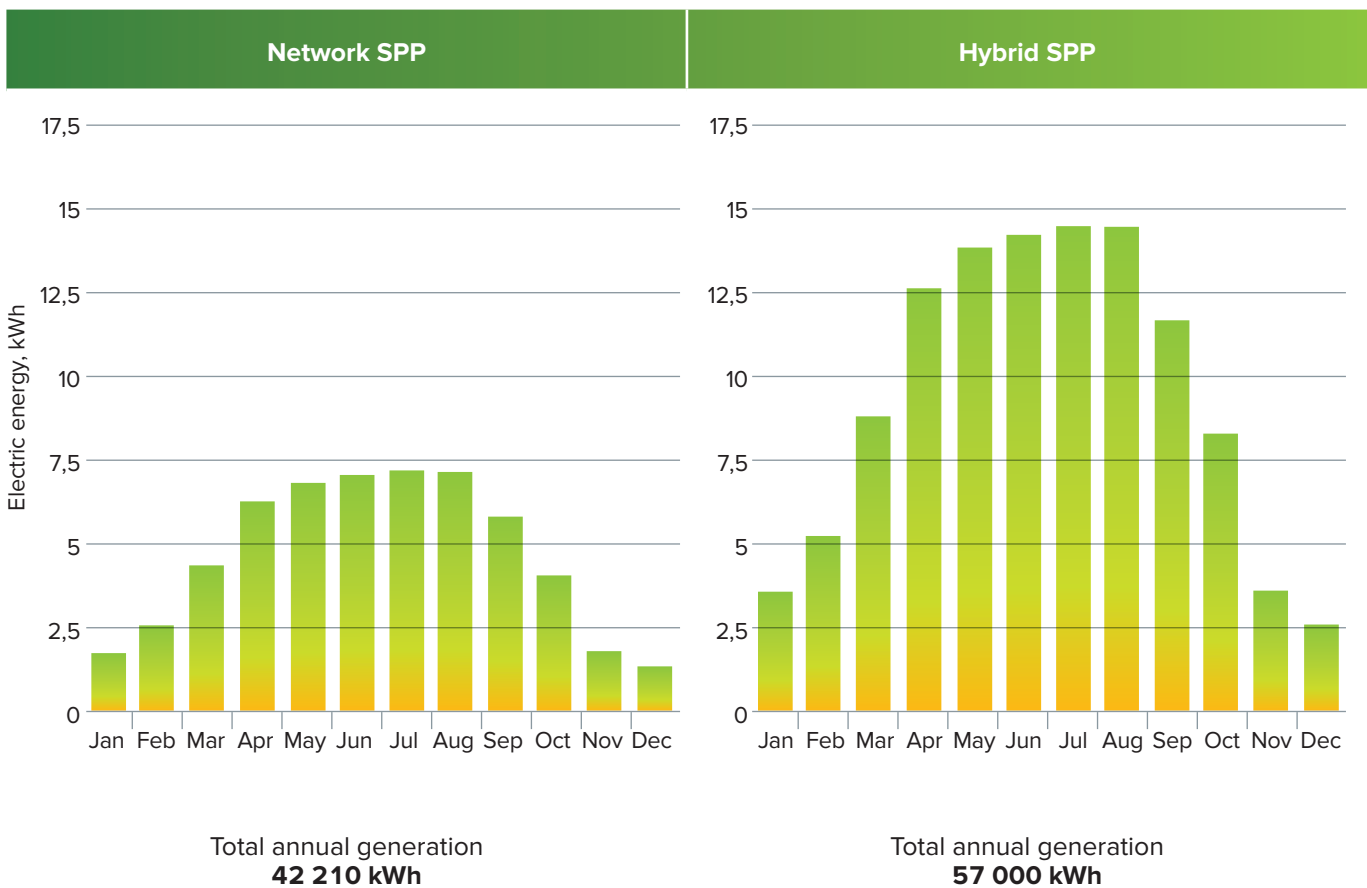
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	67	9 680	648 560
2	Network inverter, 40 kW	1	139 019	139 019
3	Installation, fastening and additional materials	-	236 274	236 274
TOTAL				1 023 853

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	95	9 680	919 600
2	Hybrid inverter, 10 kW	6	96 000	576 000
3	Accumulator battery, 5 kWh	4	120 000	480 000
4	Installation, fastening and additional materials	-	535 080	535 080
TOTAL				2 510 680

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	469 885	469 885
SPP capacity, kW/h	40	57
Battery, kW/h	-	20
Annual electric energy generation by the SPP, kWh	42 210.00	57 000.00
Percentage of replacement of traditional electric energy, %	9%	12%
Annual savings in electric energy costs, UAH	278 544	376 143
The cost of SPP, UAH	1 023 853	2 510 680
Simple payback period, years	3.7	67
Electric energy tariff, UAH/kWh, (without VAT)	5.50	5.50
Electric energy tariff, UAH/kWh, (with VAT)	6 599	6 599



WATER PUMPING STATION-3, KAMIANETS-PODILSKYI (35 KW)



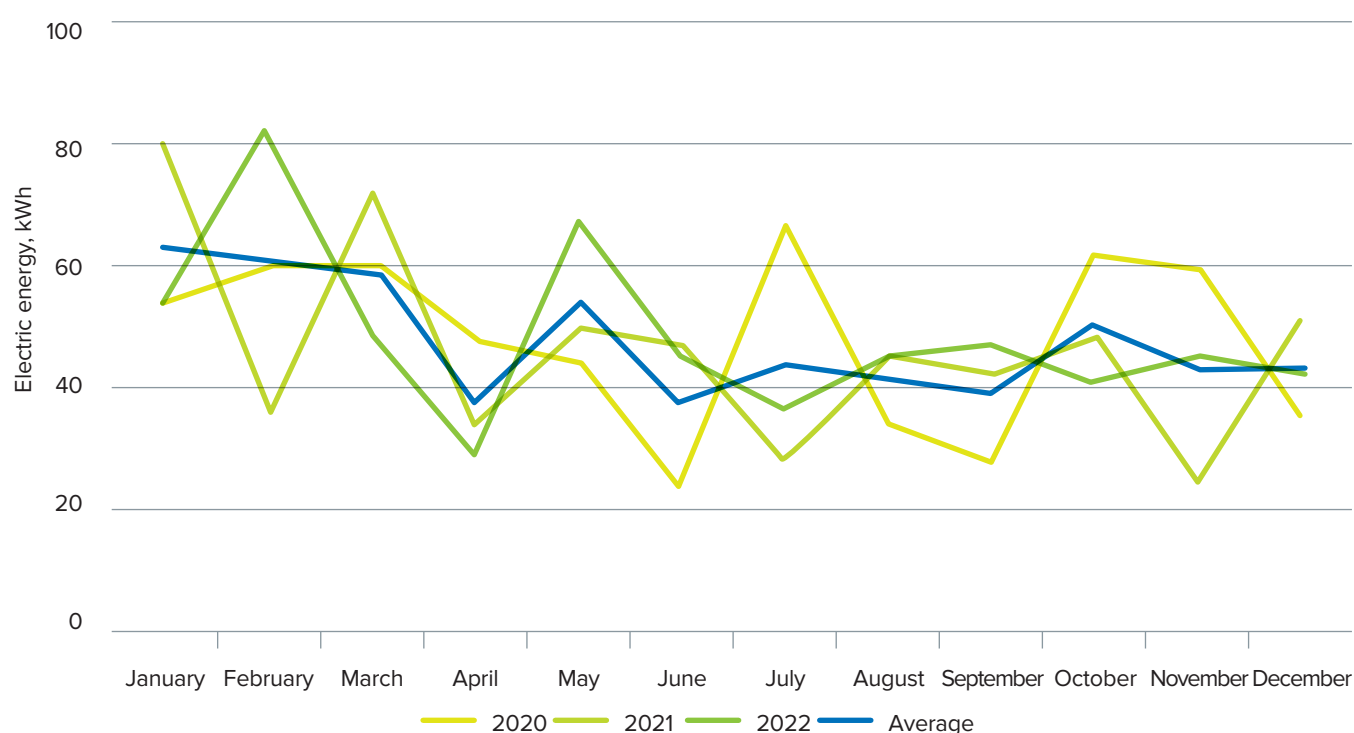
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	35 kW	-	210 m ²
Hybrid SPP	95 kW	30 kW	570 m ²

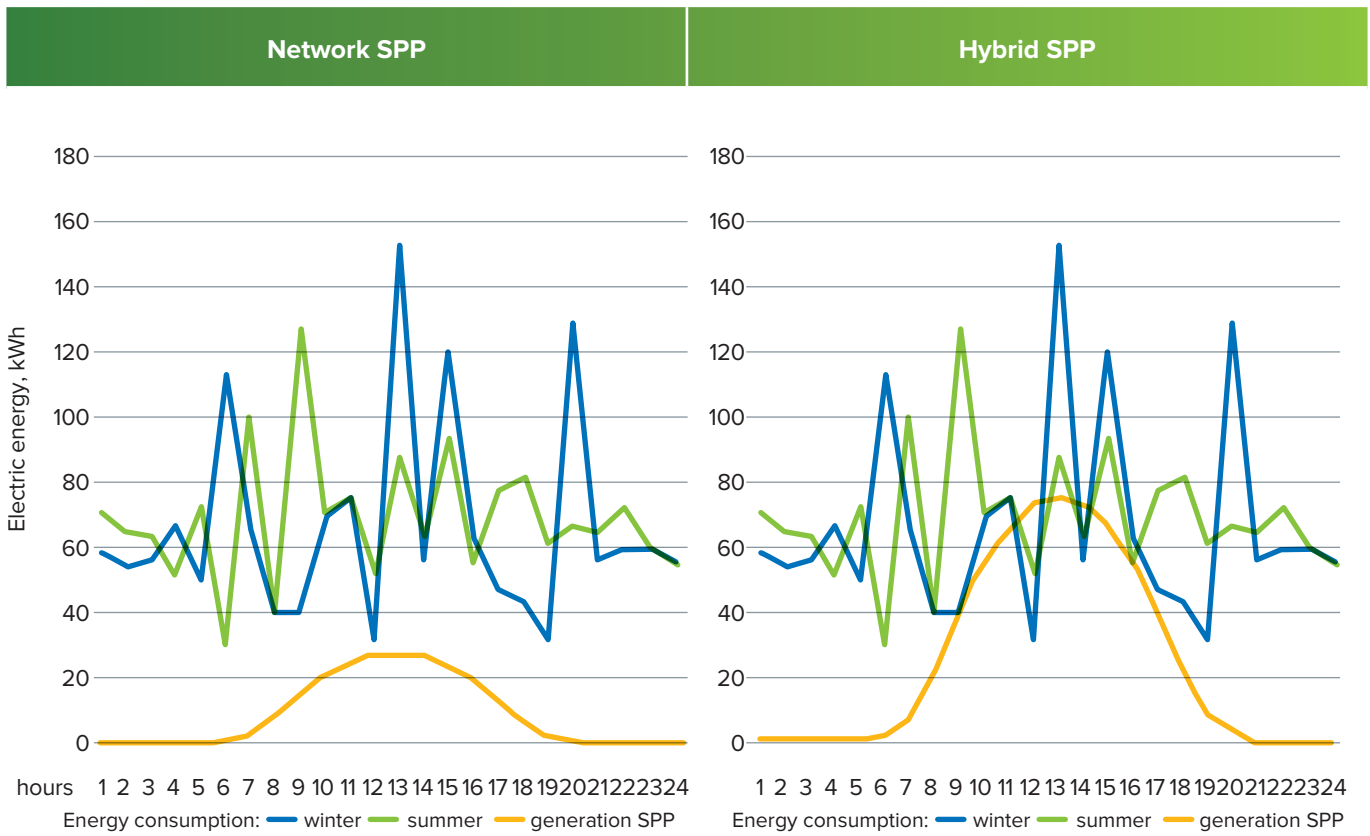
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	54 415	80 000	53 740	62 718
February	60 000	37 000	82 160	59 720
March	60 000	72 000	49 500	60 500
April	48 288	35 000	28 400	37 229
May	43 820	50 000	67 541	53 787
June	23 820	46 000	46 111	38 644
July	67 080	28 000	36 507	43 862
August	34 206	45 000	44 721	41 309
September	28 000	42 046	46 760	38 935
October	61 816	48 500	40 745	50 354
November	60 000	25 130	45 593	43 574
December	35 000	51 610	42 342	42 984
Annual	576 445	560 286	584 120	573 617

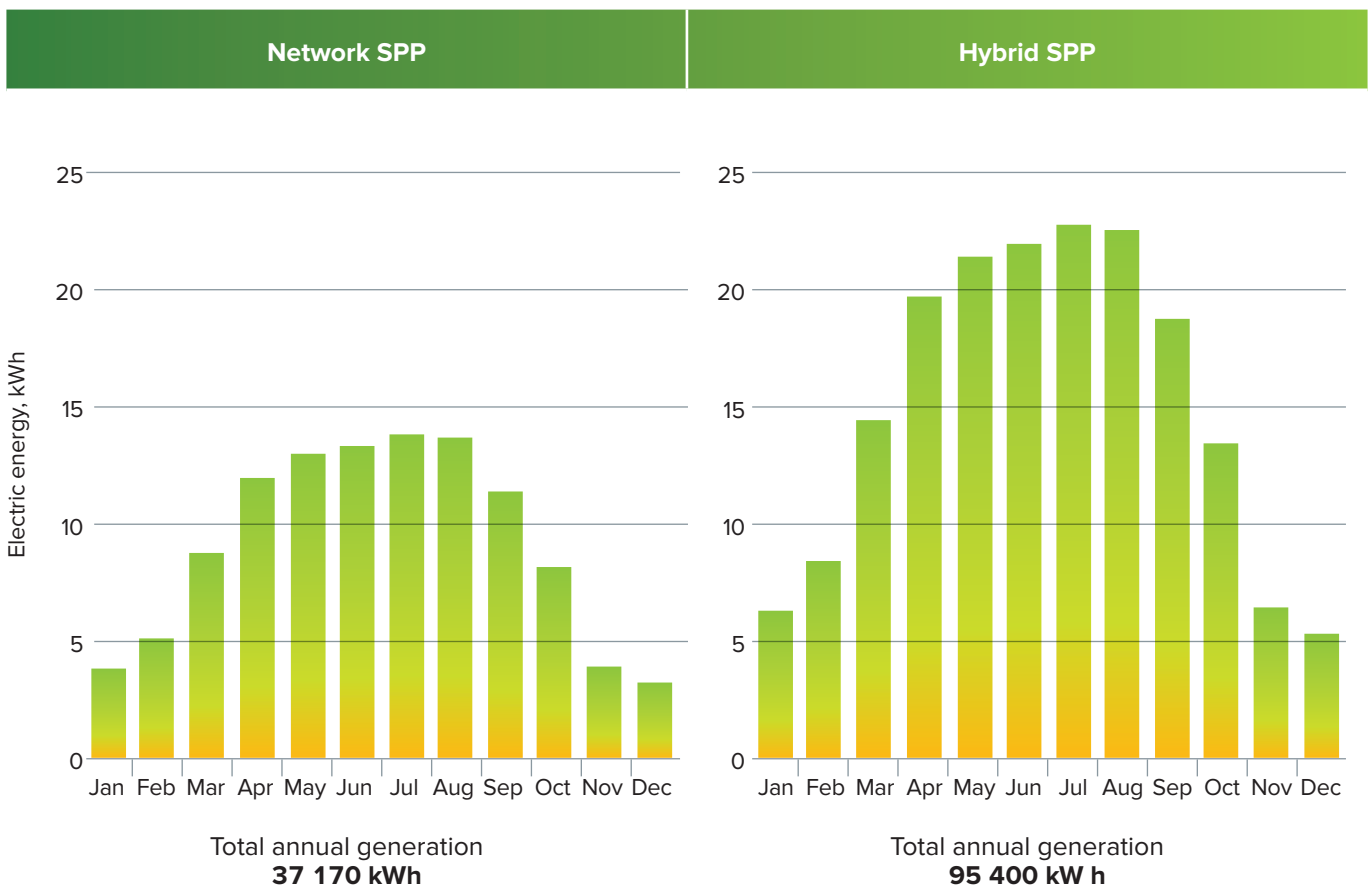
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	59	9 680	571 120
2	Network inverter, 35 kW	1	124 745	124 745
3	Installation, fastening and additional materials	-	208 760	208 760
TOTAL				904 625

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	159	9 680	1 539 120
2	Hybrid inverter, 10 kW	10	96 000	960 000
3	Accumulator battery, 5 kWh	6	120 000	720 000
4	Installation, fastening and additional materials	-	965 736	965 736
TOTAL				4 184 856

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	573 617	573 617
SPP capacity, kW/h	35	95
Battery, kW/h	-	30
Annual electric energy generation by the SPP, kWh	37 170.00	95 400.00
Percentage of replacement of traditional electric energy, %	6%	17%
Annual savings in electric energy costs, UAH	222 574	571 255
The cost of SPP, UAH	904 625	4 184 856
Simple payback period, years	4.1	7.3
Electric energy tariff, UAH/kWh, (without VAT)	4.99	4.99
Electric energy tariff, UAH/kWh, (with VAT)	5 988	5 988



SEWAGE TREATMENT FACILITIES, KAMIANETS-PODILSKYI (100 KW)



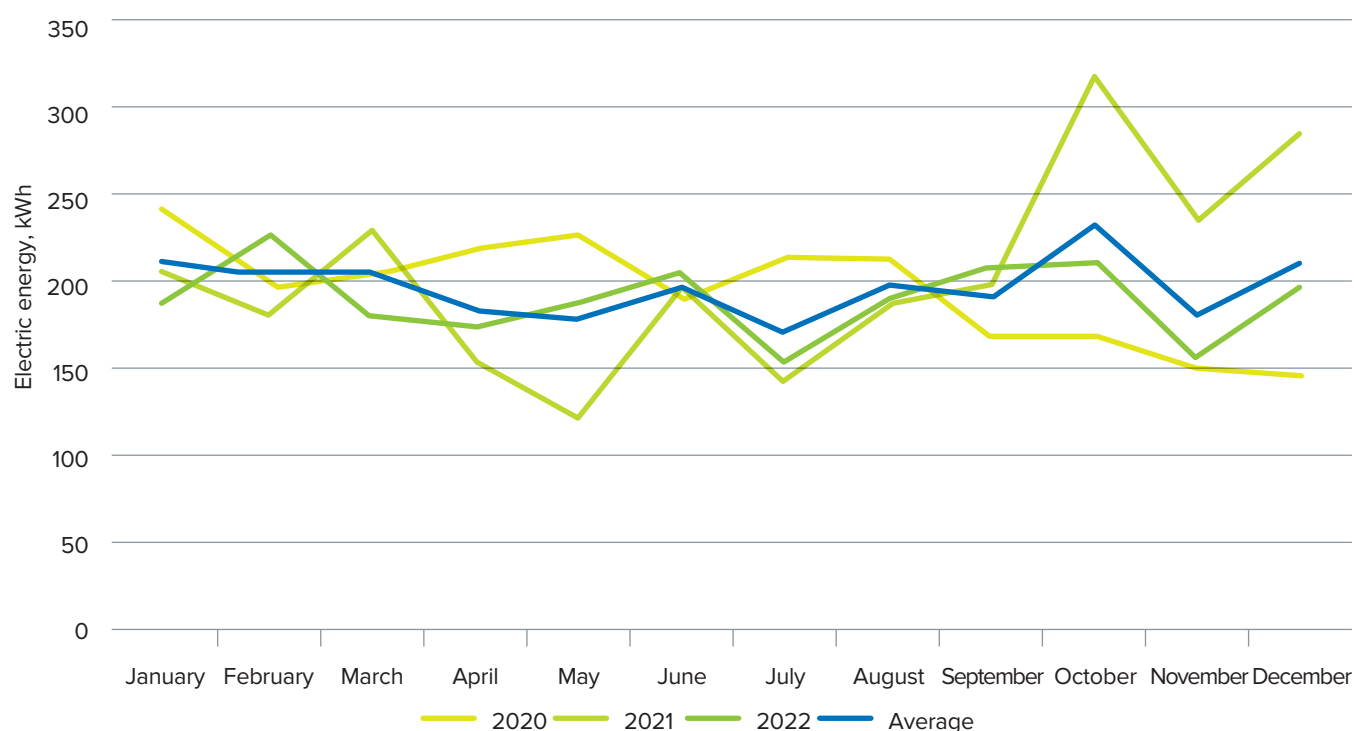
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	100 kW	-	600 m ²
Hybrid SPP	400 kW	120 kW	2 400 m ²

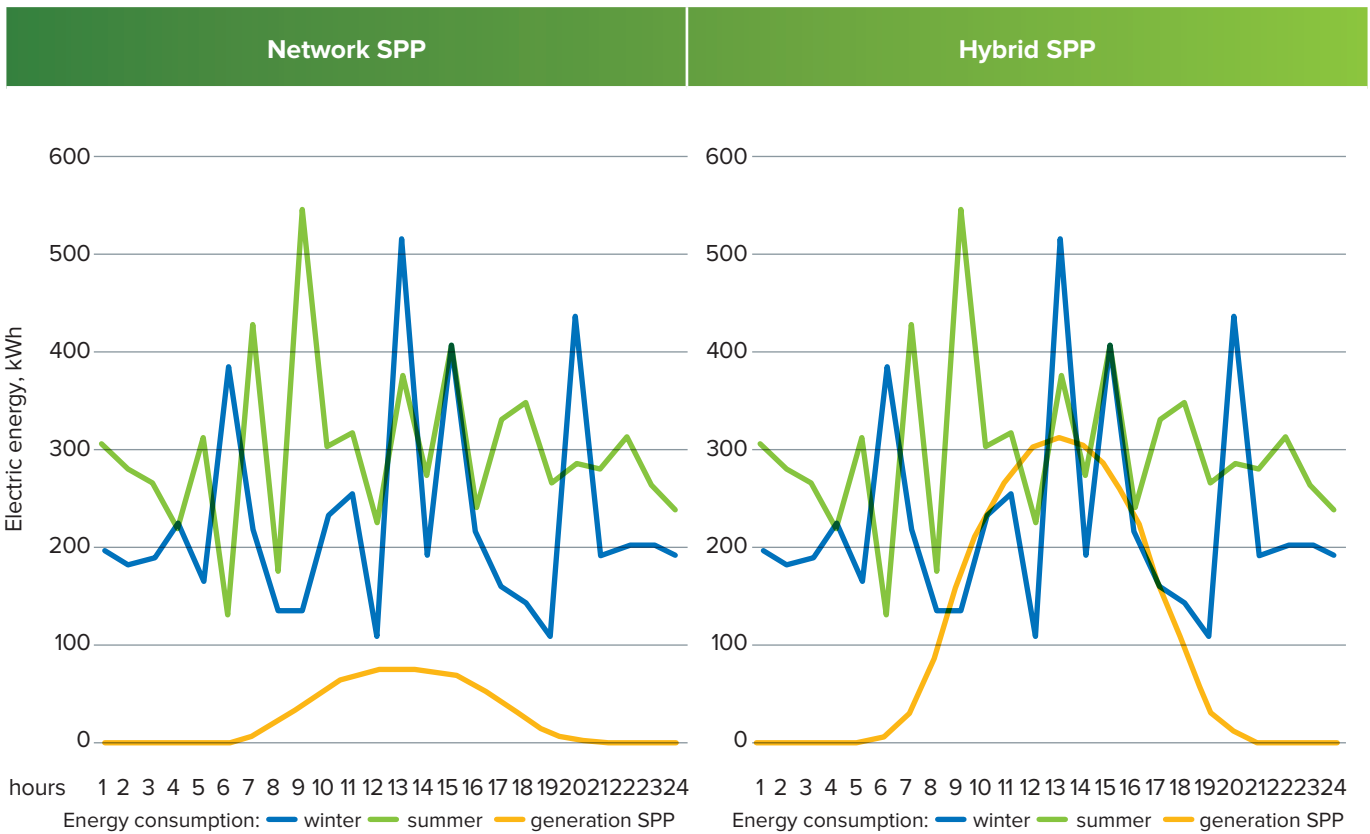
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	240 554	205 040	188 789	211 461
February	202 600	184 360	226 274	204 411
March	204 200	229 160	181 234	204 865
April	219 160	156 520	175 840	183 840
May	227 200	123 280	188 520	179 667
June	191 280	195 120	204 080	196 827
July	214 980	141 388	156 064	170 811
August	212 180	187 759	192 604	197 514
September	168 640	198 000	209 316	191 985
October	166 760	320 739	210 806	232 768
November	153 160	235 854	156 294	181 769
December	145 560	286 098	197 134	209 597
Annual	2 346 274	2 463 318	2 286 955	2 365 516

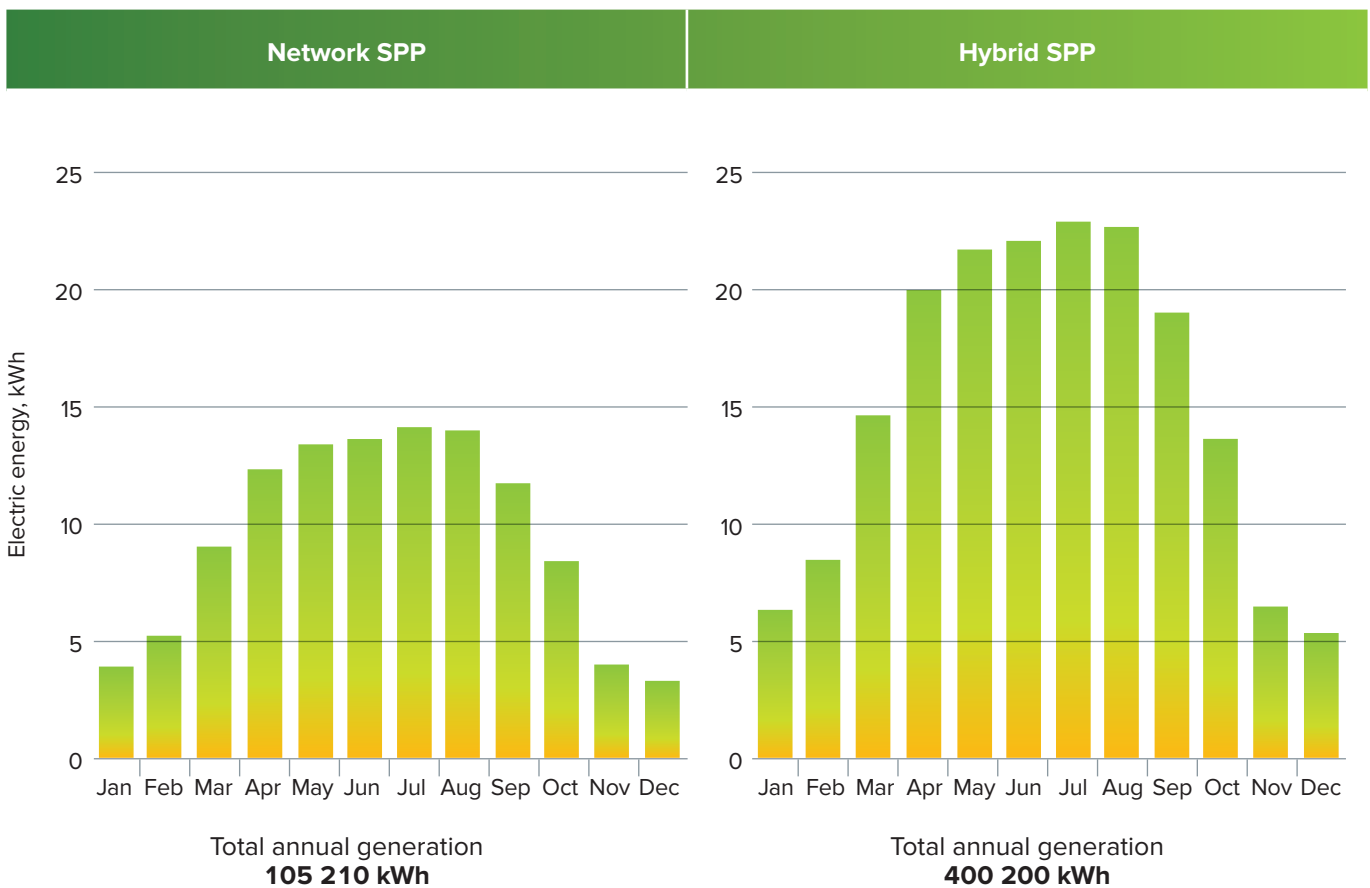
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	167	9 680	1 616 560
2	Network inverter, 100 kW	1	284 255	284 255
3	Installation, fastening and additional materials	-	570 245	570 245
TOTAL				2 471 060

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	667	9 680	6 456 560
2	Hybrid inverter, 10 kW	40	96 000	3 840 000
3	Accumulator battery, 5 kWh	24	120 000	2 880 000
4	Installation, fastening and additional materials	-	3 952 968	3 952 968
TOTAL				17 129 528

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	2 365 516	2 365 516
SPP capacity, kW/h	100	400
Battery, kW/h	-	120
Annual electric energy generation by the SPP, kWh	105 210.00	400 200.00
Percentage of replacement of traditional electric energy, %	4%	17%
Annual savings in electric energy costs, UAH	629 997	2 396 398
The cost of SPP, UAH	2 471 060	17 129 528
Simple payback period, years	3.9	7.1
Electric energy tariff, UAH/kWh, (without VAT)	4.99	4.99
Electric energy tariff, UAH/kWh, (with VAT)	5 988	5 988



PUMPING STATION I, KAMIANETS-PODILSKYI (350 KW)



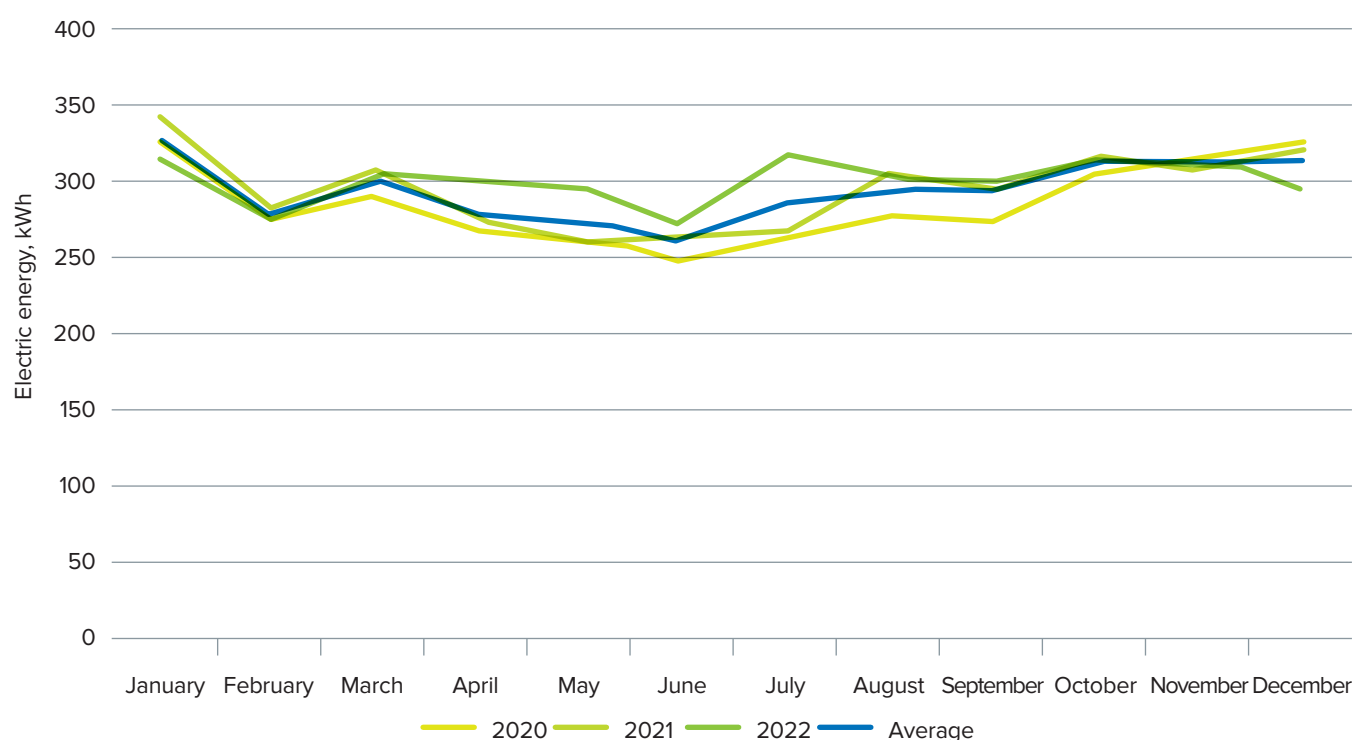
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	350 kW	-	2 100 m ²
Hybrid SPP	558 kW	200 kW	3 350 m ²

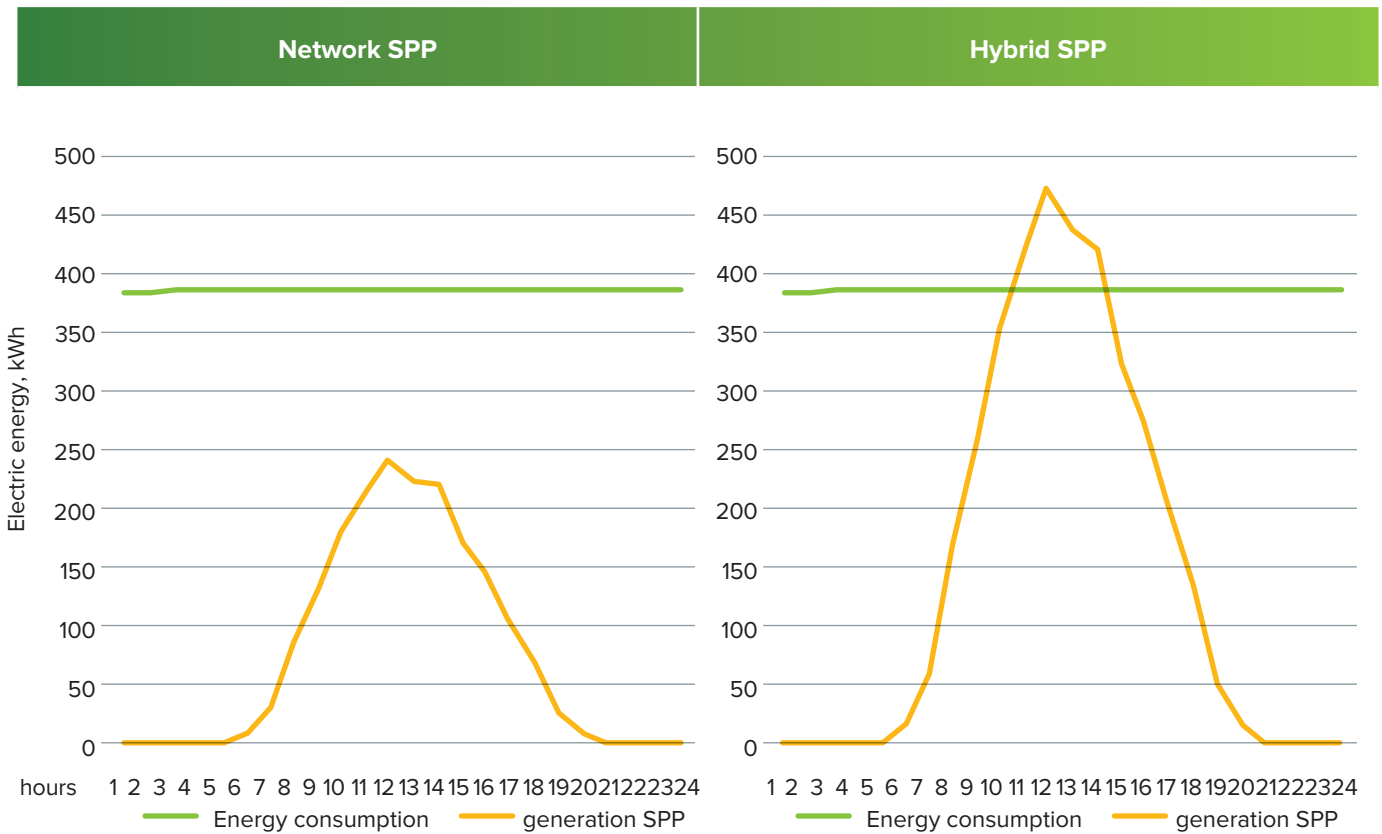
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	327 120	341 556	314 846	327 841
February	278 712	283 464	281 232	281 136
March	292 128	306 266	306 559	301 651
April	271 632	279 173	296 784	282 530
May	262 836	260 016	298 627	273 826
June	250 188	268 915	271 961	263 688
July	266 959	268 666	318 026	284 550
August	278 371	304 598	303 451	295 473
September	275 503	295 992	301 505	291 000
October	305 196	317 558	315 202	312 652
November	314 306	308 666	316 229	313 067
December	326 270	324 398	297 626	316 098
Annual	3 449 221	3 559 268	3 622 048	3 543 512

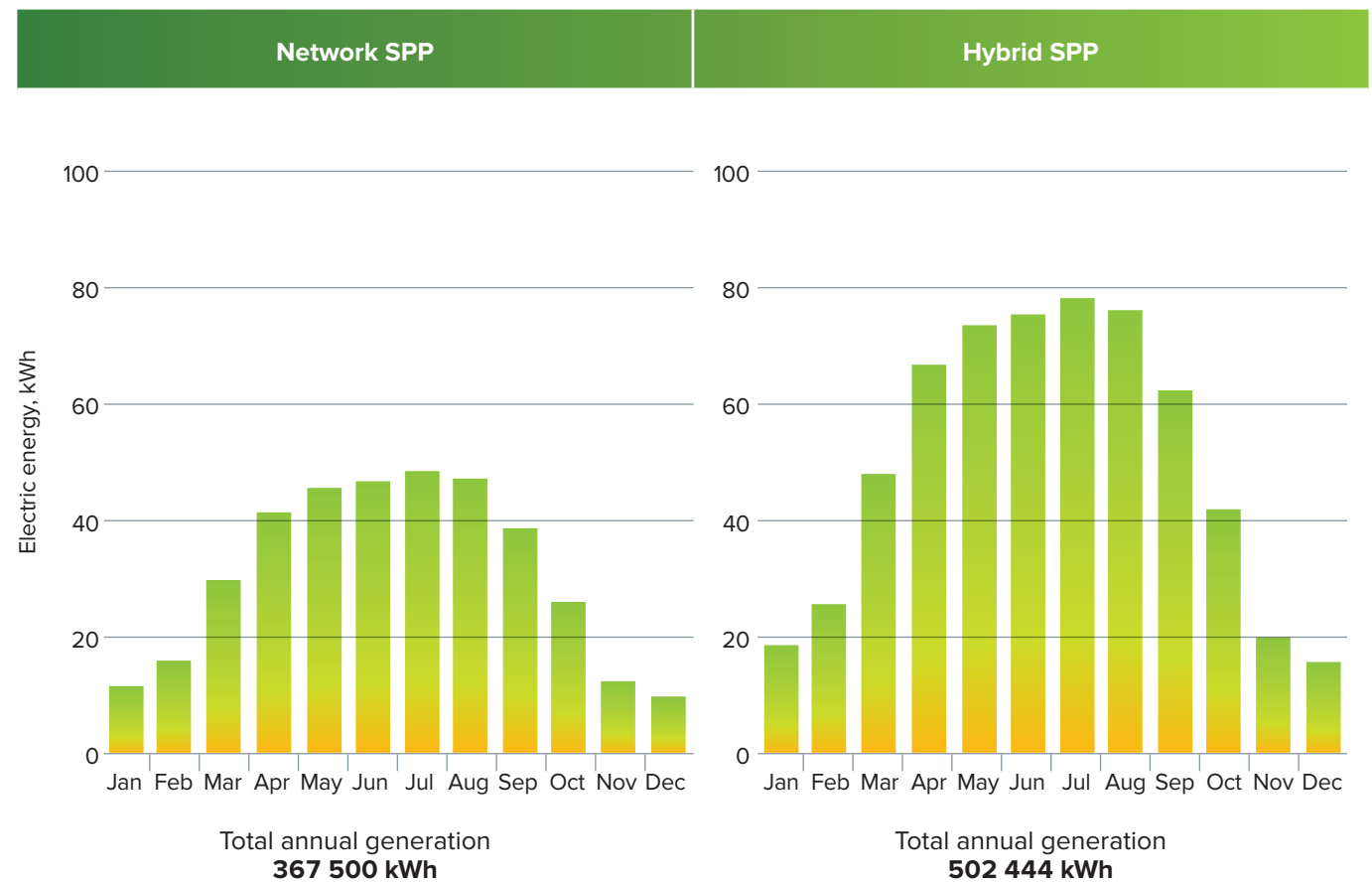
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	583	9 680	5 643 440
2	Network inverter, 100 kW	3	284 255	852 765
3	Network inverter, 50 kW	1	167 649	167 649
4	Installation, fastening and additional materials	-	1 999 156	1 999 156
TOTAL				8 663 010

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	930	9 680	9 002 400
2	Hybrid inverter, 10 kW	56	96 000	5 376 000
3	Accumulator battery, 5 kWh	40	120 000	4 800 000
4	Installation, fastening and additional materials	-	5 753 520	5 753 520
TOTAL				24 931 920

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	network	hybrid
Annual consumption by the facility, kW	3 543 512	3 543 512
SPP capacity, kW/h	350	558
Battery, kW/h	-	200
Annual electric energy generation by the SPP, kWh	367 500	502 444
Percentage of replacement of traditional electric energy, %	10%	14%
Annual savings in electric energy costs, UAH	1 720 966	2 352 895
The cost of SPP, UAH	8 663 010	24 931 920
Simple payback period, years	5.0	10.6
Electric energy tariff, UAH/kWh, (without VAT)	3.90	3.90
Electric energy tariff, UAH/kWh, (with VAT)	4.6 829	4.6 829



PUMPING STATION II, KAMIANETS-PODILSKYI (100 KW)



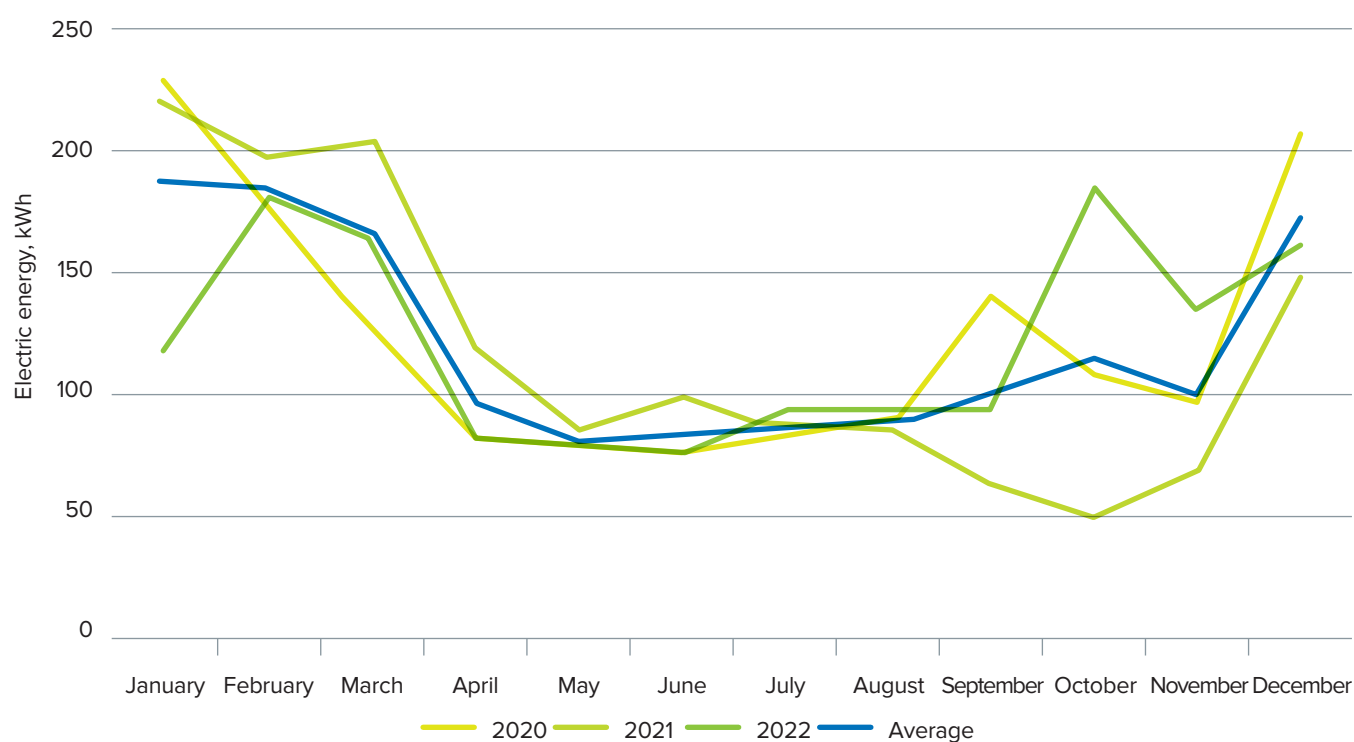
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	100 kW	-	600 m ²
Hybrid SPP	163 kW	50 kW	980 m ²

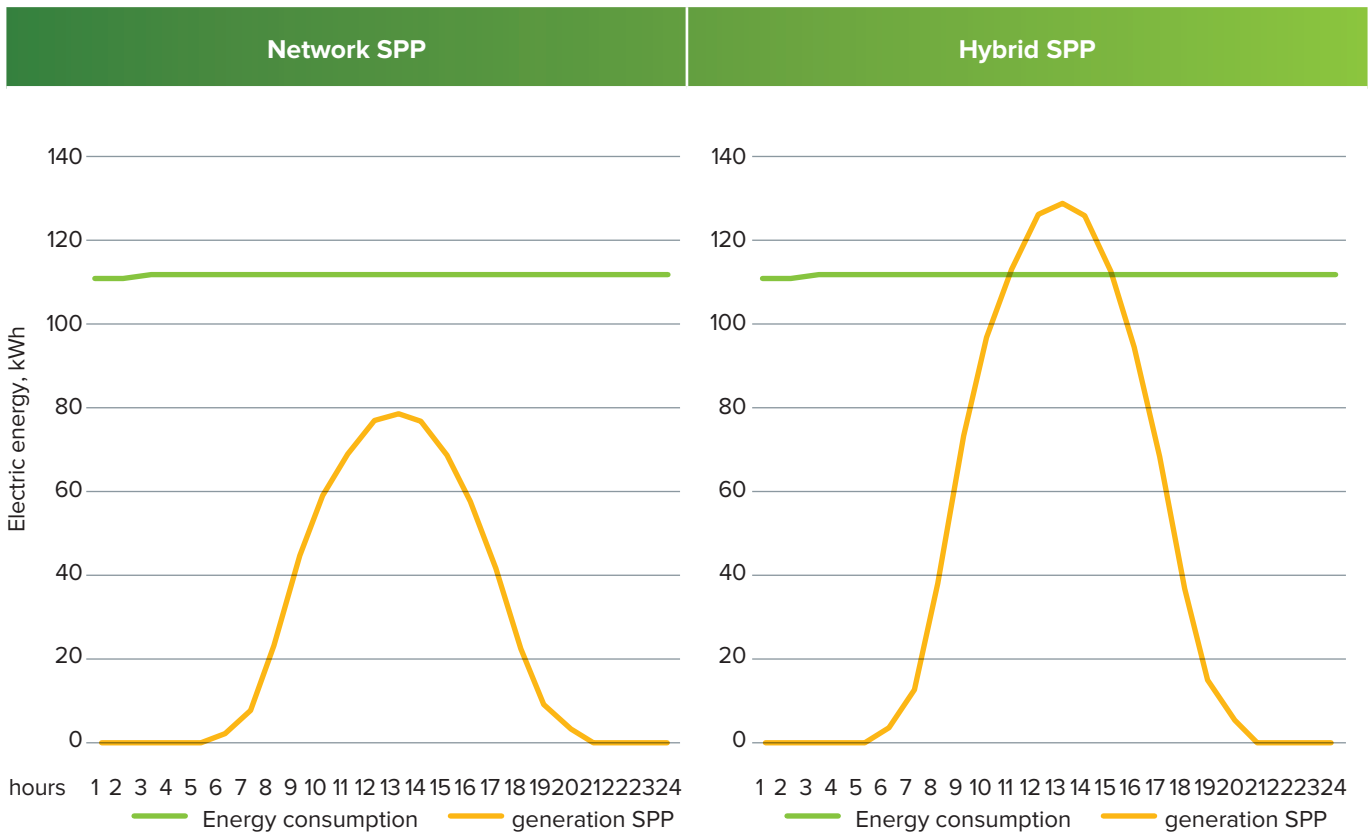
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	228 420	220 460	119 294	189 391
February	178 560	197 490	179 742	185 264
March	129 060	205 056	163 590	165 902
April	82 740	119 970	86 088	96 266
May	80 940	84 708	79 494	81 714
June	77 940	99 866	75 450	84 419
July	83 970	85 044	92 418	87 144
August	87 534	86 502	93 162	89 066
September	141 132	64 724	93 870	99 909
October	108 870	49 782	184 679	114 444
November	97 770	68 410	135 708	100 629
December	206 916	149 776	162 933	173 208
Annual	1 503 852	1 431 788	1 466 428	1 467 356

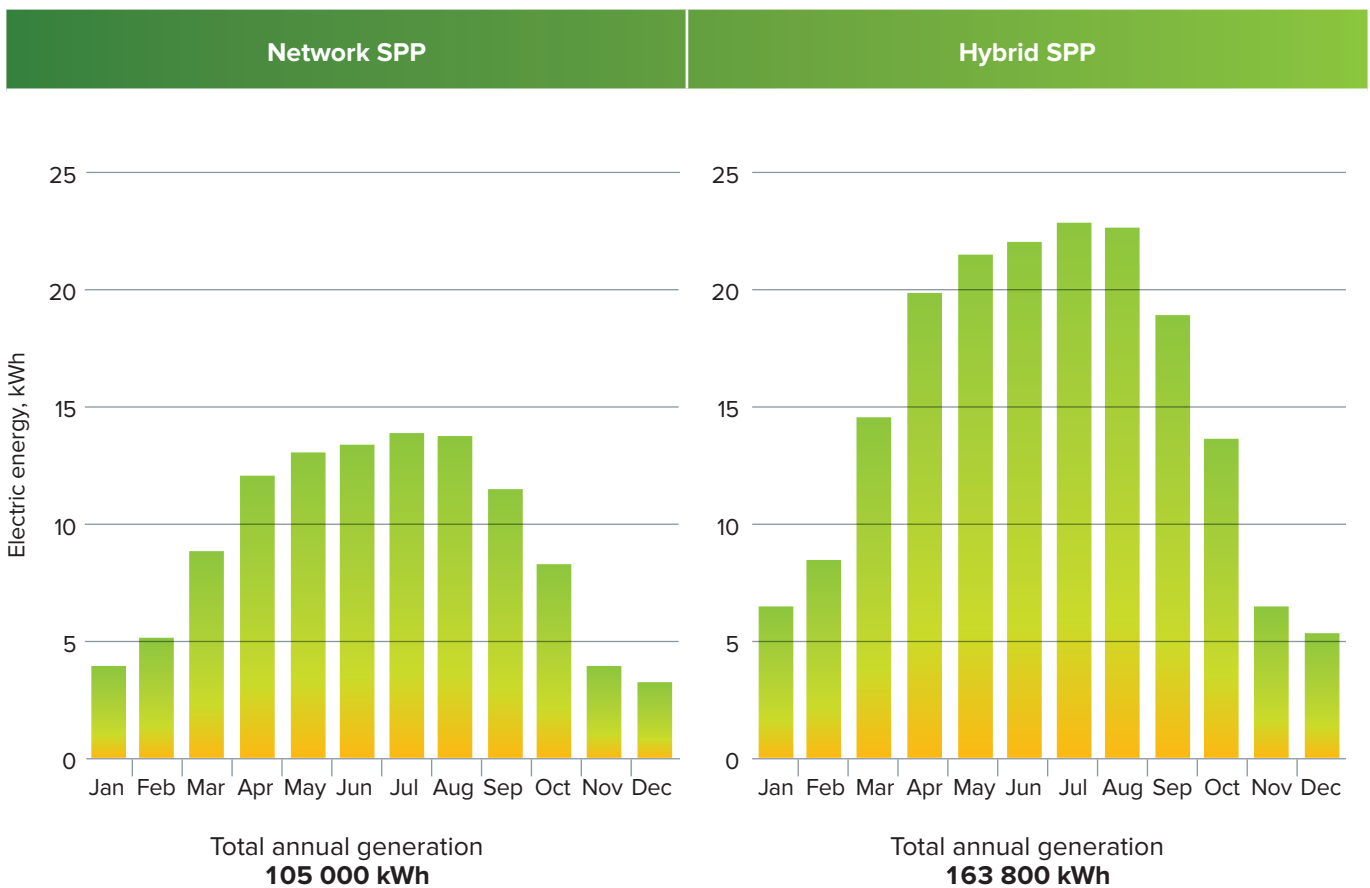
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	167	9 680	1 616 560
2	Network inverter, 100 kW	1	284 255	284 255
3	Installation, fastening and additional materials	-	570 245	570 245
TOTAL				2 471 060

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	273	9 680	2 642 640
2	Hybrid inverter, 10 kW	17	96 000	1 632 000
3	Accumulator battery, 5 kWh	10	120 000	1 200 000
4	Installation, fastening and additional materials	-	1 642 392	1 642 392
TOTAL				7 117 032

Link to indicative price offers:

solar modules

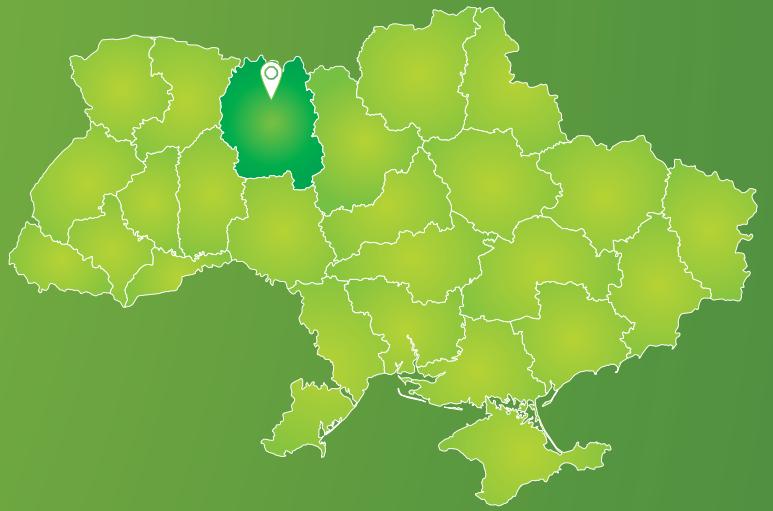
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 467 356	1 467 356
SPP capacity, kW/h	100	163
Battery, kW/h	-	50
Annual electric energy generation by the SPP, kWh	105 000.00	163 800.00
Percentage of replacement of traditional electric energy, %	7%	11%
Annual savings in electric energy costs, UAH	491 715	767 075
The cost of SPP, UAH	2 471 060	7 117 032
Simple payback period, years	5.0	9.3
Electric energy tariff, UAH/kWh, (without VAT)	3.90	3.90
Electric energy tariff, UAH/kWh, (with VAT)	4 683	4 683



LIFT PUMPING STATIONS I AND II, KOROSTEN COMMUNAL ENTERPRISE “VODOKANAL” (210 KW)



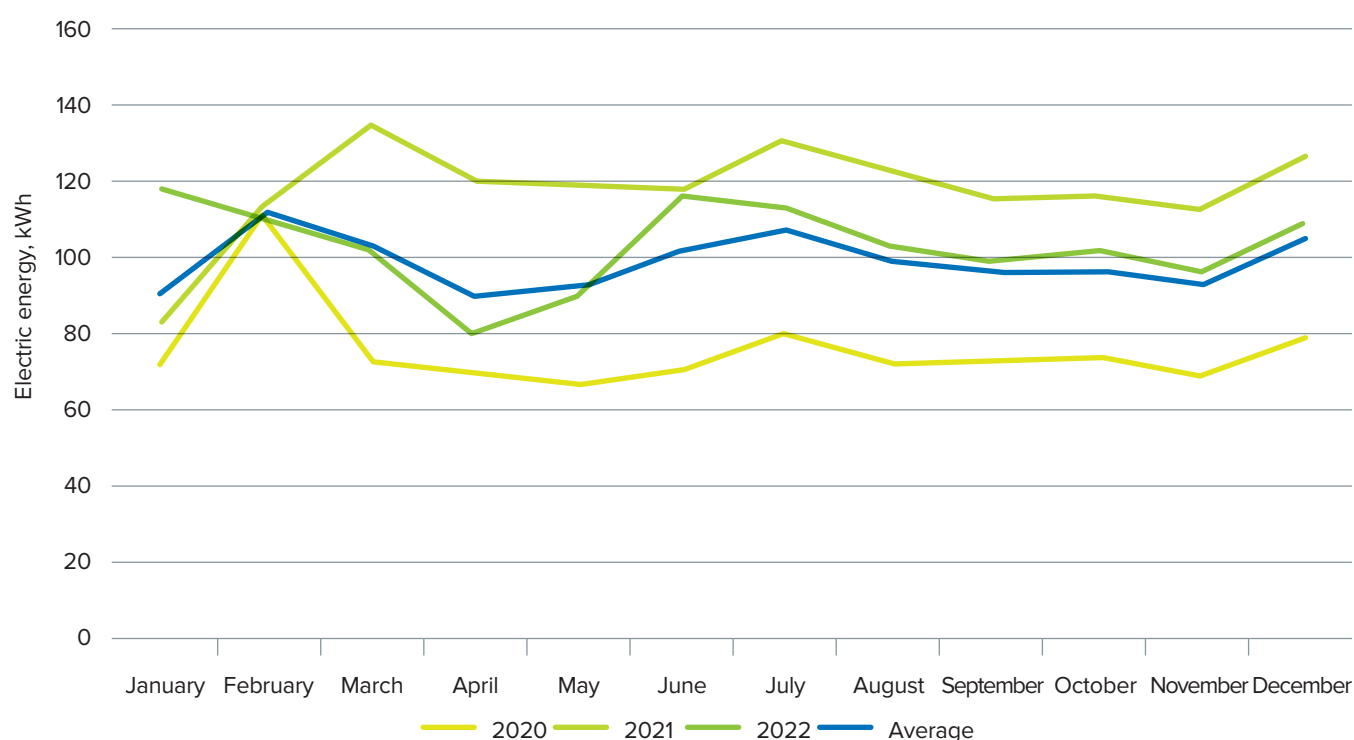
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	210 kW	-	1 150 m ²
Hybrid SPP	300 kW	60 kW	1 600 m ²

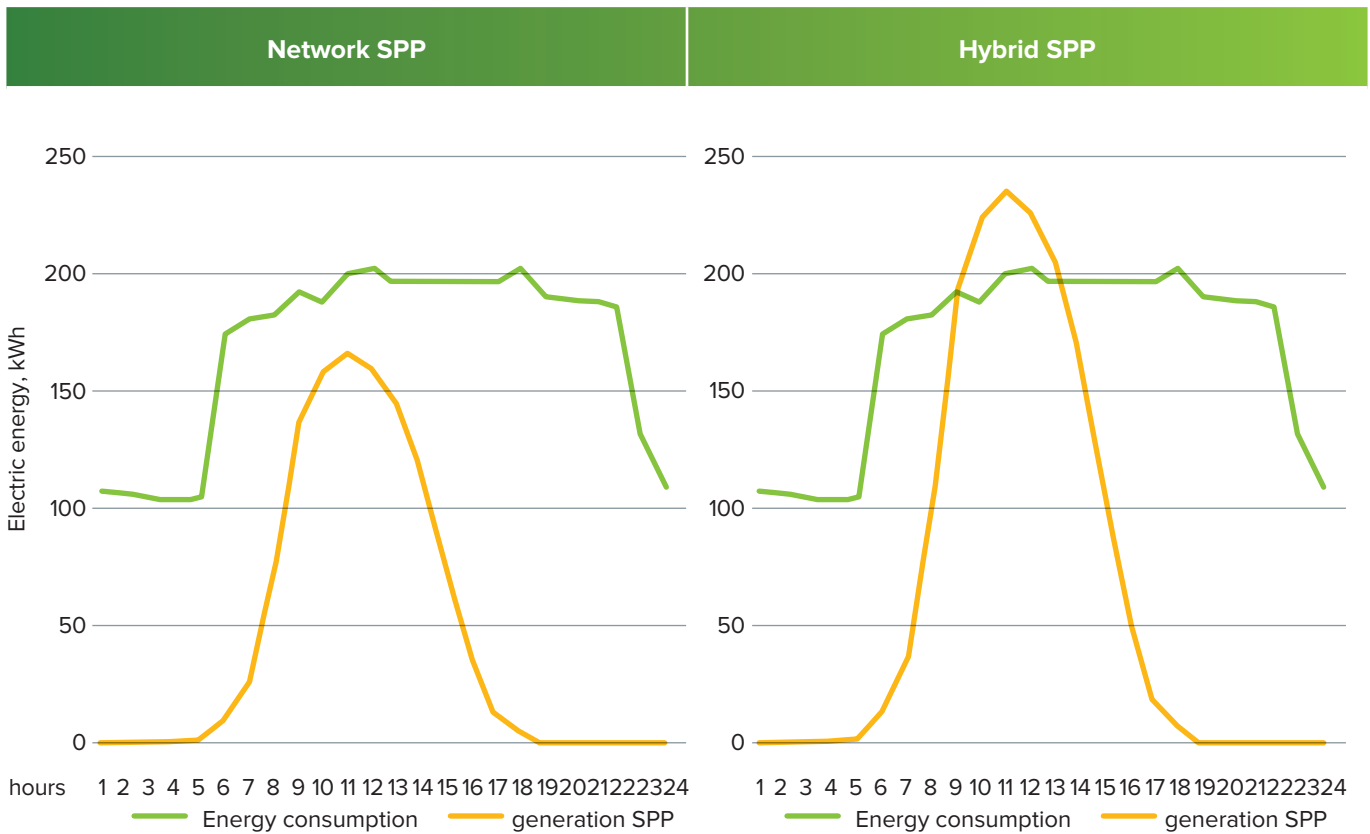
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	73 226	82 765	117 831	91 274
February	110 696	112 835	111 238	111 590
March	73 925	134 667	102 481	103 691
April	70 821	119 505	80 409	90 245
May	67 203	118 251	90 208	91 887
June	71 303	118 326	116 274	101 968
July	79 496	130 415	113 174	107 695
August	72 744	122 178	103 649	99 524
September	72 870	116 290	99 664	96 275
October	74 431	115 566	101 822	97 273
November	69 232	112 721	96 938	92 964
December	79 173	126 374	108 731	104 759
Annual	915 120	1 409 893	1 225 443	1 134 968

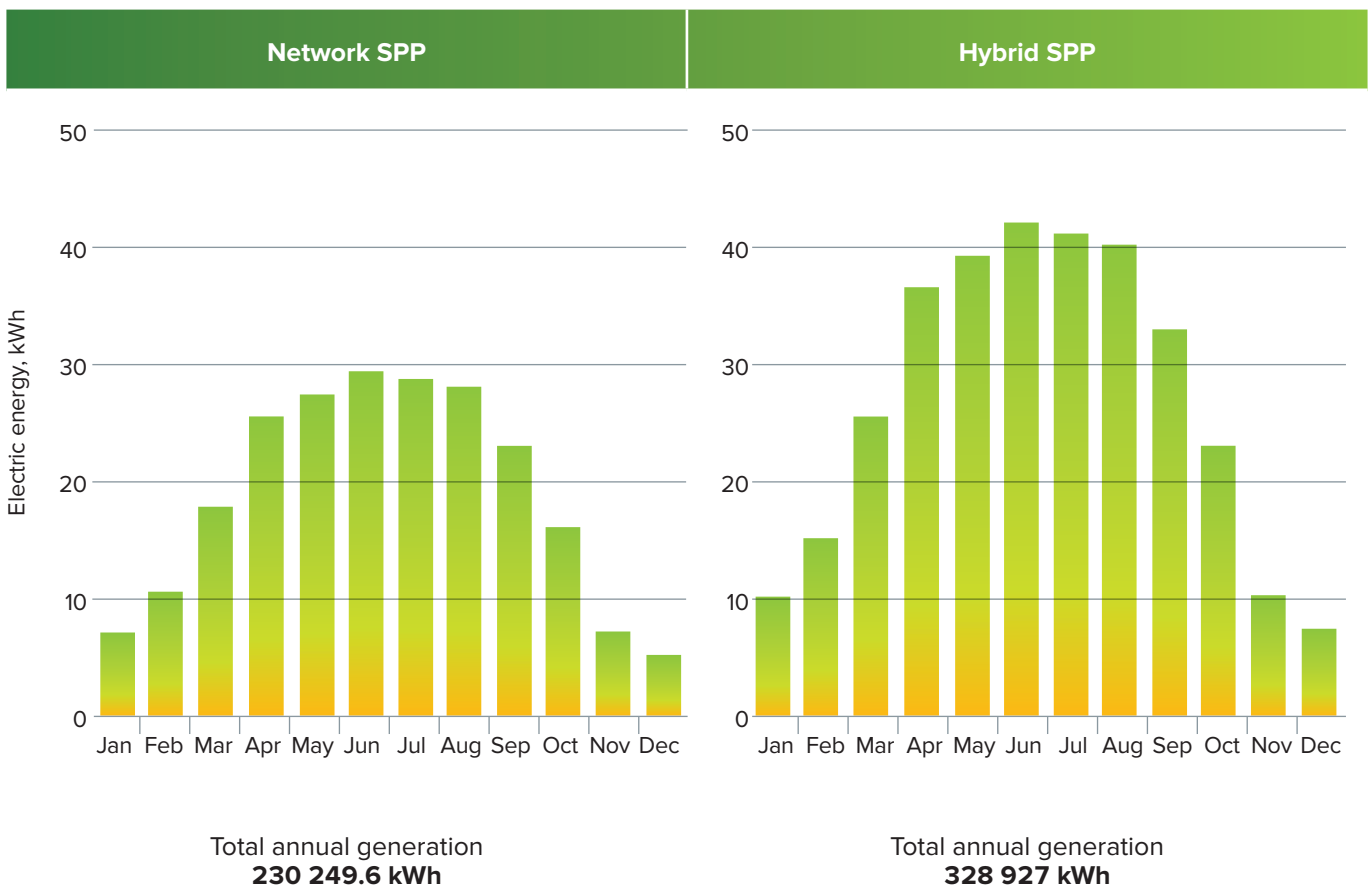
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	390	8 132	3 171 480
2	Network inverter, 100 kW	1	231 800	231 800
3	Network inverter, 60 kW	1	152 000	152 000
4	Network inverter, 50 kW	1	140 600	140 600
5	Installation, fastening and additional materials	-	981 768	981 768
TOTAL				4 677 648

HYBRID

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	560	8 132	4 553 920
2	Hybrid inverter, 30 kW	10	228 000	2 280 000
3	Accumulator battery, 5 kWh	4	292 600	1 170 400
4	Installation, fastening and additional materials	-	1 427 052	1 427 052
TOTAL				9 431 372

Link to the price offer for a 210 kW SPP (set of two stations for 150 kW and 60 kW)

<https://sun-energy.com.ua/solar-power/solar-power-plants/SPP150kwt>

https://sun-energy.com.ua/solar-power/solar-power-plants/SPP_60kwt_business

Link to the price offer for SPPs with a capacity of 300 kW (2 x 150 kW) with the addition of hybrid inverters and batteries

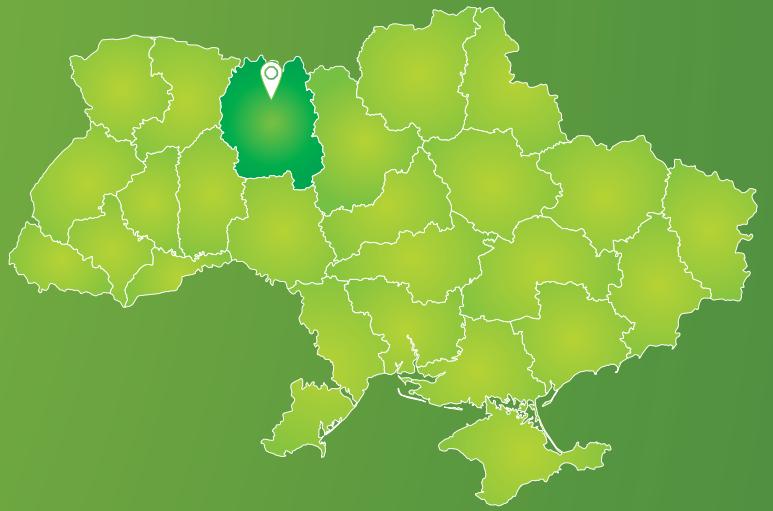
<https://sun-energy.com.ua/solar-power/solar-power-plants/SPP150kwt>

<https://sun-energy.com.ua/solar-power/solar-inverters/sun-30k-sg01hp3-eu-bm3>

https://sun-energy.com.ua/solar-power/accumulator/pylontech_force_h1_14210w

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 134 968	1 134 968
SPP capacity, kW/h	210	300
Battery, kW/h	-	60
Annual electric energy generation by the SPP, kWh	230 250	328 927
Percentage of replacement of traditional electric energy, %	20%	29%
Annual savings in electric energy costs, UAH	1 251 798	1 788 277
The cost of SPP, UAH	4 677 648	9 431 372
Simple payback period, years	3.7	5.3
Electric energy tariff, UAH/kWh, (without VAT)	5.4 367	5.4 367
Electric energy tariff, UAH/kWh, (with VAT)	6.52 404	6.52 404



SEWAGE TREATMENT FACILITIES, KOROSTEN COMMUNAL ENTERPRISE “VODOKANAL” (80 KW)



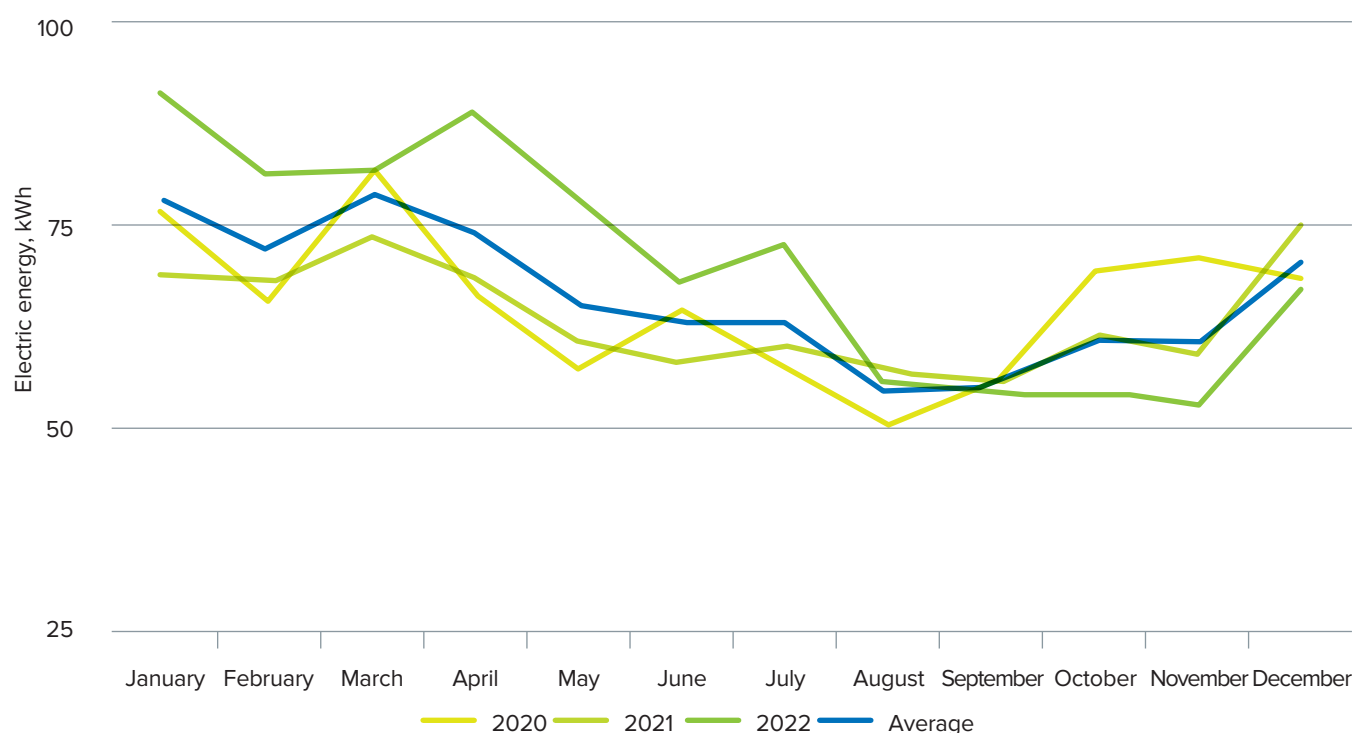
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	80 kW	-	480 m ²
Hybrid SPP	125 kW	50 kW	730 m ²

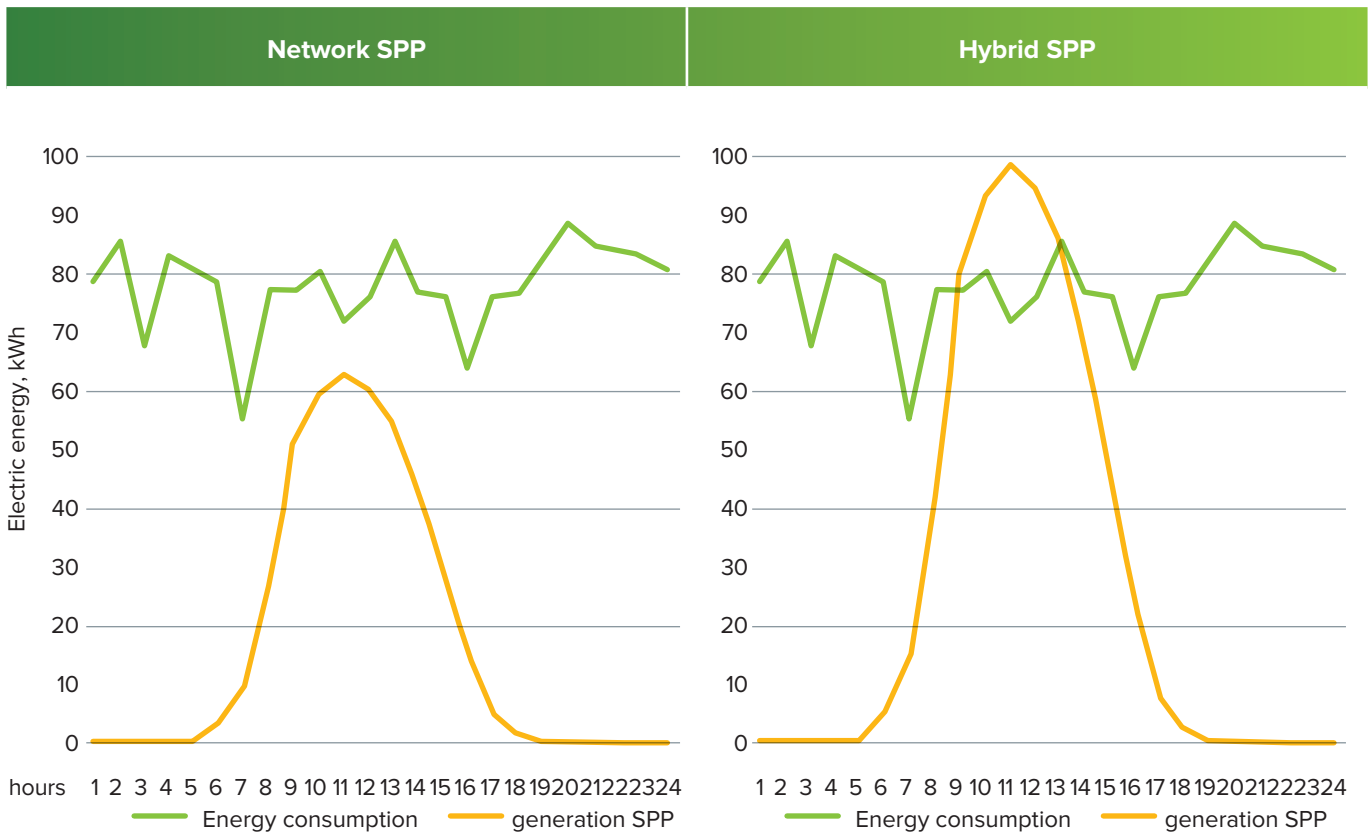
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	75 824	68 686	90 475	78 328
February	65 866	68 268	81 380	71 838
March	81 477	72 976	81 851	78 768
April	66 692	68 224	88 248	74 388
May	57 887	60 593	77 369	65 283
June	64 032	57 440	68 022	63 165
July	57 404	60 283	71 900	63 196
August	50 159	57 142	55 041	54 114
September	55 974	55 008	54 113	55 032
October	68 807	60 949	55 234	61 663
November	70 845	59 115	53 385	61 115
December	68 444	74 712	66 646	69 934
Annual	783 411	763 396	843 664	796 824

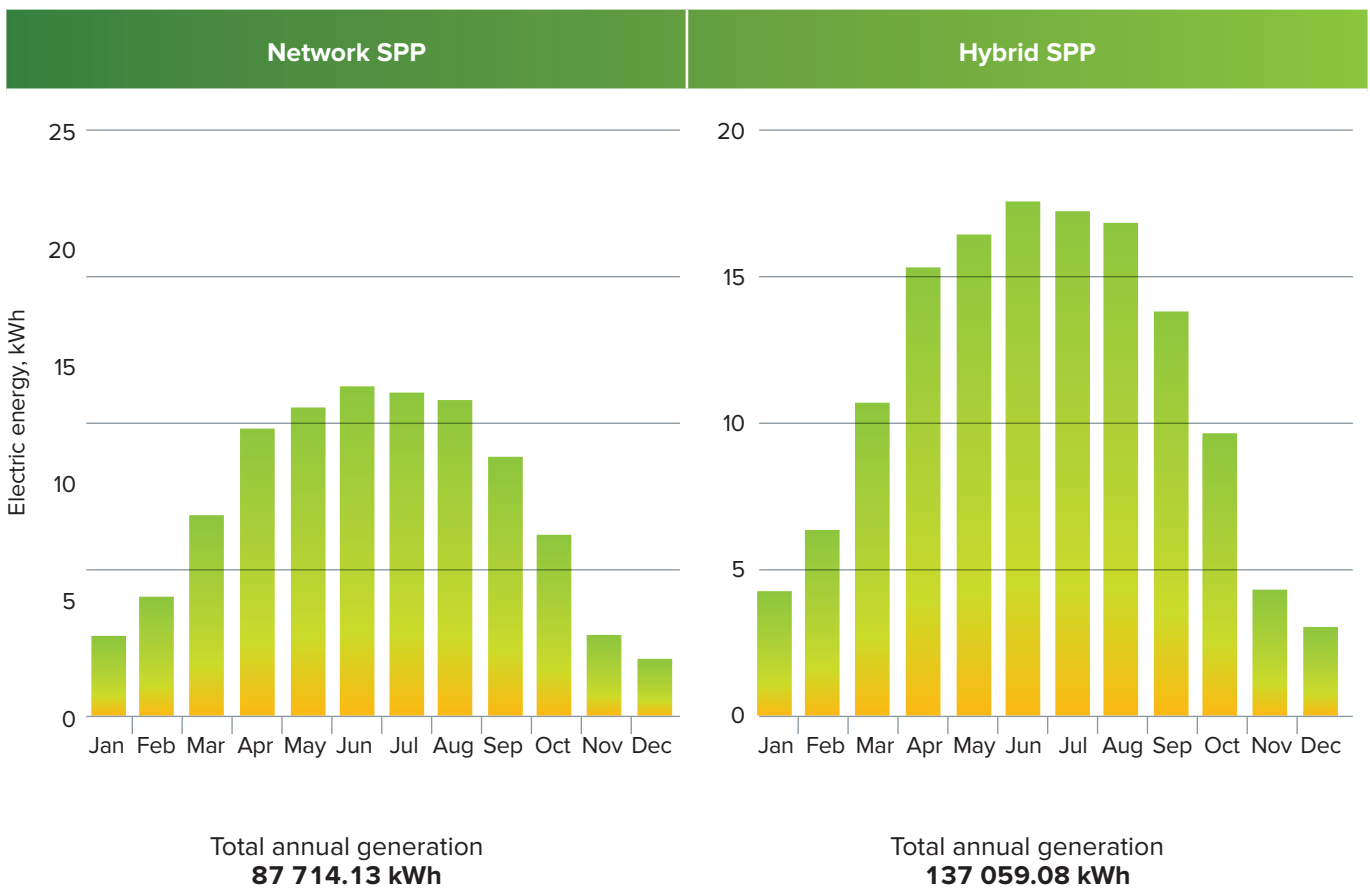
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 545 W	147	7 664	1 126 696
2	Network inverter, 50 kW	1	127 300	127 300
3	Network inverter, 30 kW	1	103 740	103 740
4	Installation, fastening and additional materials	-	506 882	506 882
TOTAL				1 864 618

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 545 W	230	7 664	1 762 858
2	Hybrid inverter, 50 kW	2	266 570	533 140
3	Hybrid inverter, 30 kW	1	228 000	228 000
4	Accumulator battery, 5 kWh	10	72 200	722 000
5	Installation, fastening and additional materials	-	621 680	621 680
TOTAL				3 867 678

Link to price offers for SPPs of approximate capacity (100-150) kW

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_100kw_business_medium

SPP 150 kW

<https://sun-energy.com.ua/solar-power/solar-power-plants/SPP150kw>

Hybrid inverters

<https://sun-energy.com.ua/solar-power/solar-inverters/sun-30k-sg01hp3-eu-bm3>

<https://sun-energy.com.ua/solar-power/solar-inverters/sofar-solar-hyd-20-ktl-3ph>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	796 824	796 824
SPP capacity, kW/h	80	125
Battery, kW/h	-	50
Annual electric energy generation by the SPP, kWh	87 714	137 059
Percentage of replacement of traditional electric energy, %	11%	17%
Annual savings in electric energy costs, UAH	476 875	745 149
The cost of SPP, UAH	1 864 618	3 867 678
Simple payback period, years	3.9	5.2
Electric energy tariff, UAH/kWh, (without VAT)	5.4 367	5.4 367
Electric energy tariff, UAH/kWh, (with VAT)	6.52 404	6.52 404



COMMUNAL ENTERPRISE “KRYVVI RIH CITY CLINICAL HOSPITAL #2” (450 KW)



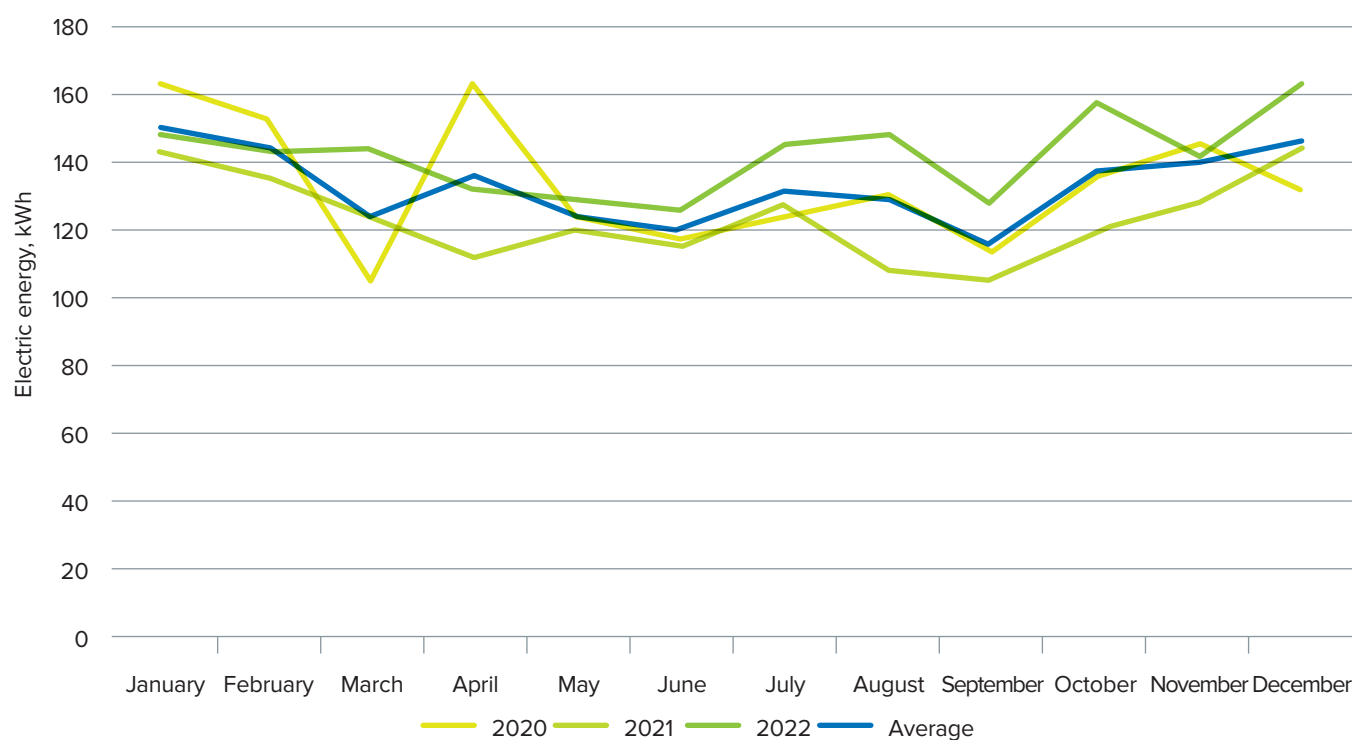
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	450 kW	-	2 475 m ²
Hybrid SPP	500 kW	50 kW	2 750 m ²

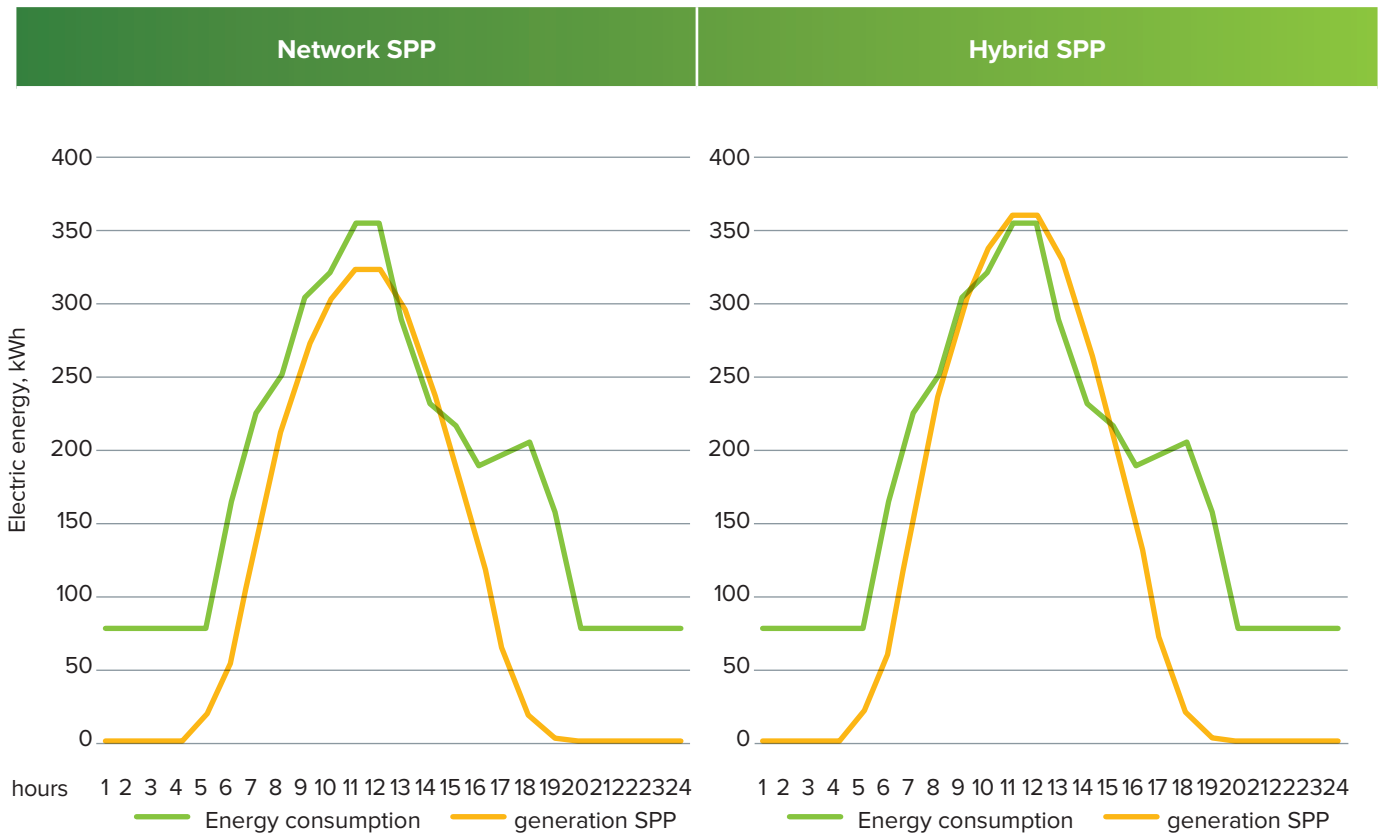
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	161 539	141 728	147 445	150 237
February	152 615	134 844	144 278	143 912
March	104 758	124 372	143 278	124 136
April	162 856	111 699	132 555	135 703
May	123 772	119 568	129 849	124 396
June	117 355	115 546	125 767	119 556
July	123 485	126 270	143 912	131 222
August	129 310	108 540	148 572	128 807
September	113 215	105 356	127 188	115 253
October	134 908	118 623	157 670	137 067
November	144 813	128 468	142 539	138 607
December	131 903	144 130	162 959	146 331
Annual	1 600 529	1 479 144	1 706 012	1 595 228

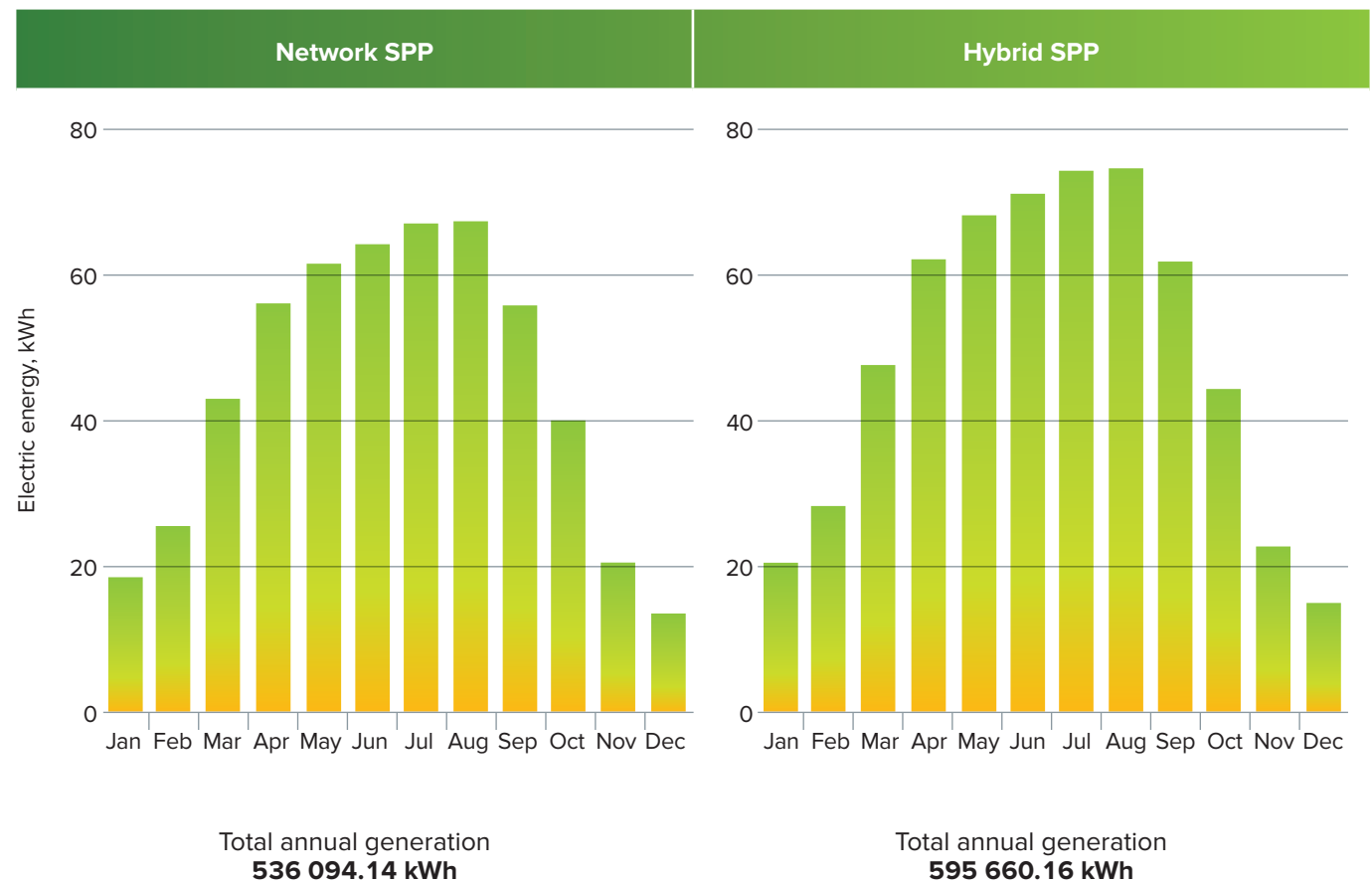
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	834	7 600	6 338 400
2	Network inverter, 100 kW	4	228 000	912 000
3	Network inverter, 50 kW	1	142 120	142 120
4	Installation, fastening and additional materials	-	2 013 772	2 013 772
TOTAL				9 406 292

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	926	7 600	7 037 600
2	Hybrid inverter, 50 kW	10	266 570	2 665 700
3	Accumulator battery, 5 kWh	10	72 200	722 000
4	Installation, fastening and additional materials	-	2 162 428	2 162 428
TOTAL				12 587 728

Link to indicative price offers:

for the SPP capacity (100 kW*5 units)

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_business_100kw

by the SPP capacity of 500 kW

<https://energo-watt.com.ua/alternativnaya-energetika-material/komplektyi-solnechnyih-stantsiy/sonyachna-elektrostanciya-500-kvt-dlya-vlasnih-potreb-mwe.html>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 595 228	1 595 228
SPP capacity, kW/h	450	500
Battery, kW/h	-	50
Annual electric energy generation by the SPP, kWh	536 094.14	595 660.16
Percentage of replacement of traditional electric energy, %	34%	37%
Annual savings in electric energy costs, UAH	2 401 702	2 668 558
The cost of SPP, UAH	9 406 292	12 587 728
Simple payback period, years	3.9	4.7
Electric energy tariff, UAH/kWh, (without VAT)	4.48	4.48
Electric energy tariff, UAH/kWh, (with VAT)	5 376	5 376



**JOINT ENTERPRISE OF THE CITY CLINICAL CENTRE
COMMUNAL ENTERPRISE “KRYVVI RIH
CITY CLINICAL HOSPITAL #2” (100 KW)**



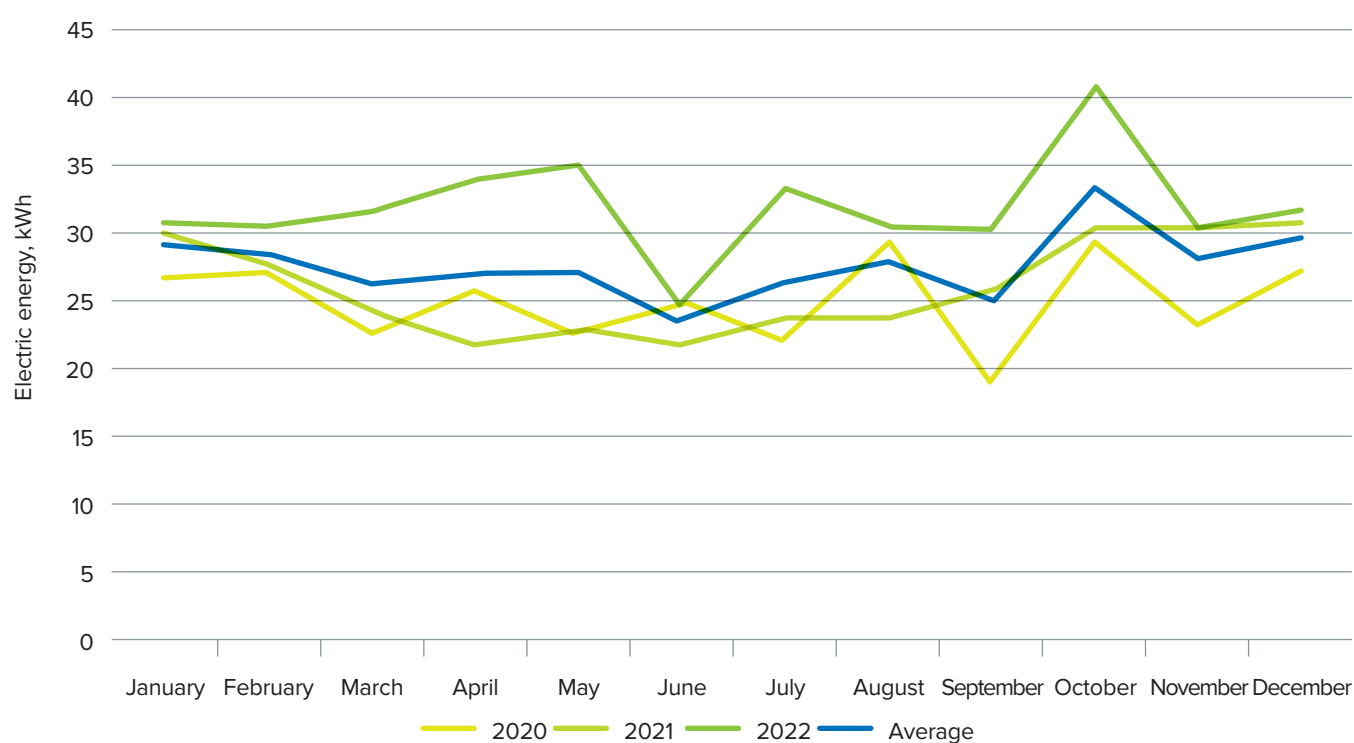
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	100 kW	-	550 m ²
Hybrid SPP	120 kW	15 kW	660 m ²

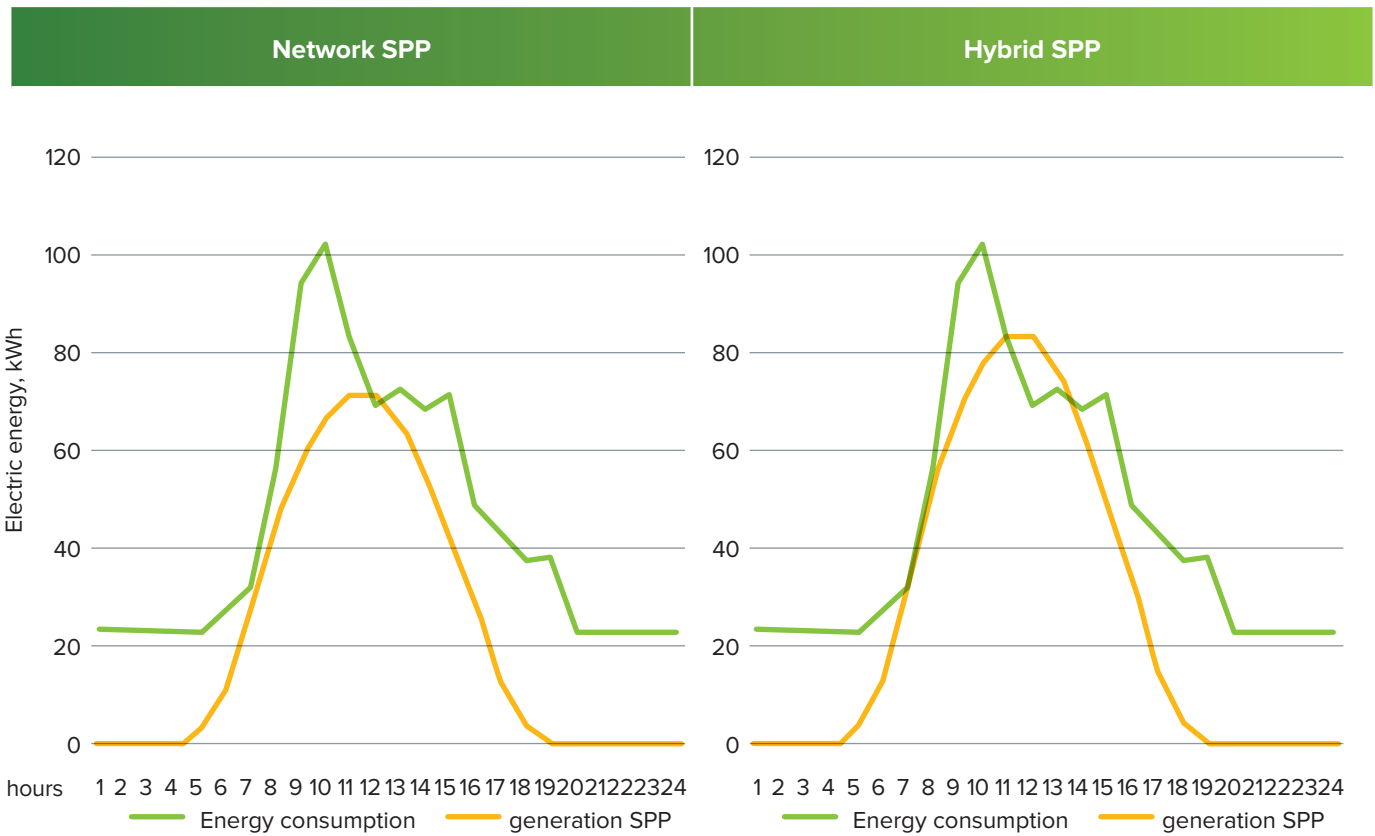
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	26 802	29 784	30 634	29 073
February	26 880	27 497	30 380	28 252
March	22 820	24 151	31 538	26 170
April	25 491	21 866	33 826	27 061
May	22 925	23 060	35 062	27 016
June	24 764	22 009	24 683	23 819
July	22 154	23 743	33 189	26 362
August	29 231	23 676	30 495	27 801
September	19 103	25 645	30 233	24 994
October	29 216	30 164	40 535	33 305
November	23 351	30 641	30 582	28 191
December	27 132	30 575	31 731	29 813
Annual	299 869	312 811	382 888	331 856

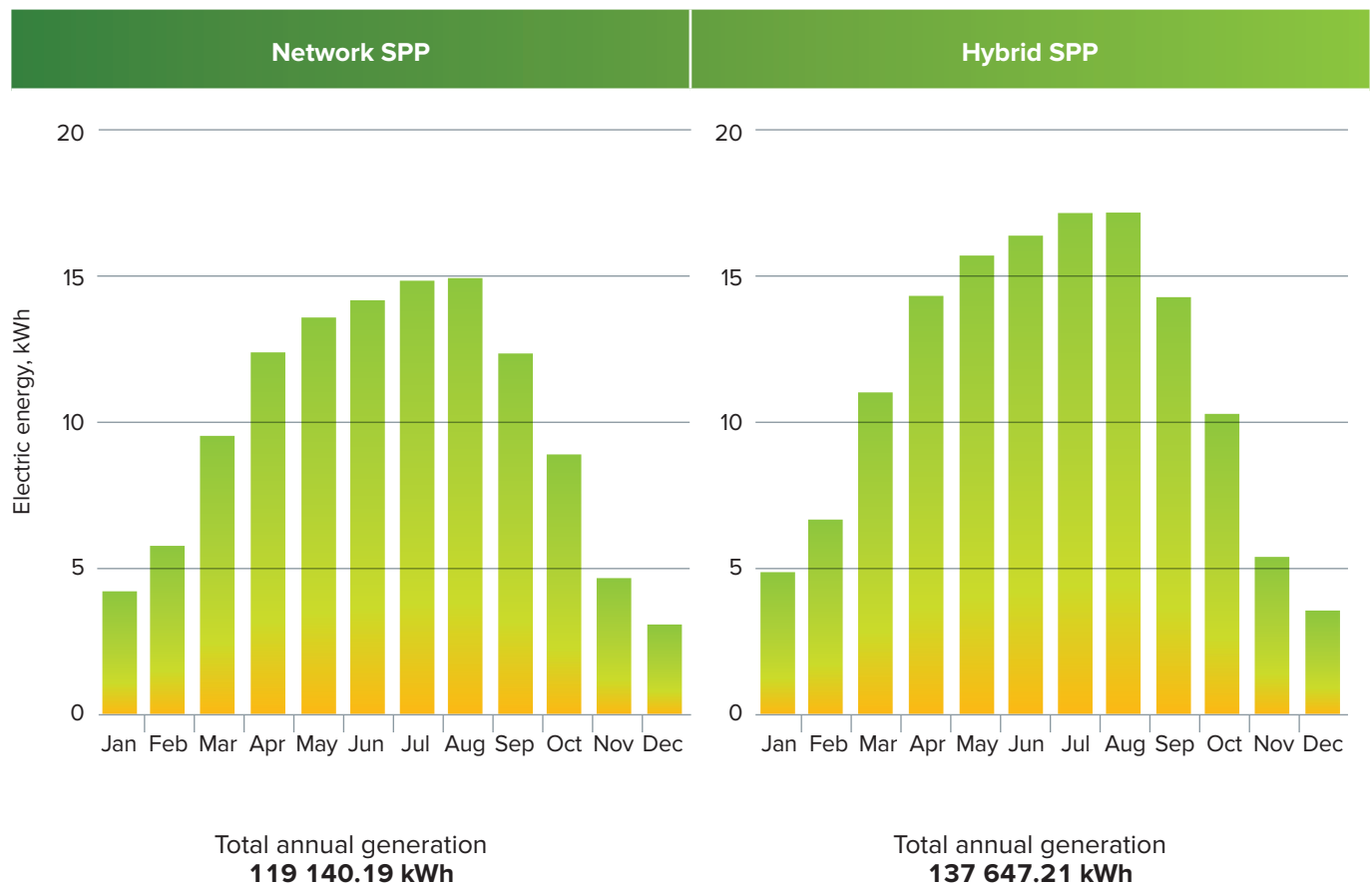
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	186	7 600	1 413 600
2	Network inverter, 100 kW	1	228 000	228 000
3	Installation, fastening and additional materials	-	580 488	580 488
TOTAL				2 222 088

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	224	7 600	1 702 400
2	Hybrid inverter, 50 kW	2	266 570	533 140
3	Hybrid inverter, 10 kW	2	112 100	224 200
4	Accumulator battery, 5 kWh	3	72 200	216 600
5	Installation, fastening and additional materials	-	656 108	656 108
TOTAL				3 332 448

Links to indicative price offers for SPPs:

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_business_100kw

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	331 856	331 856
SPP capacity, kW/h	100	120
Battery, kW/h	-	15
Annual electric energy generation by the SPP, kWh	119 140	137 647
Percentage of replacement of traditional electric energy, %	36%	41%
Annual savings in electric energy costs, UAH	533 747	616 659
The cost of SPP, UAH	2 222 088	3 332 448
Simple payback period, years	4.2	5.4
Electric energy tariff, UAH/kWh, (without VAT)	4.48	4.48
Electric energy tariff, UAH/kWh, (with VAT)	5 376	5 376



**COMMUNAL NON-COMMERCIAL ENTERPRISE
“KRYVYI RIH CITY HOSPITAL #17” (100 KW)**



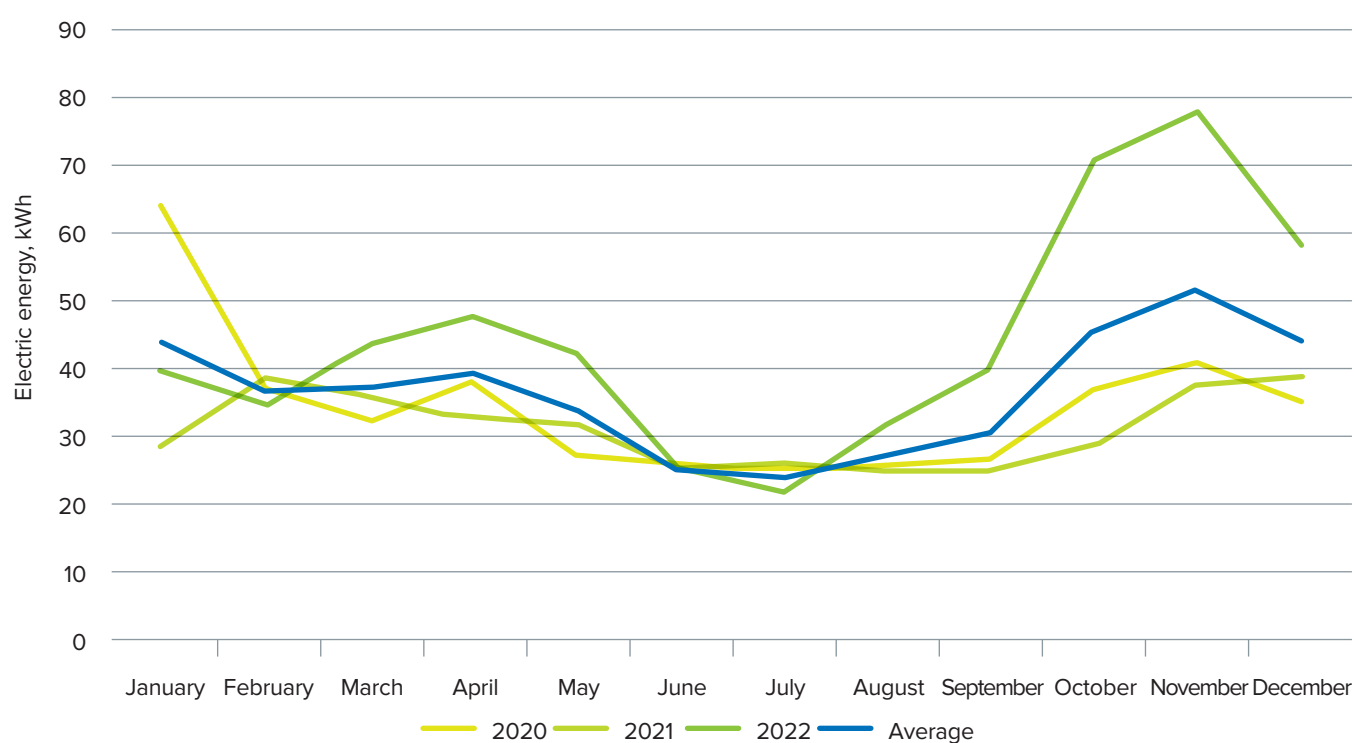
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	100 kW	-	550 m ²
Hybrid SPP	120 kW	10 kW	660 m ²

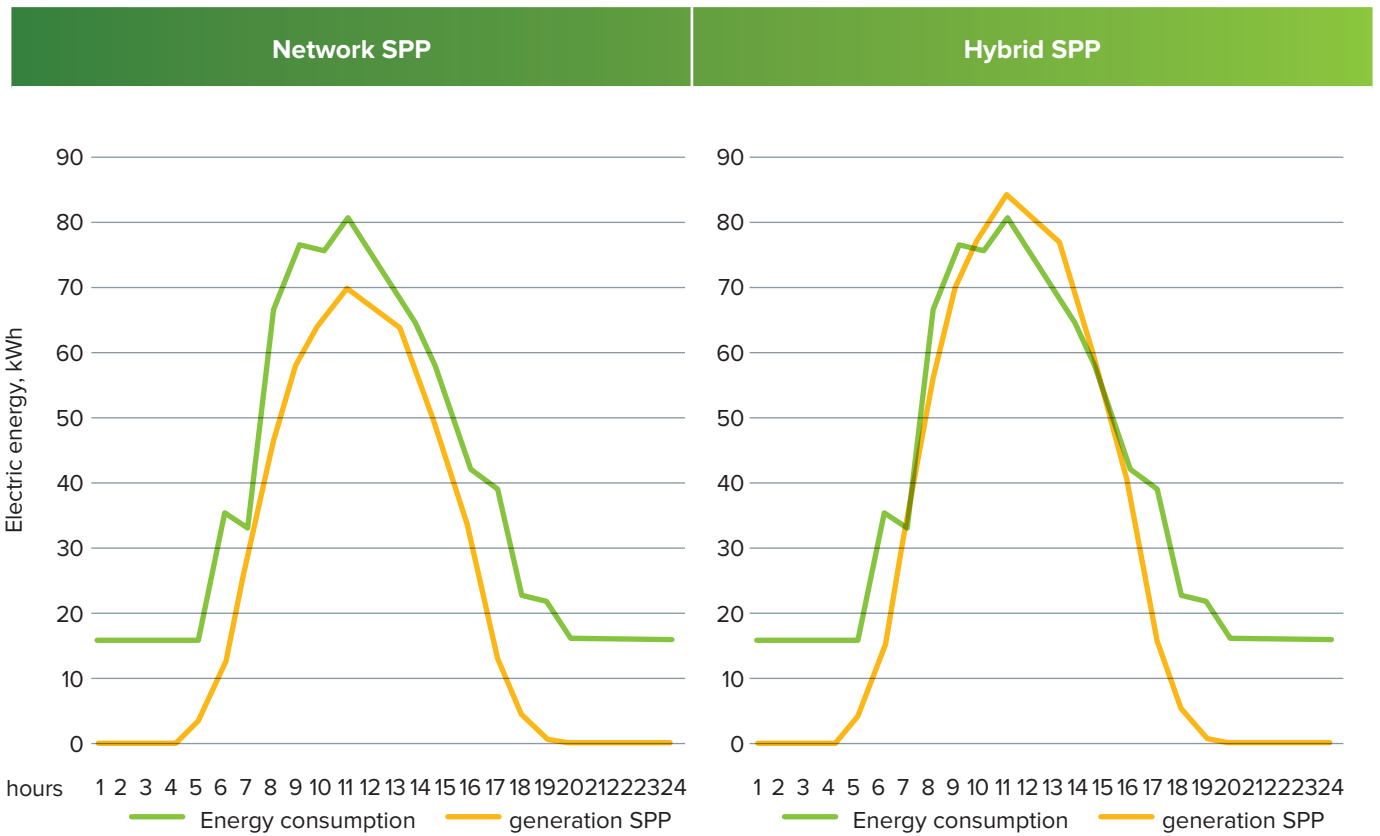
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	63 338	28 679	39 384	43 800
February	37 098	38 312	34 904	36 771
March	32 361	35 744	43 328	37 144
April	37 744	32 792	47 112	39 216
May	27 106	31 808	42 248	33 721
June	25 448	25 200	25 024	25 224
July	24 984	25 792	21 856	24 211
August	25 616	24 904	31 668	27 396
September	26 592	24 856	39 936	30 461
October	36 600	28 888	70 392	45 293
November	40 154	37 376	77 808	51 779
December	35 166	39 016	58 268	44 150
Annual	412 207	373 367	531 928	439 167

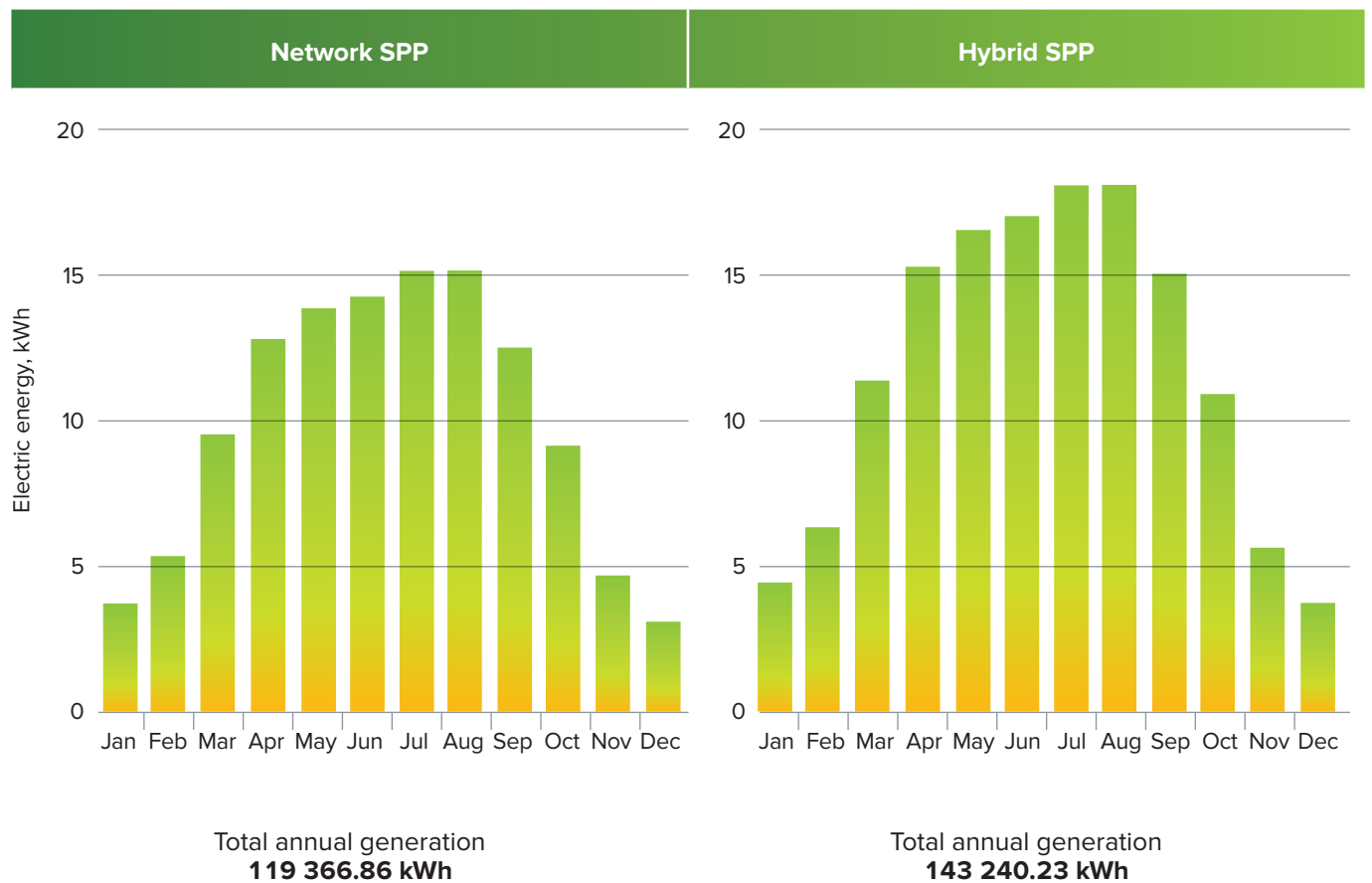
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	186	7 600	1 413 600
2	Network inverter, 100 kW	1	228 000	228 000
3	Installation, fastening and additional materials	-	580 488	580 488
TOTAL				2 222 088

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	224	7 600	1 702 400
2	Hybrid inverter, 50 kW	2	266 570	533 140
3	Hybrid inverter, 10 kW	2	112 100	224 200
4	Accumulator battery, 5 kWh	2	72 200	144 400
5	Installation, fastening and additional materials	-	659 452	659 452
TOTAL				3 263 592

Links to indicative price offers for SPPs:

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_business_100kw

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	439 167	439 167
SPP capacity, kW/h	100	120
Battery, kW/h	-	10
Annual electric energy generation by the SPP, kWh	119 366	143 240
Percentage of replacement of traditional electric energy, %	27%	33%
Annual savings in electric energy costs, UAH	556 246	667 498
The cost of SPP, UAH	2 222 088	3 263 592
Simple payback period, years	4.0	4.9
Electric energy tariff, UAH/kWh, (without VAT)	4.66	4.66
Electric energy tariff, UAH/kWh, (with VAT)	5 592	5 592



CENTRAL AERATION STATION, COMMUNAL ENTERPRISE “KRYVBASVODOKANAL” (1000 KW)



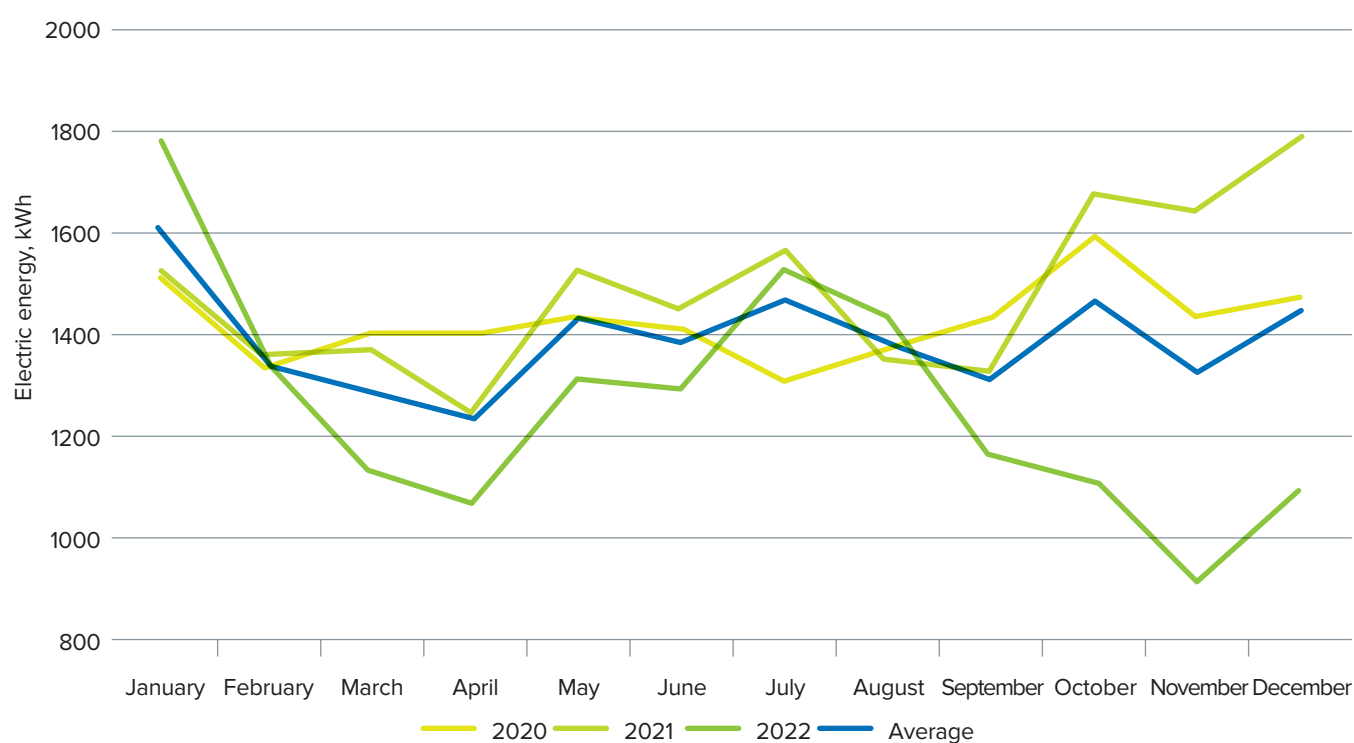
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	1 000 kW	-	5 500 m ²
Hybrid SPP	1 500 kW	600 kW	8 250 m ²

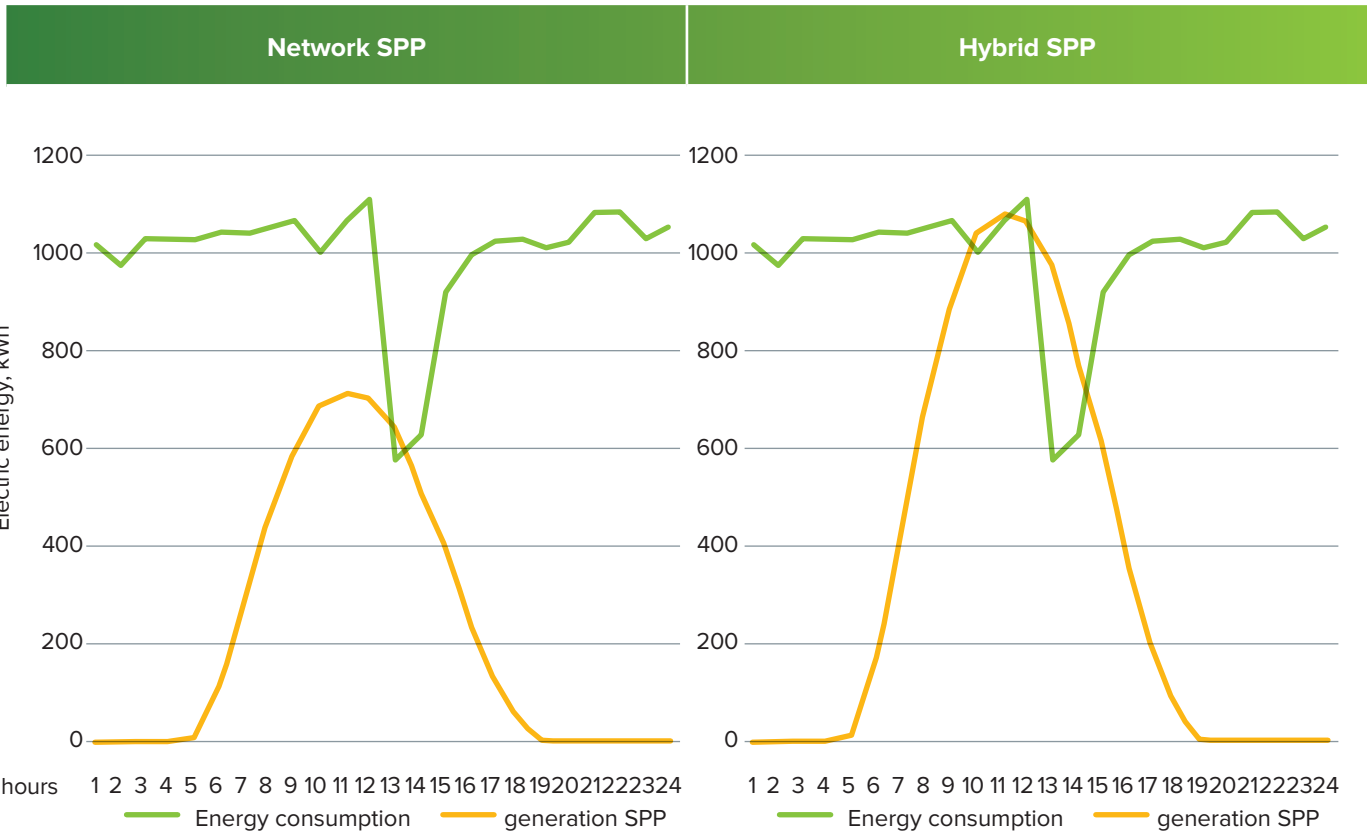
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	1 514 112	1 519 989	1 781 404	1 605 168
February	1 343 544	1 364 418	1 349 037	1 352 333
March	1 404 452	1 371 263	1 138 032	1 304 582
April	1 404 993	1 250 377	1 072 153	1 242 508
May	1 438 604	1 532 927	1 314 234	1 428 588
June	1 412 981	1 454 774	1 295 615	1 387 790
July	1 312 014	1 568 078	1 530 980	1 470 357
August	1 371 607	1 350 336	1 436 976	1 386 306
September	1 438 274	1 330 069	1 172 819	1 313 721
October	1 598 938	1 678 827	1 117 319	1 465 028
November	1 435 681	1 642 641	918 081	1 332 134
December	1 476 859	1 792 532	1 097 666	1 455 686
Annual	17 152 059	17 856 231	15 224 316	16 744 202

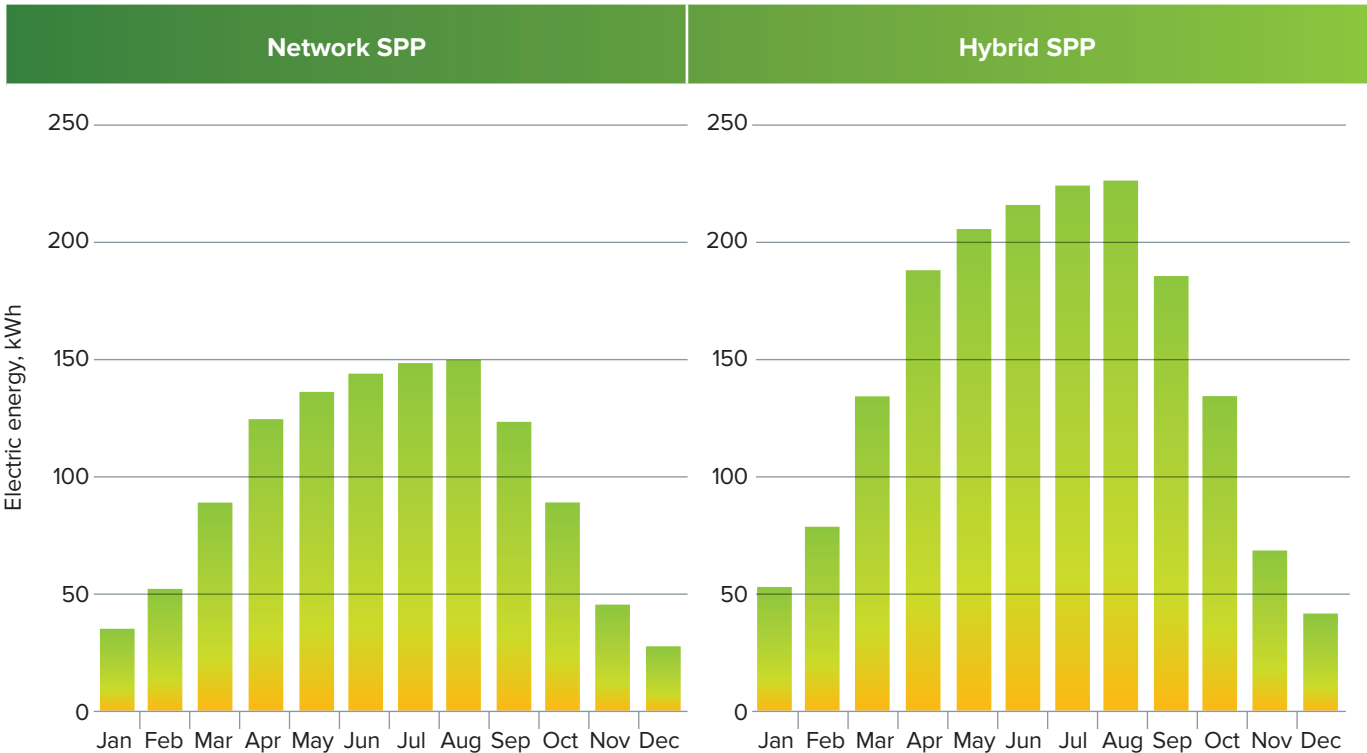
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



Total annual generation
1 181 389.45 kWh

Total annual generation
1 772 084.18 kWh

6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	1 852	7 600	14 075 200
2	Network inverter, 100 kW	10	228 000	2 280 000
3	Installation, fastening and additional materials	-	4 020 856	4 020 856
TOTAL				20 376 056

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	2 778	7 600	21 112 800
2	Hybrid inverter, 50 kW	30	266 570	7 997 100
3	Accumulator battery, 50 kWh	12	509 162	6 109 944
4	Installation, fastening and additional materials	-	5 613 284	5 613 284
TOTAL				40 833 128

Links to indicative price offers for SPPs:

*SPP 100 kW (100 kW*10 units)*

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_business_100kw

SPP 1000 kW

<https://energosesti.com.ua/product/setevaya-solnechnaya-elektrostanciya-1000-kvt/>

<https://eco-tech.com.ua/ua/p1134887480-solnechnaya-elektrostantsiya-predpriyatiam.html>

SPP 500 kW

<https://energo-watt.com.ua/alternativnaya-energetika-material/komplektyi-solnechnyih-stantsiy/sonyachna-elektrostanciya-500-kvt-dlya-vlasnih-potreb-mwe.html>

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

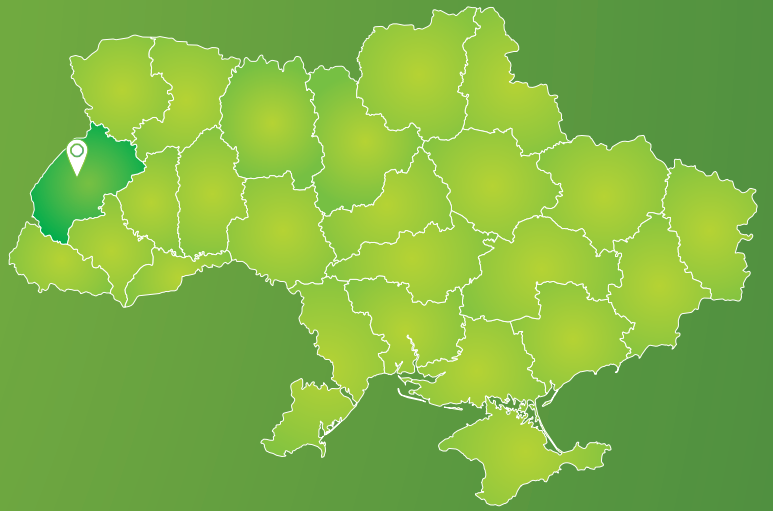
<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Industrial energy storage system 50 kW/h

<https://energystorage.com.ua/tovary/promislovi-sistemi-nakopichennya-energiyi-50-4-kvt-god/>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	16 744 202	16 744 202
SPP capacity, kW/h	1 000	1 500
Battery, kW/h	-	600
Annual electric energy generation by the SPP, kWh	1 181 389	1 772 084
Percentage of replacement of traditional electric energy, %	7%	11%
Annual savings in electric energy costs, UAH	4 834 606	7 251 909
The cost of SPP, UAH	20 376 056	40 833 128
Simple payback period, years	4.2	56
Electric energy tariff, UAH/kWh, (without VAT)	4.09	4.09
Electric energy tariff, UAH/kWh, (with VAT)	4.91	4.91



**LVIV MUNICIPAL COMMUNAL ENTERPRISE
“LVIVVODOKANAL”
PUMPING STATION IN PLUHIV VILLAGE (350 KW)**



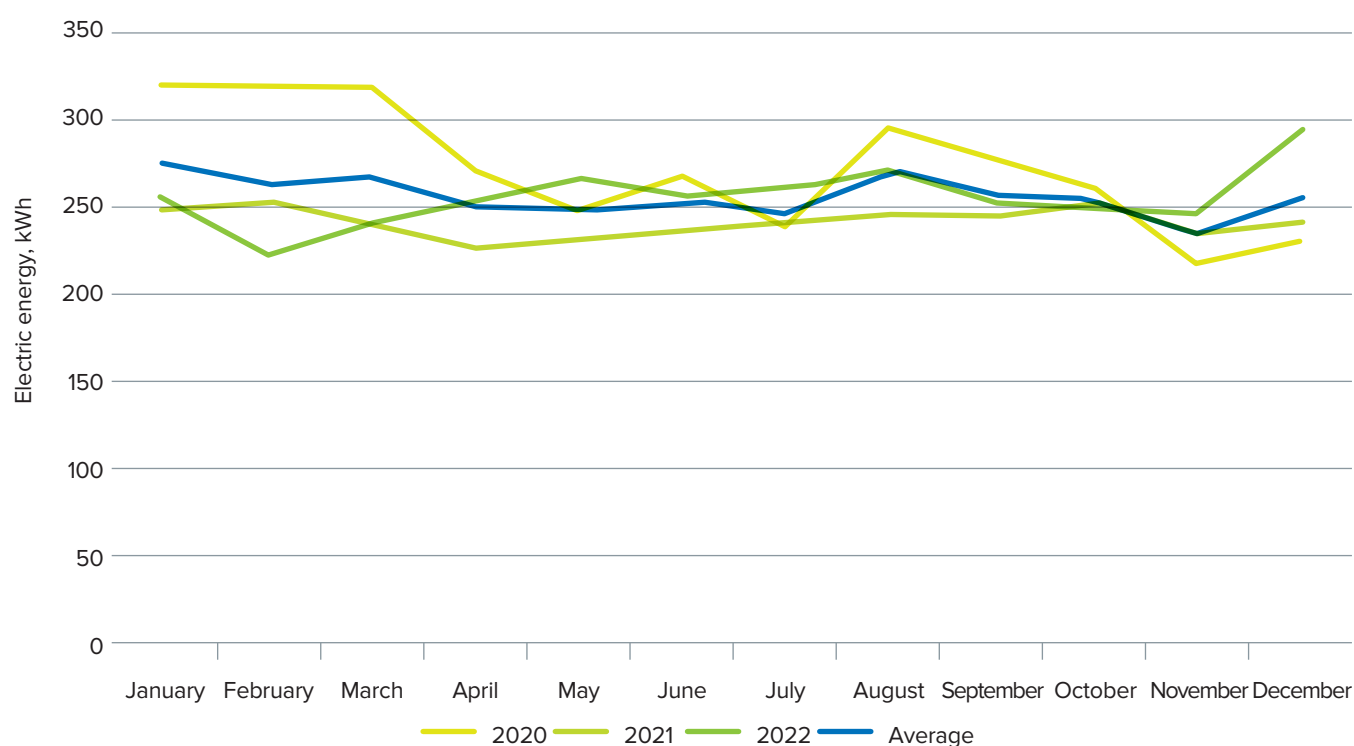
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
network	350 kW	-	2 100 m ²
hybrid	558 kW	200 kW	3 350 m ²

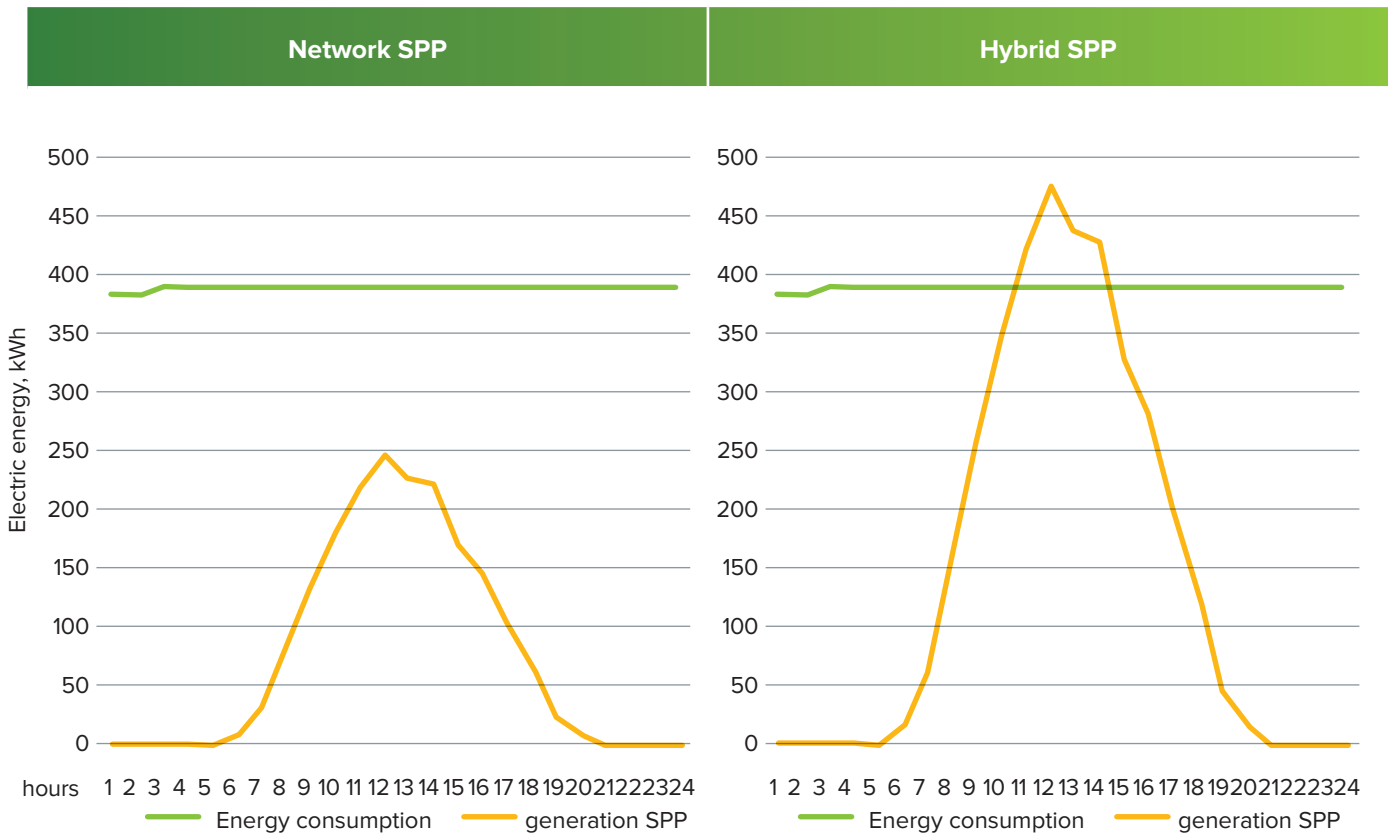
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	319 528	249 500	254 418	274 482
February	317 523	251 123	222 893	263 846
March	317 656	242 066	240 988	266 903
April	269 033	226 313	252 853	249 400
May	249 008	231 885	265 554	248 816
June	266 603	234 836	255 190	252 210
July	239 884	241 137	259 234	246 752
August	293 624	247 669	270 616	270 636
September	279 771	245 099	252 252	259 041
October	261 469	249 757	247 536	252 921
November	217 980	234 808	246 827	233 205
December	229 728	240 976	292 898	254 534
Annual	3 261 807	2 895 169	3 061 259	3 072 745

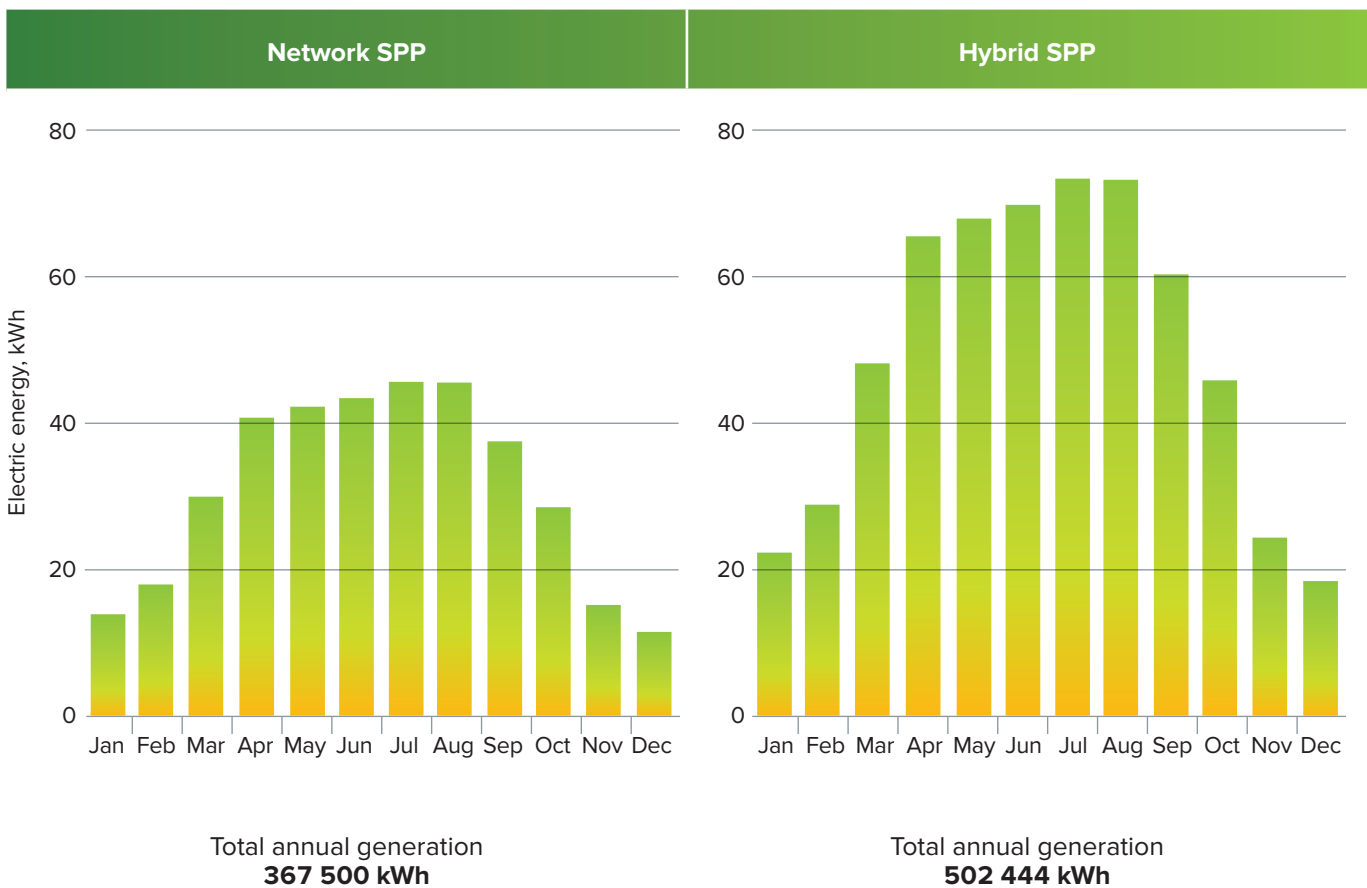
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	583	9 680	5 643 440
2	Network inverter, 100 kW	3	284 255	852 765
3	Network inverter, 50 kW	1	167 649	167 649
4	Installation, fastening and additional materials	-	1 999 156	1 999 156
TOTAL				8 663 010

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	930	9 680	9 002 400
2	Hybrid inverter, 10 kW	56	96 000	5 376 000
3	Accumulator battery, 5 kWh	40	120 000	4 800 000
4	Installation, fastening and additional materials	-	5 753 520	5 753 520
TOTAL				24 931 920

Link to indicative price offers:

solar modules

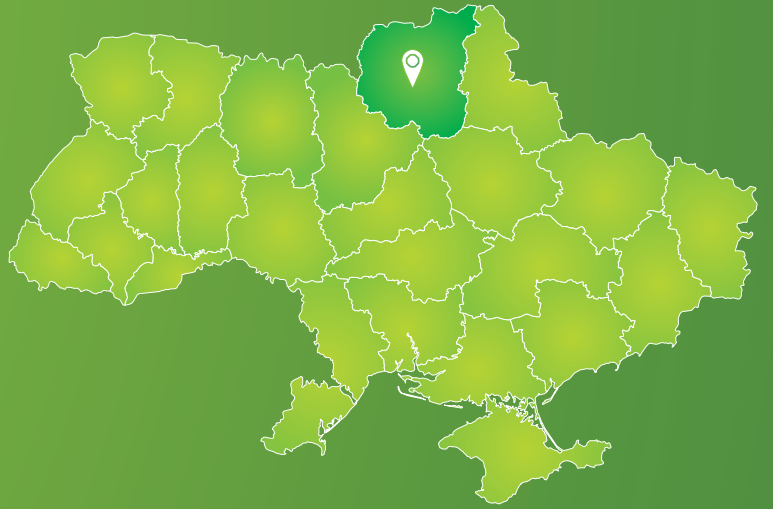
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	3 072 745	3 072 745
SPP capacity, kW/h	350	558
Battery, kW/h	-	200
Annual electric energy generation by the SPP, kWh	367 500.00	502 444.00
Percentage of replacement of traditional electric energy, %	12%	16%
Annual savings in electric energy costs, UAH	2 253 510	3 080 987
The cost of SPP, UAH	8 663 010	24 931 920
Simple payback period, years	3.8	8.1
Electric energy tariff, UAH/kWh, (without VAT)	5.11	5.11
Electric energy tariff, UAH/kWh, (with VAT)	6 132	6 132



**COMMUNAL NON-COMMERCIAL
ENTERPRISE “NIZHYN M. HALYTSKYI
CENTRAL CITY HOSPITAL” (22.2 KW)**



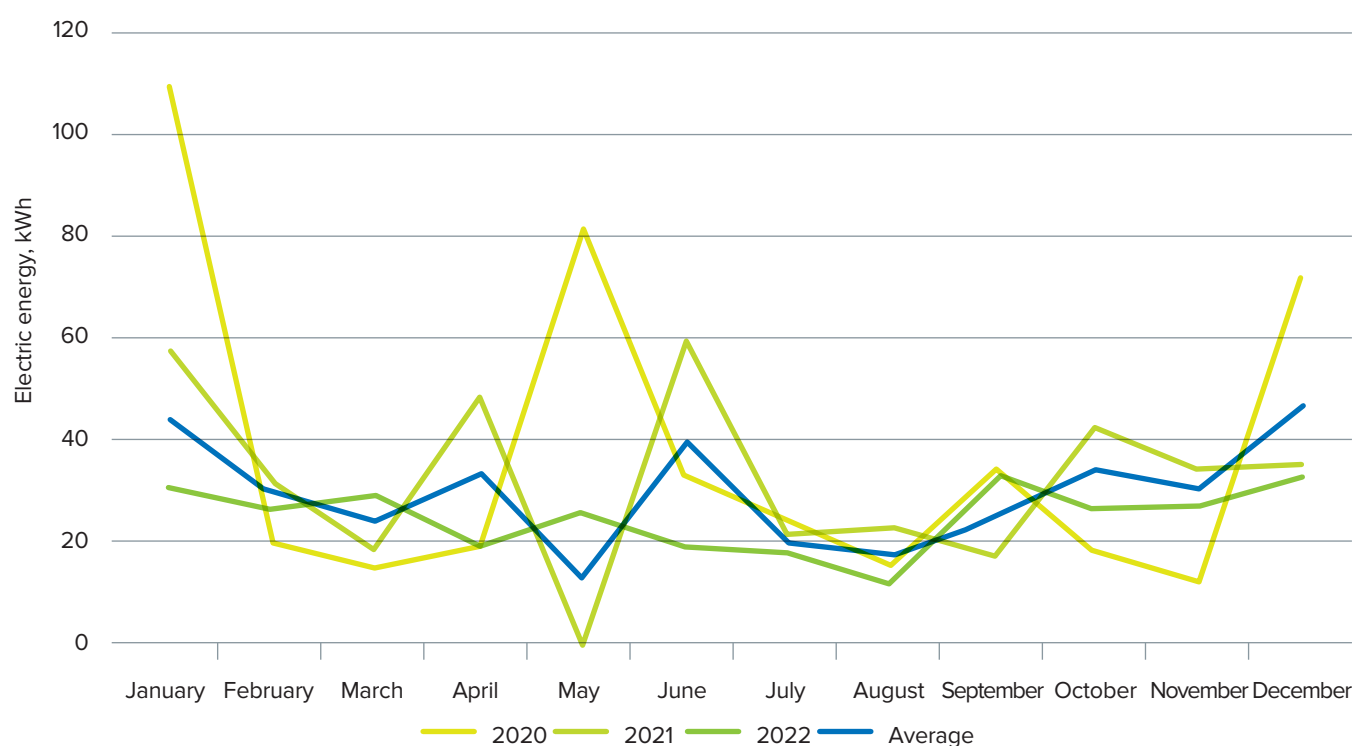
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	22.2 kW	-	135 m ²
Hybrid SPP	87.6 kW	20 kW	490 m ²

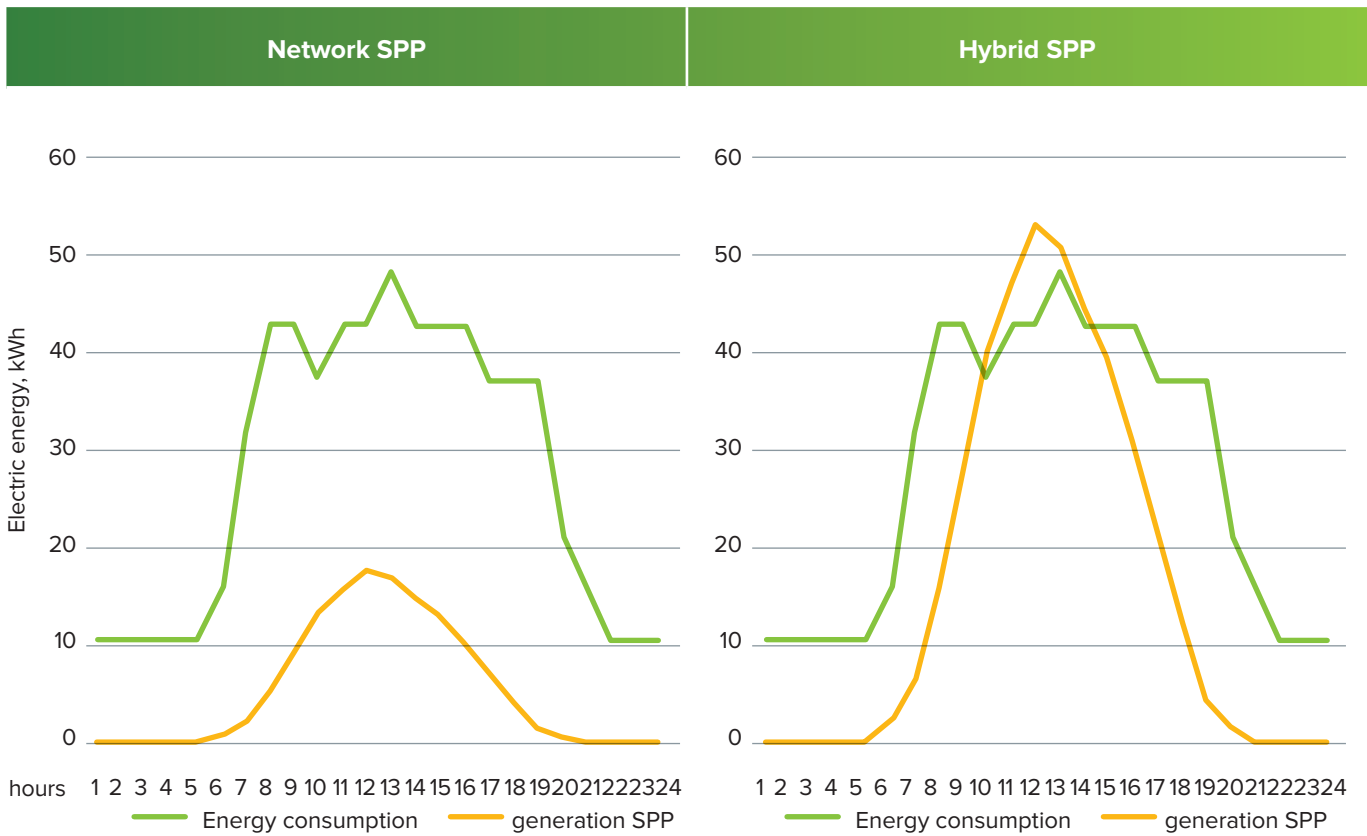
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	108 198	57 676	31 596	44 636
February	21 046	32 867	27 770	30 319
March	16 751	19 907	30 033	24 970
April	20 329	49 704	19 797	34 751
May	81 620	778	26 919	13 849
June	34 172	60 130	20 474	40 302
July	25 313	22 641	18 893	20 767
August	17 207	24 073	13 355	18 714
September	35 294	18 544	33 510	26 027
October	19 696	43 196	27 495	35 346
November	13 618	35 415	28 309	31 862
December	72 022	36 305	33 343	47 223
Annual	465 266	401 236	311 494	368 764

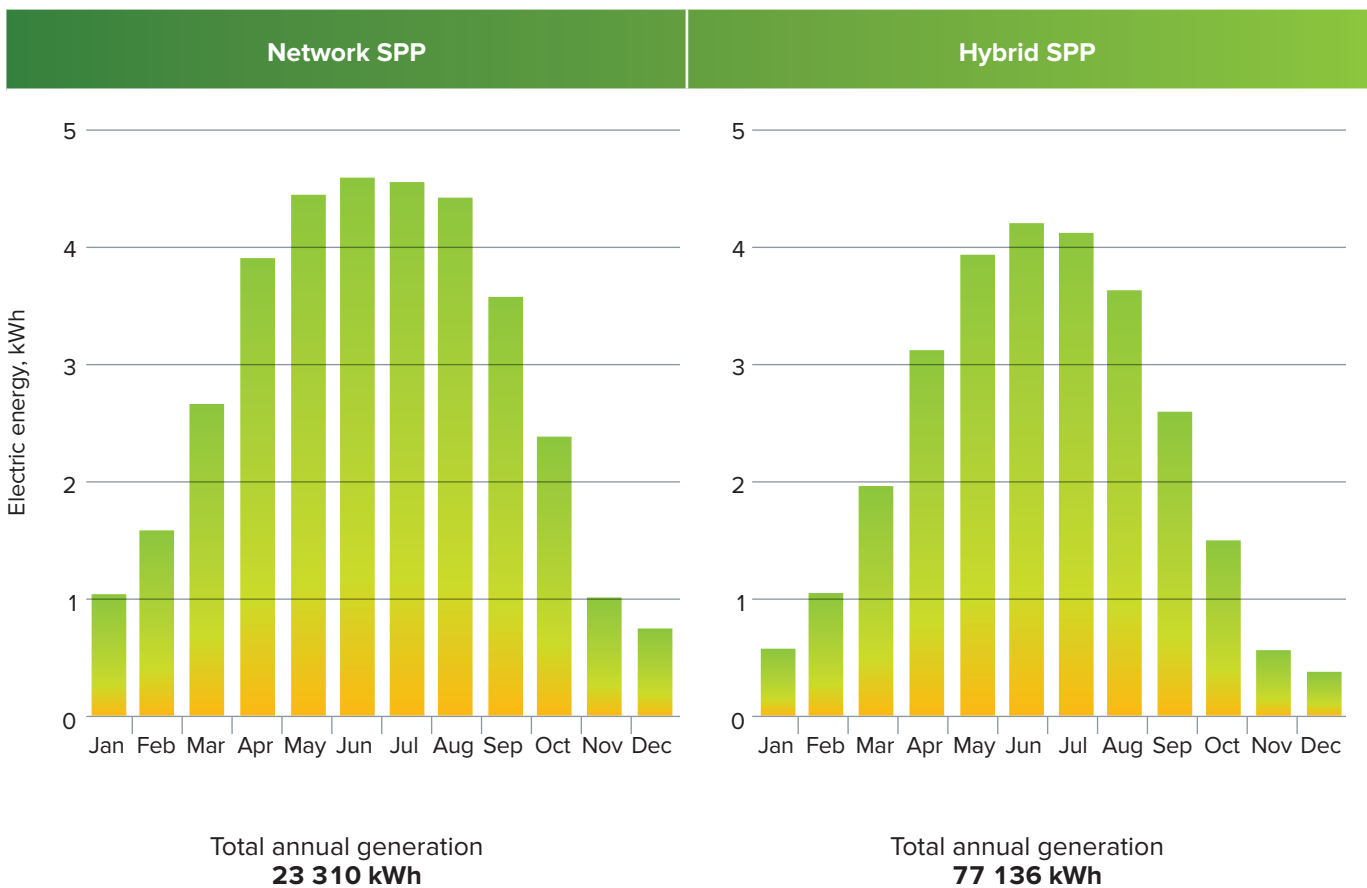
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	37	9 680	358 160
2	Network inverter, 10 kW	3	77 301	231 903
3	Installation, fastening and additional materials	-	177 019	177 019
TOTAL				767 082

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	146	9 680	1 413 280
2	Hybrid inverter, 10 kW	9	96 000	864 000
3	Accumulator battery, 5 kWh	4	120 000	480 000
4	Installation, fastening and additional materials	-	986 064	986 064
TOTAL				3 743 344

Link to indicative price offers:

solar modules

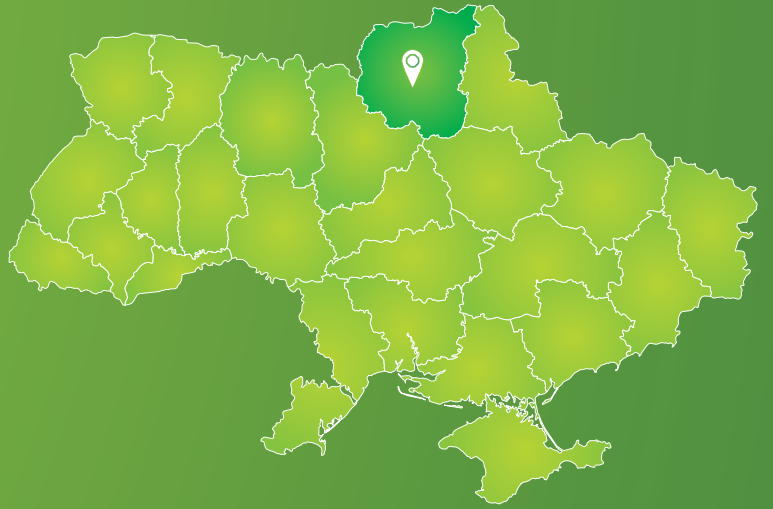
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	368 764	368 764
SPP capacity, kW/h	22.2	87.6
Battery, kW/h	-	20
Annual electric energy generation by the SPP, kWh	23 310.00	77 136.00
Percentage of replacement of traditional electric energy, %	6%	21%
Annual savings in electric energy costs, UAH	146 853	485 957
The cost of SPP, UAH	767 082	3 743 344
Simple payback period, years	5.2	7.7
Electric energy tariff, UAH/kWh, (without VAT)	5.25	5.25
Electric energy tariff, UAH/kWh, (with VAT)	6.3	6.3



**COMMUNAL ENTERPRISE “NIZHYN WATER
SUPPLY AND SEWERAGE COMPANY”
SEWAGE TREATMENT FACILITIES (60 KW)**



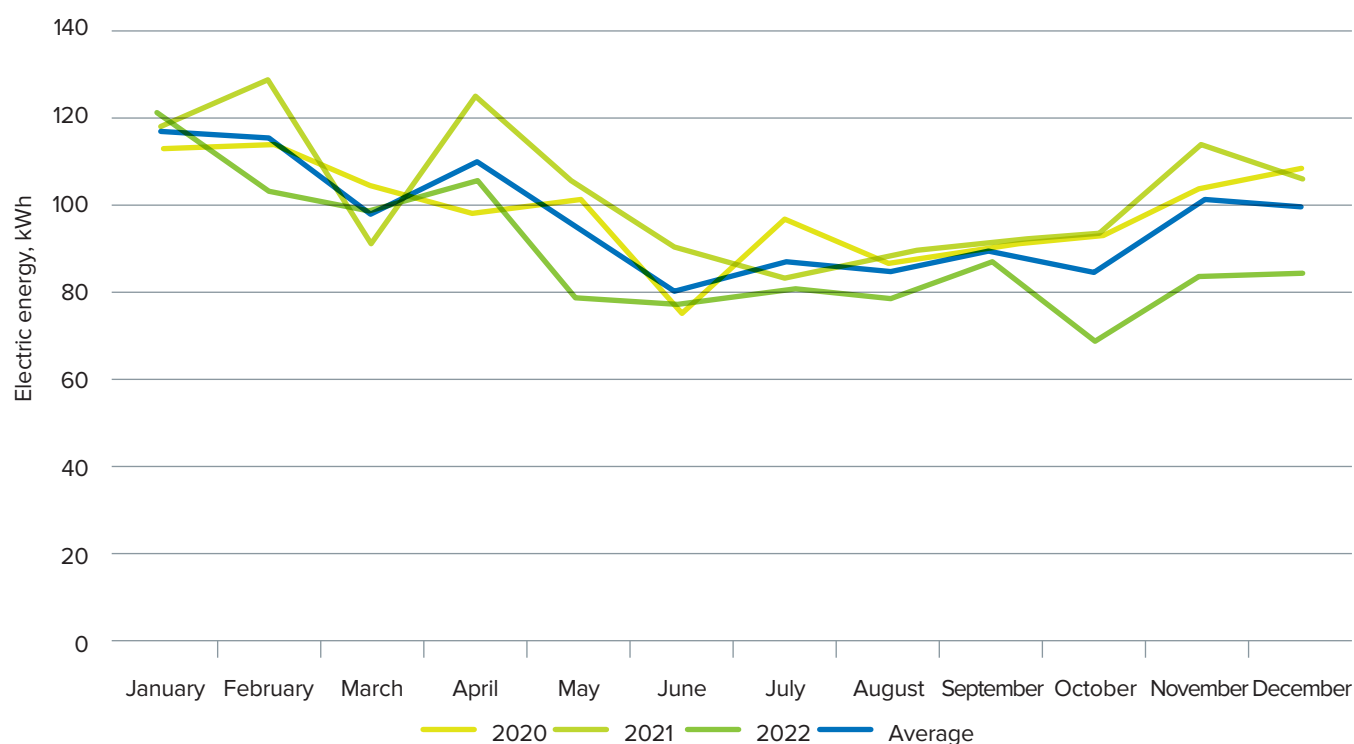
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	60 kW	-	350 m ²
Hybrid SPP	160 kW	50 kW	910 m ²

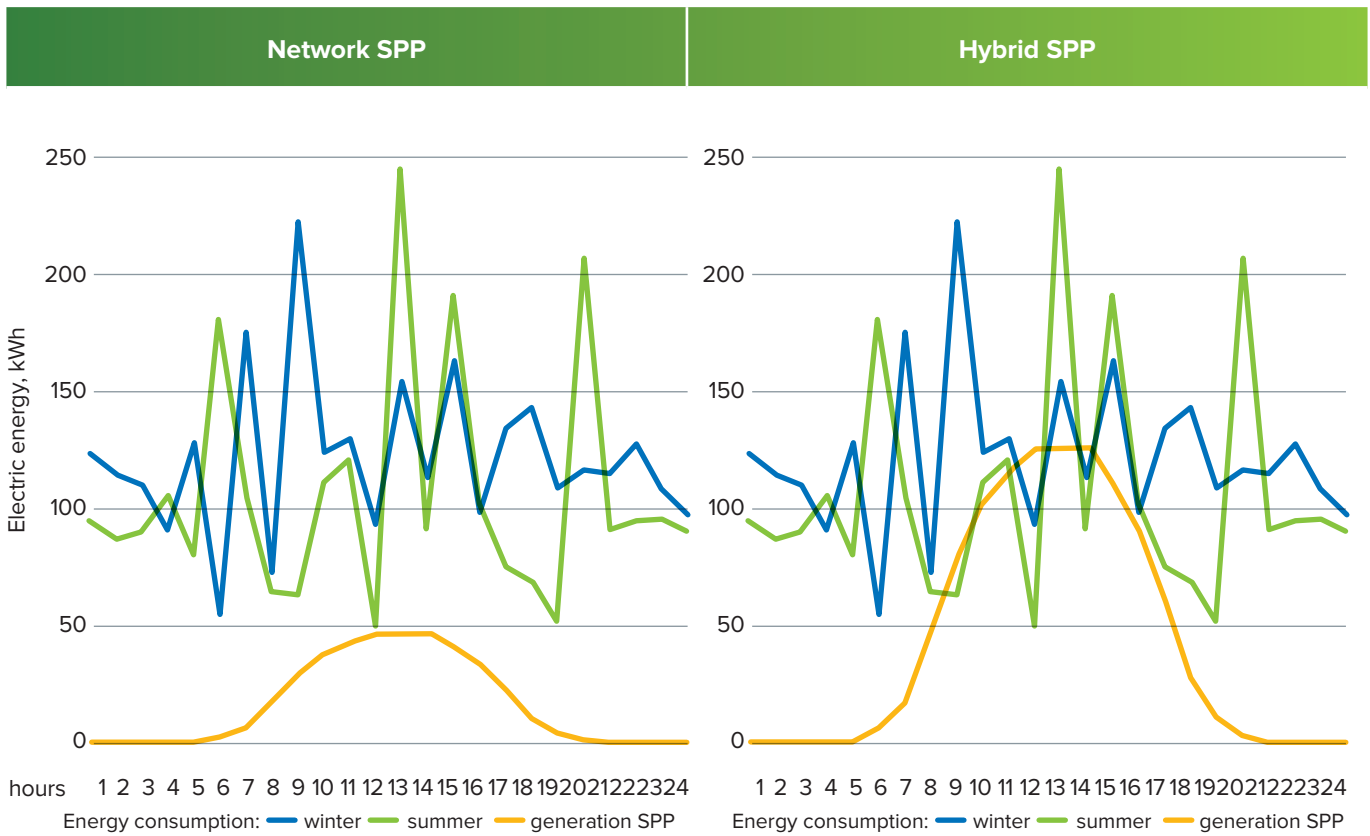
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	112 320	117 840	119 097	116 419
February	112 800	128 160	102 911	114 624
March	104 160	91 440	98 722	98 107
April	97 920	124 320	105 960	109 400
May	100 560	104 280	78 120	94 320
June	75 120	89 160	76 800	80 360
July	96 360	83 160	80 520	86 680
August	86 880	88 320	78 720	84 640
September	89 640	91 560	86 640	89 280
October	93 240	93 140	69 240	85 207
November	103 560	113 534	83 520	100 205
December	108 360	105 956	84 960	99 759
Annual	1 182 940	1 232 891	1 067 232	1 161 021

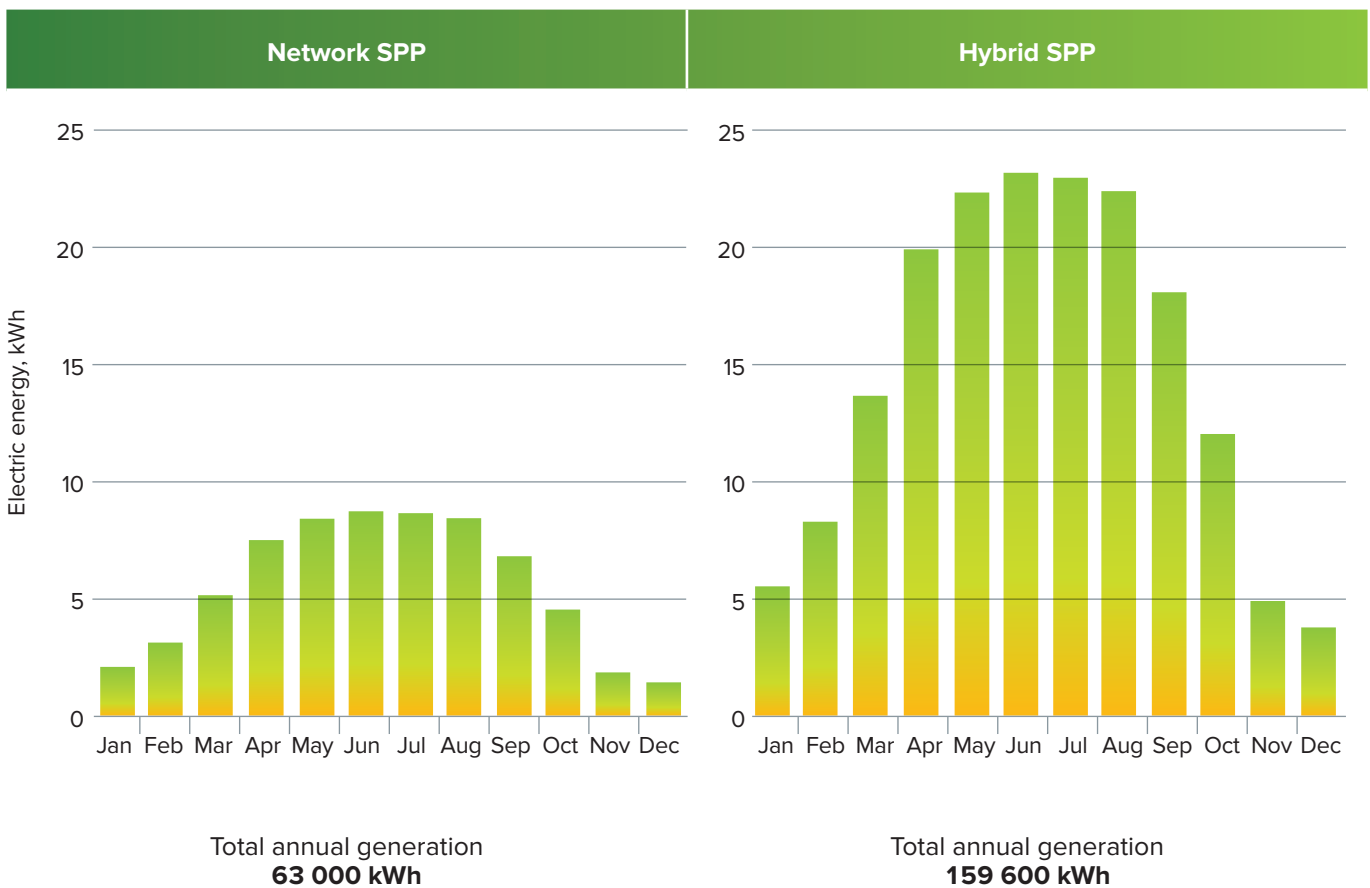
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	100	9 680	968 000
2	Network inverter, 30 kW	2	86 299	172 598
3	Installation, fastening and additional materials	-	342 179	342 179
TOTAL				1 482 777

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	266	9 680	2 574 880
2	Hybrid inverter, 10 kW	16	96 000	1 536 000
3	Accumulator battery, 5 kWh	10	120 000	1 200 000
4	Installation, fastening and additional materials	-	1 593 264	1 593 264
TOTAL				6 904 144

Link to indicative price offers:

solar modules

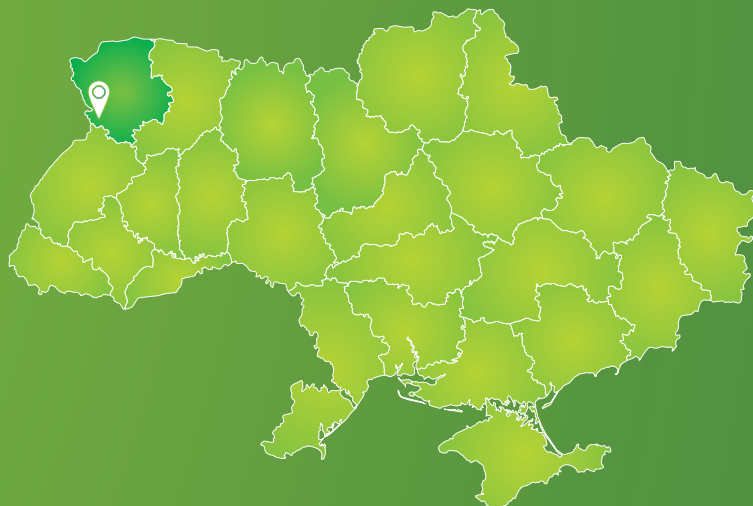
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 161 021	1 161 021
SPP capacity, kW/h	60	160
Battery, kW/h	-	50
Annual electric energy generation by the SPP, kWh	63 000.00	159 600.00
Percentage of replacement of traditional electric energy, %	5%	14%
Annual savings in electric energy costs, UAH	441 000	1 117 200
The cost of SPP, UAH	1 482 777	6 904 144
Simple payback period, years	34	6.2
Electric energy tariff, UAH/kWh, (without VAT)	5.83	5.83
Electric energy tariff, UAH/kWh, (with VAT)	7	7



COMMUNAL NON-COMMERCIAL ENTERPRISE “NOVOVOLYNSK CENTRAL CITY HOSPITAL” (80 KW)



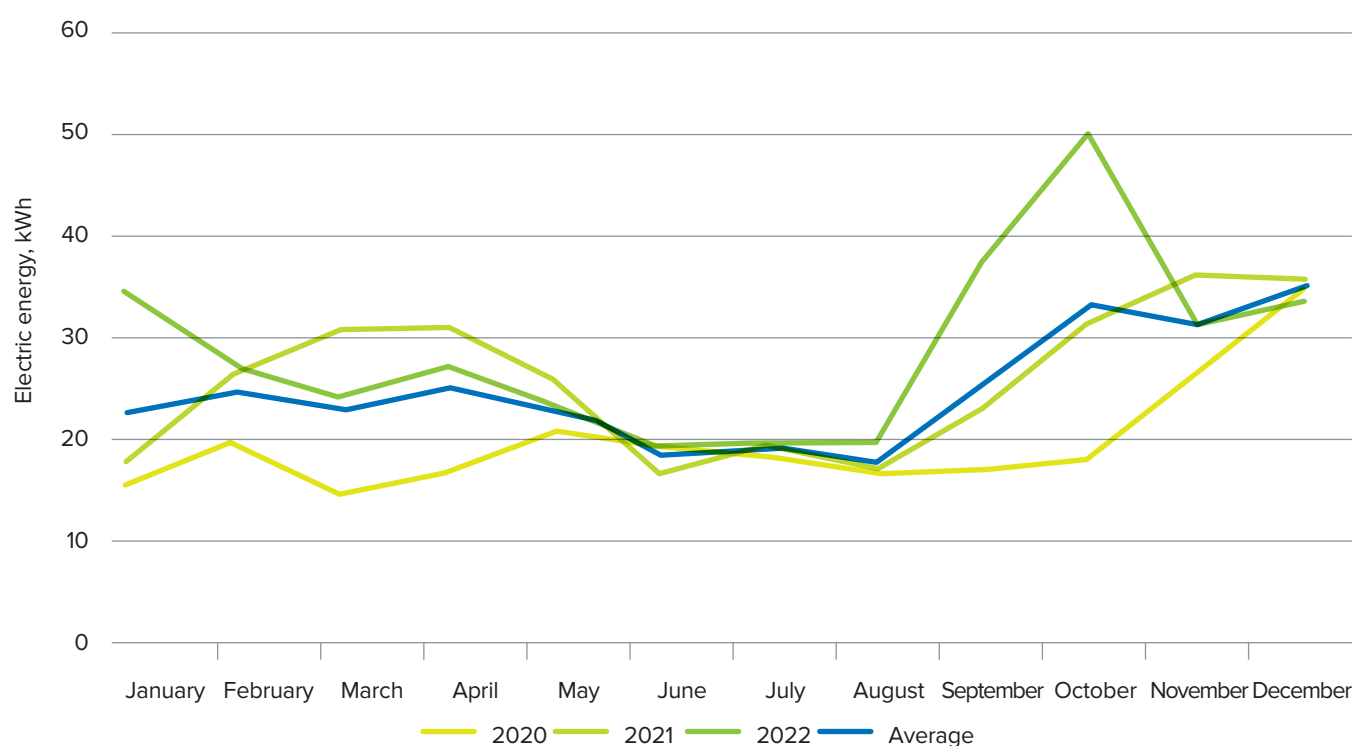
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	80 kW	-	480 m ²
Hybrid SPP	85 kW	5 kW	510 m ²

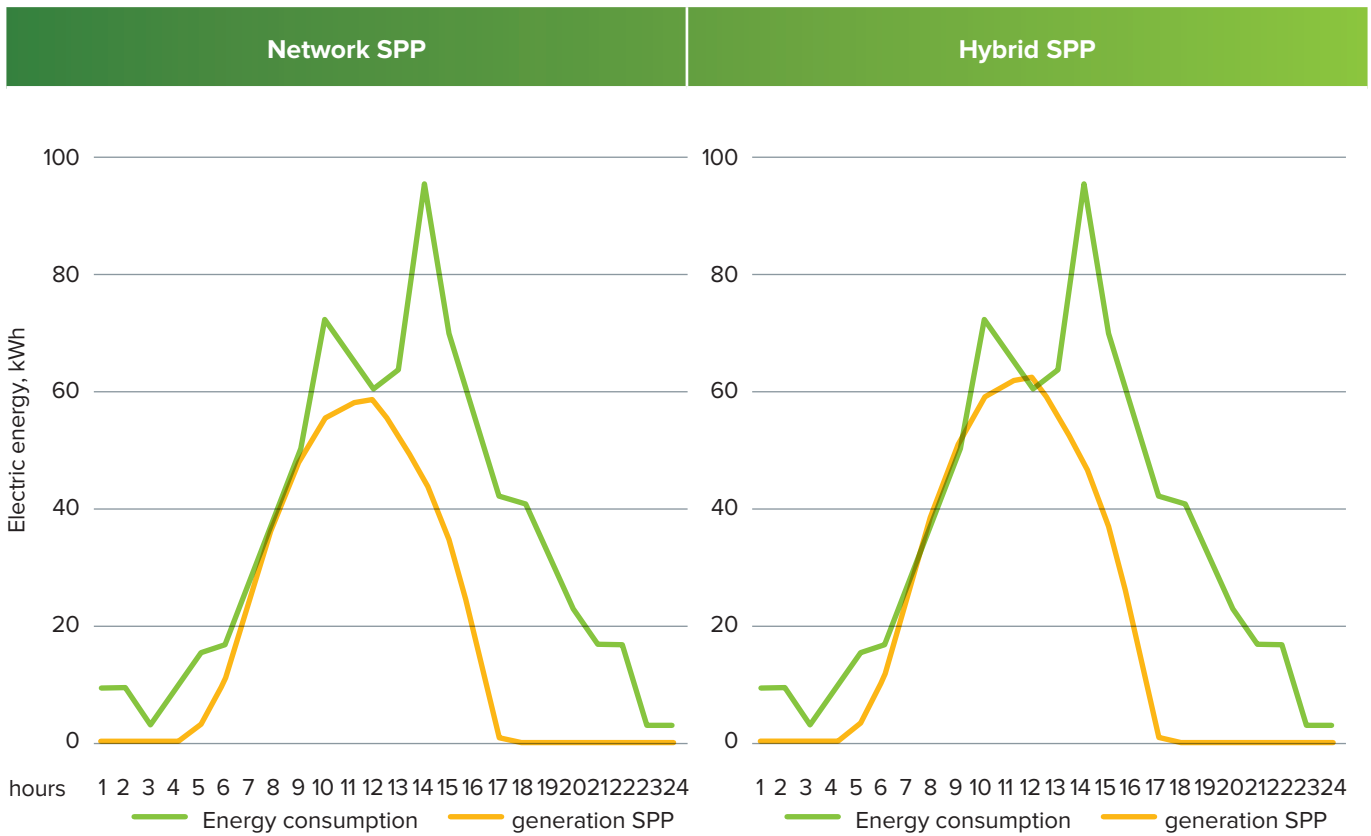
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	15 775	17 865	34 766	22 802
February	19 835	26 658	27 431	24 641
March	15 040	31 042	24 377	23 486
April	17 390	31 264	27 365	25 340
May	20 880	26 003	23 854	23 579
June	19 580	16 948	19 536	18 688
July	18 595	19 409	20 198	19 401
August	16 763	17 231	19 949	17 980
September	17 301	23 123	37 529	25 985
October	18 237	31 579	50 095	33 304
November	26 790	36 403	31 443	31 545
December	35 140	35 860	33 927	34 975
Annual	241 326	313 385	327 603	294 104

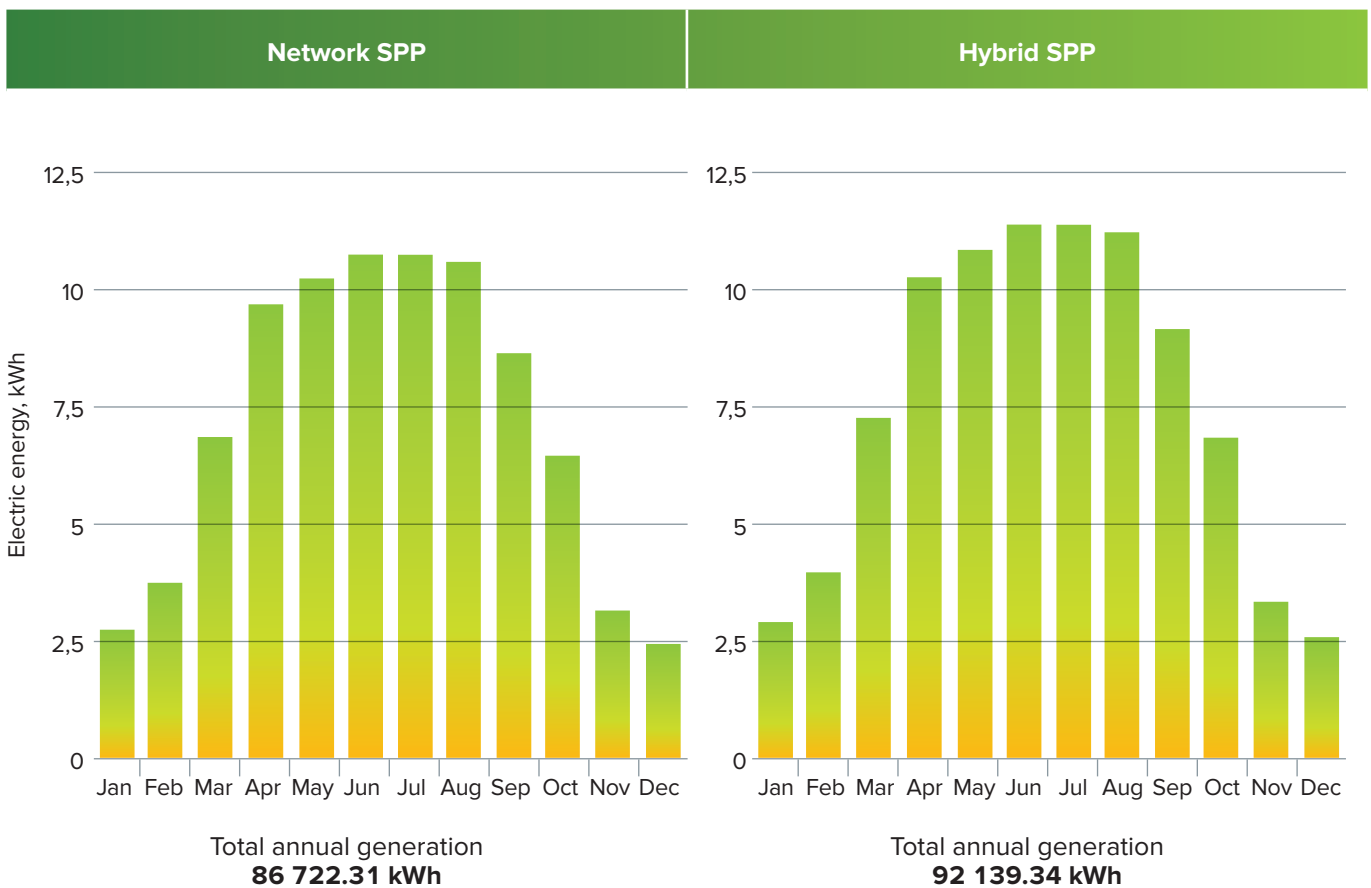
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 545 W	147	7 664	1 126 696
2	Network inverter, 50 kW	1	127 300	127 300
3	Network inverter, 30 kW	1	103 740	103 740
4	Installation, fastening and additional materials	-	430 122	430 122
TOTAL				1 787 858

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 545 W	156	7 664	1 195 678
2	Hybrid inverter, 50 kW	1	266 570	533 140
3	Hybrid inverter, 30 kW	1	228 000	228 000
4	Hybrid inverter, 5 kW	1	56 620	56 620
5	Accumulator battery, 5 kWh	1	72 200	72 200
6	Installation, fastening and additional materials	-	456 912	456 912
TOTAL				2 542 550

Link to indicative price offers for 80-100 kW SPPs

SPP 80 kW

<https://alton.com.ua/ua/solnechnaja-elektrostantsija-dlja-biznesa-80-kvt.html>

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_100kw_business_medium

Hybrid inverters

<https://sun-energy.com.ua/solar-power/solar-inverters/sun-30k-sg01hp3-eu-bm3>

<https://sun-energy.com.ua/solar-power/solar-inverters/sofar-solar-hyd-20-ktl-3ph>

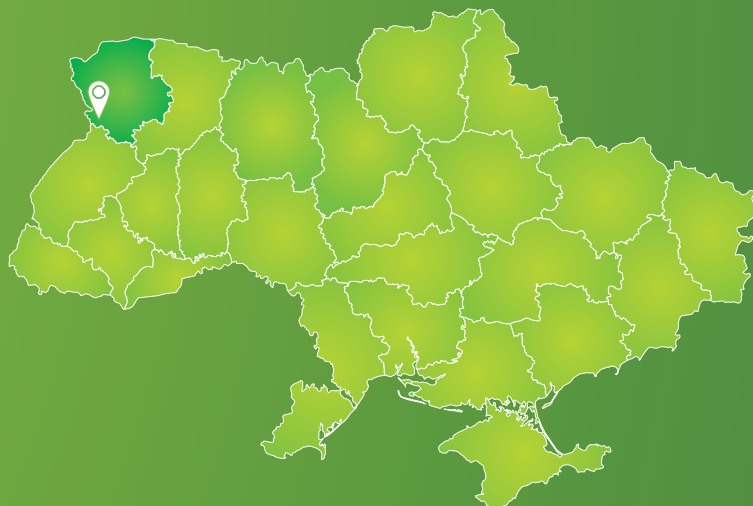
https://sun-energy.com.ua/solar-power/solar-inverters/deye_sun-5ksg03lp1-eu_1

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	294 104	294 104
SPP capacity, kW/h	80	85
Battery, kW/h	-	5
Annual electric energy generation by the SPP, kWh	86 722	92 139
Percentage of replacement of traditional electric energy, %	29%	31%
Annual savings in electric energy costs, UAH	451 089	479 266
The cost of SPP, UAH	1 787 858	2 542 550
Simple payback period, years	4.0	5.3
Electric energy tariff, UAH/kWh, (without VAT)	5.201 532	5.201 532
Electric energy tariff, UAH/kWh, (with VAT)	6.2 418 384	6.2 418 384



**COMMUNAL ENTERPRISE
“NOVOVOLYNSKVODOKANAL”
NORTHERN WATER INTAKE (200 KW)**



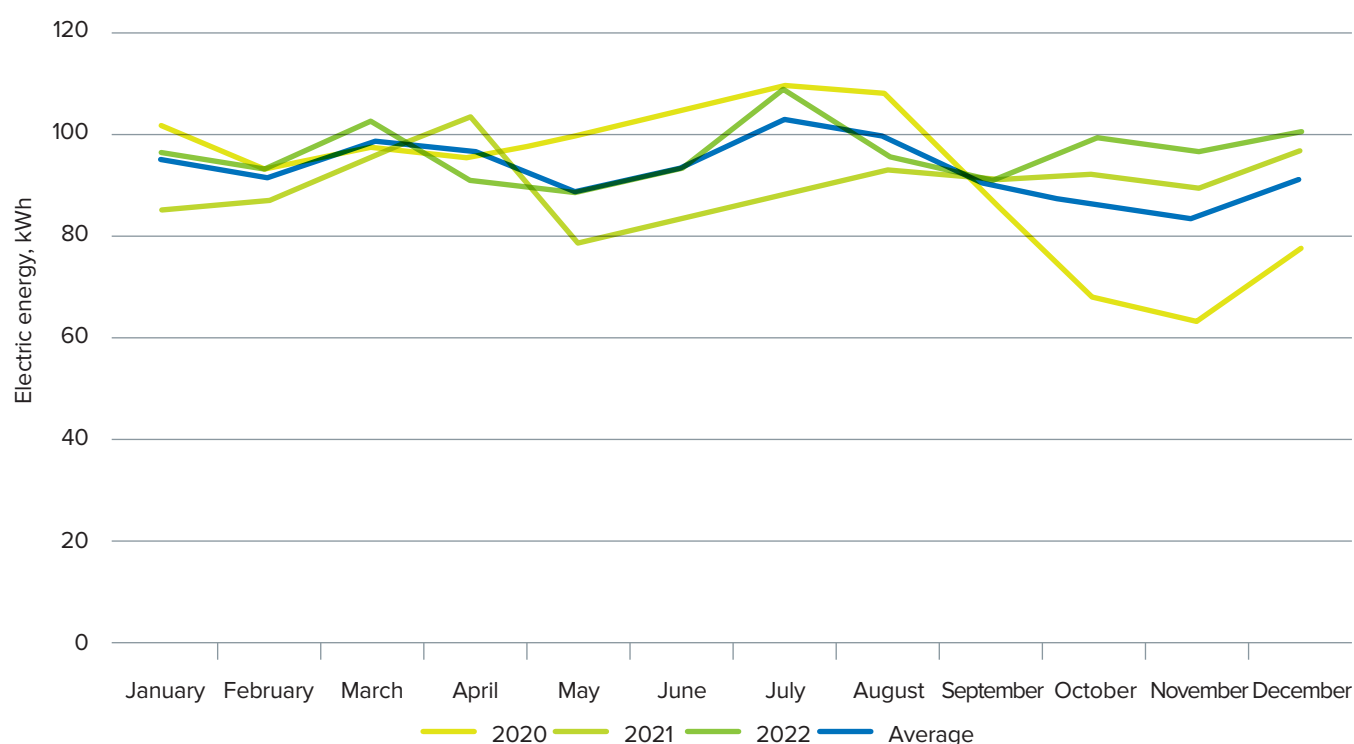
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	200 kW	-	1 020 m ²
Hybrid SPP	250 kW	65 kW	1 275 m ²

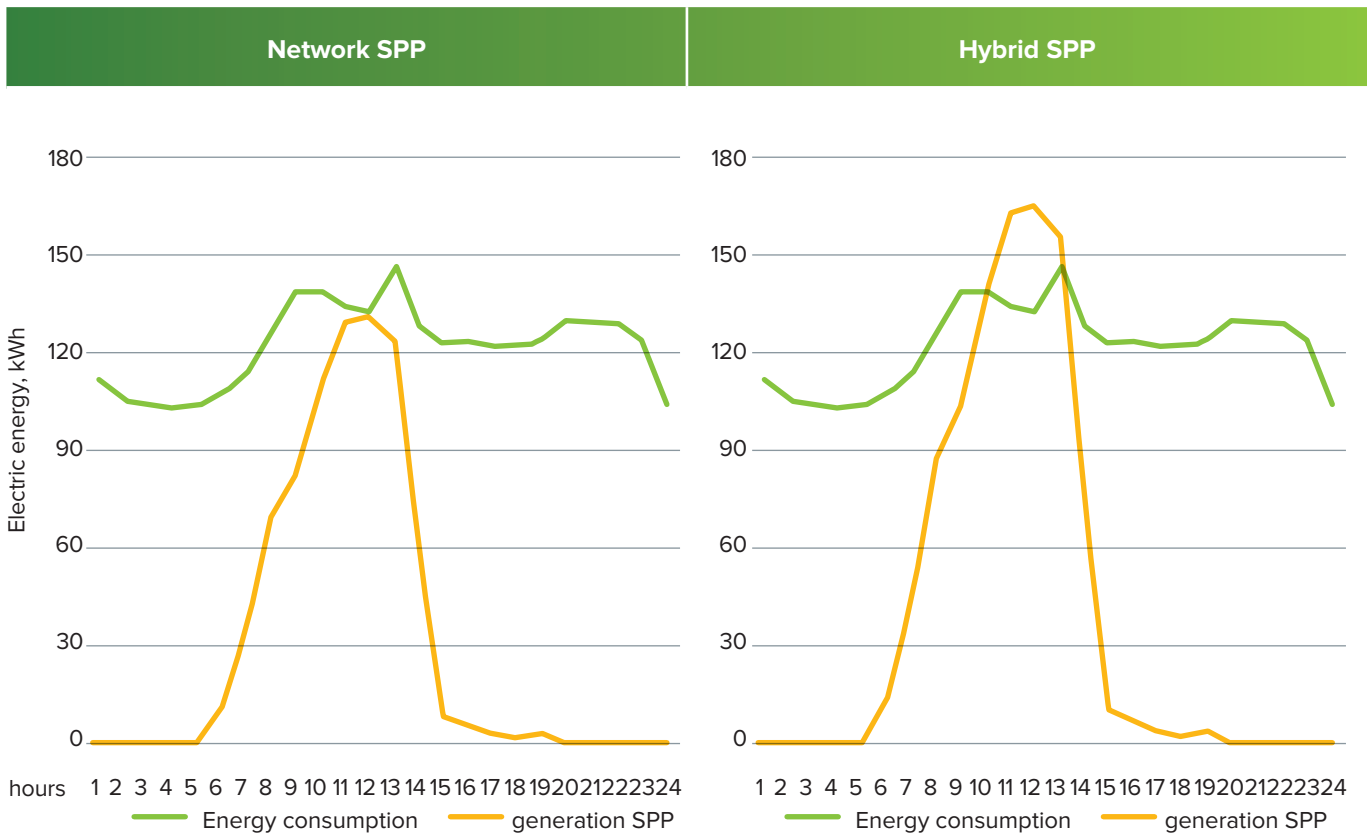
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	101 930	85 918	97 397	95 082
February	92 484	87 878	94 370	91 577
March	97 505	96 760	103 081	99 115
April	96 410	103 770	91 930	97 370
May	100 161	79 776	89 062	89 666
June	104 750	83 961	93 512	94 074
July	109 966	89 009	109 643	102 873
August	108 806	93 713	97 448	99 989
September	87 343	92 153	91 024	90 173
October	68 292	92 551	99 620	86 821
November	64 082	89 962	97 509	83 851
December	77 679	96 990	100 919	91 863
Annual	1 109 408	1 092 441	1 165 515	1 122 455

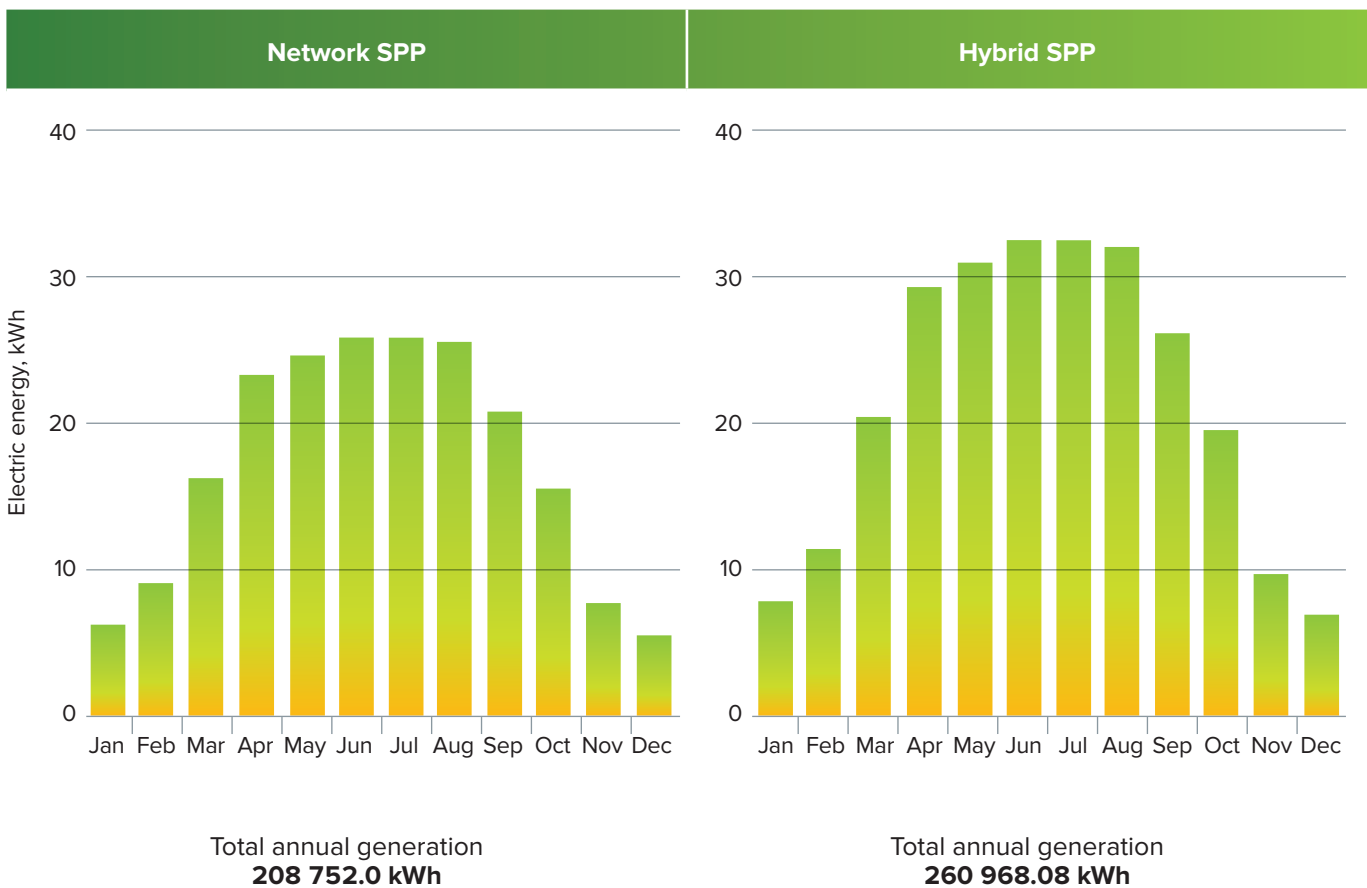
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	372	7 600	2 827 200
2	Network inverter, 100 kW	2	228 000	456 000
3	Installation, fastening and additional materials	-	1 040 136	1 040 136
TOTAL				4 323 336

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	464	7 600	3 526 400
2	Hybrid inverter, 50 kW	5	266 570	1 332 850
3	Accumulator battery, 5 kWh	13	72 200	938 600
4	Installation, fastening and additional materials	-	1 238 192	1 238 192
TOTAL				7 036 042

Links to indicative price offers for SPPs:

SPP 200 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/sonyachna_stantsiya_200kw

SPP 50 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/SPP_50kw_premium

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

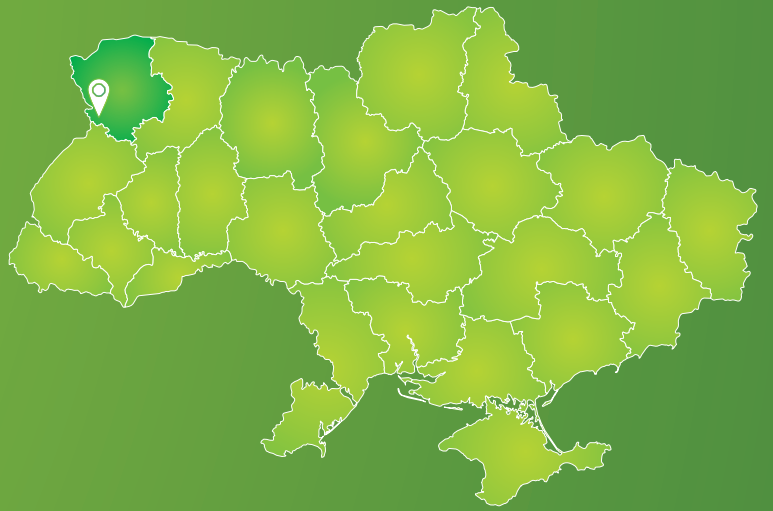
<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 122 455	1 122 455
SPP capacity, kW/h	200	250
Battery, kW/h	-	65
Annual electric energy generation by the SPP, kWh	208 752	260 968
Percentage of replacement of traditional electric energy, %	19%	23%
Annual savings in electric energy costs, UAH	1 018 710	1 273 524
The cost of SPP, UAH	4 323 336	7 036 042
Simple payback period, years	4.2	5.5
Electric energy tariff, UAH/kWh, (without VAT)	4.88	4.88
Electric energy tariff, UAH/kWh, (with VAT)	5 856	5 856



COMMUNAL ENTERPRISE “NOVOVOLYNSK Vodokanal” SOUTHERN WATER INTAKE (200 KW)



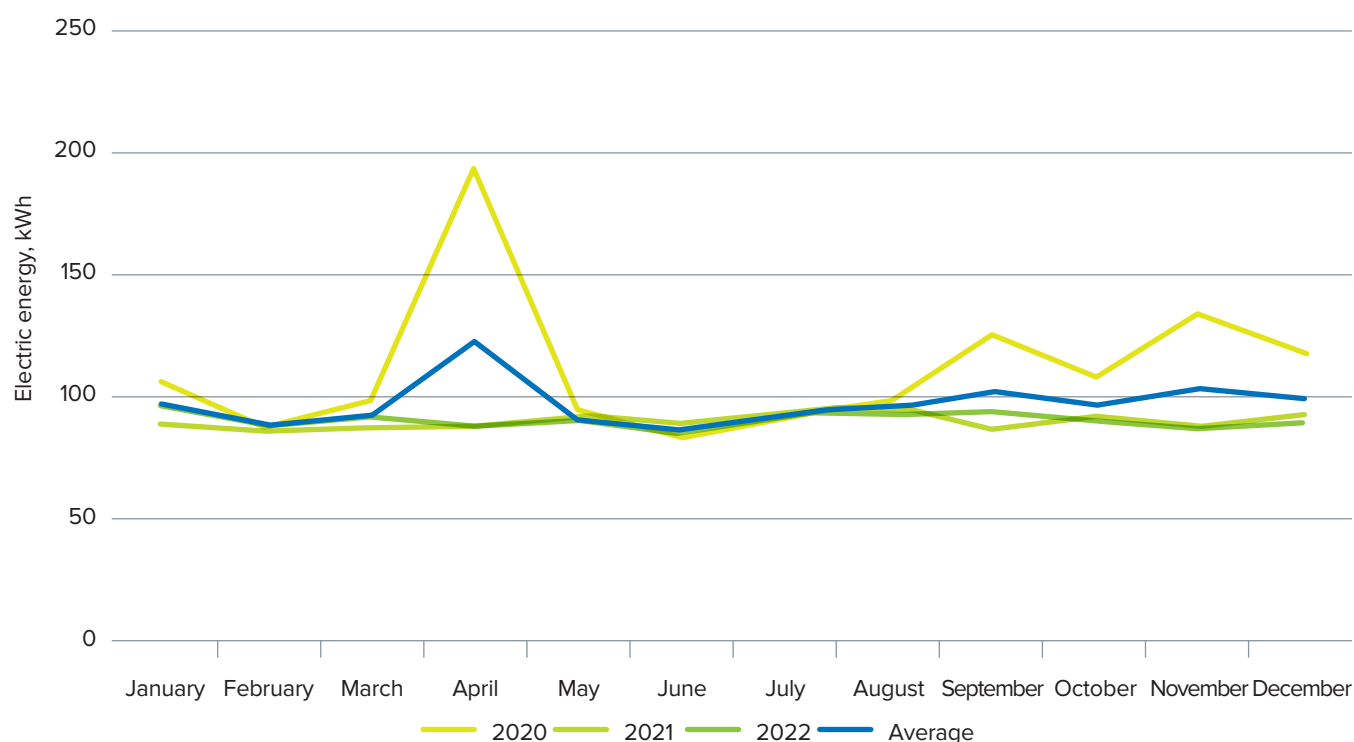
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	200 kW	-	1 020 m ²
Hybrid SPP	240 kW	50 kW	1 225 m ²

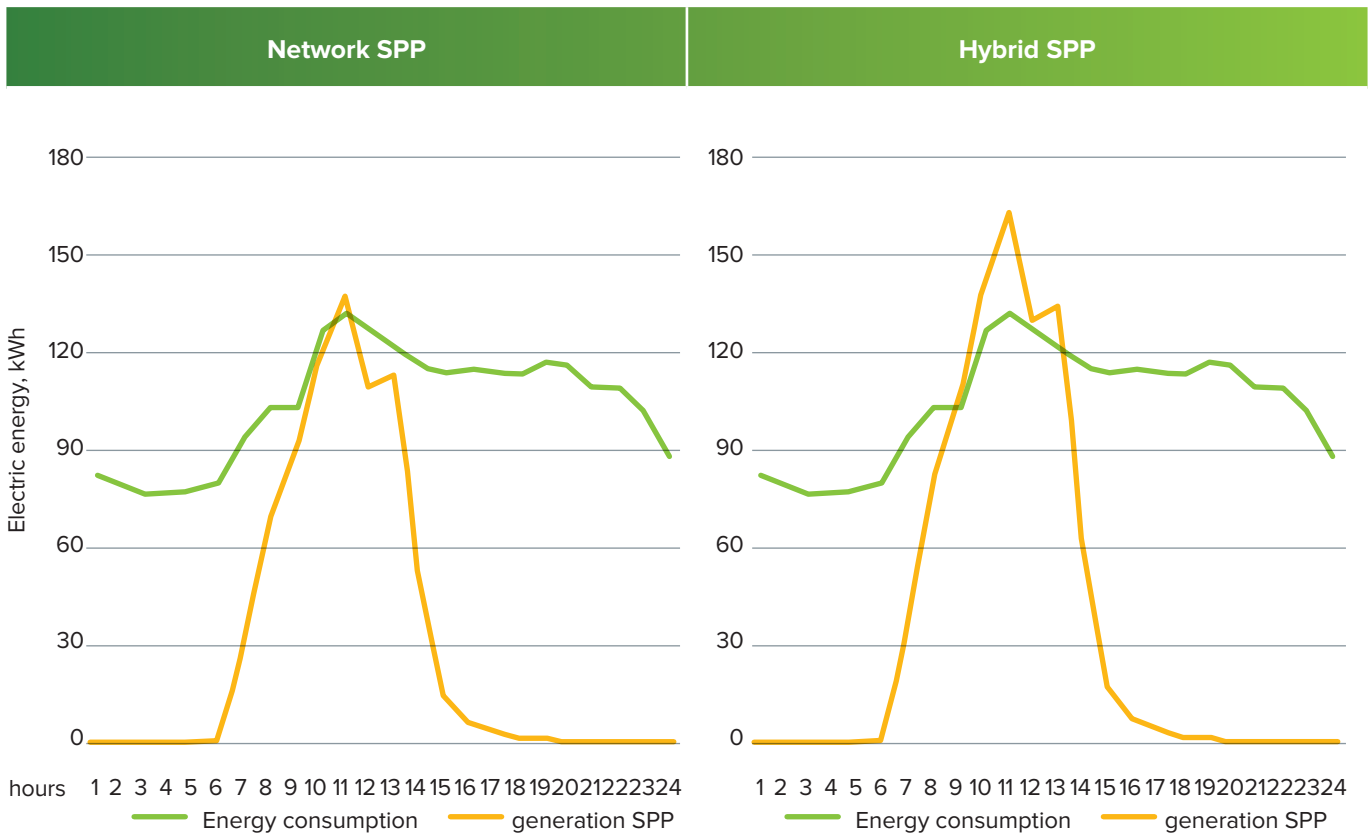
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	106 184	90 410	95 836	97 477
February	89 597	88 690	90 183	89 490
March	99 101	89 324	92 546	93 657
April	194 578	89 593	87 666	123 946
May	94 681	93 577	90 377	92 878
June	85 647	90 197	87 311	87 718
July	92 480	94 879	95 117	94 159
August	98 776	98 385	94 066	97 076
September	126 187	88 387	95 567	103 380
October	109 048	93 276	91 328	97 884
November	134 641	89 351	87 686	103 893
December	118 806	93 682	90 967	101 152
Annual	1 349 726	1 099 751	1 098 650	1 182 709

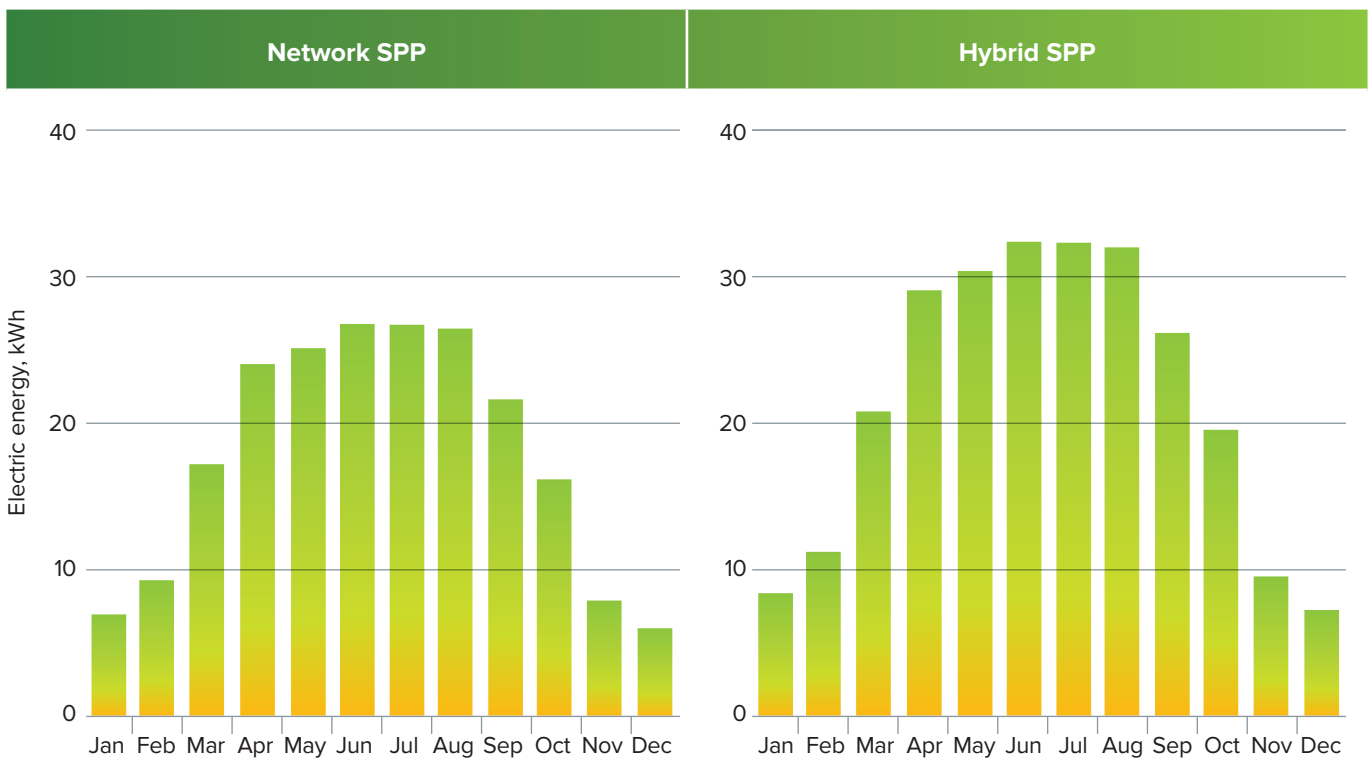
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



Total annual generation
216 069.82 kWh

Total annual generation
259 287.5 kWh

6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	372	7 600	2 827 200
2	Network inverter, 100 kW	2	228 000	456 000
3	Installation, fastening and additional materials	-	1 040 136	1 040 136
TOTAL				4 323 336

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	446	7 600	3 389 600
2	Hybrid inverter, 50 kW	5	266 570	1 332 850
3	Accumulator battery, 5 kWh	10	72 200	722 000
4	Installation, fastening and additional materials	-	1 204 372	1 204 372
TOTAL				6 648 822

Links to indicative price offers for SPPs:

SPP 200 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/sonyachna_stantsiya_200kw

SPP 50 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/SPP_50kw_premium

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

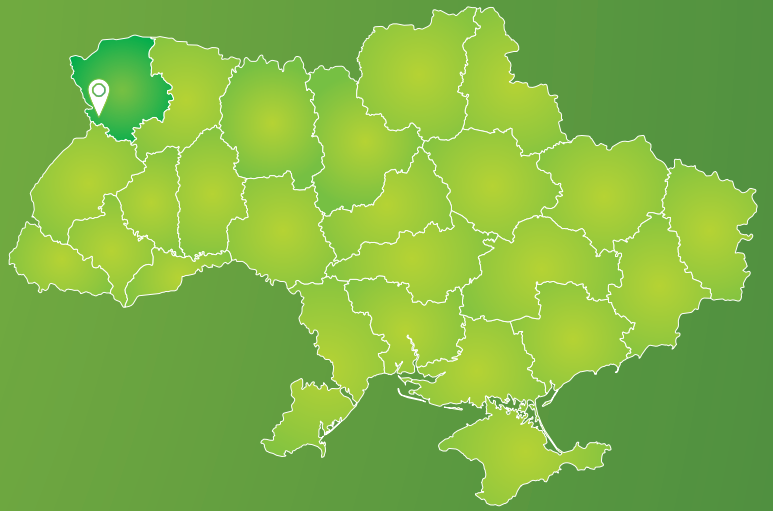
<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 182 709	1 182 709
SPP capacity, kW/h	200	240
Battery, kW/h	-	50
Annual electric energy generation by the SPP, kWh	216 070	259 288
Percentage of replacement of traditional electric energy, %	18%	22%
Annual savings in electric energy costs, UAH	1 054 421	1 265 323
The cost of SPP, UAH	4 323 336	6 648 822
Simple payback period, years	4.1	5.3
Electric energy tariff, UAH/kWh, (without VAT)	4.88	4.88
Electric energy tariff, UAH/kWh, (with VAT)	5 856	5 856



**COMMUNAL ENTERPRISE
“NOVOVOLYNSK VODOKANAL”
SEWAGE TREATMENT FACILITIES (300 KW)**



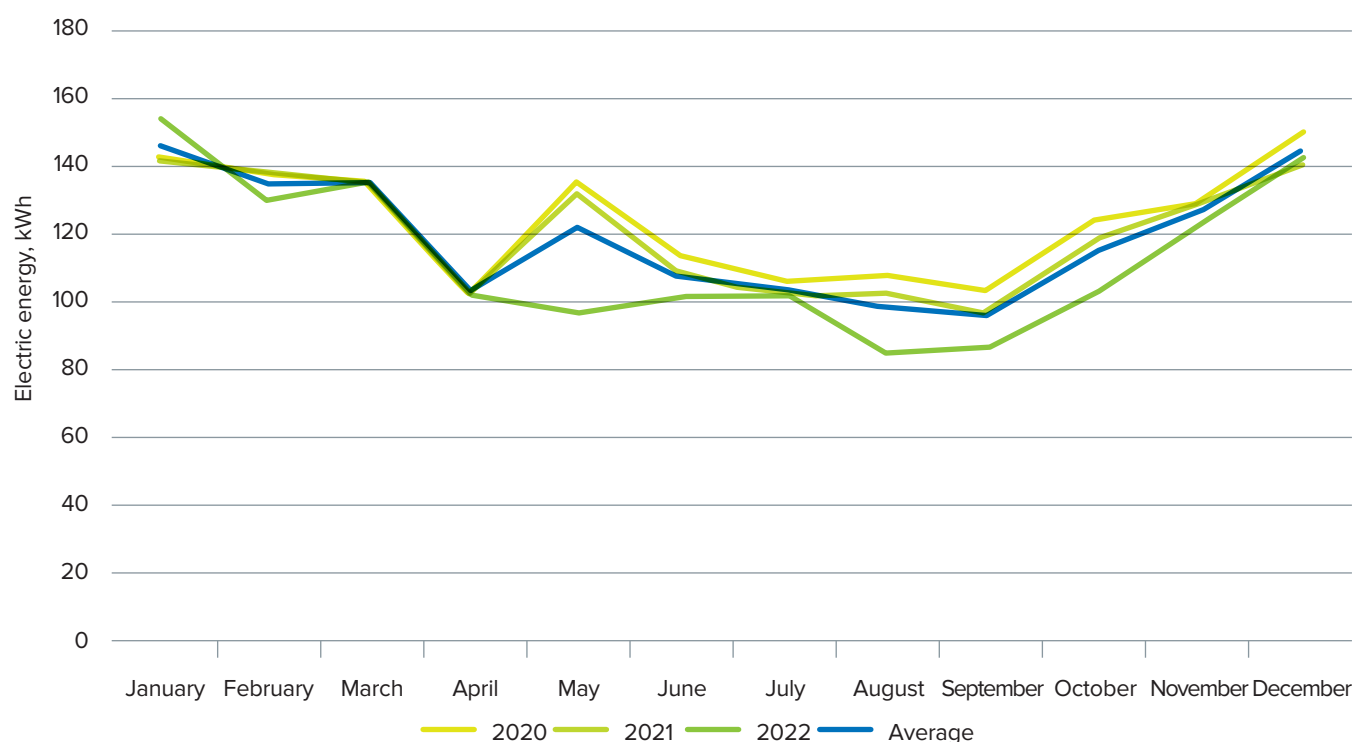
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	300 kW	-	1 530 m ²
Hybrid SPP	410 kW	120 kW	2 090 m ²

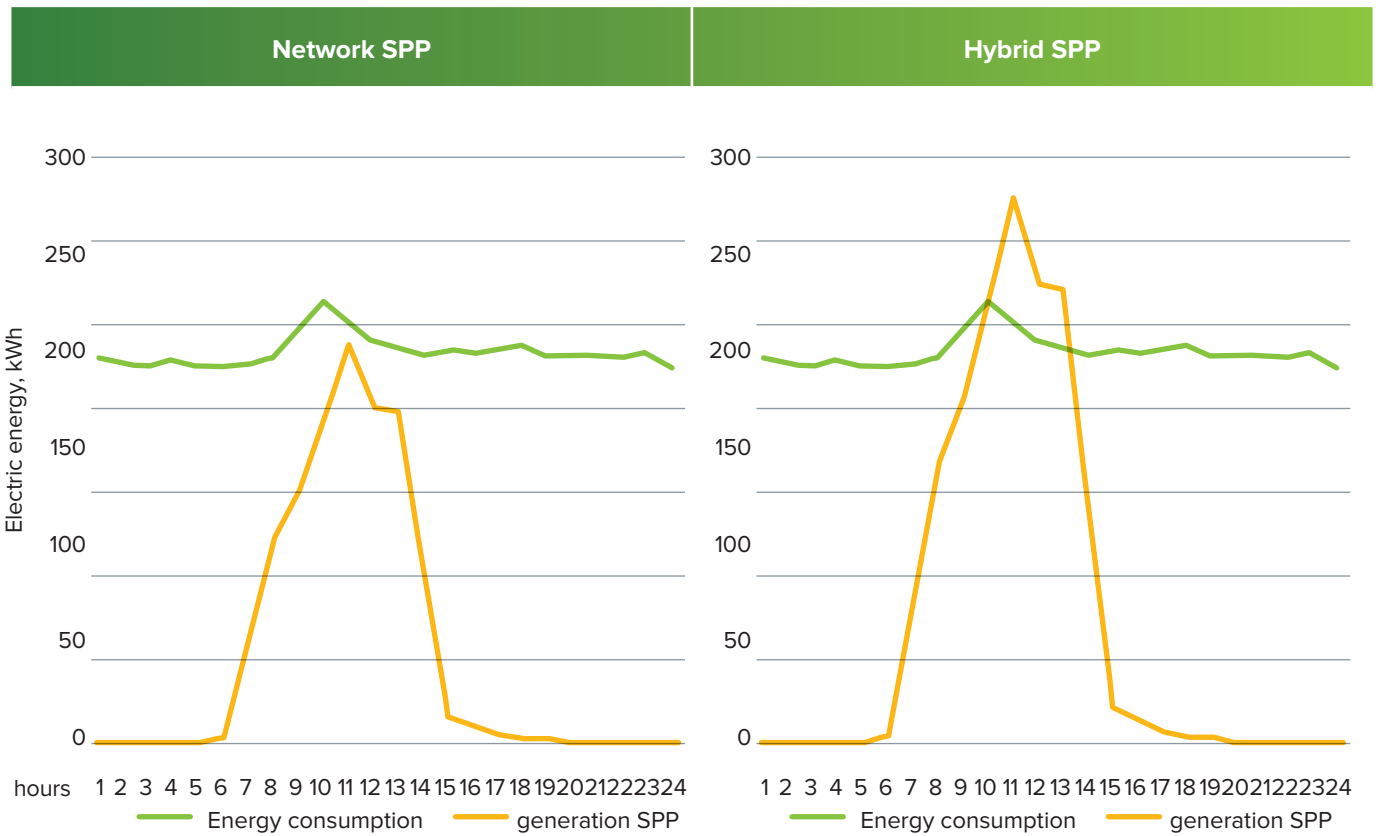
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	140 906	140 834	153 436	145 059
February	137 142	137 077	129 626	134 615
March	134 621	134 554	135 319	134 831
April	103 906	103 846	102 115	103 289
May	134 932	131 274	97 261	121 156
June	113 170	107 950	100 053	107 058
July	105 939	100 312	101 876	102 709
August	106 582	101 369	85 428	97 793
September	102 769	97 293	86 558	95 540
October	123 294	117 694	101 581	114 190
November	128 101	128 028	121 132	125 754
December	149 817	139 547	142 264	143 876
Annual	1 481 179	1 439 778	1 356 649	1 425 869

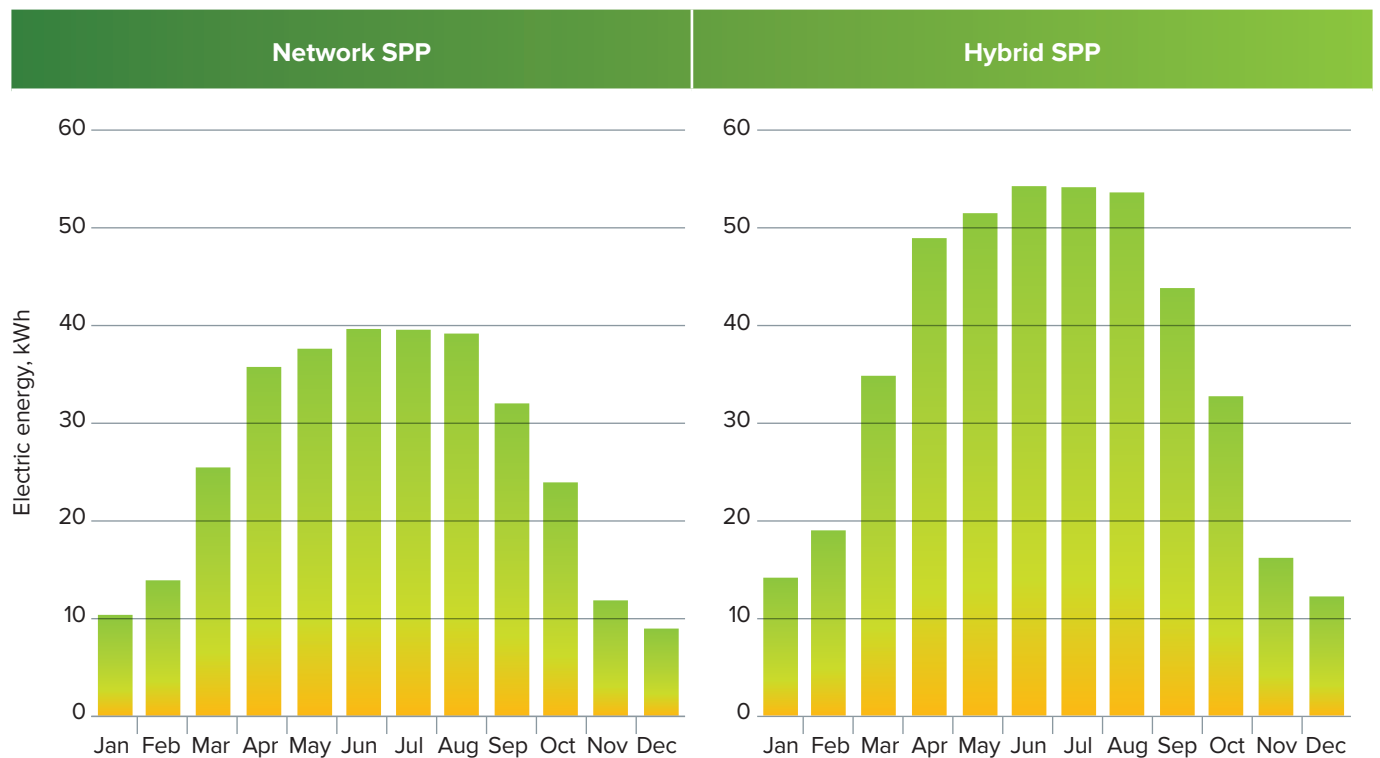
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



Total annual generation
325 180.52 kWh

Total annual generation
444 745.63 kWh

6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	556	7 600	4 225 600
2	Network inverter, 100 kW	3	228 000	684 000
3	Installation, fastening and additional materials	-	1 390 192	1 390 192
TOTAL				6 299 792

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	760	7 600	5 776 000
2	Hybrid inverter, 50 kW	8	266 570	2 132 560
3	Hybrid inverter, 10 kW	1	112 100	112 100
4	Accumulator battery, 5 kWh	24	72 200	1 732 800
5	Installation, fastening and additional materials	-	1 876 136	1 876 136
TOTAL				11 629 596

Links to indicative price offers for SPPs:

SPP 300 kW (150x2 kW)

<https://sun-energy.com.ua/solar-power/solar-power-plants/SPP150kwt>

SPP 400 kW (200x2 kW)

https://sun-energy.com.ua/solar-power/solar-power-plants/sonyachna_stantsiya_200kw

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

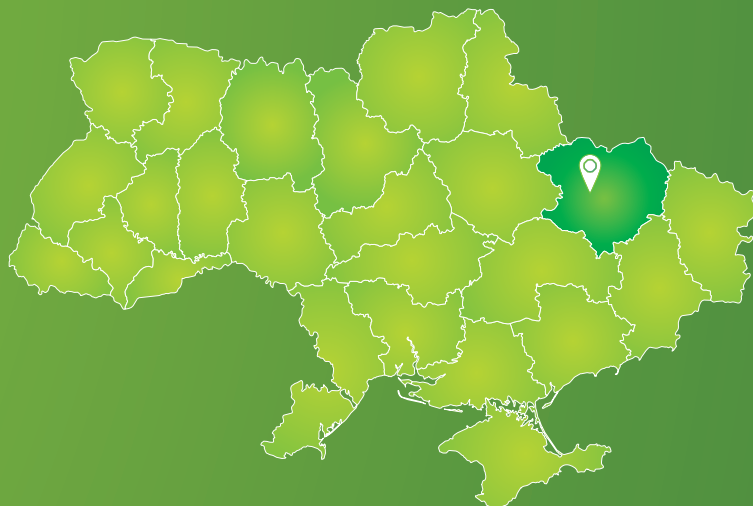
<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 425 869	1 425 869
SPP capacity, kW/h	300	410
Battery, kW/h	-	120
Annual electric energy generation by the SPP, kWh	325 180	444 745
Percentage of replacement of traditional electric energy, %	23%	31%
Annual savings in electric energy costs, UAH	1 586 878	2 170 356
The cost of SPP, UAH	6 299 792	11 629 596
Simple payback period, years	4.0	5.4
Electric energy tariff, UAH/kWh, (without VAT)	4.88	4.88
Electric energy tariff, UAH/kWh, (with VAT)	5 856	5 856



**COMMUNAL NON-COMMERCIAL
ENTERPRISE “PERVOMAIISKYI CENTRAL
DISTRICT HOSPITAL” (70 KW)**



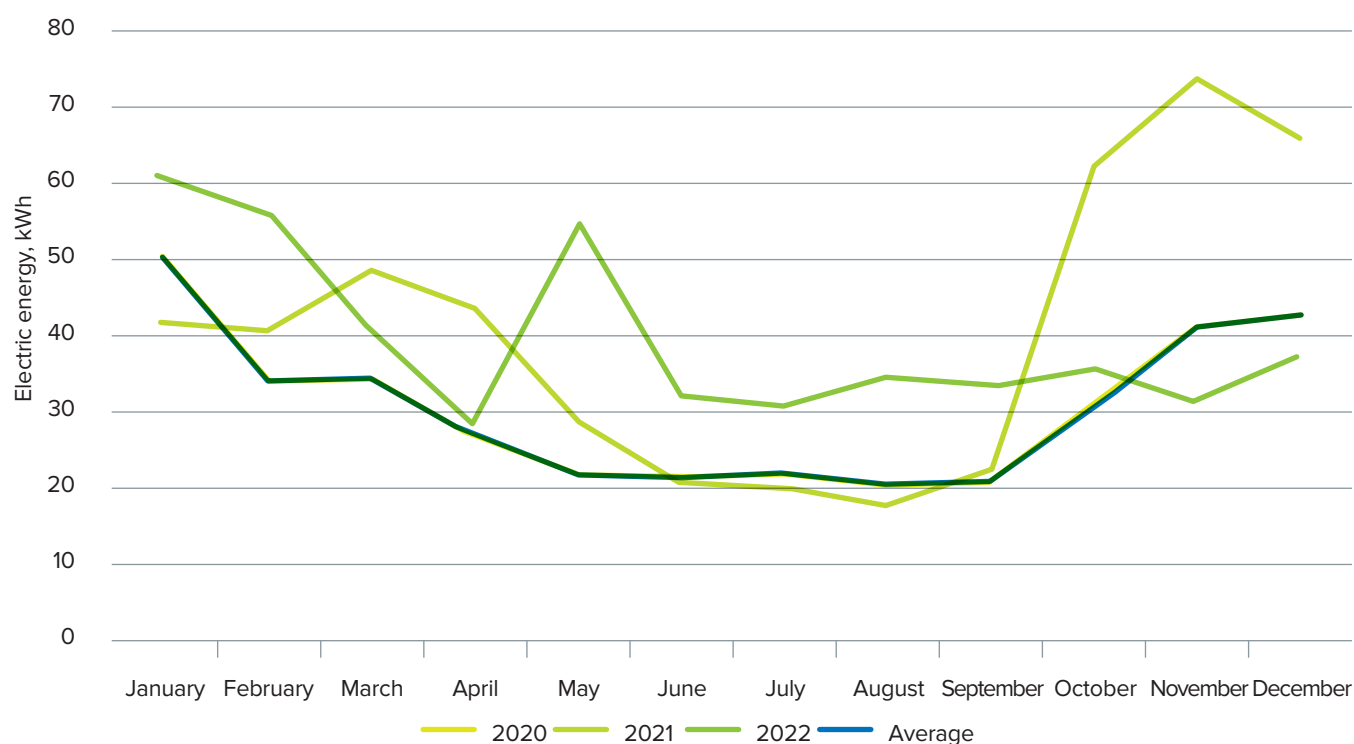
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	70 kW	-	400 m ²
Hybrid SPP	100 kW	30 kW	560 m ²

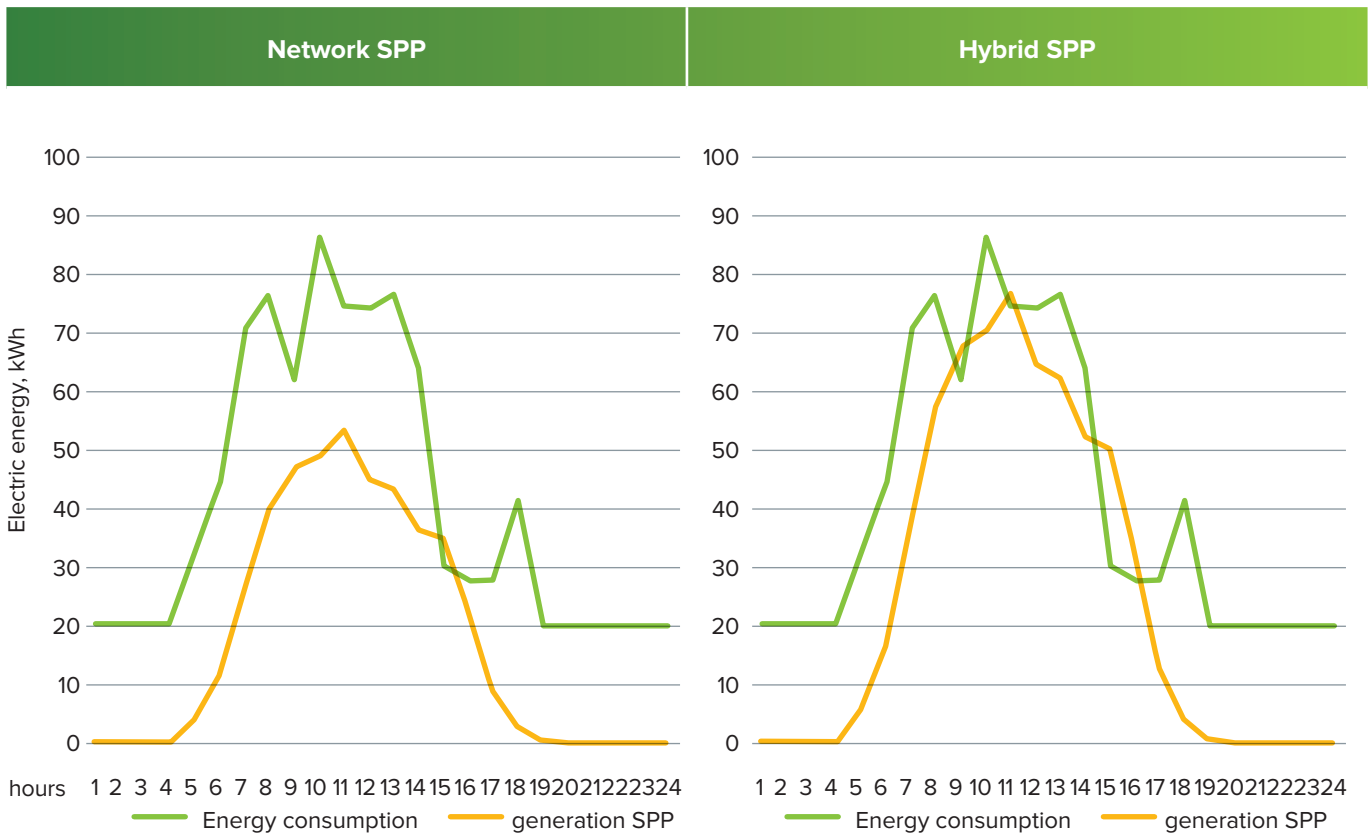
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	50 040	41 748	60 301	50 696
February	34 400	41 166	55 643	43 736
March	34 840	48 654	40 818	41 437
April	27 040	43 764	28 866	33 223
May	22 080	28 830	54 828	35 246
June	22 020	20 874	32 244	25 046
July	22 540	20 274	31 188	24 667
August	20 820	18 072	34 494	24 462
September	21 360	22 614	33 806	25 927
October	31 020	62 346	35 676	43 014
November	41 220	73 242	31 658	48 707
December	43 080	65 736	37 516	48 777
Annual	370 460	487 320	477 038	444 939

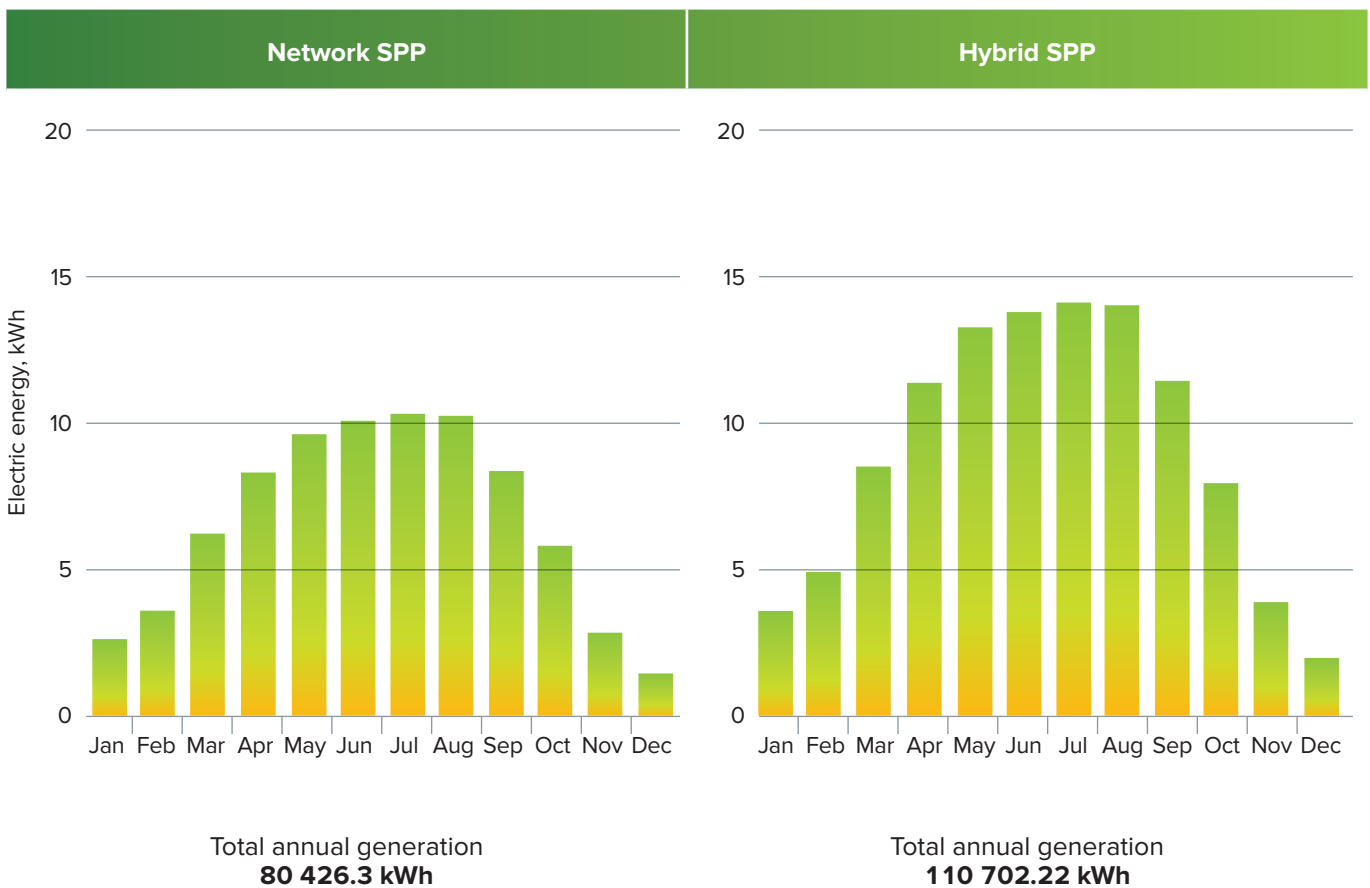
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 585 W	120	7 668	920 208
2	Network inverter, 100 kW	1	182 400	182 400
3	Installation, fastening and additional materials	-	406 904	406 904
TOTAL				1 509 512

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 585 W	172	7 668	1 318 980
2	Hybrid inverter, 20 kW	5	144 400	722 000
3	Accumulator battery, 5 kWh	6	72 200	433 200
4	Installation, fastening and additional materials	-	556 776	556 776
TOTAL				3 030 956

Link to indicative price offers for 70-100 kW SPPs

SPP 80 kW

<https://alton.com.ua/ua/solnechnaja-elektrostantsija-dlja-biznesa-80-kvt.html>

SPP 60 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/SPP_60kwt_business

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_100kw_business_medium

Hybrid inverter

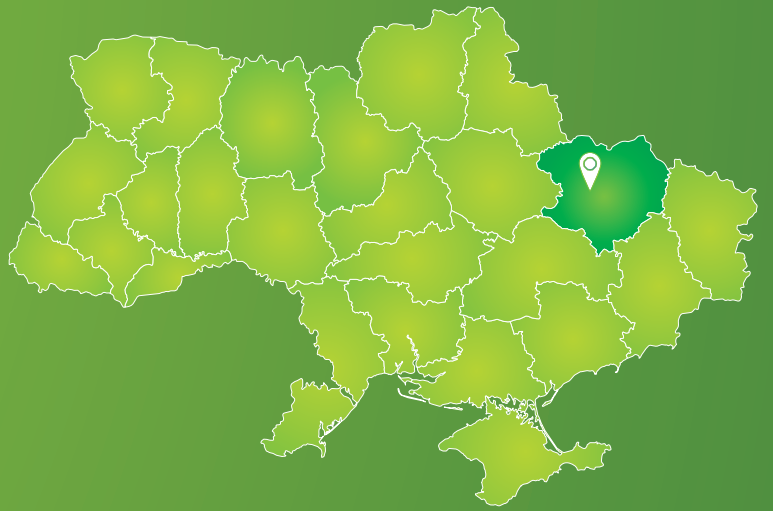
<https://sun-energy.com.ua/solar-power/solar-inverters/sofar-solar-hyd-20-ktl-3ph>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	444 939	444 939
SPP capacity, kW/h	70	100
Battery, kW/h	-	30
Annual electric energy generation by the SPP, kWh	80 426	110 702
Percentage of replacement of traditional electric energy, %	18%	25%
Annual savings in electric energy costs, UAH	335 378	461 628
The cost of SPP, UAH	1 509 512	3 030 956
Simple payback period, years	4.5	6.6
Electric energy tariff, UAH/kWh, (without VAT)	4.17	4.17
Electric energy tariff, UAH/kWh, (with VAT)	5 004	5 004



**PERVOMAISKYI COMMUNAL ENTERPRISE
“TEPLOMERZHI”
MAIN SEWAGE PUMPING STATION (20 KW)**



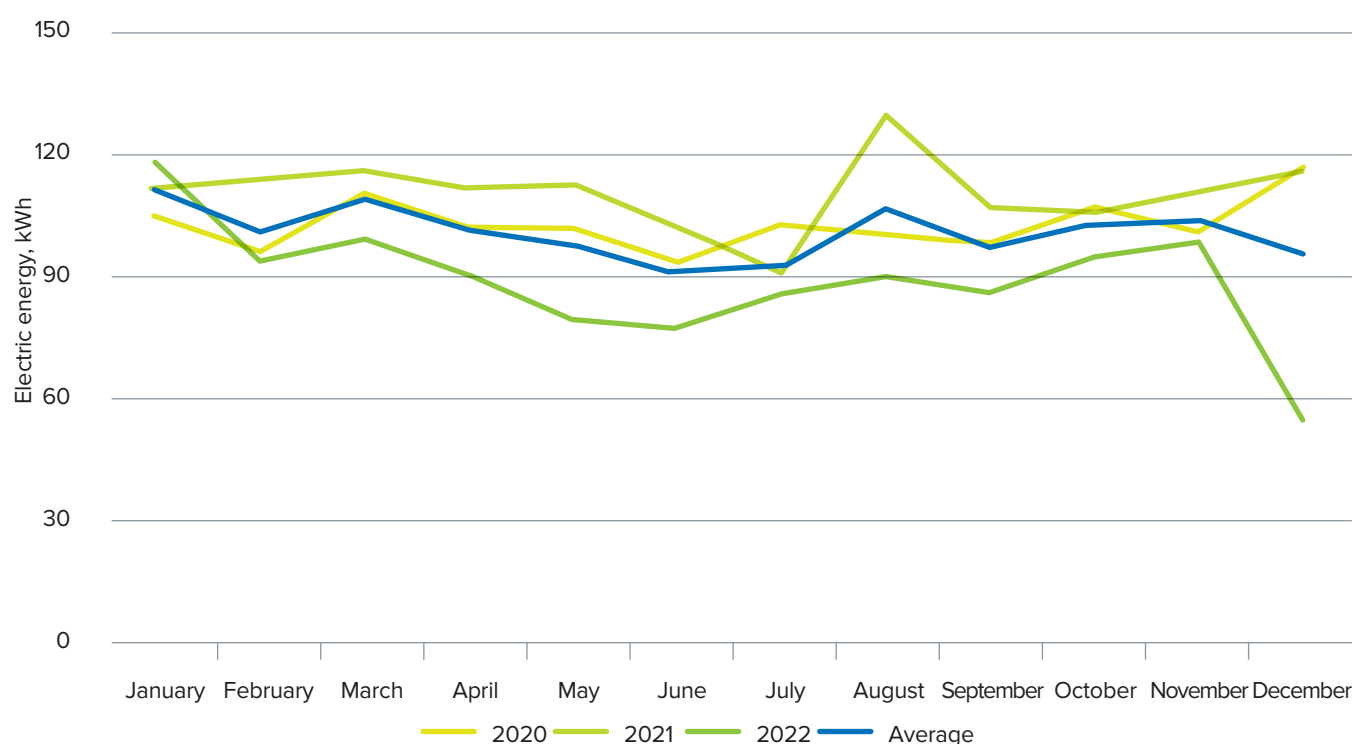
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	20 kW	-	110 m ²
Hybrid SPP	30 kW	10 kW	160 m ²

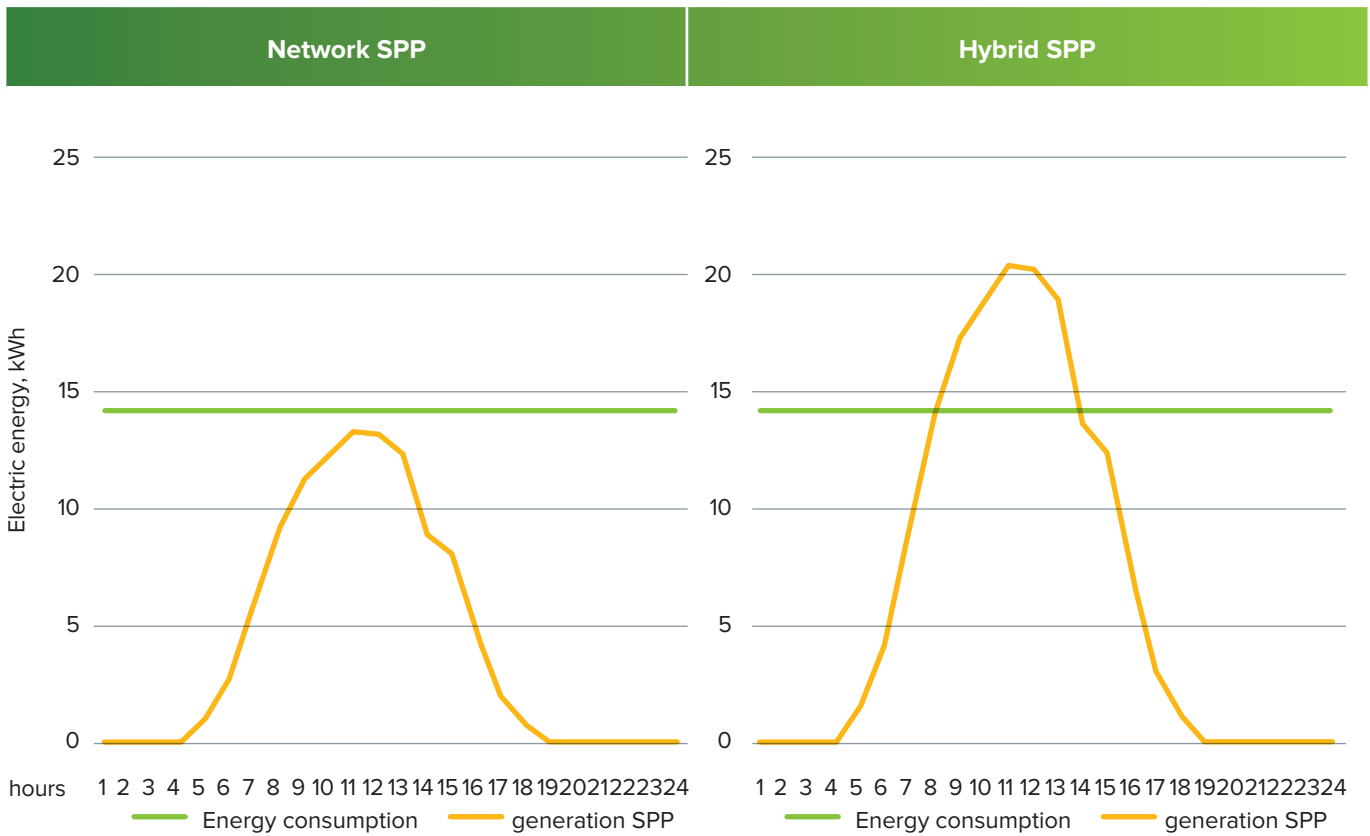
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	10 471	11 060	11 704	11 078
February	9 571	11 260	9 328	10 053
March	10 970	11 499	9 864	10 778
April	10 132	11 143	9 016	10 097
May	10 131	11 164	7 888	9 728
June	9 347	10 141	7 696	9 061
July	10 202	9 020	8 528	9 250
August	9 993	12 914	8 952	10 620
September	9 763	10 625	8 584	9 657
October	10 658	10 506	9 432	10 199
November	10 068	11 040	9 784	10 297
December	11 572	11 524	5 480	9 525
Annual	122 878	131 896	106 256	120 343

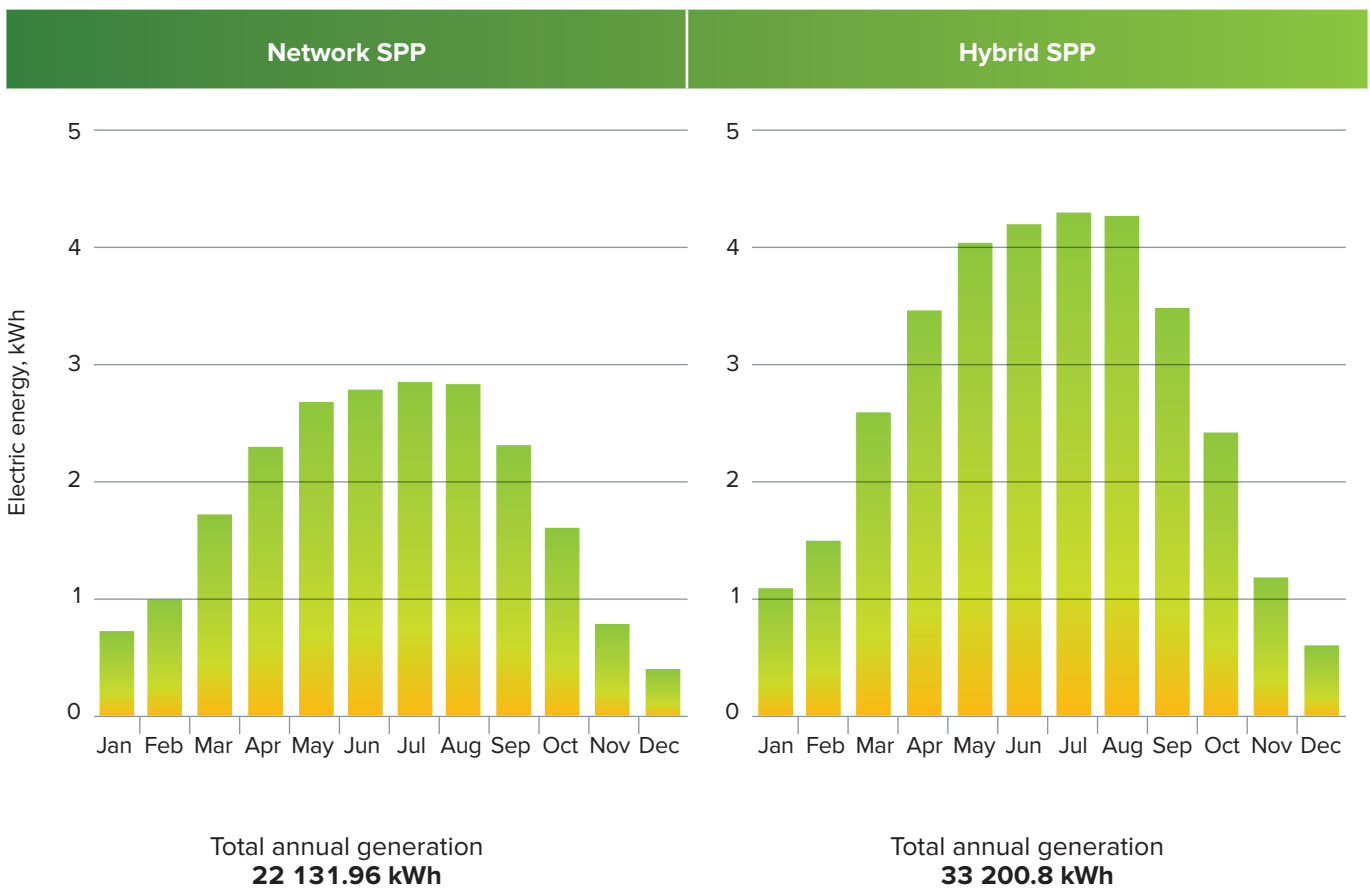
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	38	7 600	288 800
2	Network inverter, 20 kW	1	114 000	114 000
3	Installation, fastening and additional materials	-	111 644	111 644
TOTAL				514 444

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	56	7 600	425 600
2	Hybrid inverter, 30 kW	1	228 000	228 000
3	Accumulator battery, 5 kWh	2	72 200	144 400
4	Installation, fastening and additional materials	-	164 768	164 768
TOTAL				962 768

Links to indicative price offers for SPPs:

SPP 20 kW

<https://sun-energy.com.ua/solar-power/solar-power-plants/premium20kwt>

SPP 30 kW

<https://sun-energy.com.ua/solar-power/solar-power-plants/premium30kwt>

Deye SUN-30K-SG01HP3-EU-BM3 hybrid inverter

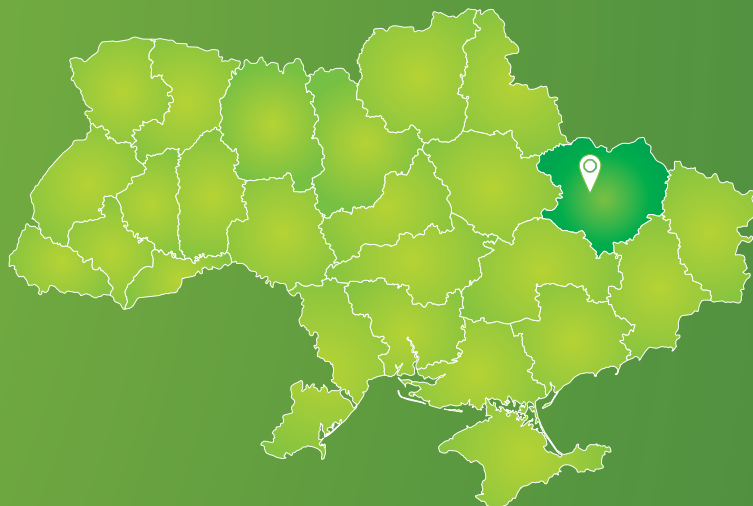
<https://sun-energy.com.ua/solar-power/solar-inverters/sun-30k-sg01hp3-eu-bm3>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	120 343	120 343
SPP capacity, kW/h	20	30
Battery, kW/h	-	10
Annual electric energy generation by the SPP, kWh	22 131	33 200
Percentage of replacement of traditional electric energy, %	18%	28%
Annual savings in electric energy costs, UAH	101 803	152 720
The cost of SPP, UAH	514 444	962 768
Simple payback period, years	5.1	6.3
Electric energy tariff, UAH/kWh, (without VAT)	4.60	4.60
Electric energy tariff, UAH/kWh, (with VAT)	5.52	5.52



**PERVOMAISKYI COMMUNAL ENTERPRISE
“TEPLOMEREZHI”
TREATMENT FACILITIES (260 KW)**



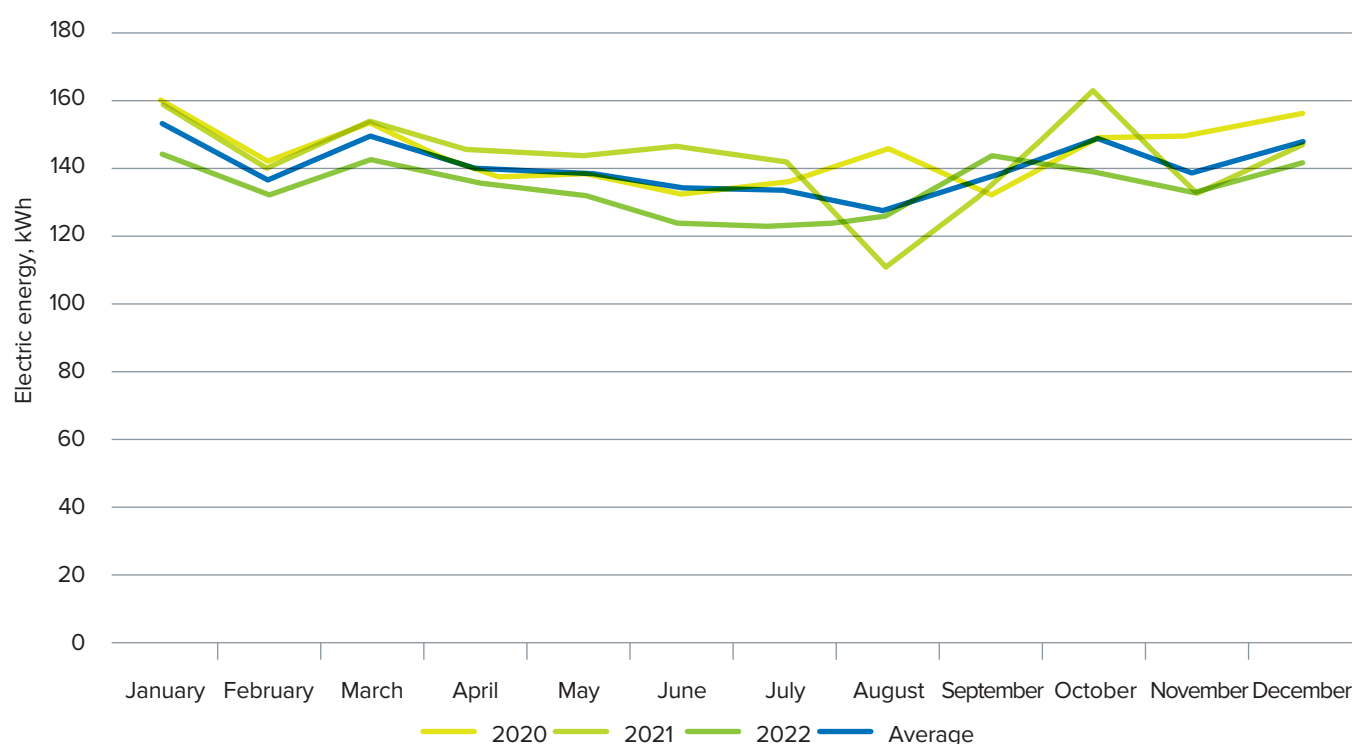
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	260 kW	-	1 430 m ²
Hybrid SPP	325 kW	110 kW	1 790 m ²

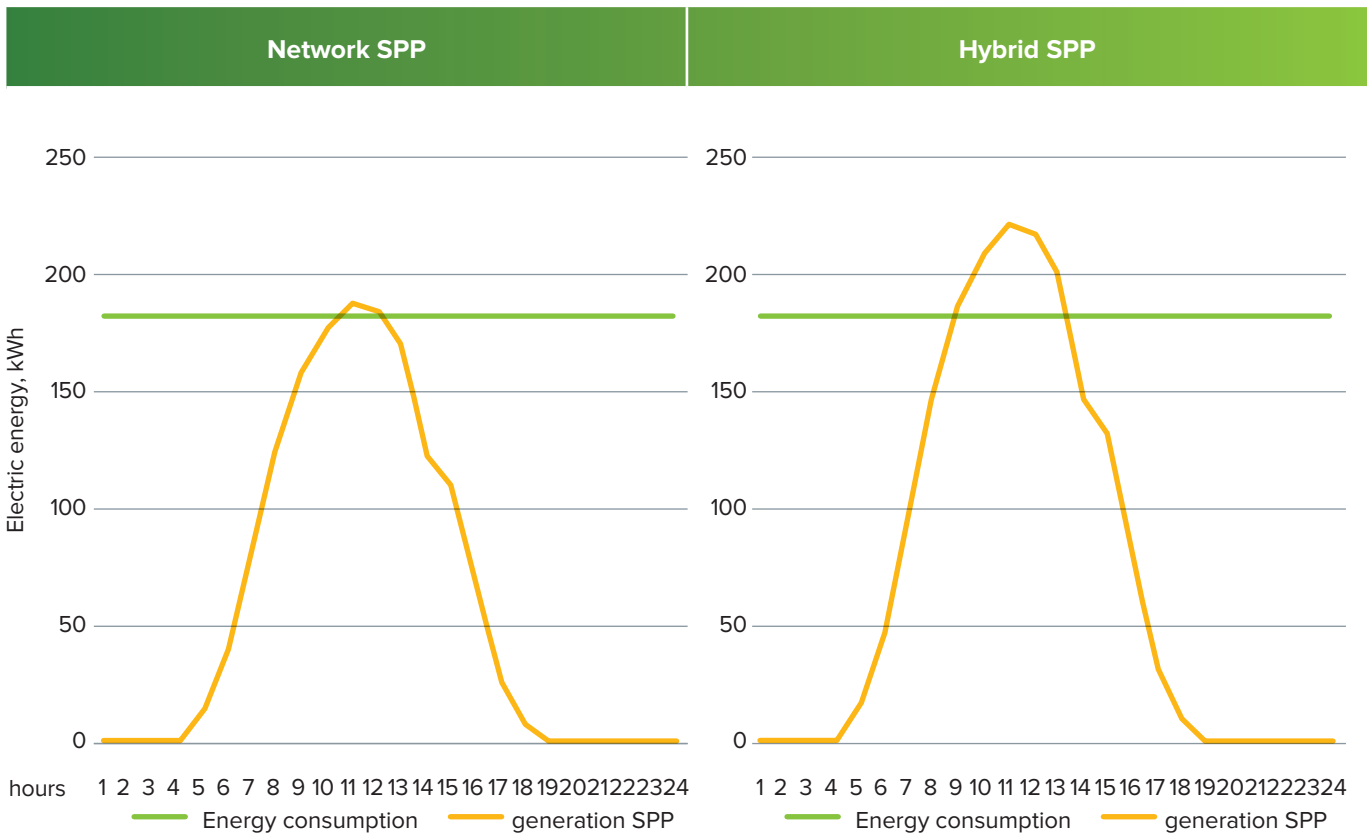
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	158 732	158 096	143 399	153 409
February	142 936	138 440	131 625	137 667
March	152 466	153 436	142 091	149 331
April	137 647	144 264	136 012	139 308
May	138 872	142 997	132 069	137 979
June	132 077	146 319	123 253	133 883
July	135 916	141 191	122 569	133 225
August	145 058	111 018	124 750	126 942
September	131 165	134 404	143 612	136 394
October	147 355	161 963	138 979	149 432
November	149 663	133 504	132 555	138 574
December	155 050	145 691	141 621	147 454
Annual	1 726 937	1 711 323	1 912 535	1 783 598

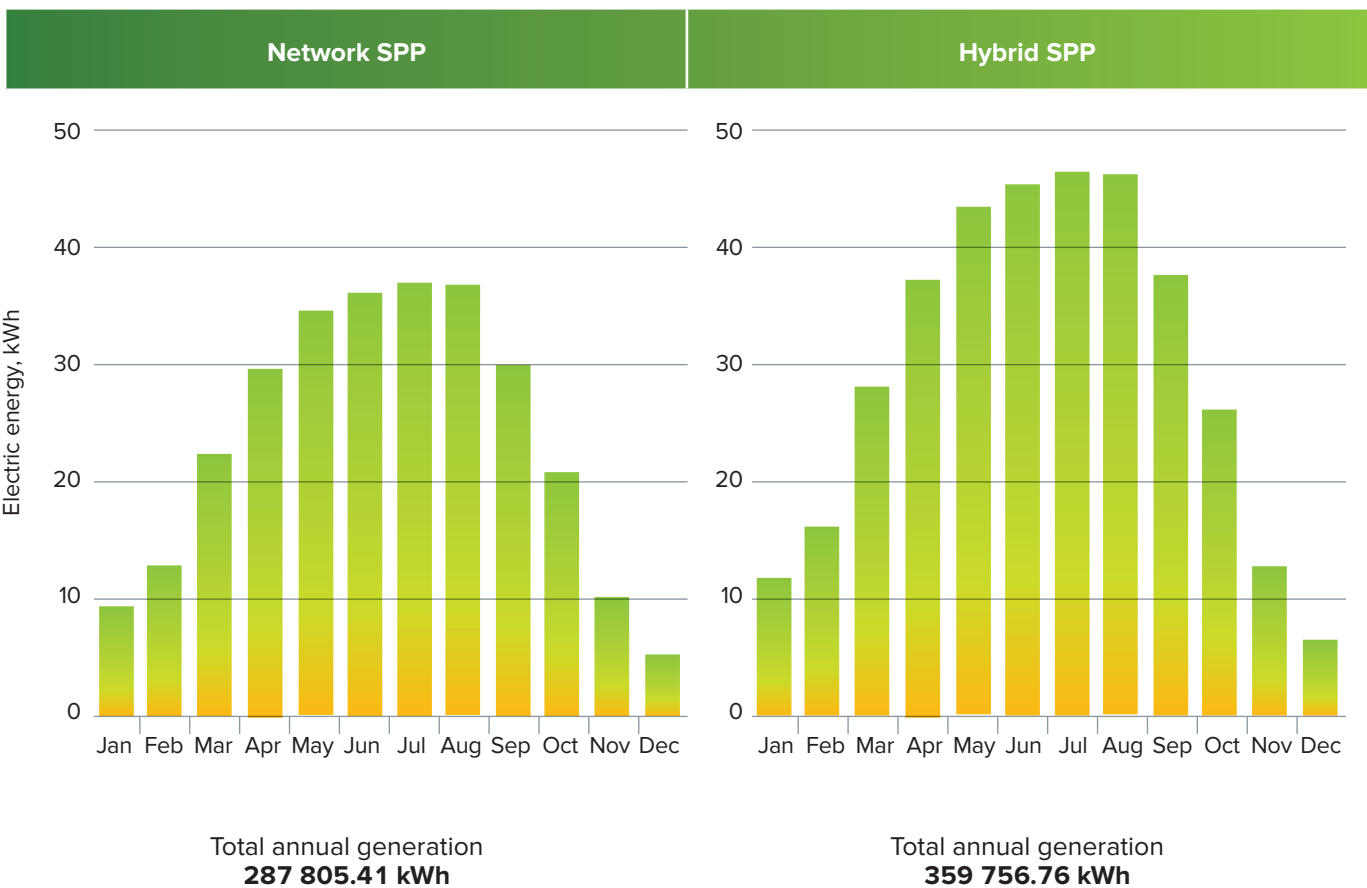
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	482	7 600	3 663 200
2	Network inverter, 100 kW	2	228 000	456 000
3	Network inverter, 60 kW	1	153 596	153 596
4	Installation, fastening and additional materials	-	1 272 012	1 272 012
TOTAL				5 544 808

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	604	7 600	4 590 400
2	Hybrid inverter, 50 kW	6	266 570	1 599 420
3	Hybrid inverter, 30 kW	1	228 000	228 000
4	Accumulator battery, 5 kWh	22	72 200	1 588 400
5	Installation, fastening and additional materials	-	1 512 932	1 512 932
TOTAL				9 519 152

Links to indicative price offers for SPPs:

SPP 200 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/sonyachna_stantsiya_200kw

SPP 60 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/SPP_60kwt_business

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_100kw_business_Medium

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Deye SUN-30K-SG01HP3-EU-BM3 hybrid inverter

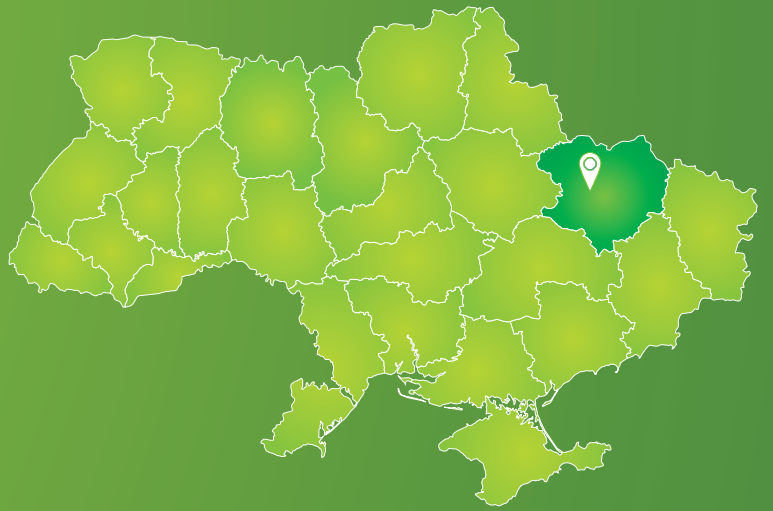
<https://sun-energy.com.ua/solar-power/solar-inverters/sun-30k-sg01hp3-eu-bm3>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 783 598	1 783 598
SPP capacity, kW/h	260	325
Battery, kW/h	-	110
Annual electric energy generation by the SPP, kWh	287 805	359 756
Percentage of replacement of traditional electric energy, %	16%	20%
Annual savings in electric energy costs, UAH	1 323 903	1 654 878
The cost of SPP, UAH	5 544 808	9 519 152
Simple payback period, years	4.2	5.8
Electric energy tariff, UAH/kWh, (without VAT)	4.60	4.60
Electric energy tariff, UAH/kWh, (with VAT)	5.52	5.52



**PERVOMAISKYI COMMUNAL ENTERPRISE
“TEPLOMEREZHI”
PUMPING STATION (250 KW)**



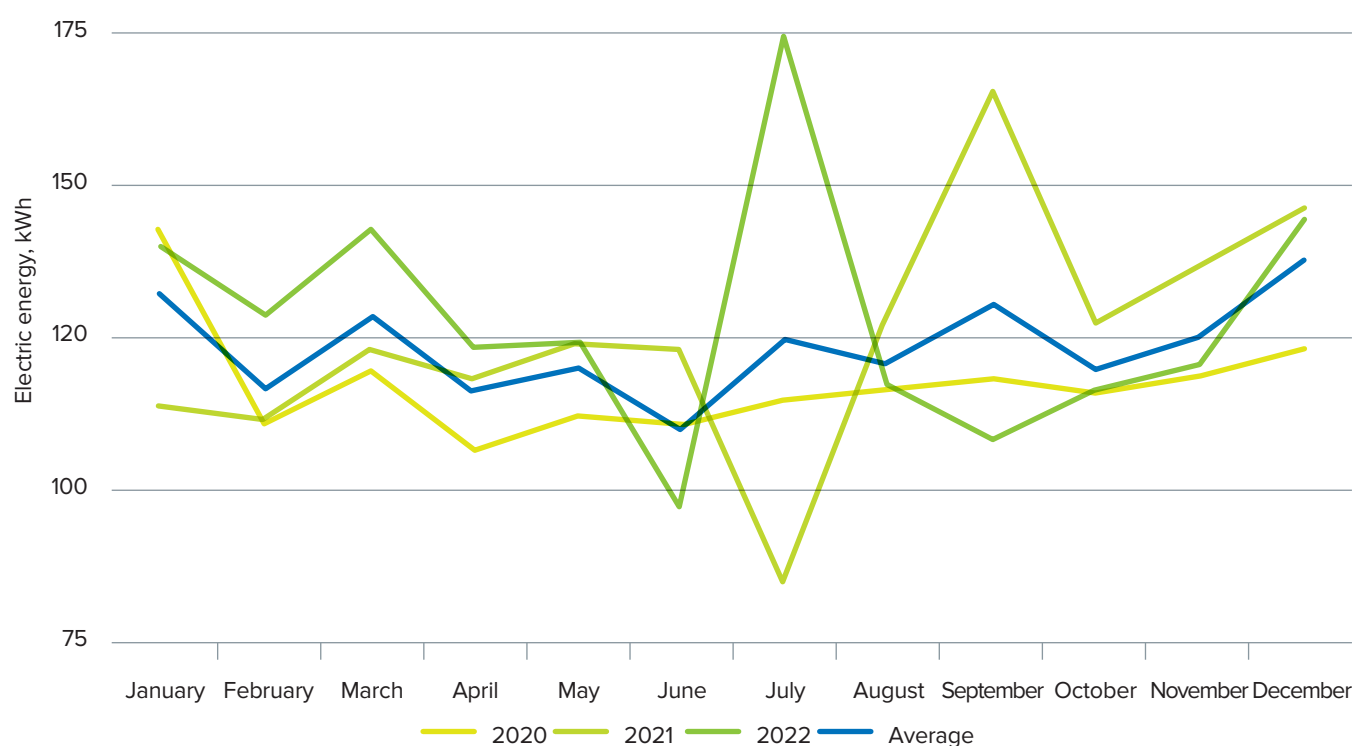
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	250 kW	-	1 275 m ²
Hybrid SPP	310 kW	100 kW	1 740 m ²

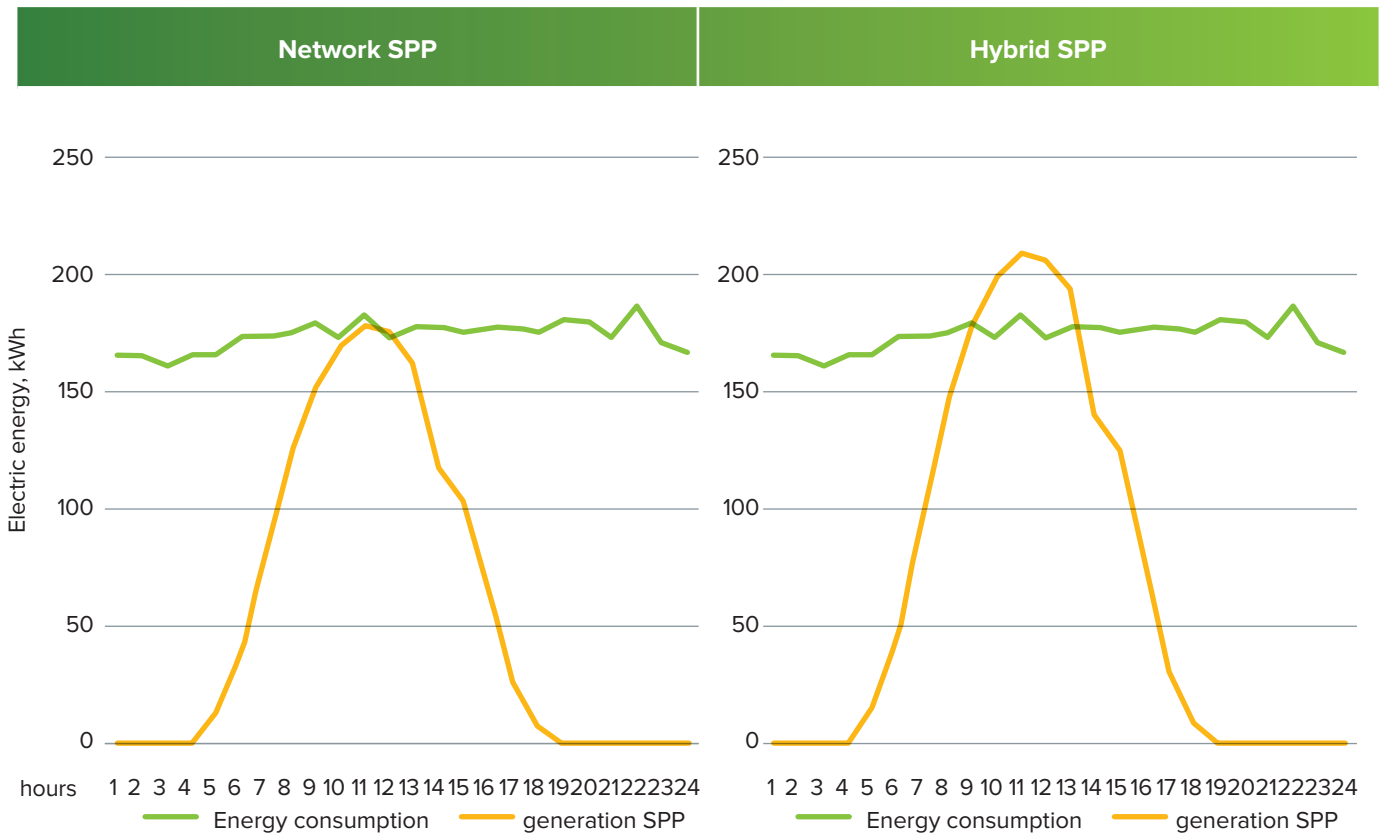
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	138 728	111 745	135 918	128 797
February	108 679	109 561	125 453	114 564
March	116 858	120 213	138 662	125 244
April	105 084	115 661	120 783	113 843
May	109 920	121 241	122 025	117 729
June	108 700	120 233	95 650	108 194
July	112 411	83 815	168 990	121 739
August	114 167	125 495	114 877	118 180
September	115 460	159 849	106 446	127 252
October	113 769	124 473	114 023	117 422
November	116 081	133 397	118 291	122 590
December	120 087	142 052	140 023	134 054
Annual	1 379 944	1 467 735	1 501 141	1 449 607

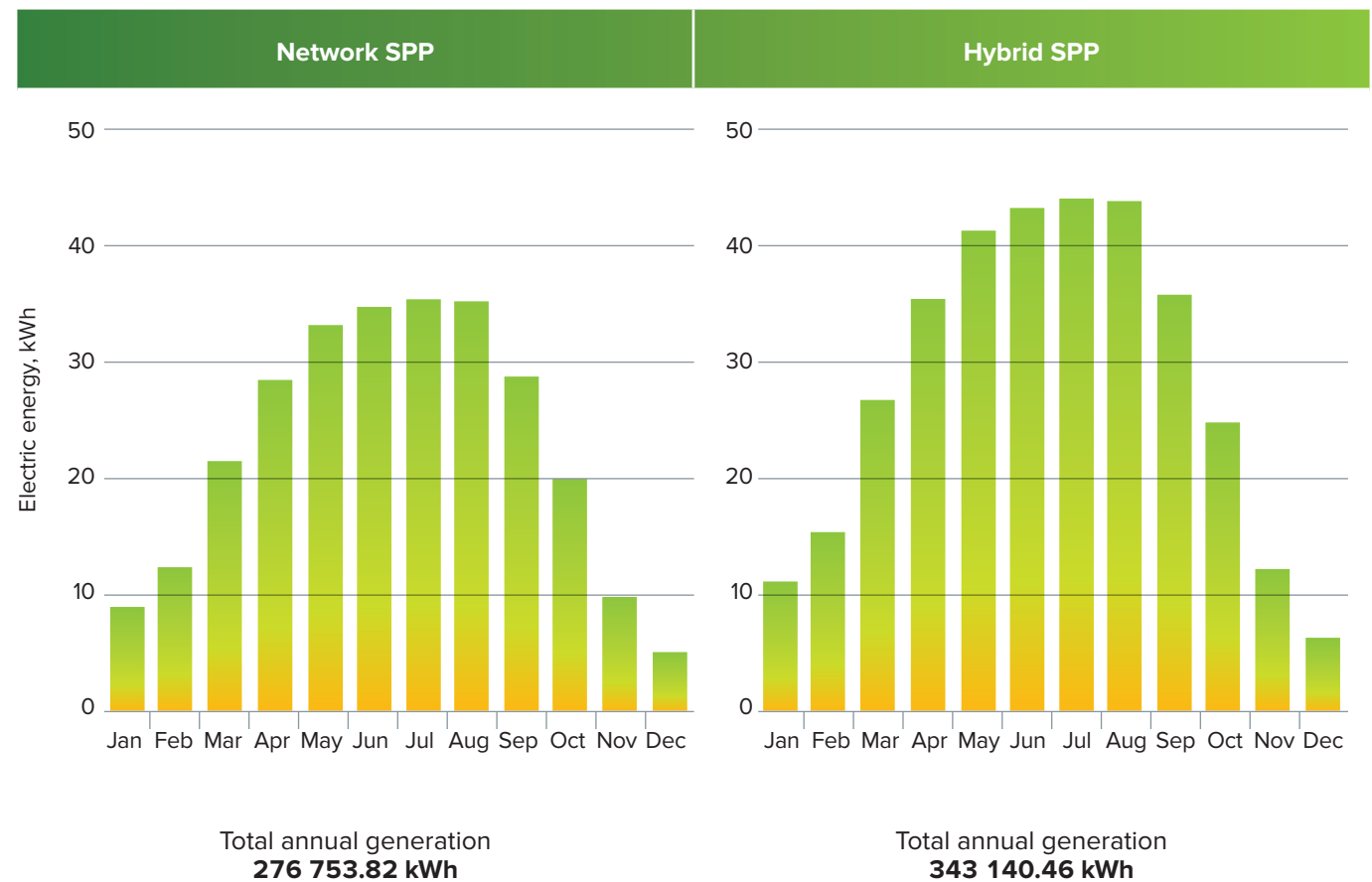
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	464	7 600	3 526 400
2	Network inverter, 100 kW	2	228 000	456 000
3	Network inverter, 50 kW	1	142 120	142 120
4	Installation, fastening and additional materials	-	1 238 192	1 238 192
TOTAL				5 362 712

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	576	7 600	4 377 600
2	Hybrid inverter, 50 kW	6	266 570	1 599 420
3	Hybrid inverter, 10 kW	1	112 100	112 100
4	Accumulator battery, 5 kWh	20	72 200	1 444 000
5	Installation, fastening and additional materials	-	1 461 024	1 461 024
TOTAL				8 994 144

Links to indicative price offers for SPPs:

SPP 200 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/sonyachna_stantsiya_200kw

SPP 50 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/station_50kw_business_Medium

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_100kw_business_Medium

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Deye SUN-10K-SG04LP3-EU hybrid inverter

<https://sun-energy.com.ua/solar-power/solar-inverters/deye-sun-10k-sg04-lp3-eu>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 449 607	1 449 607
SPP capacity, kW/h	250	310
Battery, kW/h	-	100
Annual electric energy generation by the SPP, kWh	276 754	343 140
Percentage of replacement of traditional electric energy, %	19%	24%
Annual savings in electric energy costs, UAH	1 273 068	1 578 446
The cost of SPP, UAH	5 362 712	8 994 144
Simple payback period, years	4.2	5.7
Electric energy tariff, UAH/kWh, (without VAT)	4.60	4.60
Electric energy tariff, UAH/kWh, (with VAT)	5.52	5.52



**COMMUNAL NON-COMMERCIAL
ENTERPRISE “PIVDENNOUKRAINSK
MULTI-PROFILE CITY HOSPITAL” (75 KW)**



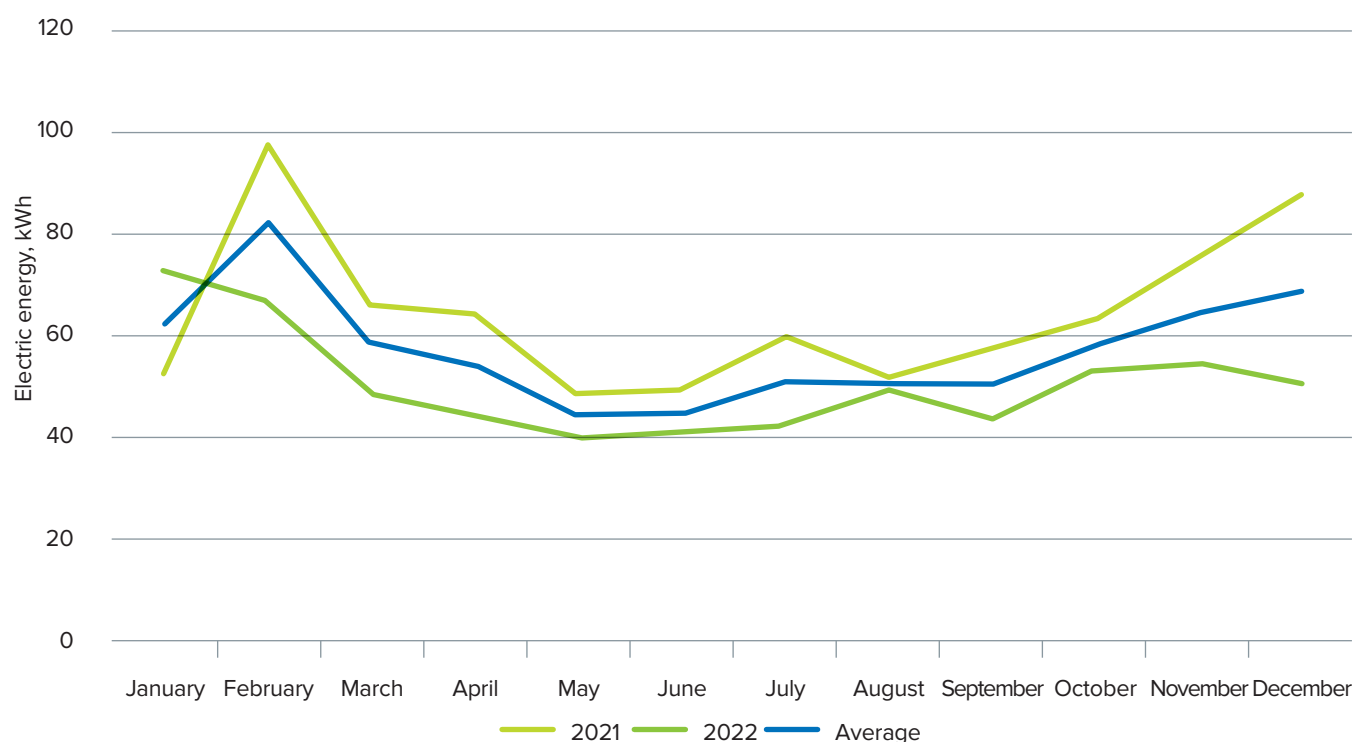
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	75 kW	-	450 m ²
Hybrid SPP	85 kW	30 kW	510 m ²

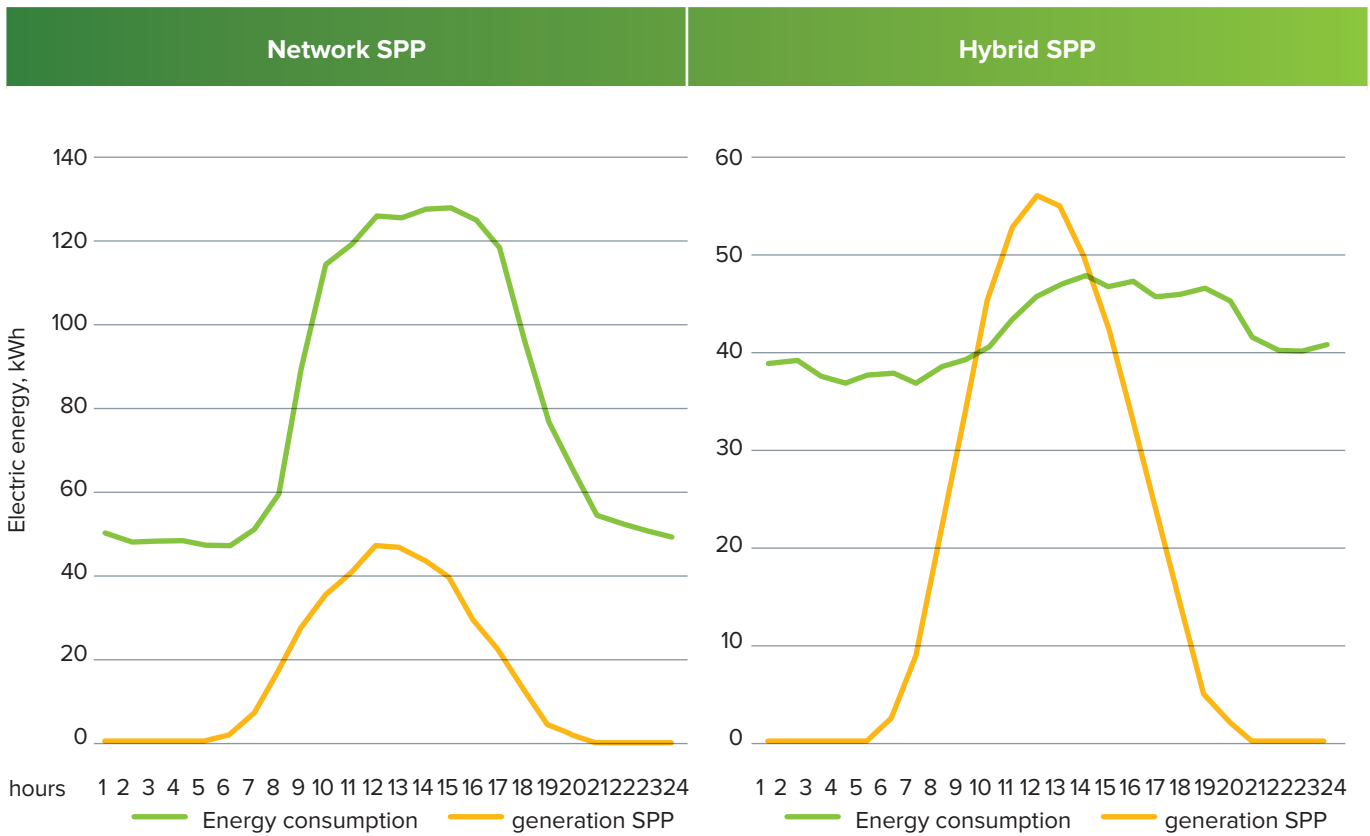
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh		
	2021	2022	Average
January	52 329	73 082	62 706
February	98 042	67 602	82 822
March	66 632	49 368	58 000
April	64 701	45 078	54 890
May	49 367	40 270	44 819
June	49 942	40 640	45 291
July	59 712	42 904	51 308
August	52 257	49 257	50 757
September	57 330	44 312	50 821
October	63 525	53 525	58 525
November	75 144	55 144	65 144
December	87 758	50 758	69 258
Annual	776 739	611 940	694 340

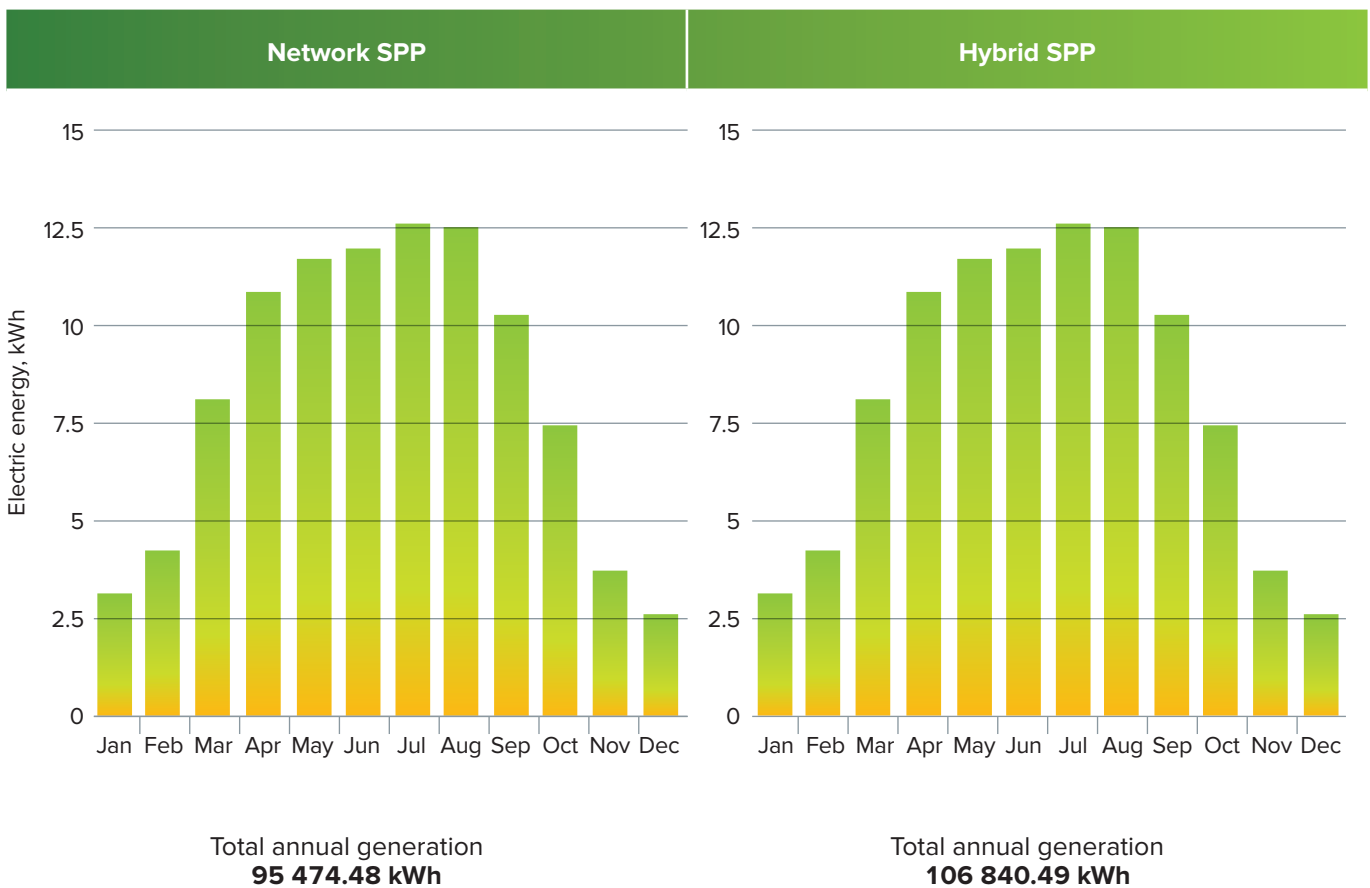
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	126	9 680	1 219 680
2	Network inverter, 30 kW	2	76 160	152 320
3	Network inverter, 20 kW	1	69 880	69 880
4	Installation, fastening and additional materials	-	432 564	432 564
TOTAL				1 874 444

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	141	9 680	1 364 880
2	Hybrid inverter, 10 kW	8	96 000	768 000
3	Hybrid inverter, 5 kW	1	36 990	36 990
4	Accumulator battery, 5 kWh	6	120 000	720 000
5	Installation, fastening and additional materials	-	866 961	866 961
TOTAL				3 756 831

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	694 340	694 340
SPP capacity, kW/h	75	85
Battery, kW/h	-	30
Annual electric energy generation by the SPP, kWh	95 474.48	106 840.49
Percentage of replacement of traditional electric energy, %	14%	15%
Annual savings in electric energy costs, UAH	587 168	657 069
The cost of SPP, UAH	1 874 444	3 756 831
Simple payback period, years	3.2	5.7
Electric energy tariff, UAH/kWh, (without VAT)	6.15	6.15
Electric energy tariff, UAH/kWh, (with VAT)	7.38	7.38



COMMUNAL NON-COMMERCIAL ENTERPRISE “SLAVUTYCH CITY HOSPITAL” (25 KW)



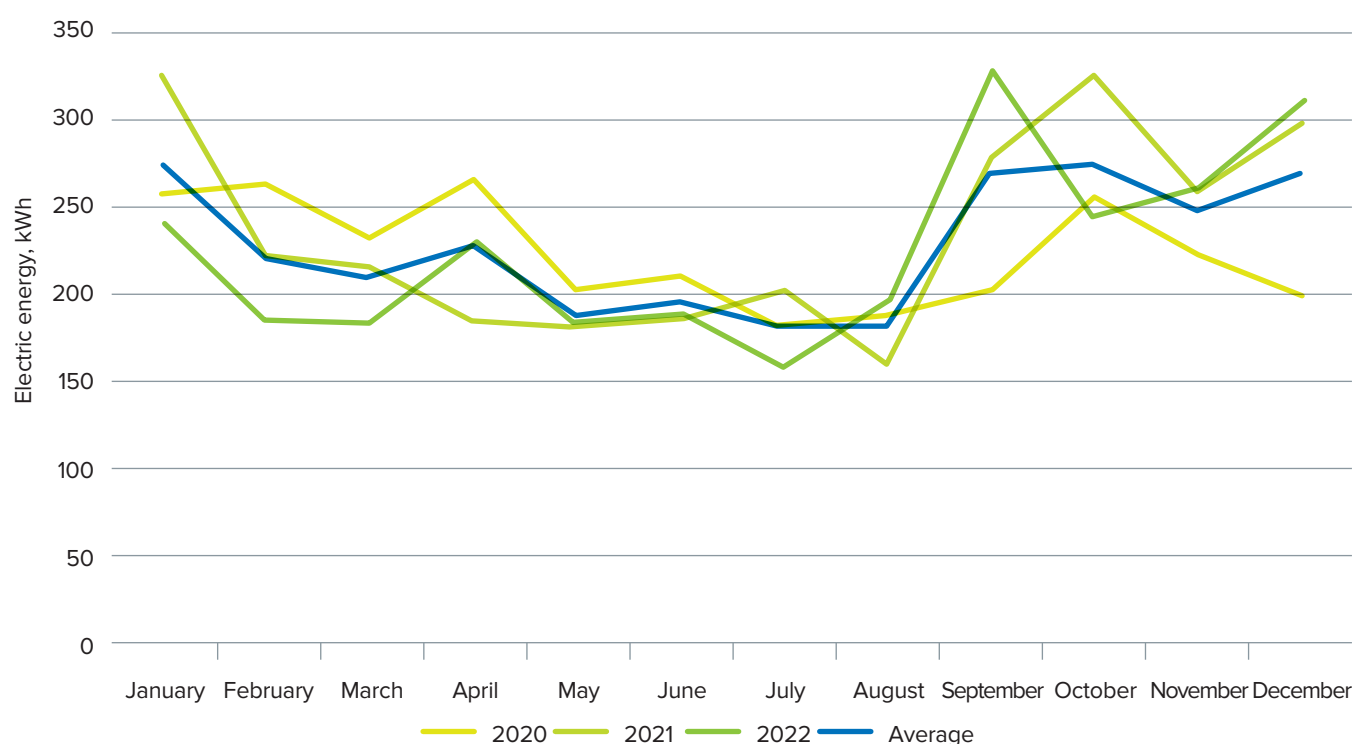
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	25 kW	-	150 m ²
Hybrid SPP	45 kW	20 kW	270 m ²

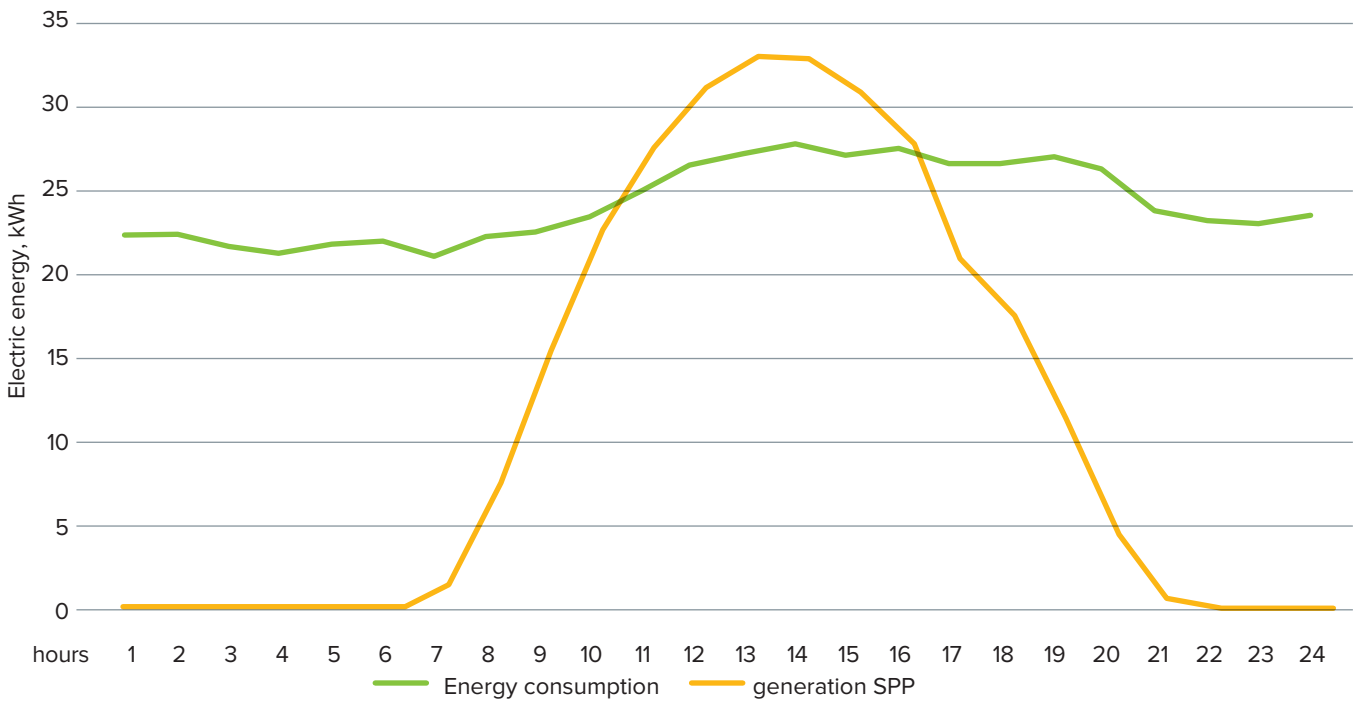
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	25 692	32 375	24 122	27 396
February	26 448	22 296	18 470	22 404
March	23 320	21 423	18 378	21 040
April	26 639	18 622	23 060	22 773
May	20 175	18 258	18 238	18 890
June	21 169	18 730	18 932	19 610
July	18 265	20 225	15 948	18 146
August	18 872	16 153	19 658	18 227
September	20 308	27 863	32 907	27 026
October	25 603	32 609	24 419	27 543
November	22 518	26 026	26 044	24 862
December	20 041	29 856	31 030	26 975
Annual	269 050	284 445	271 206	274 900

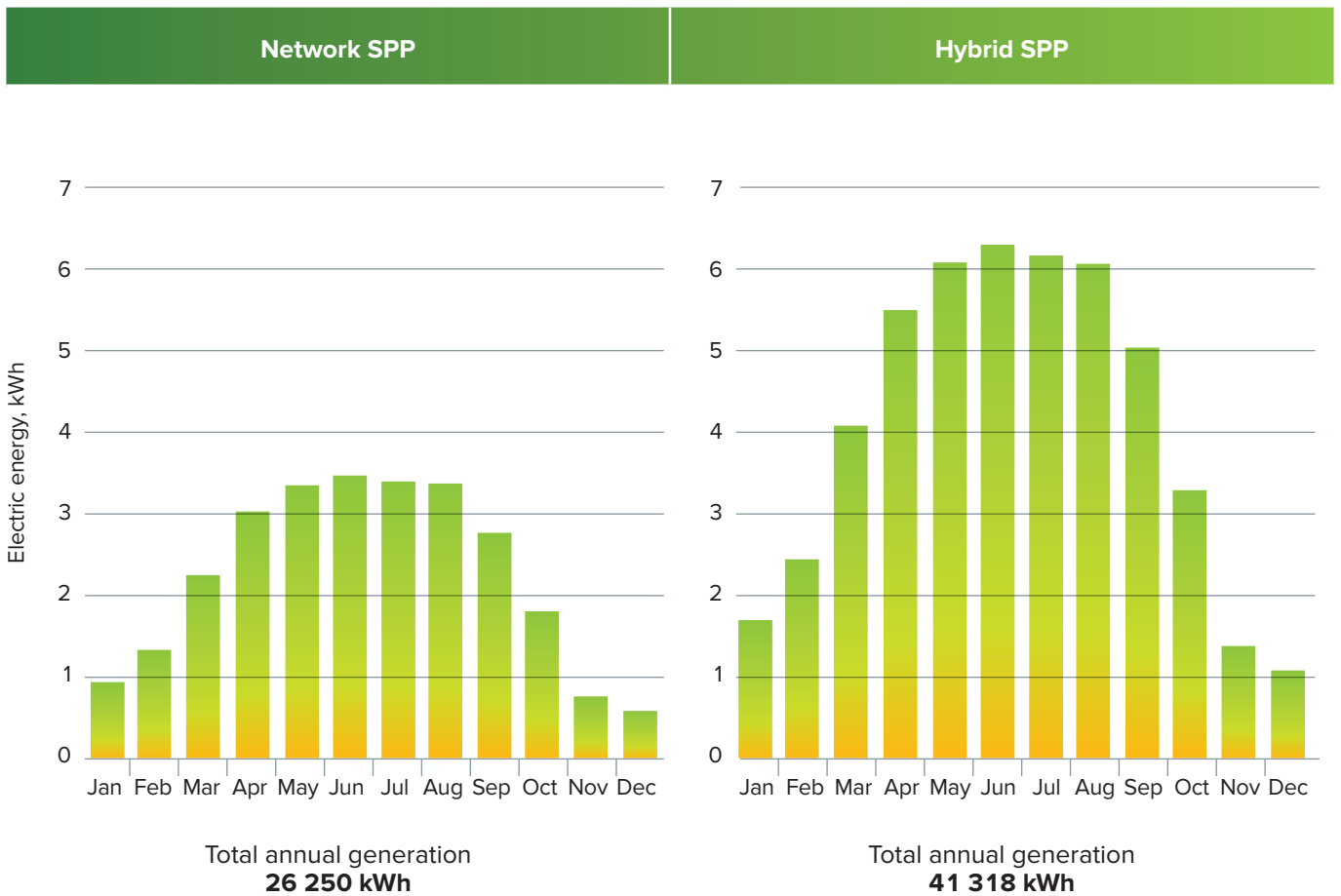
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	42	9 680	406 560
2	Network inverter, 25 kW	1	70 161	70 161
3	Installation, fastening and additional materials	-	143 016	143 016
TOTAL				619 737

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	75	9 680	726 000
2	Hybrid inverter, 10 kW	3	96 000	288 000
3	Hybrid inverter, 5 kW	3	36 990	110 970
4	Accumulator battery, 5 kWh	4	120 000	480 000
5	Installation, fastening and additional materials	-	337 491	337 491
TOTAL				1 942 461

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	274 900	274 900
SPP capacity, kW/h	25	45
Battery, kW/h	-	20
Annual electric energy generation by the SPP, kWh	26 250.00	41 318.00
Percentage of replacement of traditional electric energy, %	10%	15%
Annual savings in electric energy costs, UAH	148 312	233 447
The cost of SPP, UAH	619 737	1 942 461
Simple payback period, years	4.2	8.3
Electric energy tariff, UAH/kWh, (without VAT)	5.65	5.65
Electric energy tariff, UAH/kWh, (with VAT)	6.78	6.78



SEWAGE TREATMENT FACILITIES, SLAVUTYCH (63 KW)



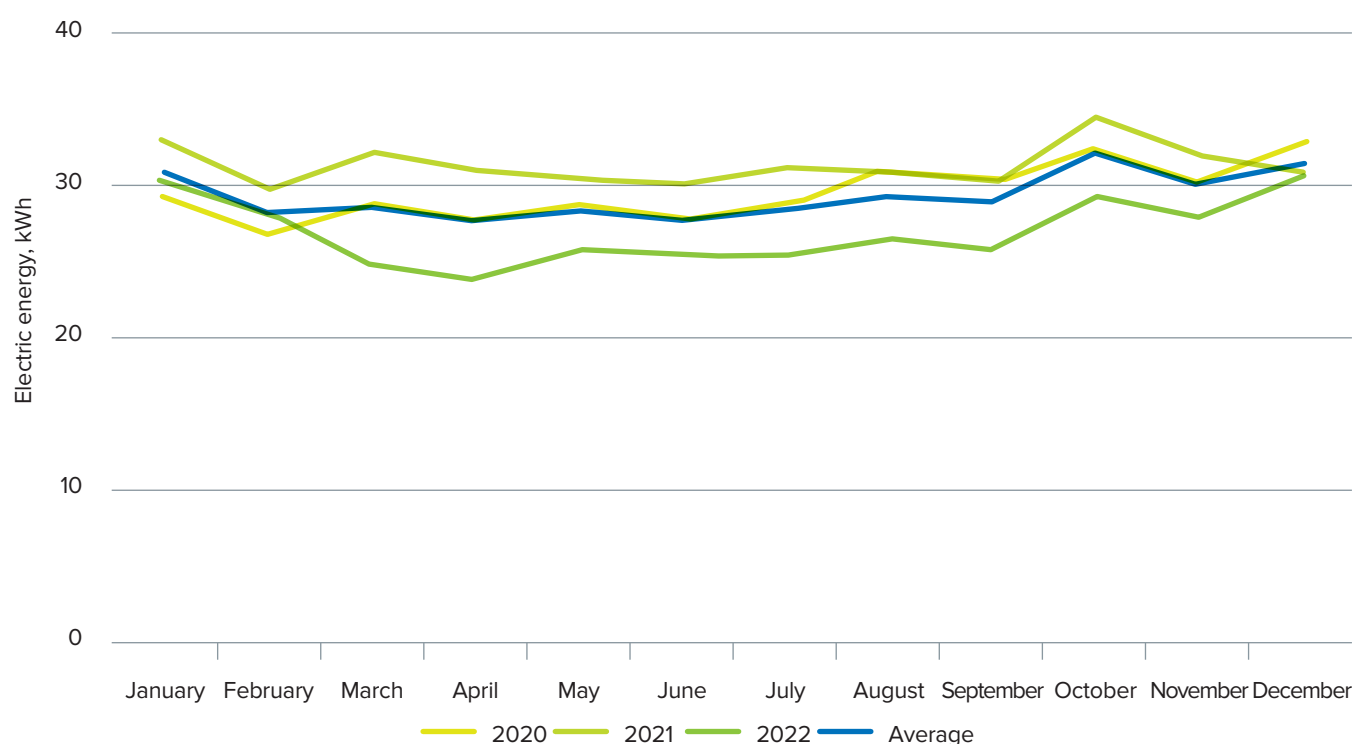
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	63 kW	-	380 m ²
Hybrid SPP	77 kW	25 kW	460 m ²

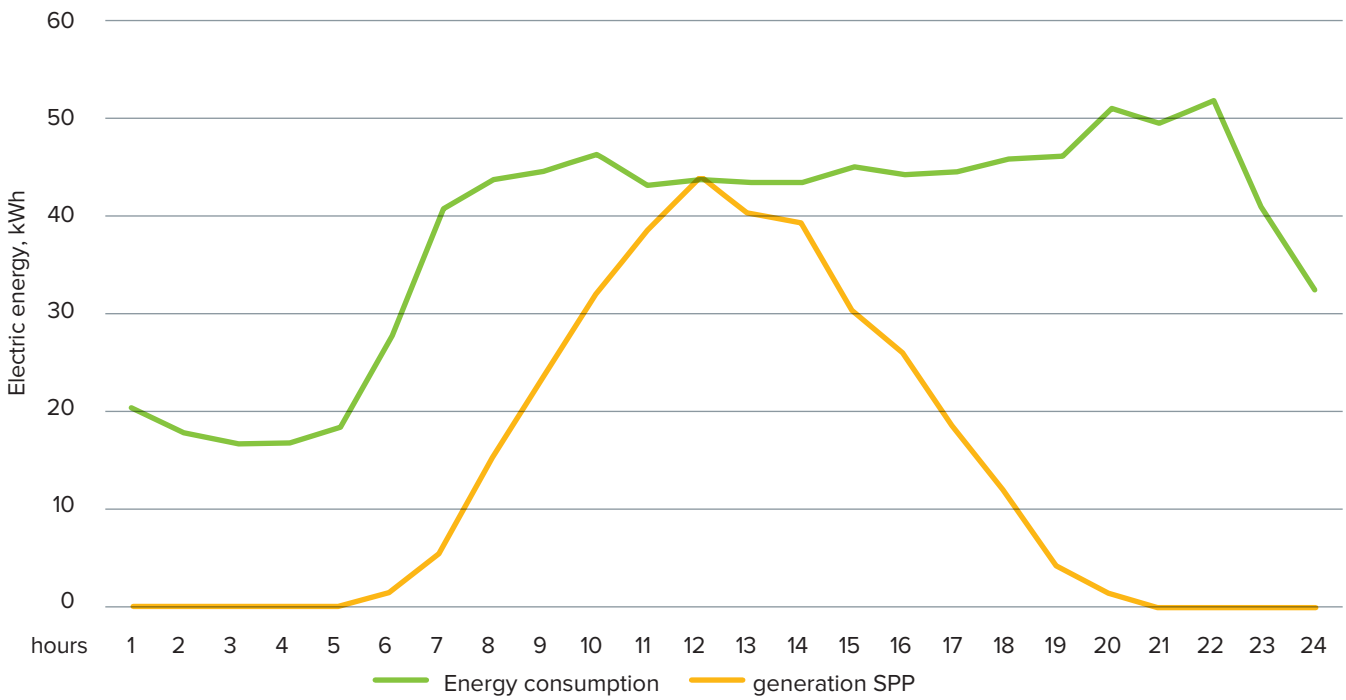
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	29 420	32 800	30 340	30 853
February	26 920	29 980	28 300	28 400
March	28 680	32 180	25 000	28 620
April	27 880	31 060	23 940	27 627
May	28 720	30 460	25 880	28 353
June	27 900	30 220	25 460	27 860
July	28 840	31 220	25 600	28 553
August	30 960	30 900	26 520	29 460
September	30 340	30 420	26 100	28 953
October	32 560	34 540	29 380	32 160
November	30 500	32 080	27 940	30 173
December	32 760	31 180	30 660	31 533
Annual	355 480	377 040	325 120	352 547

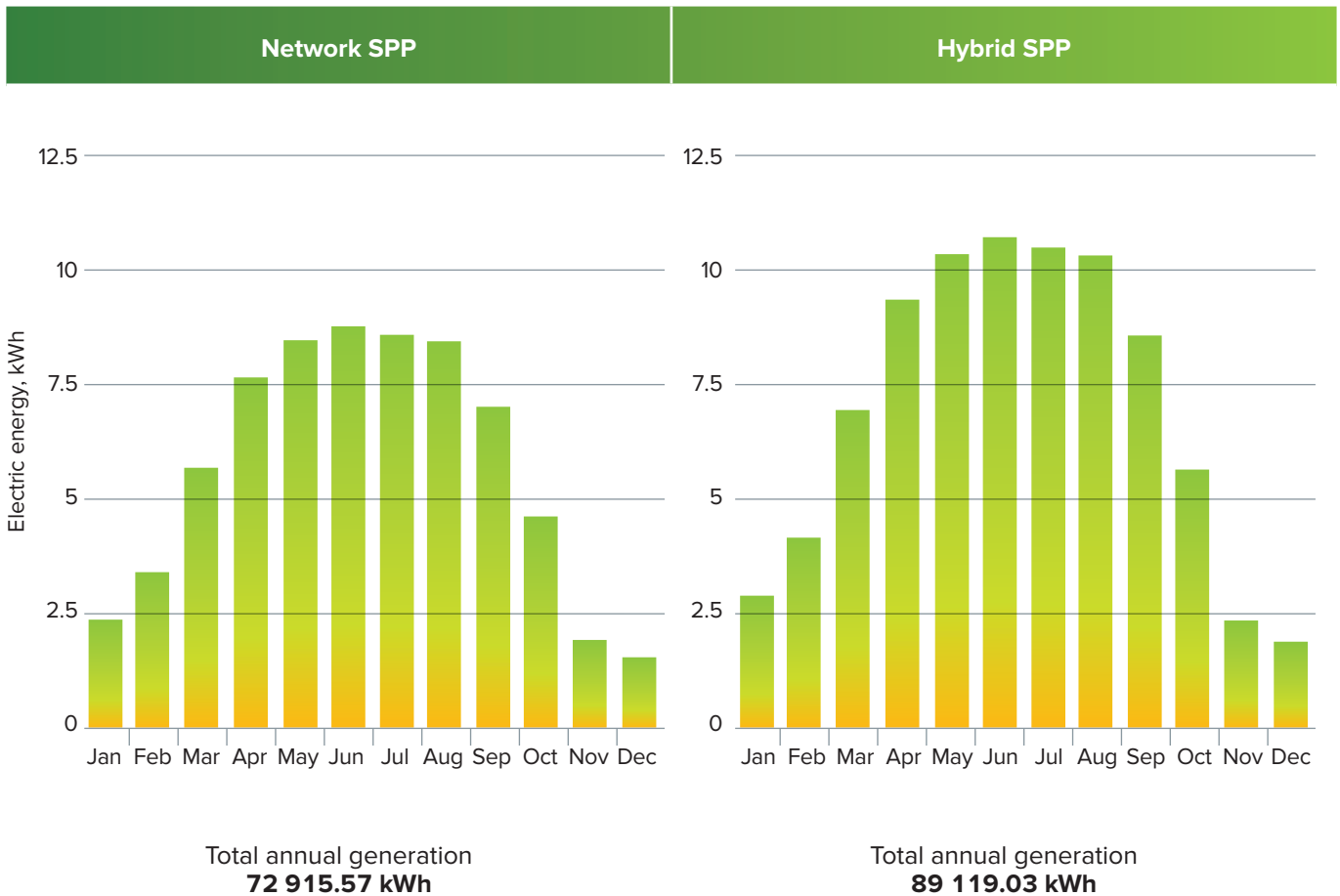
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	105	9 680	1 016 400
2	Network inverter, 36 kW	2	124 000	248 000
3	Installation, fastening and additional materials	-	379 320	379 320
TOTAL				1 643 720

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	129	9 680	1 248 720
2	Hybrid inverter, 10 kW	8	96 000	768 000
3	Accumulator battery, 5 kWh	5	120 000	600 000
4	Installation, fastening and additional materials	-	605 016	605 016
TOTAL				3 221 736

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	352 547	352 547
SPP capacity, kW/h	63	77
Battery, kW/h	-	25
Annual electric energy generation by the SPP, kWh	72 915.57	89 119.03
Percentage of replacement of traditional electric energy, %	21%	25%
Annual savings in electric energy costs, UAH	372 477	455 250
The cost of SPP, UAH	1 643 720	3 221 736
Simple payback period, years	4.4	7.1
Electric energy tariff, UAH/kWh, (without VAT)	5.11	5.11
Electric energy tariff, UAH/kWh, (with VAT)	6.13	6.13



WATER TREATMENT FACILITIES, SLAVUTYCH (56 KW)



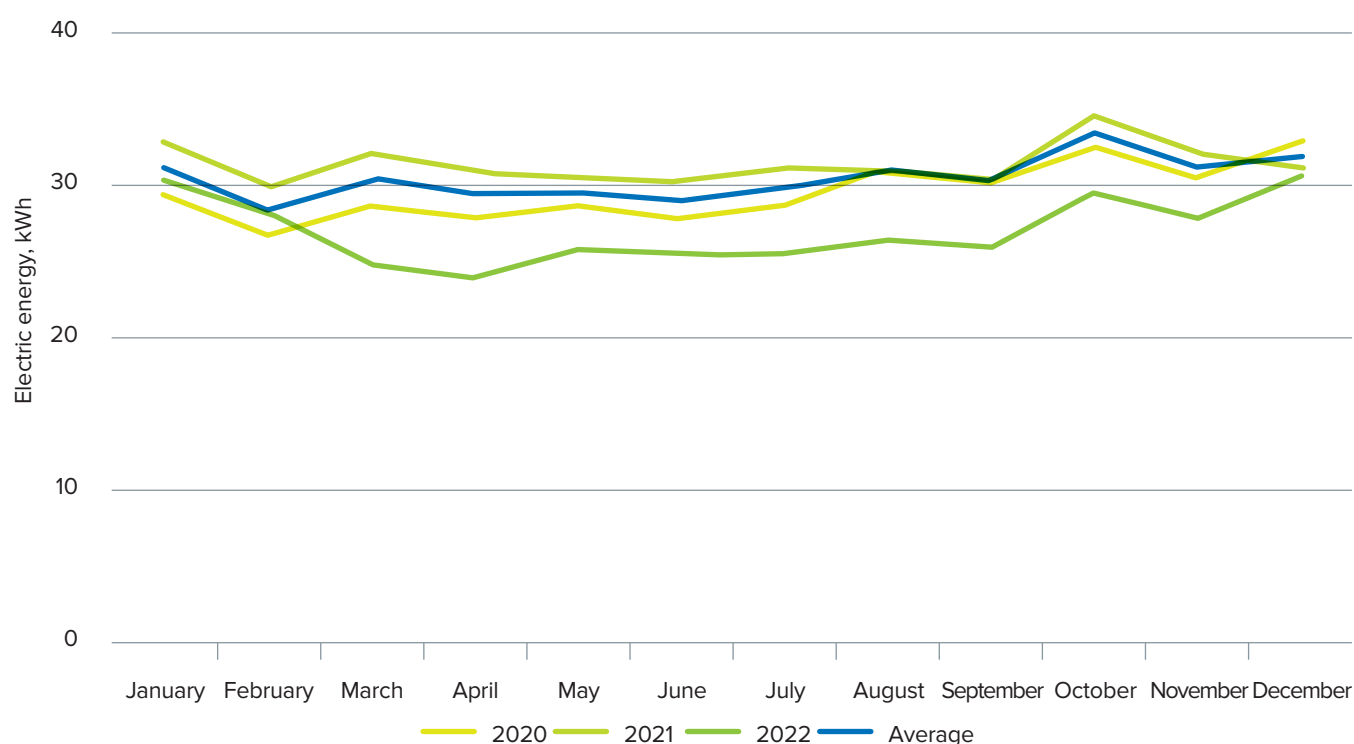
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	56 kW	-	335 m ²
Hybrid SPP	77 kW	25 kW	460 m ²

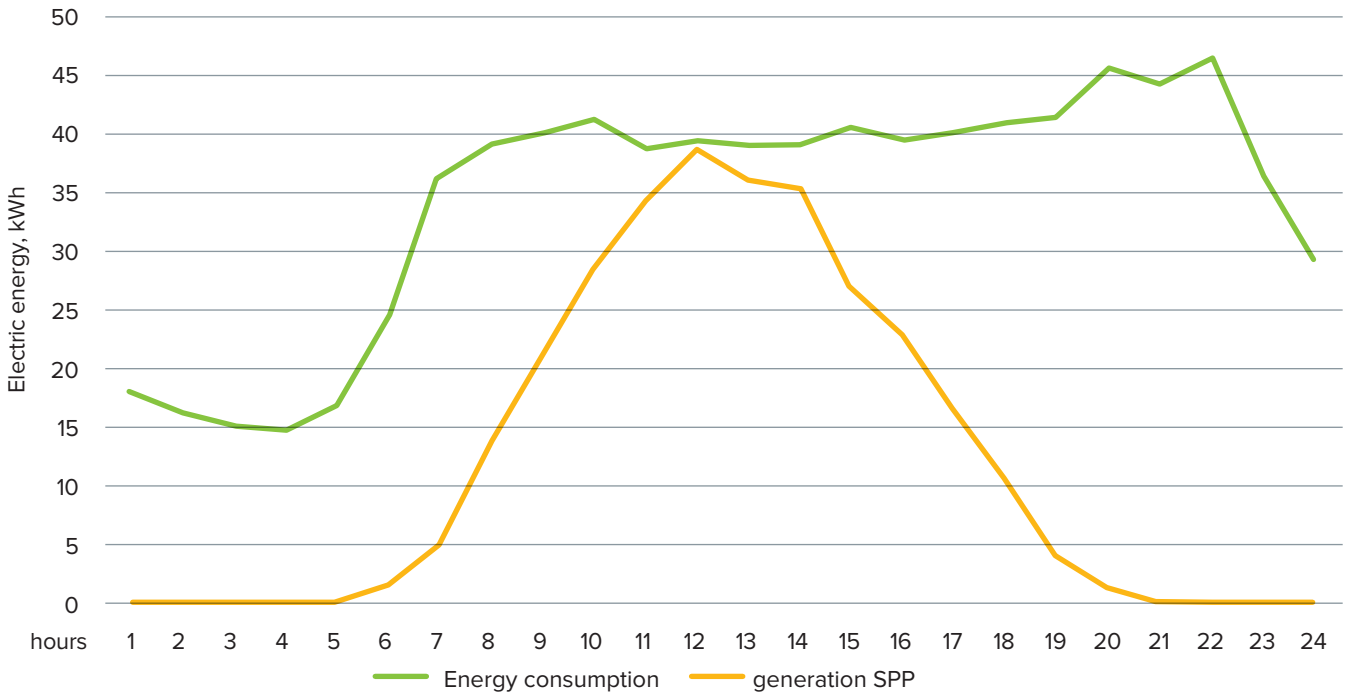
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	29 420	32 800	30 340	31 110
February	26 920	29 980	28 300	28 450
March	28 680	32 180	25 000	30 430
April	27 880	31 060	23 940	29 470
May	28 720	30 460	25 880	29 590
June	27 900	30 220	25 460	29 060
July	28 840	31 220	25 600	30 030
August	30 960	30 900	26 520	30 930
September	30 340	30 420	26 100	30 380
October	32 560	34 540	29 380	33 550
November	30 500	32 080	27 940	31 290
December	32 760	31 180	30 660	31 970
Annual	355 480	377 040	325 120	366 260

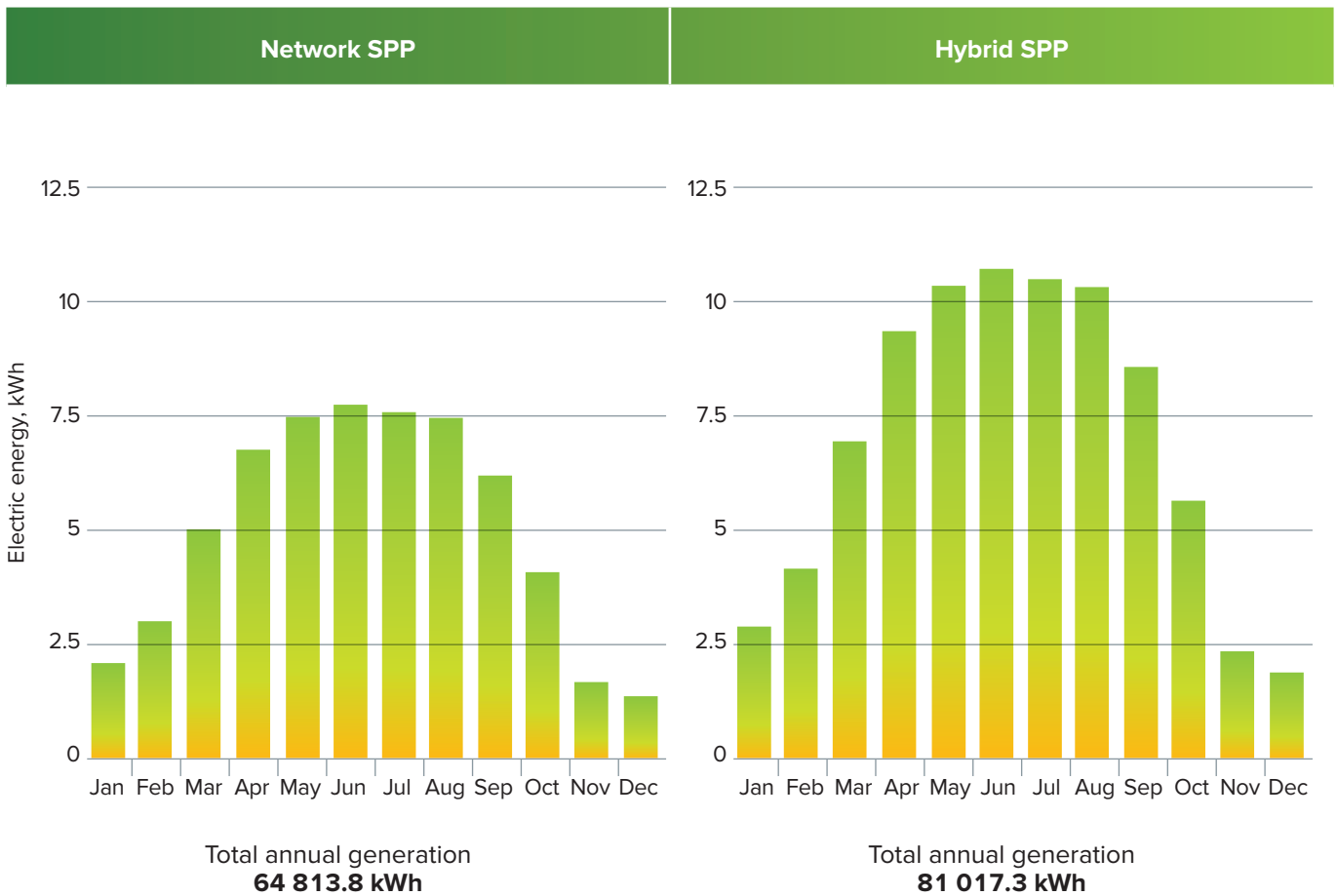
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	94	9 680	909 920
2	Network inverter, 36 kW	2	124 000	248 000
3	Installation, fastening and additional materials	-	347 376	347 376
TOTAL				1 505 296

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	129	9 680	1 248 720
2	Hybrid inverter, 10 kW	7	96 000	672 000
3	Accumulator battery, 5 kWh	5	120 000	600 000
4	Installation, fastening and additional materials	-	425 208	425 208
TOTAL				2 945 928

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	366 260	366 260
SPP capacity, kW/h	56	77
Battery, kW/h	-	25
Annual electric energy generation by the SPP, kWh	64 813.84	81 017.30
Percentage of replacement of traditional electric energy, %	18%	22%
Annual savings in electric energy costs, UAH	331 091	413 863
The cost of SPP, UAH	1 505 296	2 945 928
Simple payback period, years	4.5	7.1
Electric energy tariff, UAH/kWh, (without VAT)	5.11	5.11
Electric energy tariff, UAH/kWh, (with VAT)	6.13	6.13



MUNICIPAL COMMUNAL ENTERPRISE “KHMELNYTSKVODOKANAL” WATER PRESSURE BOOSTER STATION VNS-10 (950 KW)



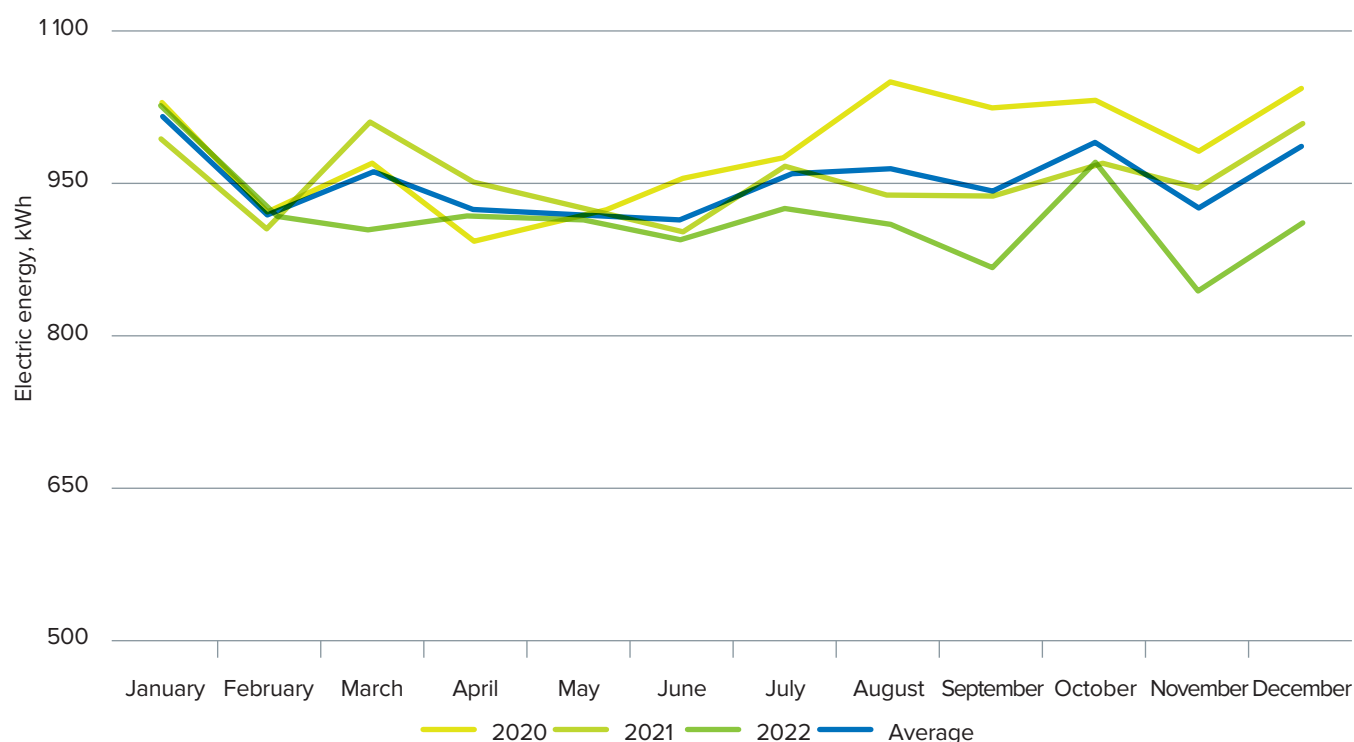
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	950 kW	-	5 700 m ²
Hybrid SPP	1 140 kW	190 kW	6 850 m ²

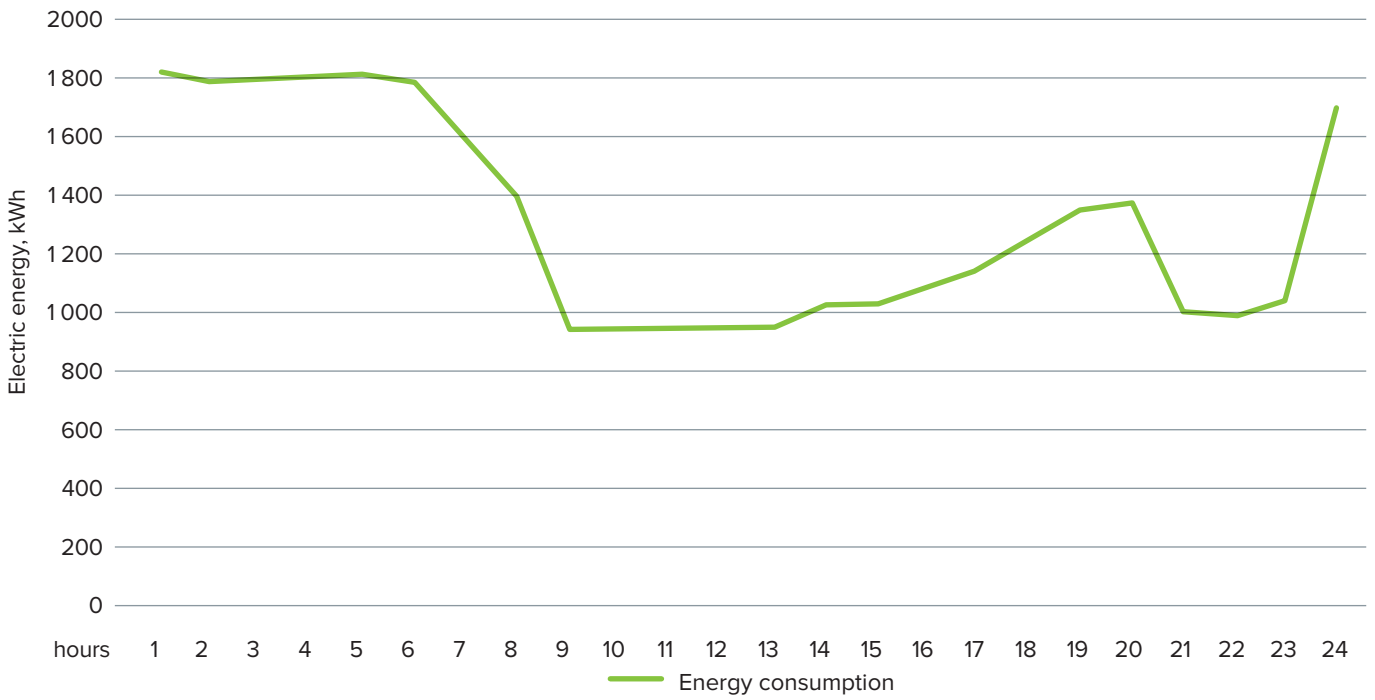
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	1 029 780	993 383	1 021 547	1 014 903
February	925 965	907 362	921 030	918 119
March	968 435	1 011 310	905 986	961 910
April	895 840	953 150	917 558	922 183
May	915 260	927 241	914 997	919 166
June	955 455	902 703	893 898	917 352
July	975 636	966 355	925 960	955 984
August	1 049 896	940 029	908 727	966 217
September	1 025 901	939 685	866 680	944 089
October	1 032 574	968 190	970 707	990 490
November	984 460	945 947	843 600	924 669
December	1 043 909	1 009 240	909 298	987 482
Annual	11 803 111	11 464 595	10 999 988	11 422 565

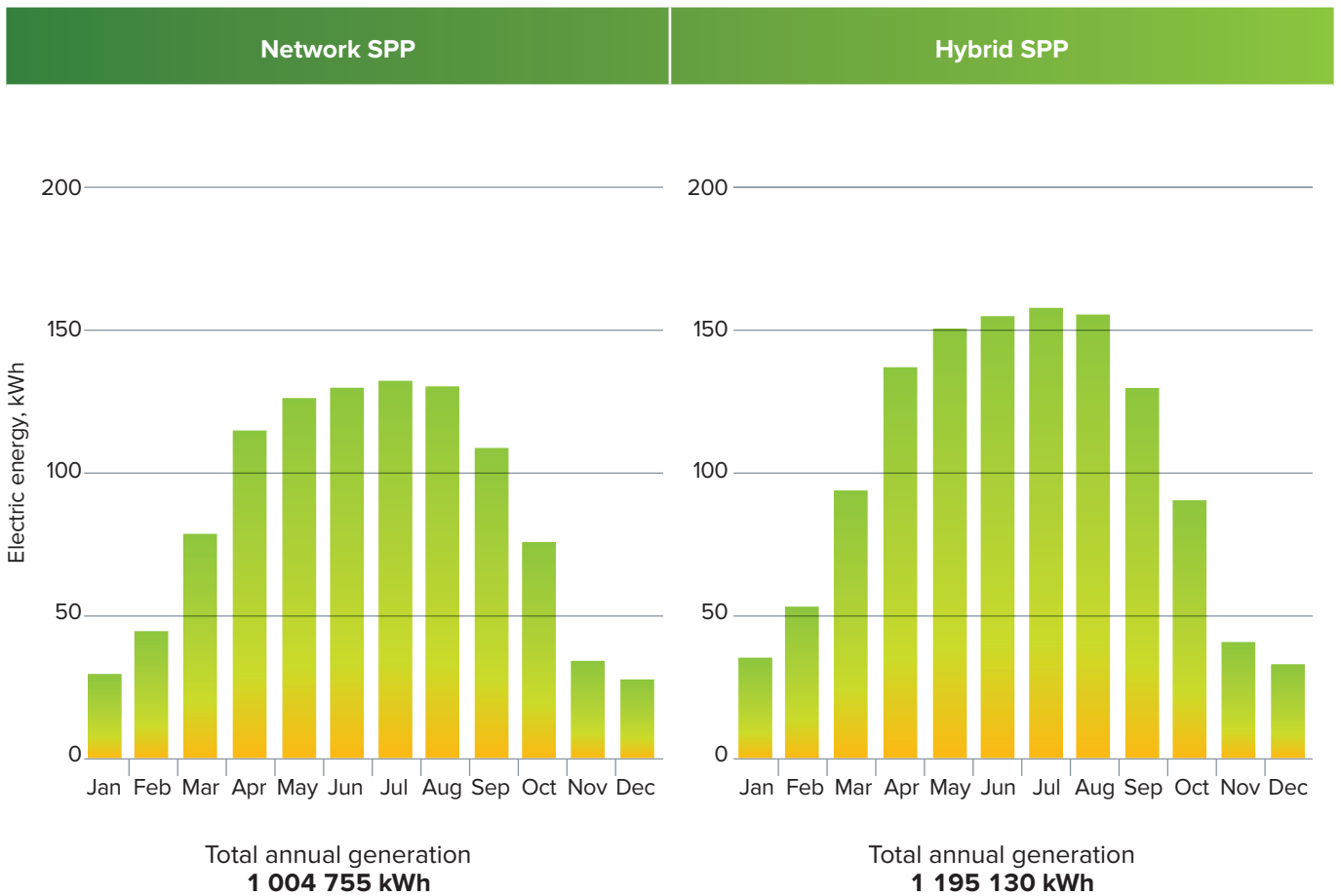
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 685 W	1 385	6 358	8 805 069
2	Network inverter, 110 kW	9	113 802	1 024 218
3	Installation, fastening and additional materials	-	16 100 400	16 100 400
TOTAL				25 929 687

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 685 W	1 650	6 358	10 490 700
2	Hybrid inverter, 50 kW	23	266 570	6 131 110
3	Accumulator battery, 190 kWh	1	4 446 000	4 446 000
4	Installation, fastening and additional materials	-	19 151 002	19 151 002
TOTAL				40 218 812

Link to indicative price offers:

solar modules

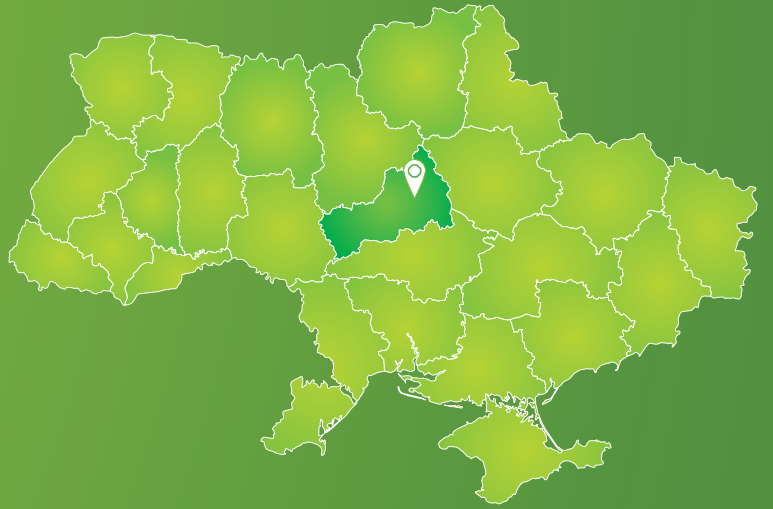
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

battery

<https://energystorage.com.ua/ua/resheniya/sistemy-akkumulirovaniya-energii/promyshlennyeot-200-kvt>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	11 422 565	11 422 565
SPP capacity, kW/h	950	1 130
Battery, kW/h	-	190
Annual electric energy generation by the SPP, kWh	1 004 755.00	1 195 130.00
Percentage of replacement of traditional electric energy, %	9%	10%
Annual savings in electric energy costs, UAH	4 179 781	4 971 741
The cost of SPP, UAH	25 929 687	40 218 812
Simple payback period, years	6.2	8.1
Electric energy tariff, UAH/kWh, (without VAT)	4.16	4.16
Electric energy tariff, UAH/kWh, (with VAT)	4.99	4.99



ADMINISTRATIVE BUILDING OF THE CHERKASY CITY COUNCIL (15 KW)



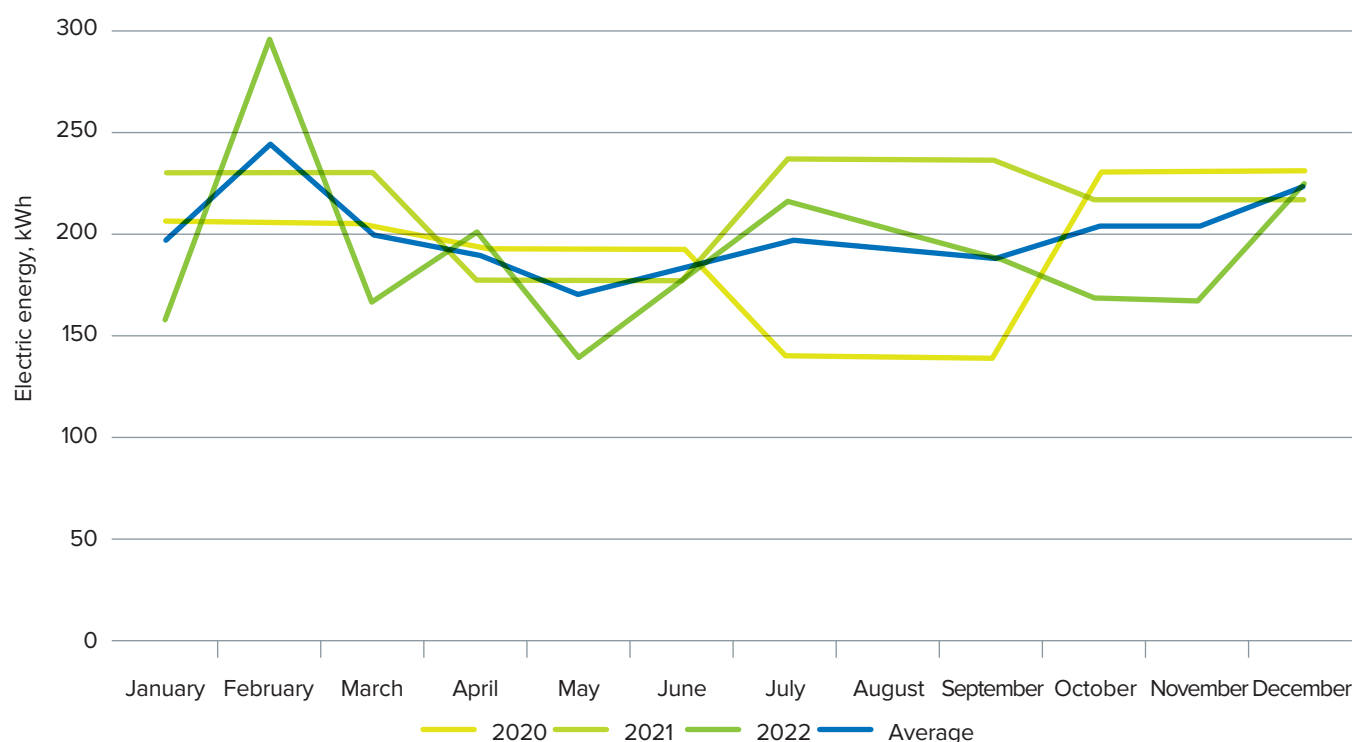
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	15 kW	-	90 m ²
Hybrid SPP	19 kW	10 kW	115 m ²

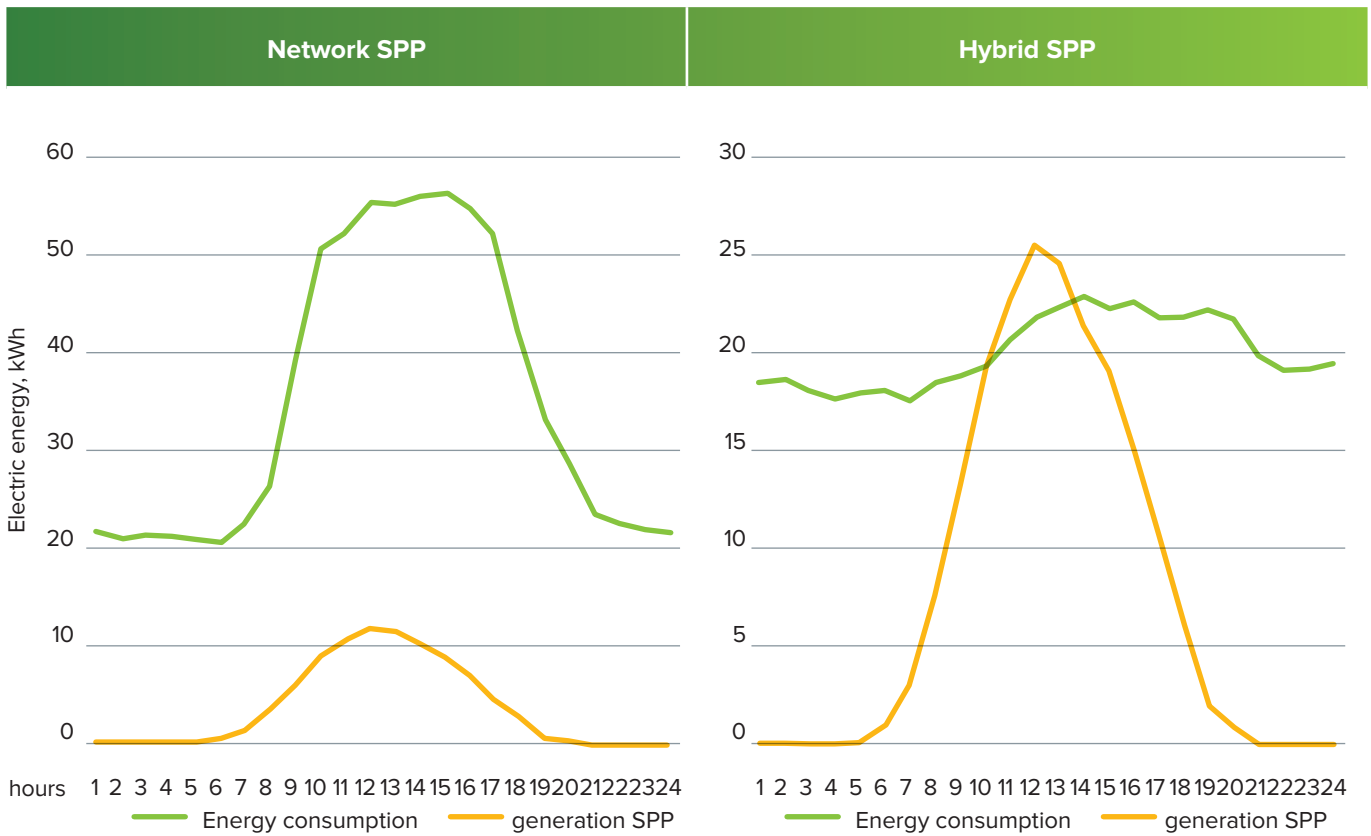
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	20 480	22 973	15 686	19 713
February	20 480	22 973	29 759	24 404
March	20 480	22 973	16 494	19 982
April	19 227	17 760	20 005	18 997
May	19 227	17 760	13 823	16 937
June	19 227	17 760	17 997	18 328
July	13 922	23 582	21 465	19 656
August	13 922	23 582	20 153	19 219
September	13 922	23 582	18 839	18 781
October	22 973	21 629	16 725	20 442
November	22 973	21 629	16 591	20 398
December	22 973	21 629	22 512	22 371
Annual	229 805	257 833	230 049	239 229

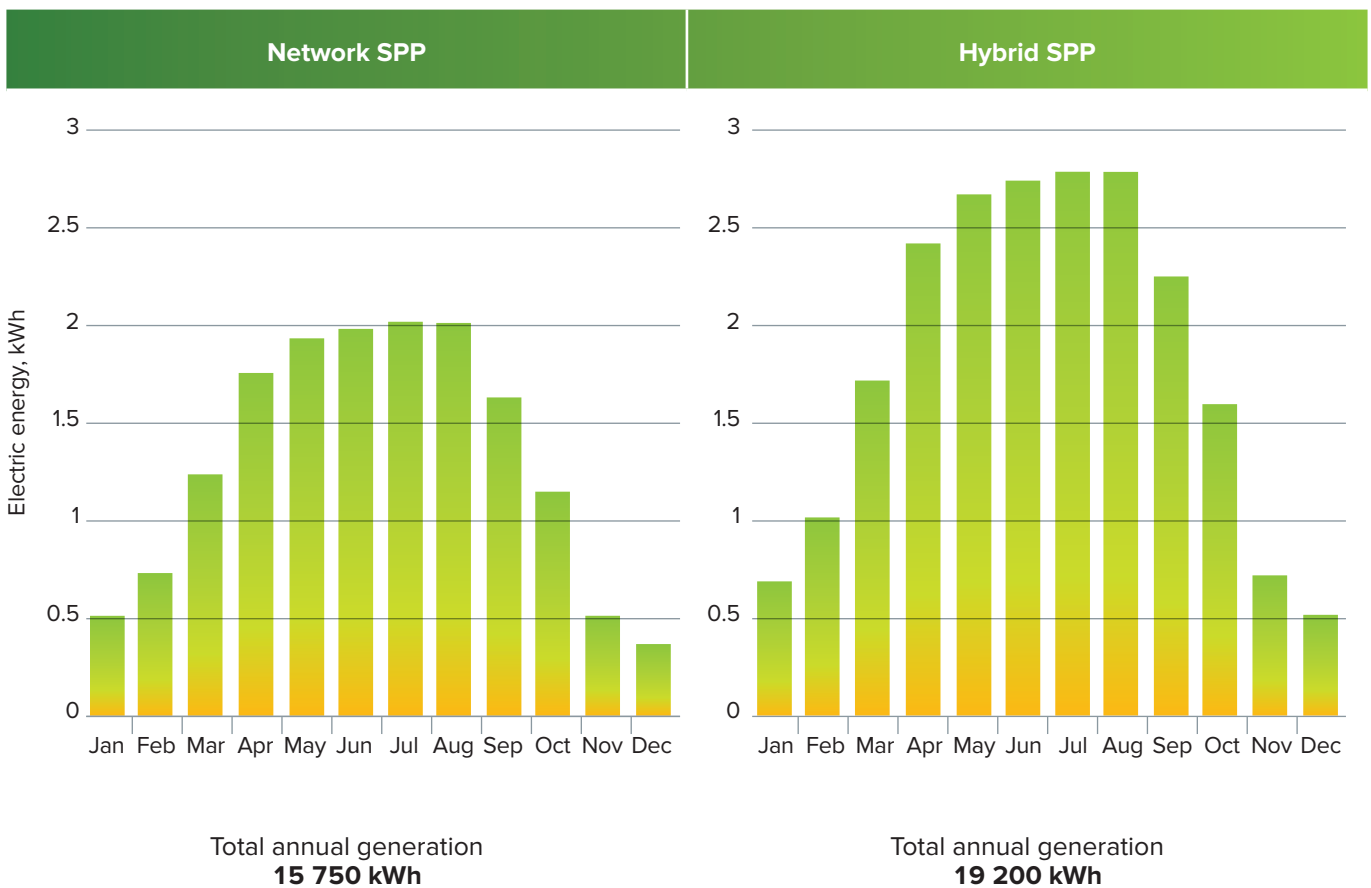
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	25	9 680	242 000
2	Network inverter, 30 kW	1	76 160	76 160
3	Installation, fastening and additional materials	-	95 448	95 448
TOTAL				413 608

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	32	9 680	309 760
2	Hybrid inverter, 10 kW	2	96 000	192 000
3	Accumulator battery, 5 kWh	2	120 000	240 000
4	Installation, fastening and additional materials	-	258 528	258 528
TOTAL				1 000 288

Link to indicative price offers:

solar modules

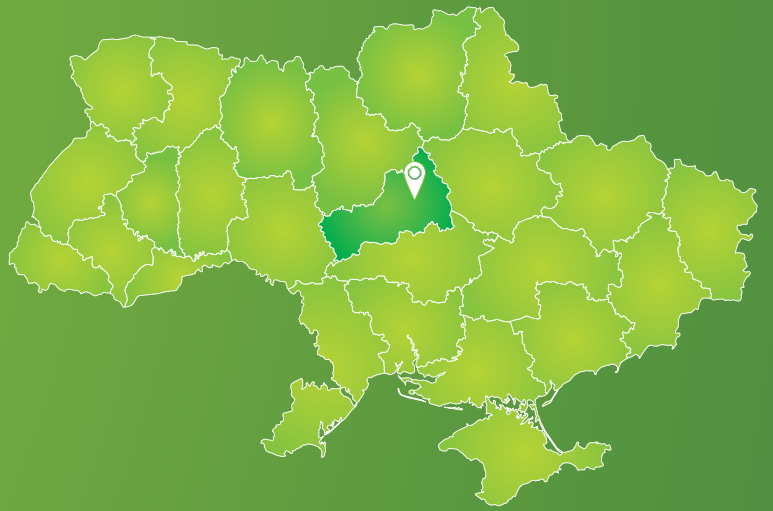
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	239 229	239 229
SPP capacity, kW/h	15	19
Battery, kW/h	-	10
Annual electric energy generation by the SPP, kWh	15 750.00	19 200.00
Percentage of replacement of traditional electric energy, %	7%	8%
Annual savings in electric energy costs, UAH	101 588	123 840
The cost of SPP, UAH	413 608	1 000 288
Simple payback period, years	4.1	8.1
Electric energy tariff, UAH/kWh, (without VAT)	5.37	5.37
Electric energy tariff, UAH/kWh, (with VAT)	6.45	6.45



**COMMUNAL NON-COMMERCIAL
ENTERPRISE “CHERKASY CITY
CHILDREN’S HOSPITAL” (50 KW)**



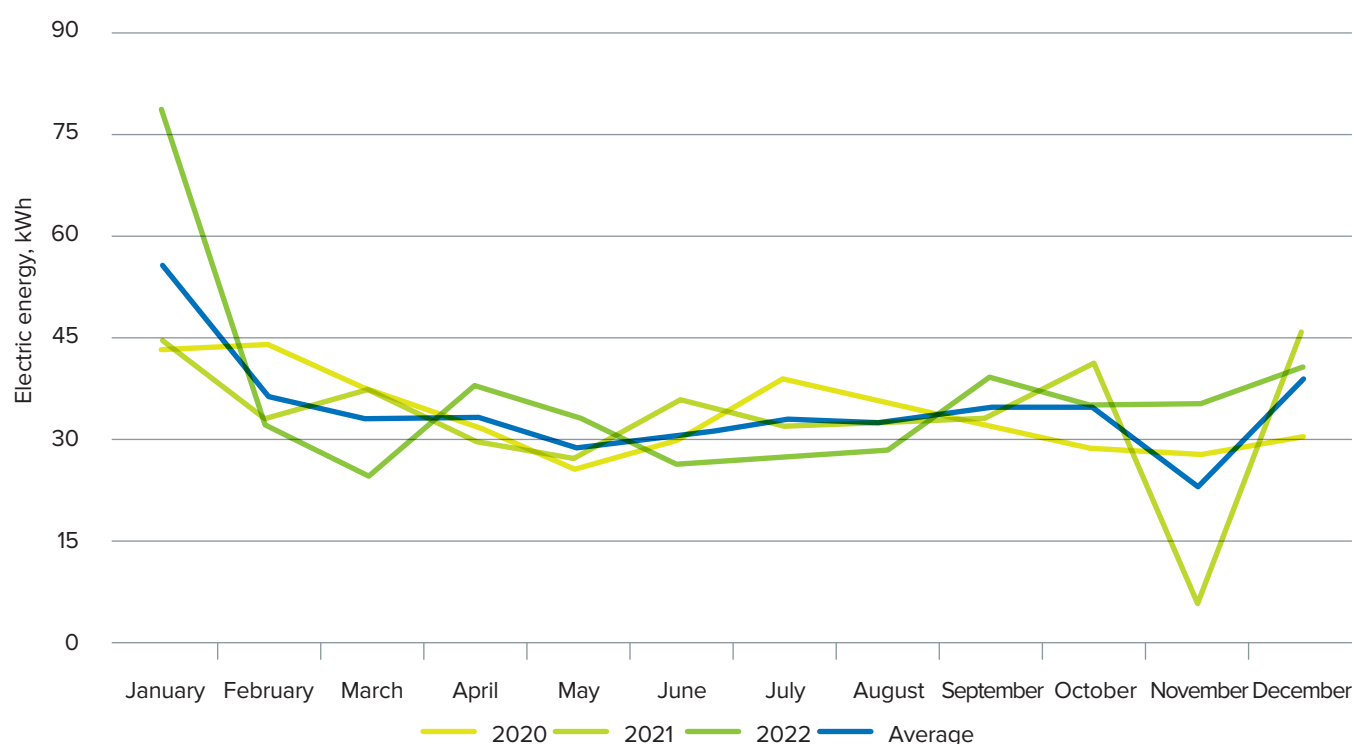
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	50 kW	-	300 m ²
Hybrid SPP	100 kW	30 kW	600 m ²

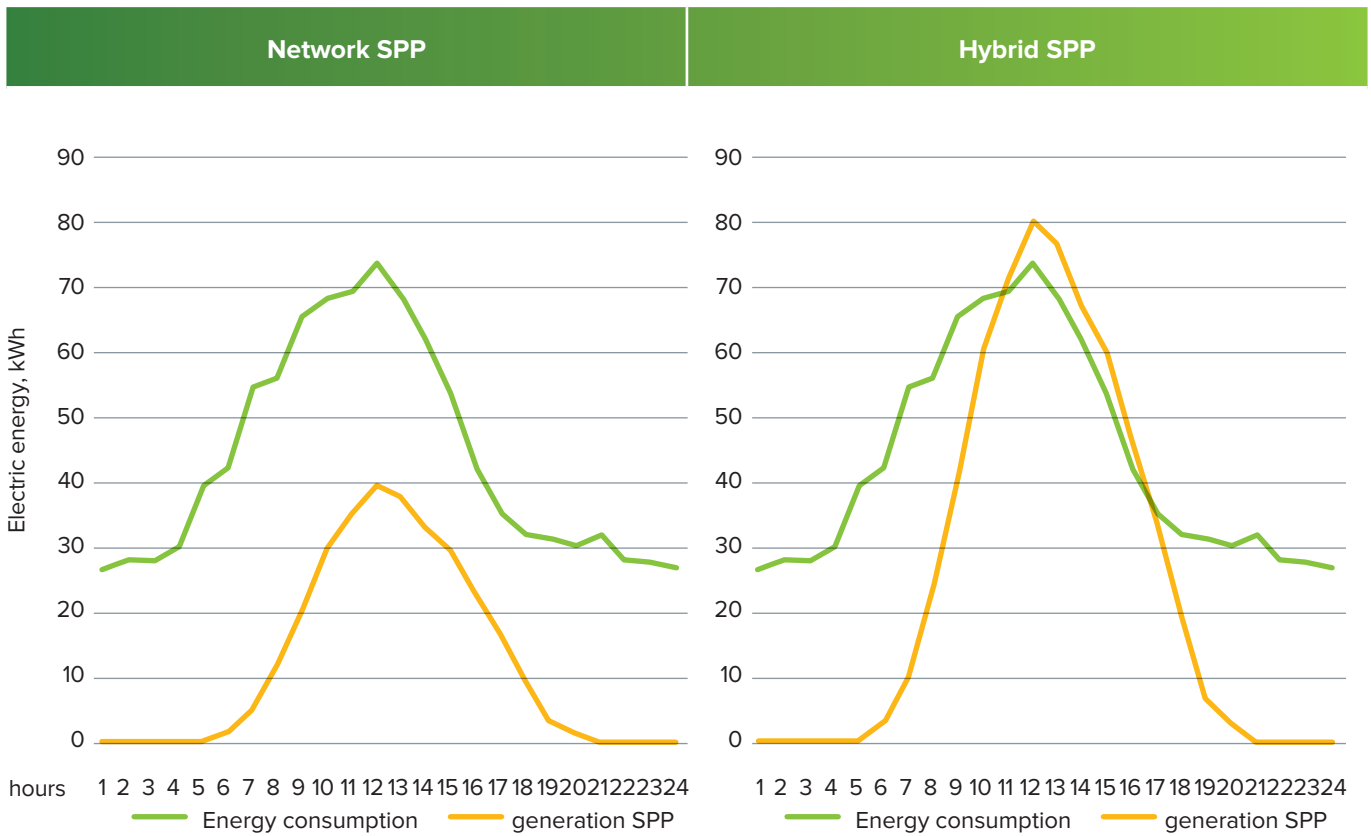
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	43 334	44 528	78 555	55 472
February	43 682	33 053	31 840	36 192
March	36 954	37 089	24 853	32 965
April	32 017	29 856	37 804	33 226
May	25 487	27 169	33 158	28 605
June	30 272	35 786	25 944	30 667
July	39 127	32 067	27 480	32 891
August	35 065	33 330	28 347	32 247
September	32 068	33 536	39 072	34 892
October	28 361	41 216	34 936	34 838
November	27 691	5 568	35 260	22 840
December	30 165	45 432	40 676	38 758
Annual	404 223	398 630	437 925	413 593

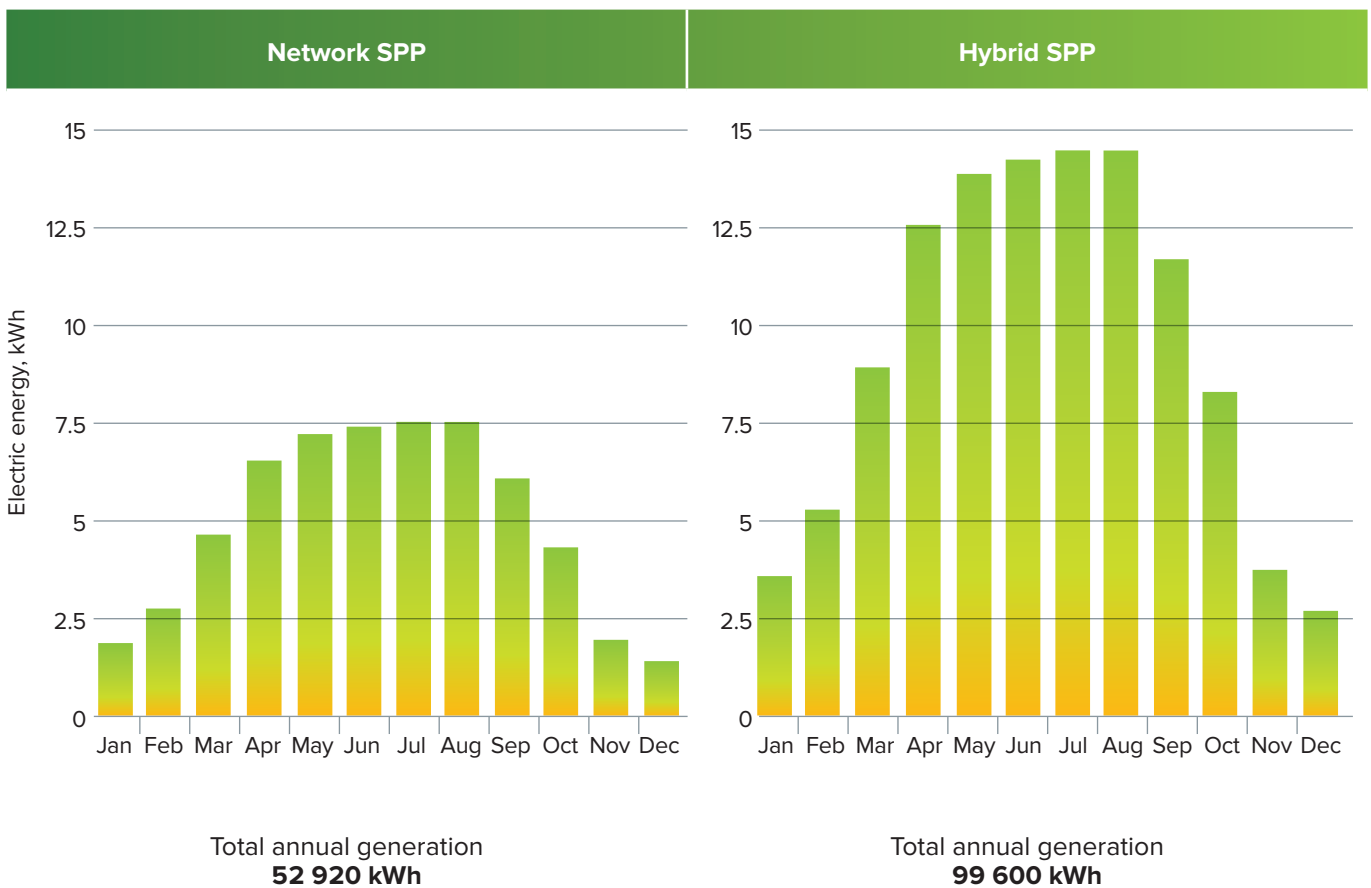
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	84	9 680	813 120
2	Network inverter, 50 kW	1	182 000	182 000
3	Installation, fastening and additional materials	-	298 536	298 536
TOTAL				1 293 656

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	166	9 680	1 606 880
2	Hybrid inverter, 10 kW	10	96 000	960 000
3	Accumulator battery, 5 kWh	6	120 000	720 000
4	Installation, fastening and additional materials	-	986 064	986 064
TOTAL				4 272 944

Link to indicative price offers:

solar modules

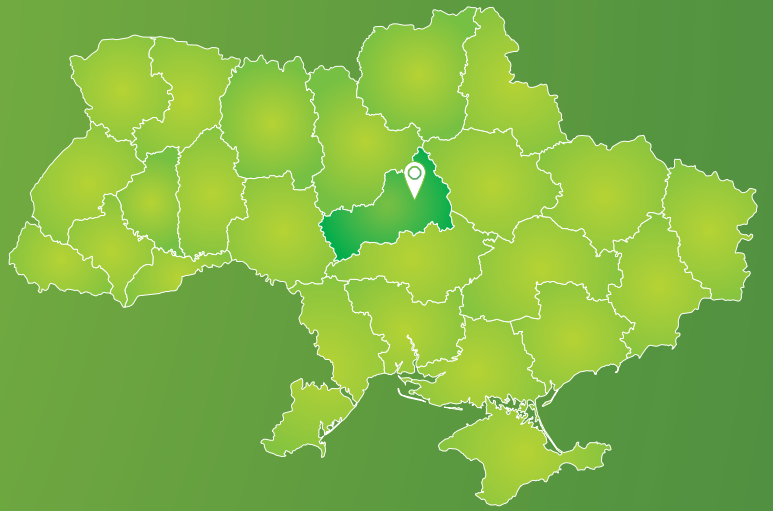
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	413 593	413 593
SPP capacity, kW/h	50	100
Battery, kW/h	-	30
Annual electric energy generation by the SPP, kWh	52 920	99 600
Percentage of replacement of traditional electric energy, %	13%	24%
Annual savings in electric energy costs, UAH	363 968	685 019
The cost of SPP, UAH	1 293 656	4 272 944
Simple payback period, years	3.6	6.2
Electric energy tariff, UAH/kWh, (without VAT)	5.73	5.73
Electric energy tariff, UAH/kWh, (with VAT)	6.8 777	6.8 777



COMMUNAL NON-COMMERCIAL ENTERPRISE “MOTHER AND CHILD CENTRE” (40 KW)



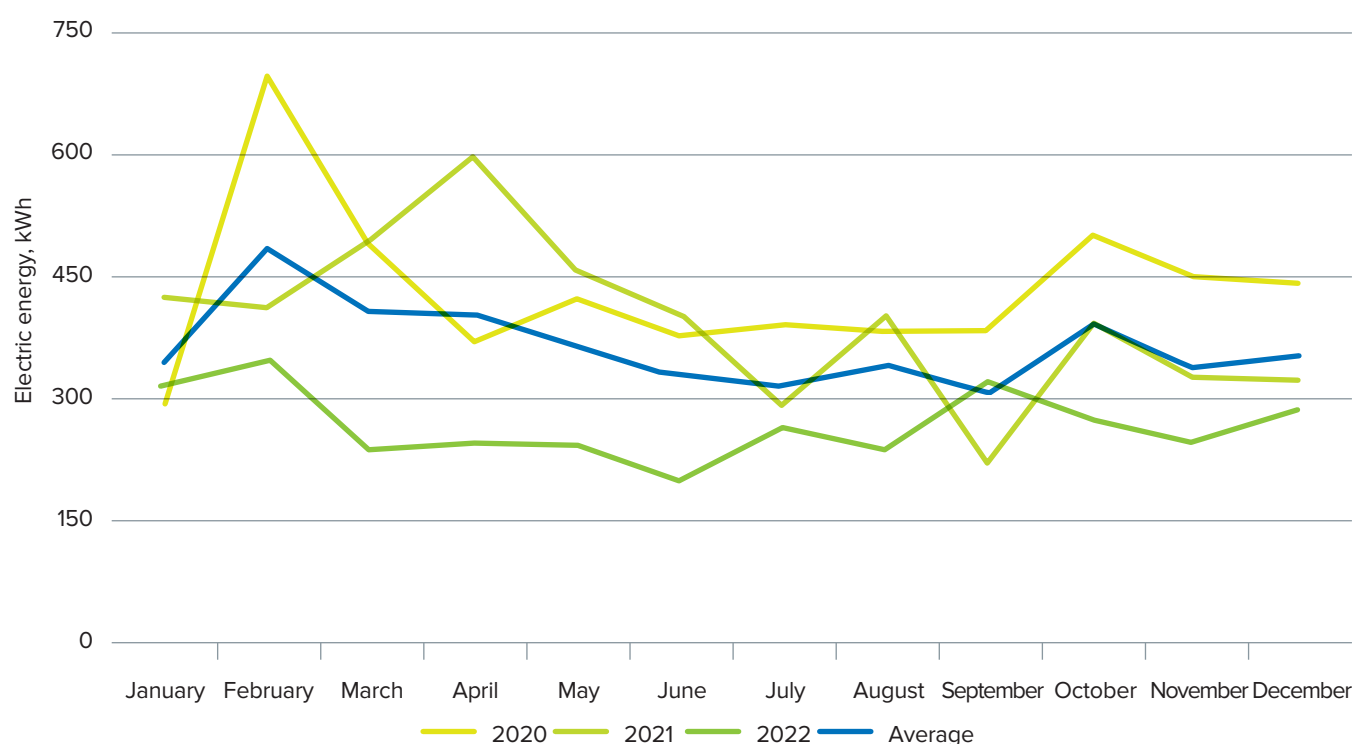
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	40 kW	-	240 m ²
Hybrid SPP	100 kW	30 kW	600 m ²

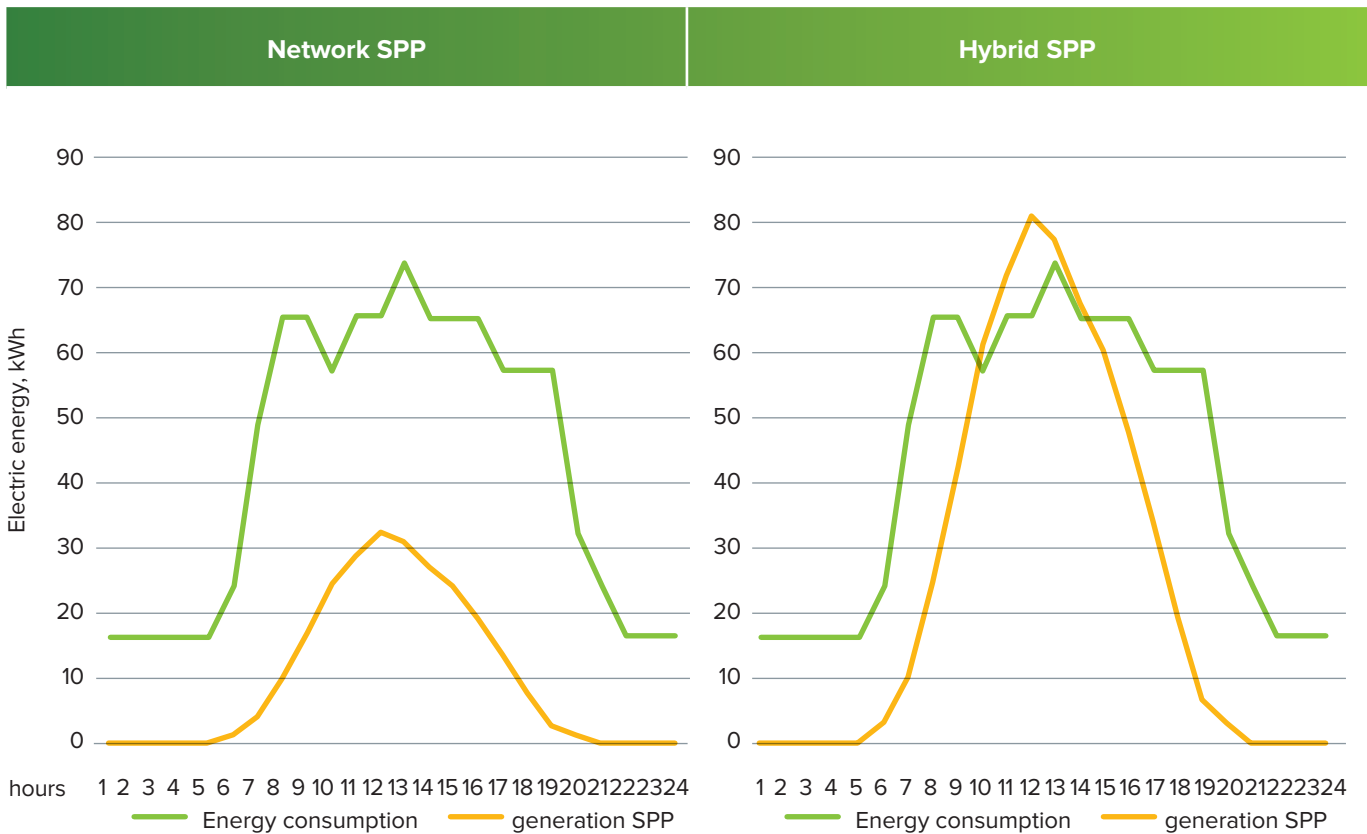
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	29 180	42 787	32 099	34 688
February	70 056	41 478	34 970	48 834
March	48 962	49 694	23 810	40 822
April	37 190	59 874	24 795	40 619
May	42 387	45 917	24 413	36 248
June	37 863	40 563	20 443	32 956
July	39 482	29 182	26 579	31 748
August	38 385	40 559	23 759	34 234
September	38 667	22 276	32 159	31 034
October	50 278	39 189	27 743	39 070
November	45 093	33 161	24 662	34 305
December	44 489	32 471	29 068	35 343
Annual	522 032	477 151	324 500	441 227

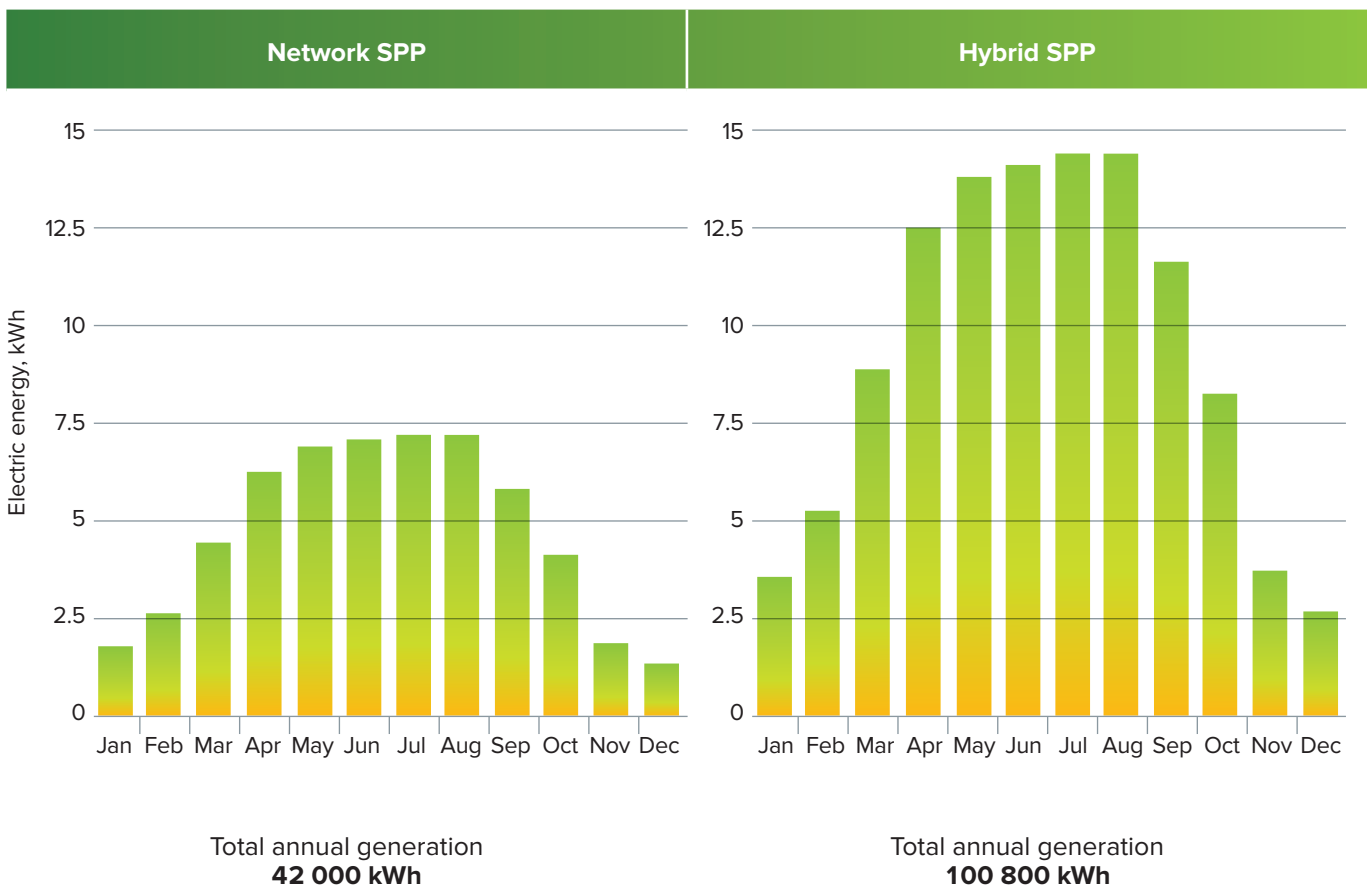
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



Total annual generation
42 000 kWh

Total annual generation
100 800 kWh

6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	67	9 680	648 560
2	Network inverter, 50 kW	1	170 280	170 280
3	Installation, fastening and additional materials	-	245 652	245 652
TOTAL				1 064 492

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 600 W	168	9 680	1 626 240
2	Hybrid inverter, 10 kW	10	96 000	960 000
3	Accumulator battery, 5 kWh	6	120 000	720 000
4	Installation, fastening and additional materials	-	991 872	991 872
TOTAL				4 298 112

Link to indicative price offers:

solar modules

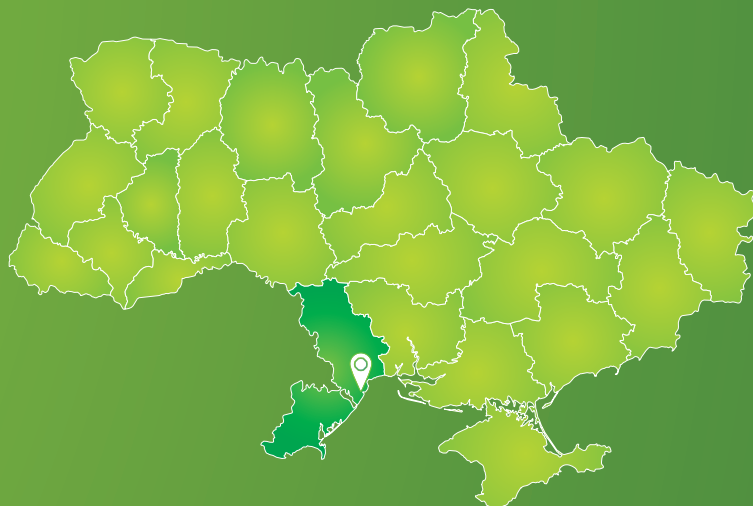
<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

inverters

<https://soncedim.com.ua/invertori/brand-huawei-sun2000-or-solis>

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	441 227	441 227
SPP capacity, kW/h	40	100
Battery, kW/h	-	30
Annual electric energy generation by the SPP, kWh	42 000	100 800
Percentage of replacement of traditional electric energy, %	10%	23%
Annual savings in electric energy costs, UAH	258 300	619 920
The cost of SPP, UAH	1 064 492	4 298 112
Simple payback period, years	4.1	6.9
Electric energy tariff, UAH/kWh, (without VAT)	512	512
Electric energy tariff, UAH/kWh, (with VAT)	6.15	6.15



**COMMUNAL NON-COMMERCIAL ENTERPRISE
“CHORNOMORSK HOSPITAL” (150 KW)**



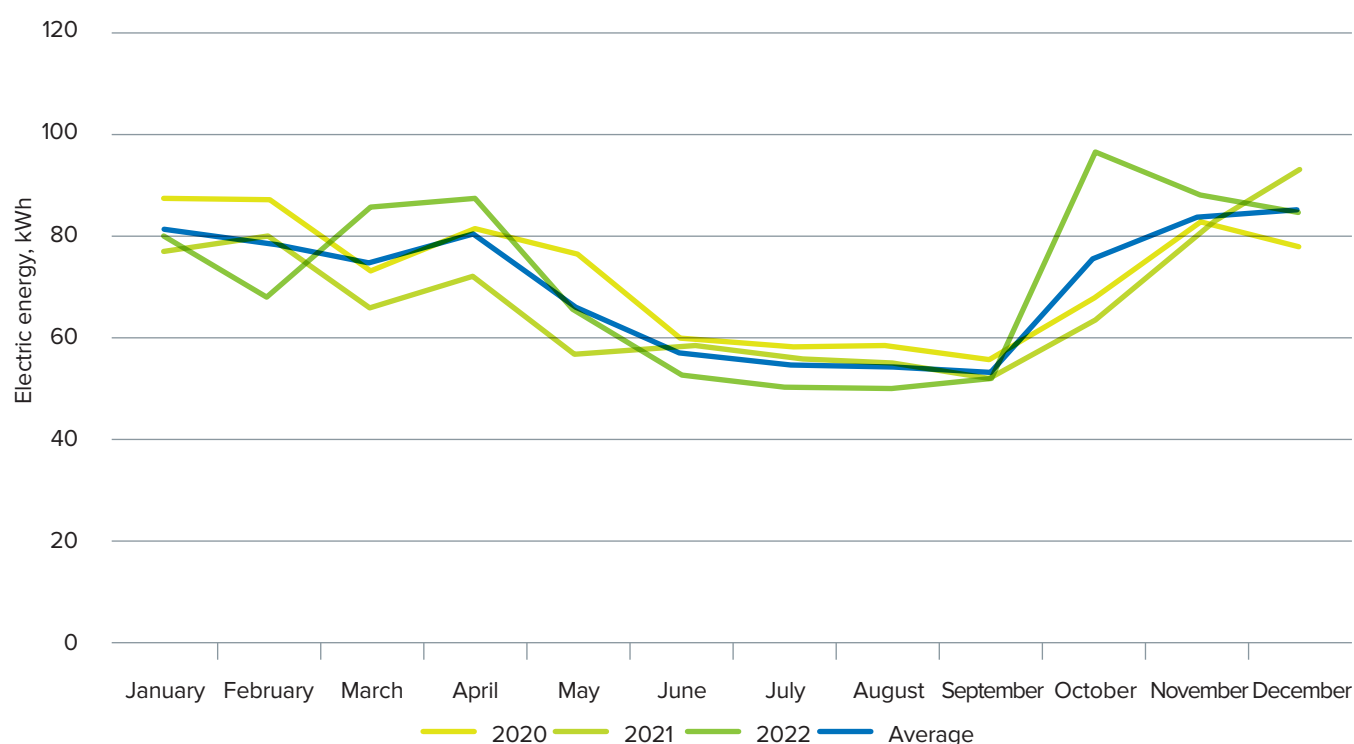
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	150 kW	-	800 m ²
Hybrid SPP	195 kW	35 kW	1 050 m ²

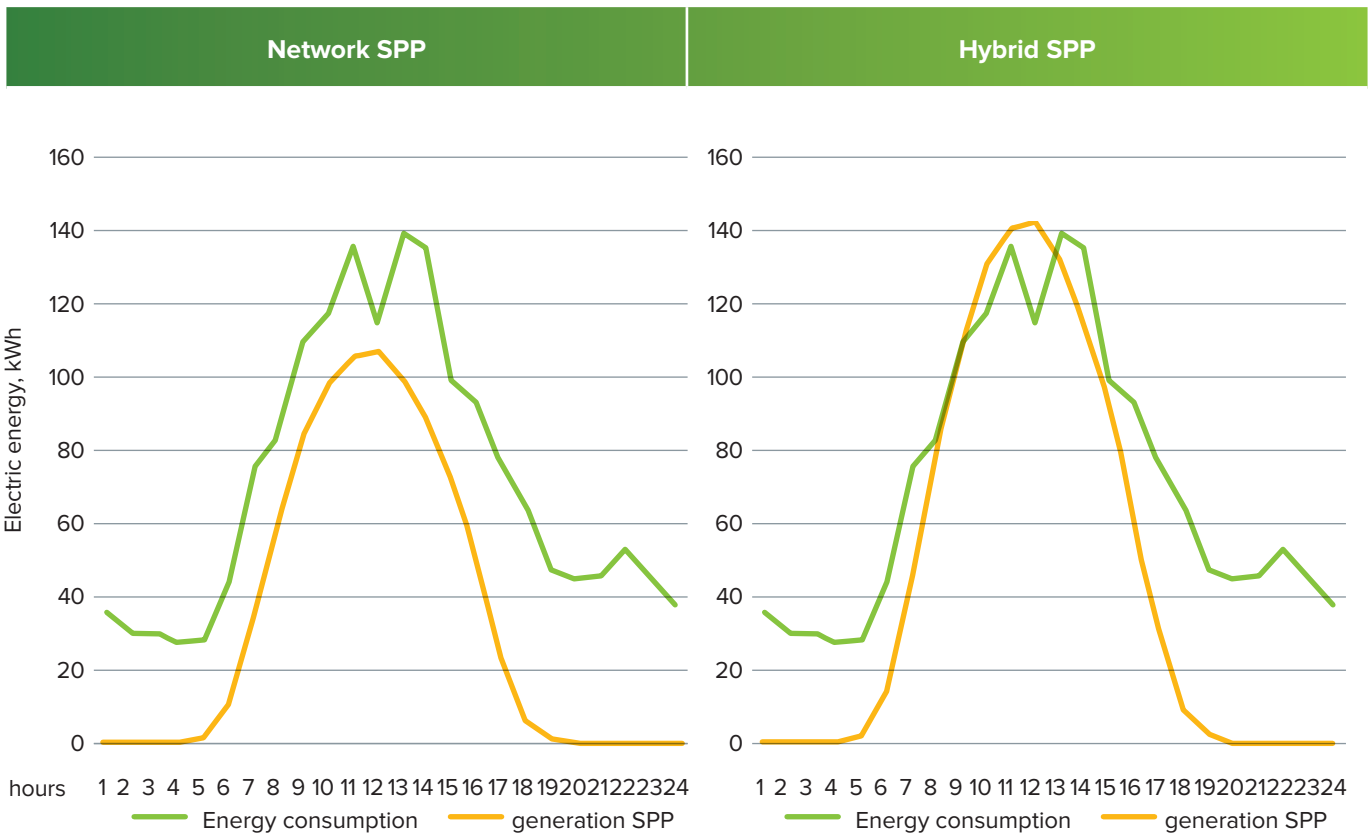
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	87 462	77 302	80 104	81 623
February	87 384	79 903	68 221	78 503
March	73 025	66 274	85 864	75 054
April	81 122	72 233	87 724	80 360
May	76 632	56 717	64 887	66 079
June	60 091	58 699	52 747	57 179
July	58 282	56 202	50 354	54 946
August	58 577	55 312	50 270	54 720
September	55 977	51 862	52 480	53 440
October	67 993	63 315	96 390	75 899
November	82 434	80 660	88 235	83 776
December	77 952	93 614	84 321	85 296
Annual	866 931	812 093	861 597	846 874

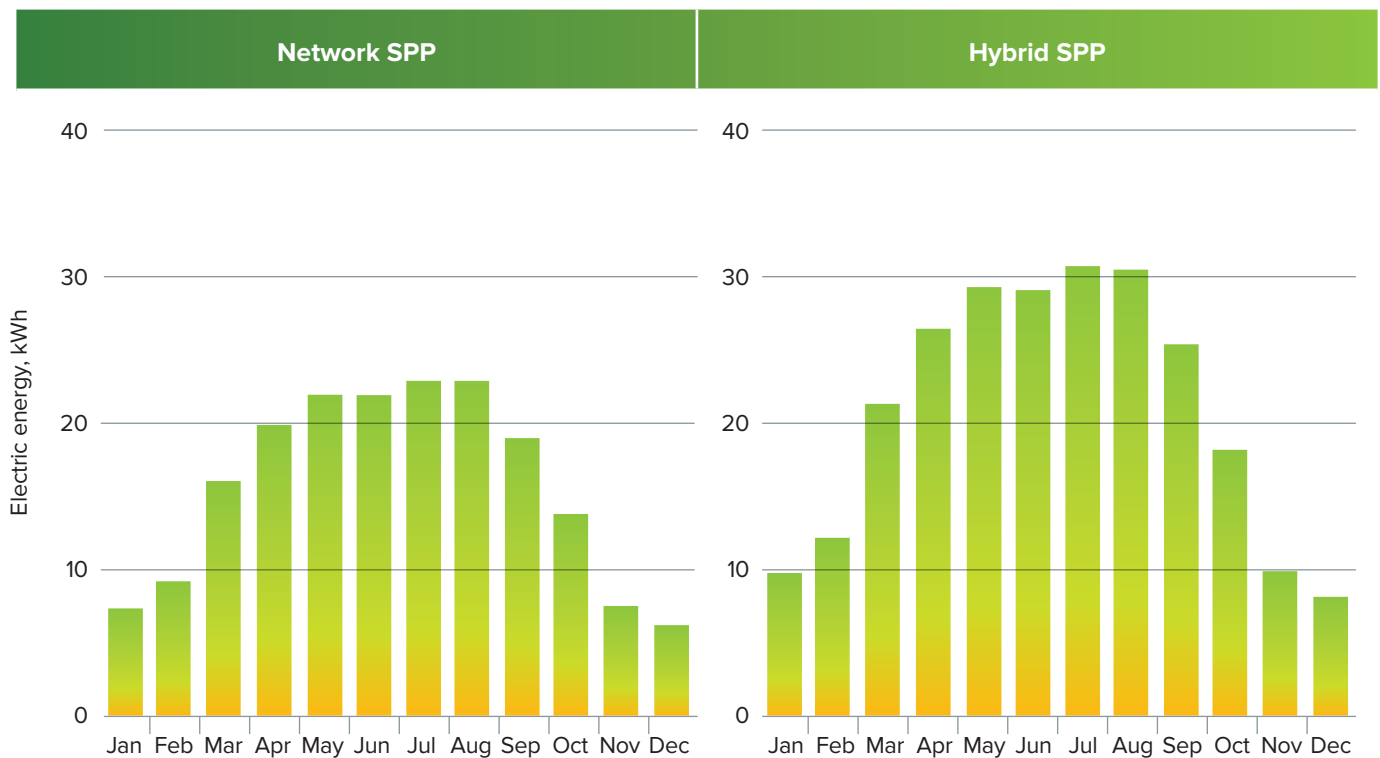
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



Total annual generation
190 644.2 kWh

Total annual generation
252 556.4 kWh

6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	280	7 600	2 128 000
2	Network inverter, 100 kW	1	228 000	228 000
3	Network inverter, 50 kW	1	142 120	142 120
4	Installation, fastening and additional materials	-	773 300	773 300
TOTAL				3 271 420

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	362	7 600	2 751 200
2	Hybrid inverter, 50 kW	4	266 570	1 066 280
3	Accumulator battery, 5 kWh	7	72 200	505 400
4	Installation, fastening and additional materials	-	958 436	958 436
TOTAL				5 281 316

Links to indicative price offers for SPPs:

SPP 150 kW

<https://sun-energy.com.ua/solar-power/solar-power-plants/SPP150kwt>

SPP 200 kW

<https://solar-tech.com.ua/complete-systems/setevye-solnechnye-elektrostancii-dlya-biznesa-pod-sobstvennoe-potreblenie1/setevaya-stanciya-200-kvt-pod-sobstvennoe-potreblenie-na-kryschu-.html>

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

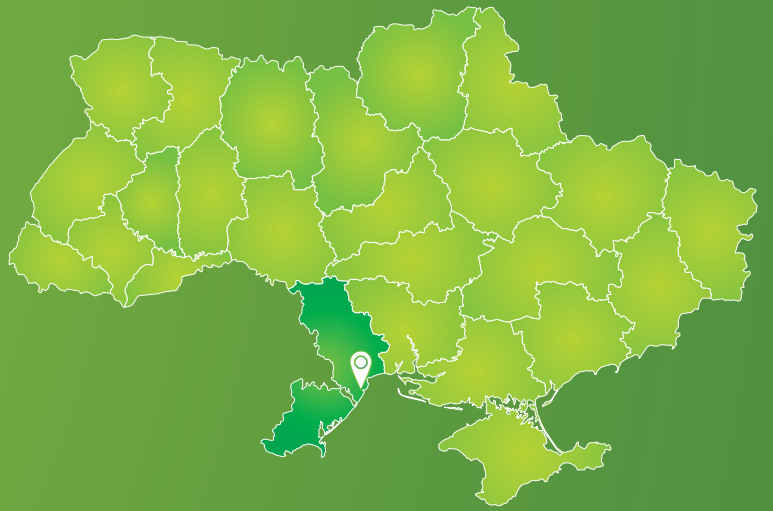
<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	846 874	846 874
SPP capacity, kW/h	150	195
Battery, kW/h	-	35
Annual electric energy generation by the SPP, kWh	190 644	252 556
Percentage of replacement of traditional electric energy, %	23%	30%
Annual savings in electric energy costs, UAH	1 052 356	1 394 111
The cost of SPP, UAH	3 271 420	5 281 316
Simple payback period, years	3.1	3.8
Electric energy tariff, UAH/kWh, (without VAT)	5.52	5.52
Electric energy tariff, UAH/kWh, (with VAT)	6 624	6 624



**COMMUNAL ENTERPRISE
“CHORNOMORSKVODOKANAL”
MAIN SEWAGE PUMPING STATION (85 KW)**



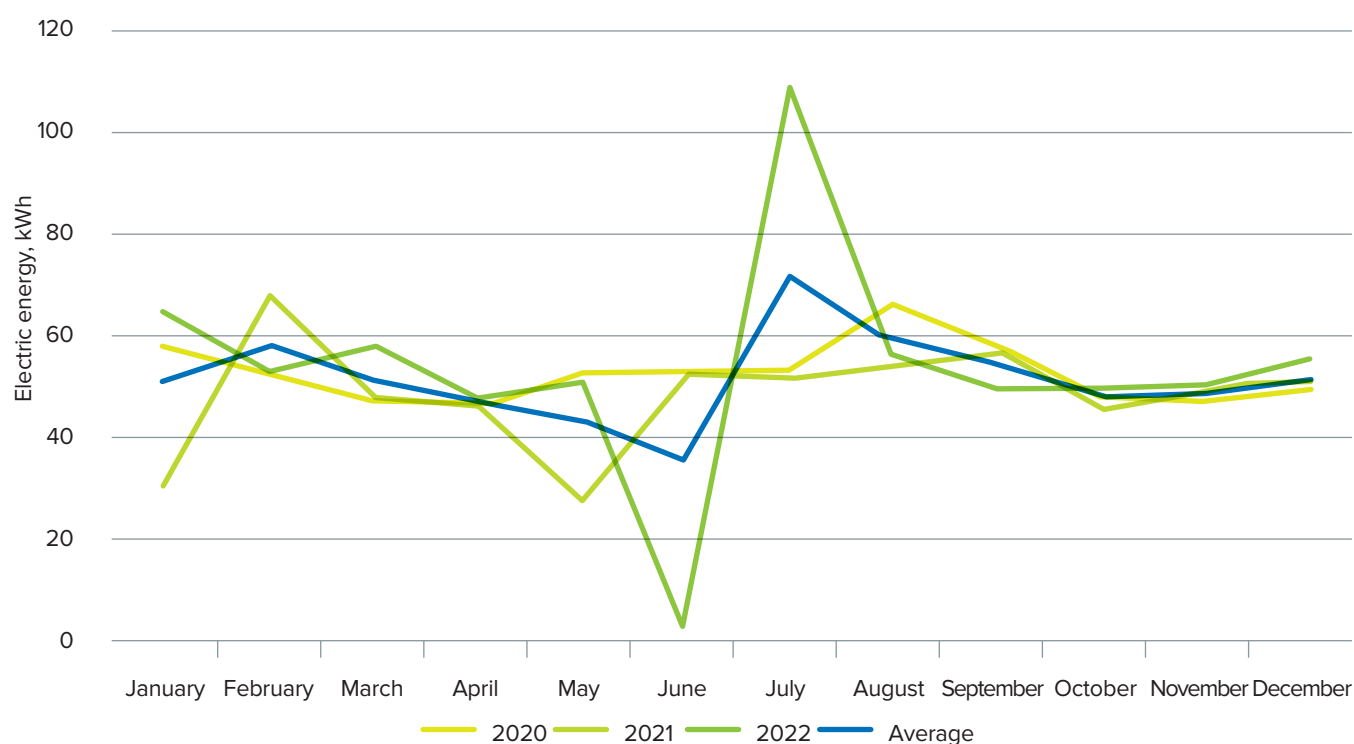
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	85 kW	-	450 m ²
Hybrid SPP	100 kW	30 kW	550 m ²

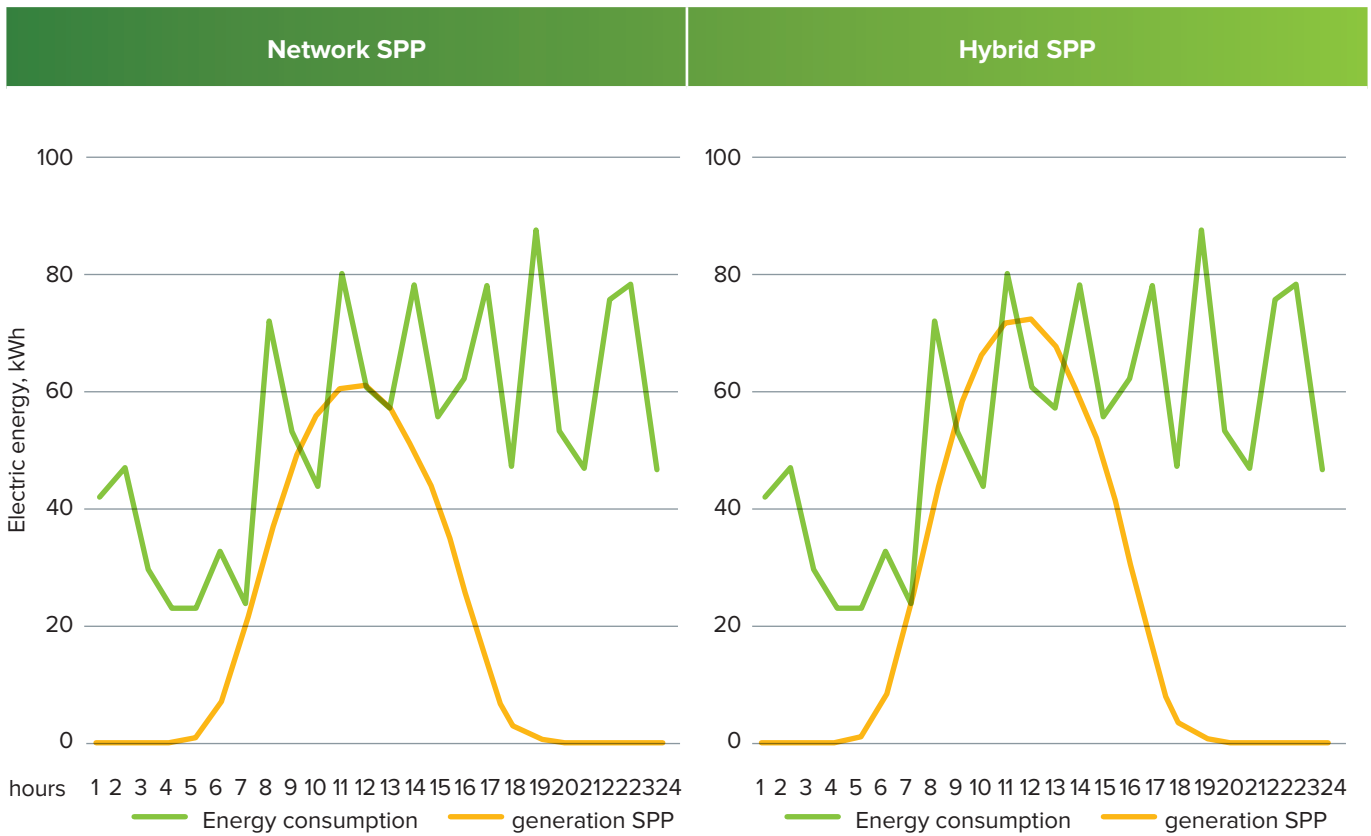
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	57 355	30 979	65 161	51 165
February	52 771	68 183	53 855	58 270
March	47 351	48 245	57 726	51 107
April	47 105	47 027	48 458	47 530
May	52 857	27 898	51 223	43 993
June	52 857	51 917	3 800	36 191
July	53 894	51 990	108 765	71 550
August	66 332	54 354	56 836	59 174
September	57 879	56 902	49 602	54 794
October	48 544	46 134	49 413	48 030
November	47 339	50 240	50 549	49 376
December	49 580	51 443	55 738	52 254
Annual	633 864	585 312	651 126	623 434

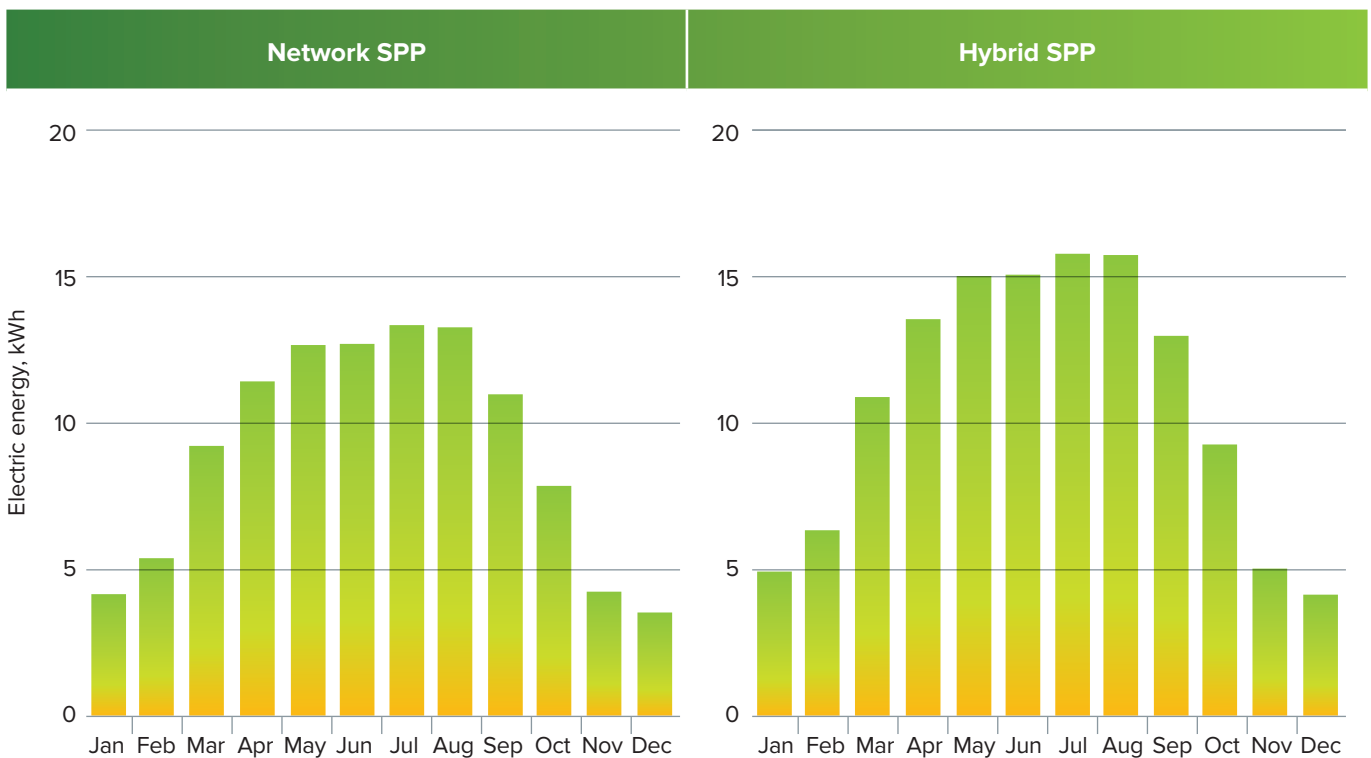
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



Total annual generation
109 801.46 kWh

Total annual generation
129 154.44 kWh

6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 545 W	156	7 581	1 182 636
2	Network inverter, 100 kW	1	228 000	228 000
3	Installation, fastening and additional materials	-	475 152	475 152
TOTAL				1 885 788

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	186	7 600	1 413 600
2	Hybrid inverter, 50 kW	2	266 570	533 140
3	Accumulator battery, 5 kWh	6	72 200	433 200
4	Installation, fastening and additional materials	-	580 488	580 488
TOTAL				2 960 428

Links to indicative price offers for SPPs:

SPP 60 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/SPP_60kwt_business

SPP 100 kW

https://sun-energy.com.ua/solar-power/solar-power-plants/solar_station_business_100kw

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

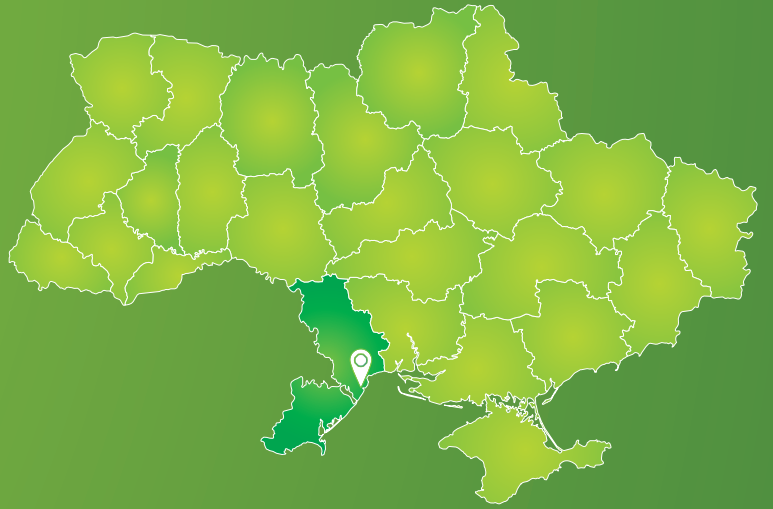
<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	623 434	623 434
SPP capacity, kW/h	85	100
Battery, kW/h	-	30
Annual electric energy generation by the SPP, kWh	109 801	129 154
Percentage of replacement of traditional electric energy, %	18%	21%
Annual savings in electric energy costs, UAH	581 948	684 519
The cost of SPP, UAH	1 885 788	2 960 428
Simple payback period, years	3.2	4.3
Electric energy tariff, UAH/kWh, (without VAT)	5.30	5.30
Electric energy tariff, UAH/kWh, (with VAT)	6.36	6.36



**COMMUNAL ENTERPRISE
“CHORNOMORSKVVODOKANAL”
SEWAGE TREATMENT FACILITIES (330 KW)**



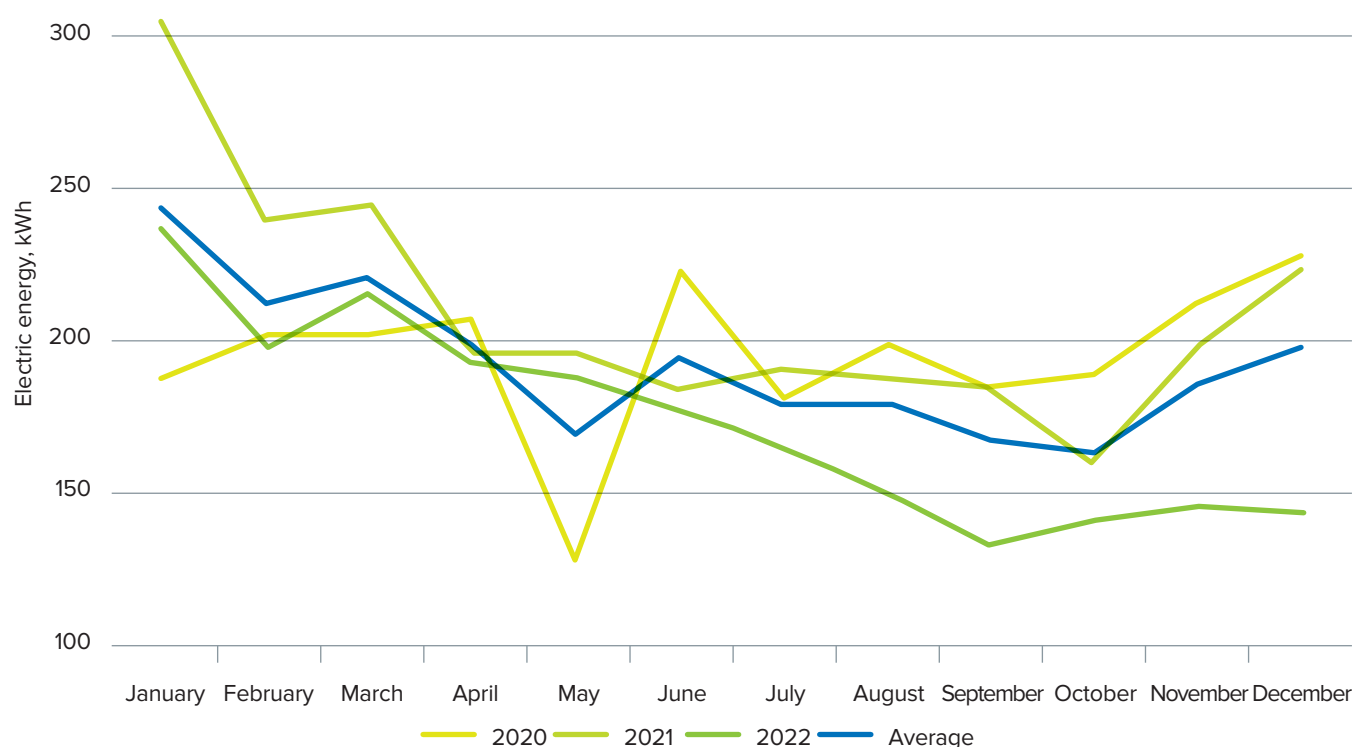
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	330 kW	-	1 760 m ²
Hybrid SPP	400 kW	150 kW	2 040 m ²

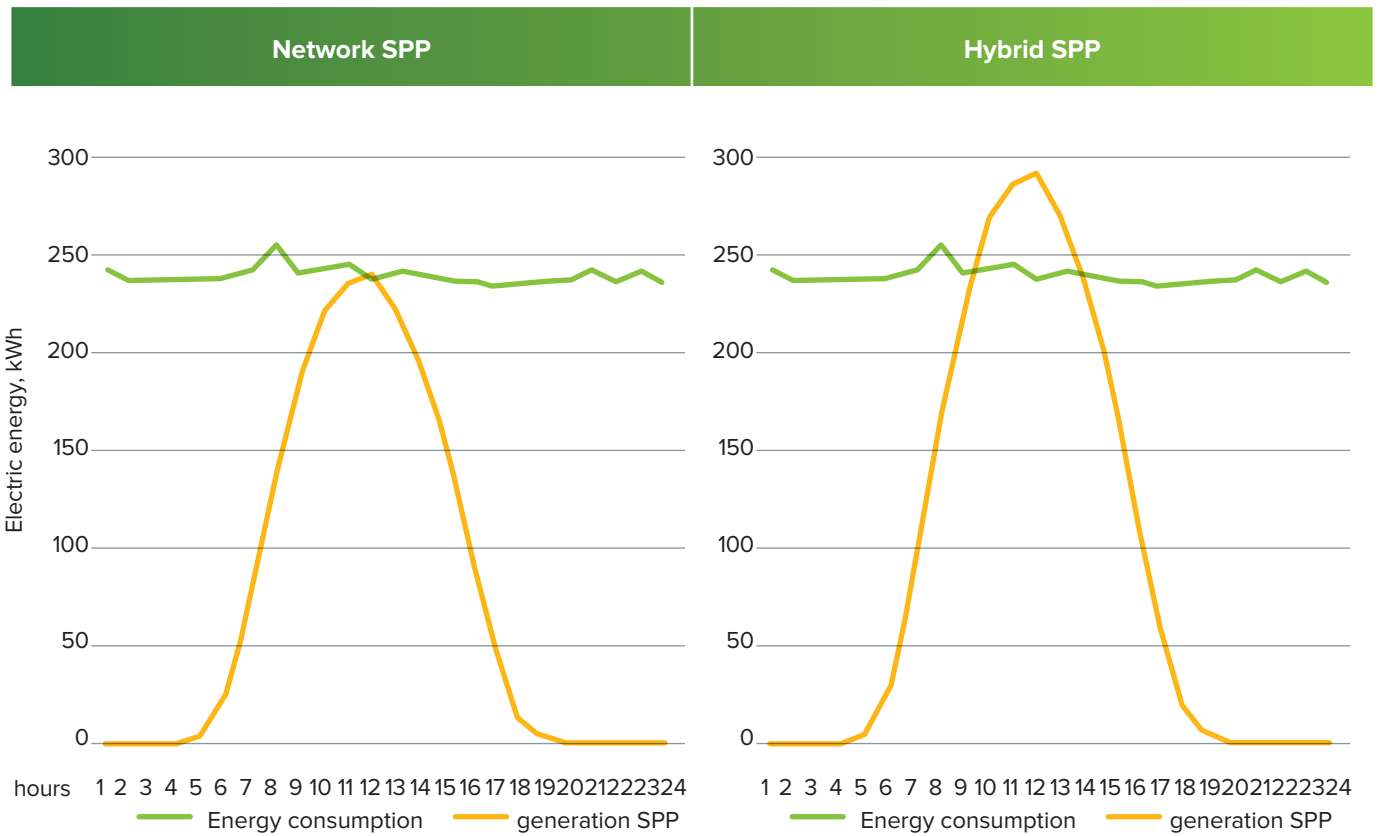
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2019	2020	2021	Average
January	183 517	187 931	305 169	225 539
February	163 807	200 762	238 738	201 102
March	162 043	202 205	244 587	202 945
April	163 925	207 213	196 270	189 136
May	126 813	127 066	195 473	149 784
June	126 813	222 479	183 788	177 693
July	150 353	181 893	190 896	174 381
August	165 815	199 137	186 574	183 842
September	148 462	184 537	183 849	172 283
October	150 258	188 062	200 685	179 668
November	158 326	211 645	198 123	189 365
December	181 406	227 232	222 833	210 490
Annual	1 881 538	2 340 162	2 546 985	2 256 228

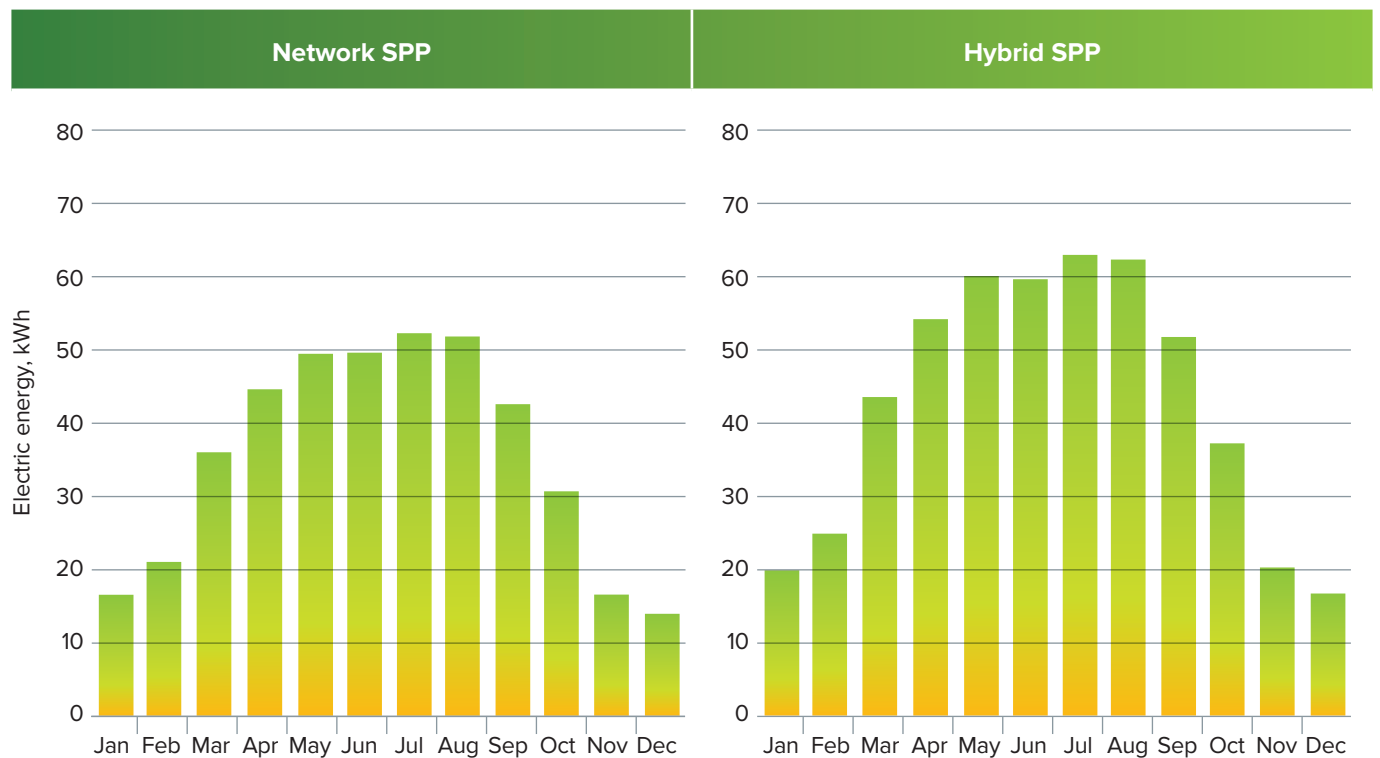
3. Monthly electric energy consumption according to the facility data



4. Hourly electric energy consumption by the facility during the summer and SPP generation



5. Monthly generation



Total annual generation
428 282.0 kWh

Total annual generation
517 630.91 kWh

6. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	612	7 600	4 651 200
2	Network inverter, 100 kW	3	228 000	684 000
3	Network inverter, 50 kW	1	142 120	142 120
4	Installation, fastening and additional materials	-	1 540 976	1 540 976
TOTAL				7 018 296

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 540 W	744	7 600	5 654 400
2	Hybrid inverter, 50 kW	8	266 570	2 132 560
3	Accumulator battery, 5 kWh	30	72 200	2 166 000
4	Installation, fastening and additional materials	-	1 844 672	1 844 672
TOTAL				11 797 632

Links to indicative price offers for SPPs:

SPP 300 kW (150x2 kW)

<https://sun-energy.com.ua/solar-power/solar-power-plants/SPP150kwt>

SPP 400 kW (200x2 kW)

https://sun-energy.com.ua/solar-power/solar-power-plants/sonyachna_stantsiya_200kw

Hybrid inverter Deye SUN-50K-SG01HP3-EU-BM4 (50kW, 3phase, 4MPPT)

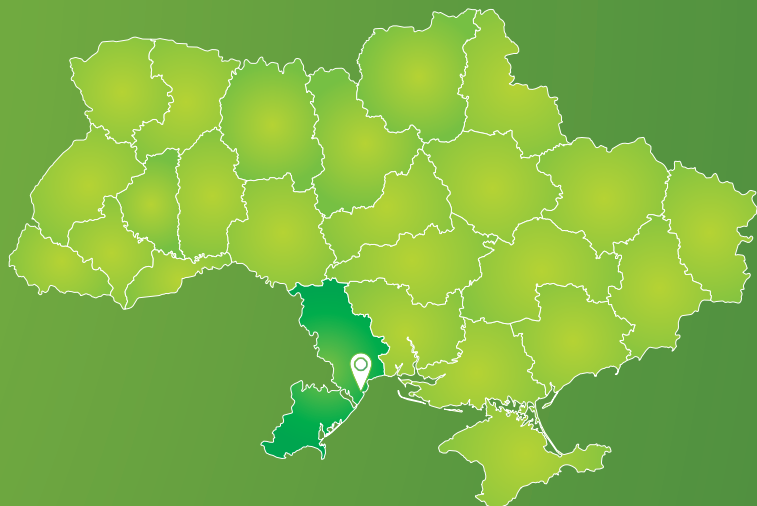
<https://onlysolar.in.ua/katalog/sonyachnij-gibridnij-invertor-deye-sun-50k-sg01hp3-eu-bm4-50-kvt-3-fazi-4-mppt/>

Battery

https://sun-energy.com.ua/solar-power/accumulator/pylontech_model_us5000_c

7. Final characteristics of the project

Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	2 256 228	2 256 228
SPP capacity, kW/h	330	400
Battery, kW/h	-	150
Annual electric energy generation by the SPP, kWh	428 282	517 631
Percentage of replacement of traditional electric energy, %	19%	23%
Annual savings in electric energy costs, UAH	2 269 895	2 743 444
The cost of SPP, UAH	7 018 296	11 797 632
Simple payback period, years	3.1	4.3
Electric energy tariff, UAH/kWh, (without VAT)	5.30	5.30
Electric energy tariff, UAH/kWh, (with VAT)	6.36	6.36



**COMMUNAL ENTERPRISE “CHORTKIV
PRODUCTION ADMINISTRATION OF WATER
SUPPLY AND SEWERAGE COMPANY” (428 KW)**



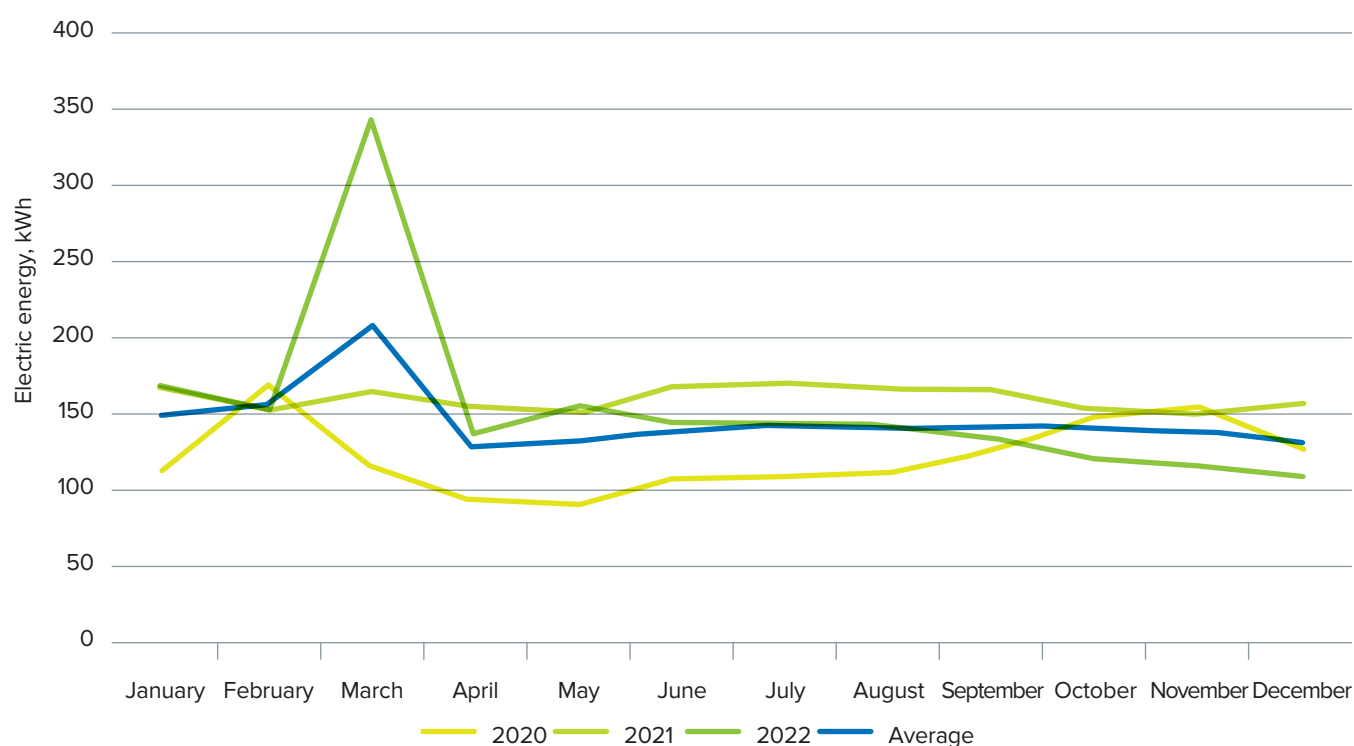
1. Technical parameters of SPP generation

	Recommended capacity	Accumulator	Required area for installation
Network SPP	428 kW	-	2 570 m ²
Hybrid SPP	513 kW	85 kW	3 100 m ²

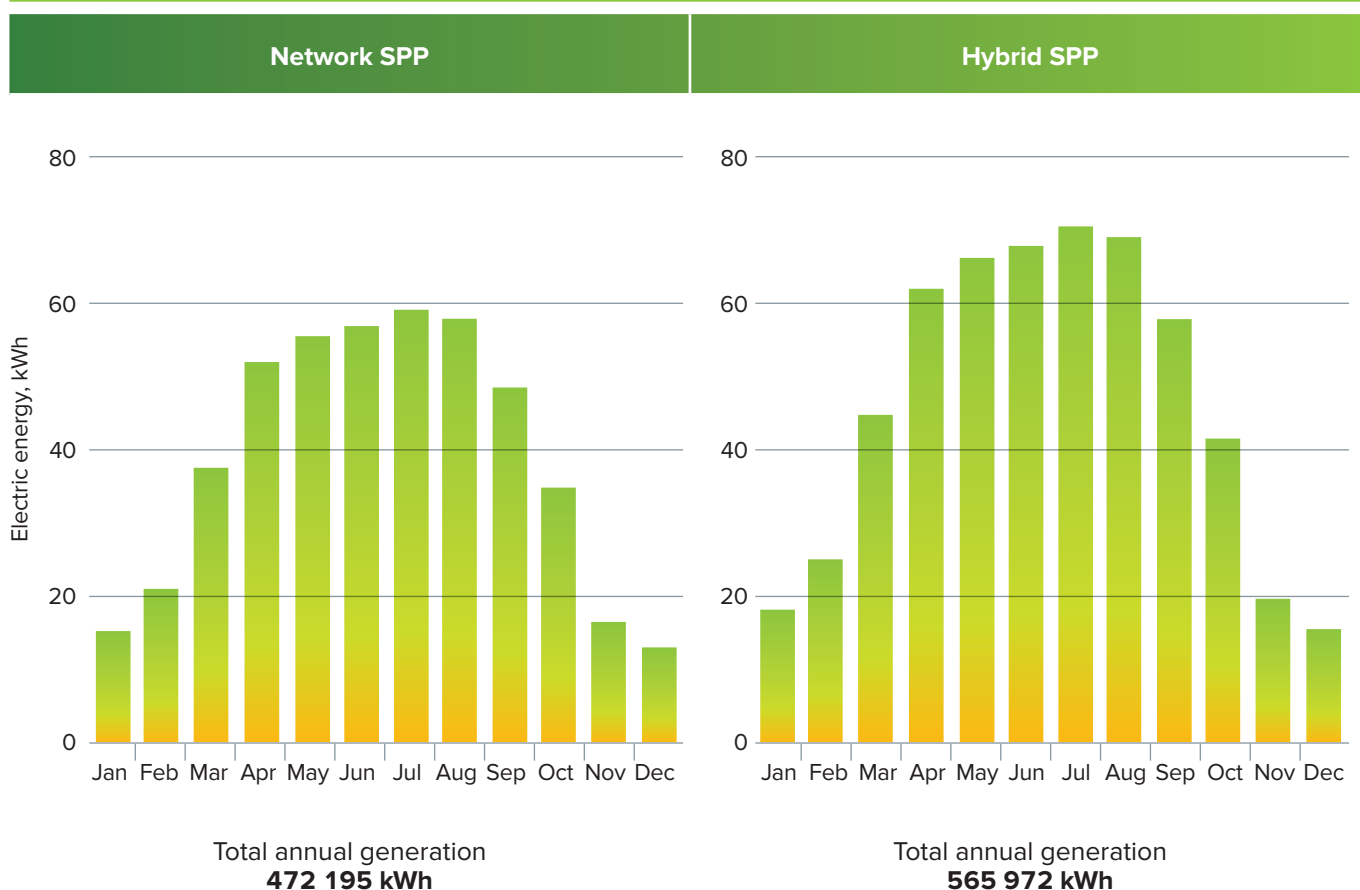
2. Monthly electric energy consumption according to the facility data

Monthly consumption	Electric energy, kWh			
	2020	2021	2022	Average
January	112 930	166 410	168 295	149 212
February	169 600	153 985	153 985	159 190
March	117 610	165 120	341 632	208 121
April	94 290	154 850	137 936	129 025
May	92 290	151 580	155 691	133 187
June	108 170	168 800	145 162	140 711
July	111 200	171 360	146 093	142 884
August	111 820	167 900	143 321	141 014
September	126 280	166 550	135 400	142 743
October	148 740	153 560	121 901	141 400
November	155 460	150 720	117 069	141 083
December	127 360	157 136	110 221	131 572
Annual	1 475 750	1 927 971	1 876 706	1 760 142

3. Monthly electric energy consumption according to the facility data



4. Monthly generation



5. Estimated cost of equipment and works for the plant installation

NETWORK SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 550 W	778	8 777	6 828 545
2	Network inverter, 90 kW	5	331 500	1 657 500
3	Installation, fastening and additional materials	-	3 196 610	3 196 610
TOTAL				11 682 655

HYBRID SPP

#	Unit	Quantity	Price per unit, UAH	Cost, UAH
1	Solar panel, 550 W	932	8 777	8 180 164
2	Hybrid inverter, 90 kW	6	331 500	1 989 000
3	Accumulator battery, 85 kWh	1	1 985 000	1 985 000
4	Installation, fastening and additional materials	-	3 829 358	3 829 358
TOTAL				15 983 522

Link to indicative price offers:

solar modules

<https://soncedim.com.ua/soniachni-batareyi/brand-abi-solar-or-longi/property-potuzhnist-modulja-4623-or-5094-or-5833>

battery

<https://energystorage.com.ua/ua/resheniya/sistemy-akkumulirovaniya-energii/promyshlennyet-200-kvt>

6. Final characteristics of the project

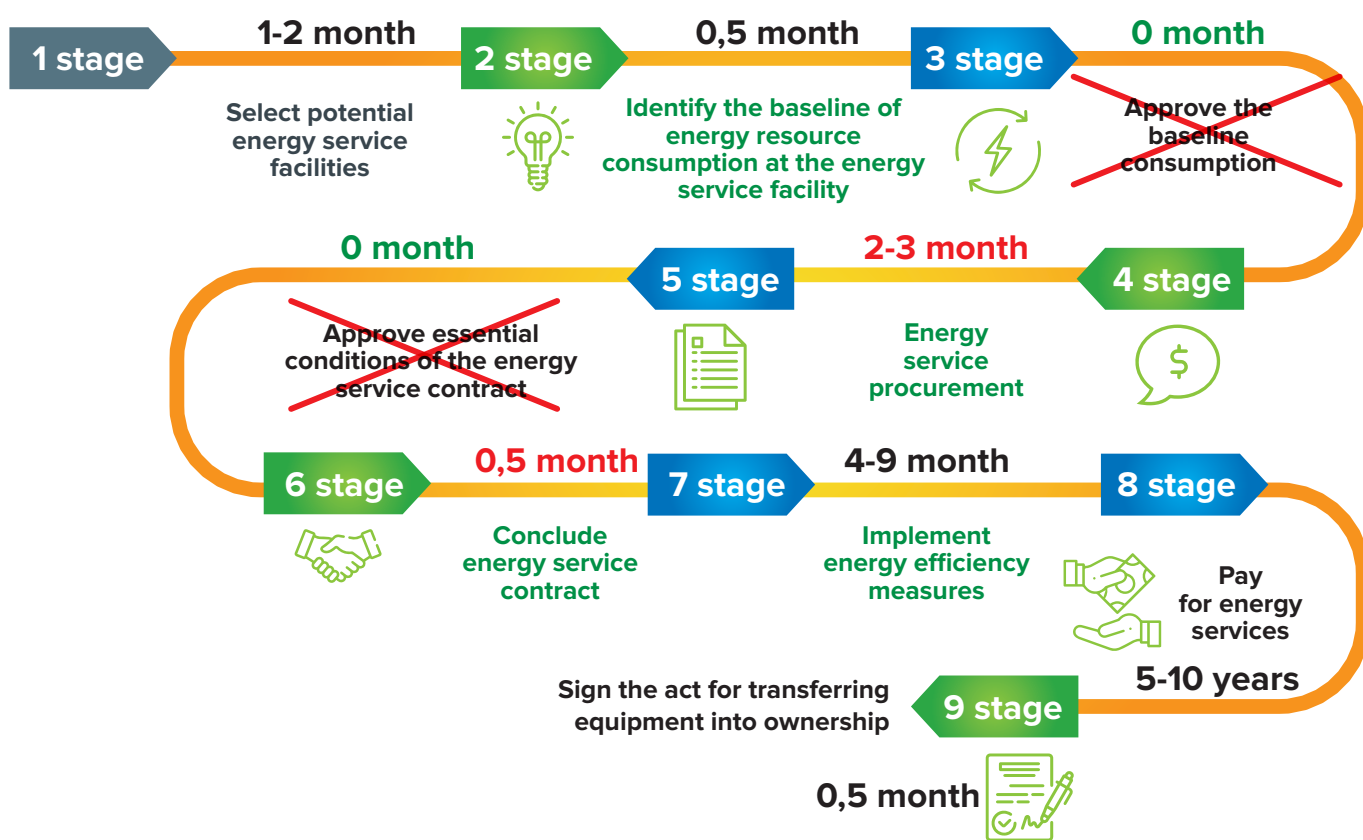
Characteristics	Network SPP	Hybrid SPP
Annual consumption by the facility, kW	1 760 142	1 760 142
SPP capacity, kW/h	428	513
Battery, kW/h	-	85
Annual electric energy generation by the SPP, kWh	472 195	565 972
Percentage of replacement of traditional electric energy, %	27%	32%
Annual savings in electric energy costs, UAH	2 460 136	2 948 714
The cost of SPP, UAH	11 682 655	15 983 522
Simple payback period, years	4.7	5.4
Electric energy tariff, UAH/kWh, (without VAT)	5.21	5.21
Electric energy tariff, UAH/kWh, (with VAT)	6.25	6.25

ANNEX 1: ROADMAP OF THE ENERGY SERVICE CONTRACT

(taking into account the peculiarities of Resolution of the CMU No. 621 of 19 June 2023*)



After adopting Resolution of the Cabinet of Ministers of Ukraine: the energy service procurement cycle was reduced to 2,5 – 3,5 months



On 19 June the Government adopted Resolution of the Cabinet of Ministers of Ukraine No. 621 “On amending the specific procedures of public procurement of goods, works and services for customers, which are provided by the Law of Ukraine “On Public Procurement” for the period of martial law in Ukraine and within 90 days from the date of its termination or cancellation.”

The progressiveness of this act lies, first of all, in the fact that for the first time in the last six years **the procedure for concluding ESCO contracts was reduced almost threefold (to 2-3 months)**, which is strategically important for the country affected by energy terrorism from the Russian Federation.

The Resolution of the Government achieved a significant reduction in time for purchasing energy service.

Tool	Legislative amendment	Expected effect
De-regulation tools	<ul style="list-style-type: none"> No additional procedure for approval of the baseline level of fuel and energy resources consumption. The baseline level appears immediately in tender documentation. No additional procedure for approval of essential conditions after the bids conducted and determining the winner of the procurement bid procedure (local council - for municipal property and the State Energy Efficiency Agency - for public property). 	<ul style="list-style-type: none"> Reduced procurement procedure (up to 45 days); Allows to conclude contracts immediately after the tender regardless of the decision of the local council (including if the session of the local council was not convened). Reduced procurement procedure (up to 90 days)
Tool to increase the investment attractiveness of infrastructure for energy efficiency projects	<ul style="list-style-type: none"> Modified approach for determining the baseline consumption levels (instead of average indicators for the three year period preceding the procurement, based on the methodology of the Ministry of Infrastructure or, where no methodology exists, average consumption in 2 019 – 2 021). 	<ul style="list-style-type: none"> Payback period of the investment projects reduced by 20%
Tools to encourage the implementation of large-scale energy efficiency projects	<ul style="list-style-type: none"> Grounds outlined for concluding a contract without the use of open bids, but provided four conditions are met: <ul style="list-style-type: none"> ✓ Energy consumption reduction by at least 50%; ✓ Savings must be confirmed by energy audit; ✓ The contractor of energy service should have at least 1 year experience of achieving savings of more than 50%; ✓ Customer shall, within 10 working days from the date of the contract conclusion, publicize in the electronic procurement system the report on the contract, energy service contract and all its annexes. 	<ul style="list-style-type: none"> Implementation of energy efficiency measures by the beginning of 2 023-2 024 heating season; Deep thermal modernization has the advantage over fast-payback projects; Energy audits mitigate the risks of inefficient projects
Tools to reduce the procedures and simplify documentation	<ul style="list-style-type: none"> Reduced period for concluding contracts for energy service procurement. The customer of energy service does not have to publicize in the electronic procurement system information with restricted access or information the disclosure of which during martial law may pose a threat to national security and order. 	<ul style="list-style-type: none"> 20 (+40 if justified) calendar days instead of 60 working days, in line with Article 33 (6) of the Law of Ukraine «On Public Procurement»; Simplified requirements for tender documentation to mitigate the requirements for publicizing technical and economic characteristics of the energy service facility;
Tool for monitoring the effectiveness of contracts	<ul style="list-style-type: none"> Every six months since when the energy service contract was concluded, the customer of energy service shall submit the information on the results of its implementation to the State Energy Efficiency Agency, in the form determined by the State Energy Efficiency Agency. 	<ul style="list-style-type: none"> The State will analyse the effectiveness of the act provisions and make the decision to introduce similar regulations on an ongoing basis through amendments to basic laws; State Energy Efficiency Agency, Ministry of Economy, Ministry of Infrastructure shall have a comprehensive analysis on the reduction of energy consumption in the public sector and municipal infrastructure through the implementation of energy service.

Anticipated impact of the reviewed amendments is estimated as an increase in number of signed energy service contracts up to 100 in 2023 and up to 200 — each year starting from 2024, which should be a tangible result compared to the average of 47 contracts a year in 2020–2022.

However, to achieve the strategic objectives of thermal modernization of non-residential buildings, the following indicators of quantitative and qualitative leap in the energy service of the public sector must be set:

- Annual coverage by energy service projects of buildings and infrastructure of municipal and public property at the level of at least 1% of the total number within 10 years (about 1-1,500 buildings per year);
- Average “depth of project energy efficiency” — at least 40% (the level of energy consumption reduction in relation to baseline);
- Share of renewable energy and/or alternative fuel energy service contracts is at least 50% of the annual total number of energy service contracts concluded.

Conclusions

Improvements introduced by the Government in public procurement of energy services create prerequisites for a significant improvement of the investment climate towards energy efficiency of public and municipal property infrastructure, enabling significant reduction of energy and utilities costs for multiple managers of public funds, with the use of extra-budgetary resources.

Implementing strategic objectives of the State using the energy service requires additional instruments to encourage investors, including improved access of business entities to credit resources, mitigating investment risks in view of the Russian aggression and expanding investment areas.

Scan the QR code to access Appendix 2. Template of the tender documentation for the purchase of energy services according to the solar power plant model using the example of the city of Cherkasy. (in Ukrainian)



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**United Nations Development
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1 Klovsky Uzviz, Kyiv 01021, Ukraine

Tel: +38 044 253 93 63

E-mail: registry.ua@undp.org

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