Option 1
30kWp / 80kW / 150kWh Solar EV charging Station
GIZ-NESP

Design Justification for 30kWp Solar EV Station

System Configuration Overview

The proposed system consists of the following key components:

- Solar PV Array: 30kWp (605W high-efficiency monocrystalline panels)

- Inverter: 80kW hybrid inverter

- Battery Storage: 150kWh lithium-ion battery

- Grid Connection: Available to supplement power when solar or battery is insufficient

- EV Battery Capacity: Two electric vehicles, each with 87kWh battery capacity

Daily Solar Generation Estimate

Average hourly profiles

Total photovoltaic power output [kWh]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0 - 1												
1 - 2												
2 - 3												
3 - 4												
4 - 5												
5 - 6												
6 - 7				0.130	0.358	0.355	0.184	0.139	0.187	0.228	0.067	0.007
7 - 8	1.136	1.172	1.875	2.583	2.930	2.647	2.285	2.296	3.000	3.673	4.104	2.853
8 - 9	7.130	6.499	6.583	6.737	6.531	5.902	5.167	5.270	6.731	8.467	10.402	9.048
9 - 10	12.539	11.788	11.478	10.879	10.165	9.049	7.894	7.907	10.100	12.765	15.421	14.275
10 - 11	16.734	16.130	15.539	14.336	12.960	11.490	10.114	9.740	12.534	15.929	19.046	18.158
11 - 12	19.450	19.026	18.313	16.660	15.294	13.711	12.365	11.406	14.512	18.196	21.094	20.393
12 - 13	20.430	20.240	19.379	17.738	16.045	14.080	12.926	12.909	15.912	18.920	21.387	20.975
13 - 14	19.692	19.572	18.642	17.144	15.442	13.828	13.120	12.569	15.533	17.744	19.987	19.904
14 - 15	17.238	17.185	16.022	14.944	13.700	12.305	12.013	11.522	13.300	15.024	17.017	17.166
15 - 16	13.378	13.313	12.212	11.398	10.686	9.929	9.712	9.256	10.248	10.718	12.599	13.089
16 - 17	8.346	8.507	7.674	7.027	6.685	6.594	6.552	6.325	6.319	5.681	7.149	7.785
17 - 18	2.794	3.113	2.740	2.490	2.496	2.878	3.076	2.938	2.312	1.228	1.122	1.680
18 - 19	0.018	0.048	0.039	0.076	0.146	0.357	0.469	0.305	0.074			
19 - 20												
20 - 21												
21 - 22												
22 - 23												
23 - 24												
Sum	139	137	130	122	113	103	96	93	111	129	149	145

Average energy generated per day
Highest: **149kWh**
Lowest: **93kWh**

Energy Requirement:
The two electric vehicles (EVs) require a total of 174 kWh to charge (87 kWh each).

Solar PV Capacity:
The 30 kW solar PV system can generate between 93 kWh (minimum) and 149 kWh (maximum) per day, depending on sunlight conditions.

Battery Storage and Charging Strategy:

The battery bank can discharge up to 135 kWh of energy.

During the day, the EVs can be charged using the 135 kWh from the battery.

Additionally, the system can supply about 24 kWh directly from the solar panels during charging hours.

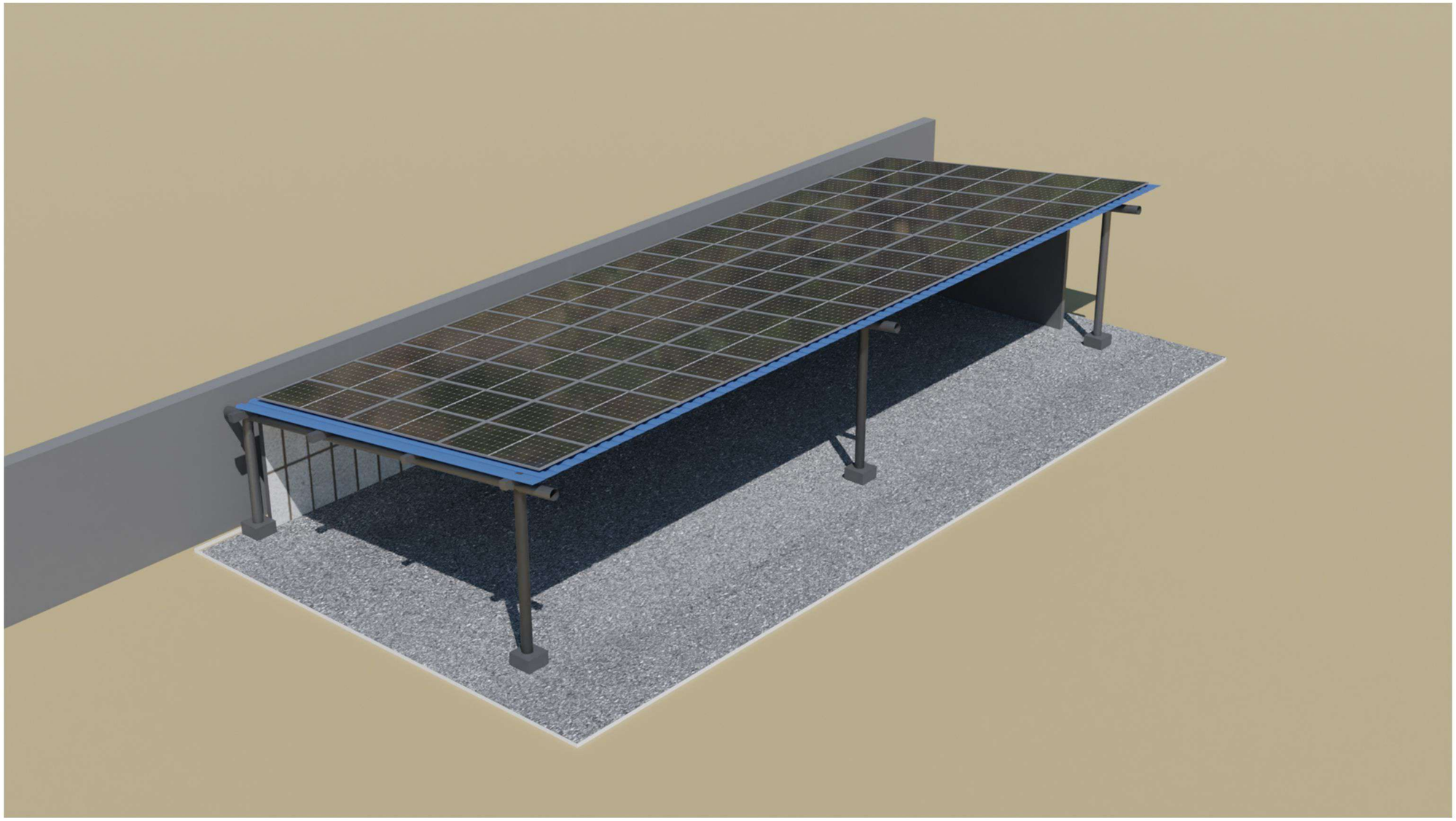
This brings the total energy available for EV charging to approximately 159 kWh which is not sufficient if the two EV are fully discharged.

Energy Gap and Backup:

Since the EVs need 174 kWh and the system can provide 159 kWh, there's a shortfall of about 15 kWh.

This shortfall will be covered by grid or generator support, especially on days with lower solar generation.

System Cycle:
After charging the EVs, any excess solar energy will be used to recharge the battery bank for the next charging cycle, ensuring continuous operation.



3D View

Note:

Project:

GIZ 30kWp Mini Grid

Company:

Note:

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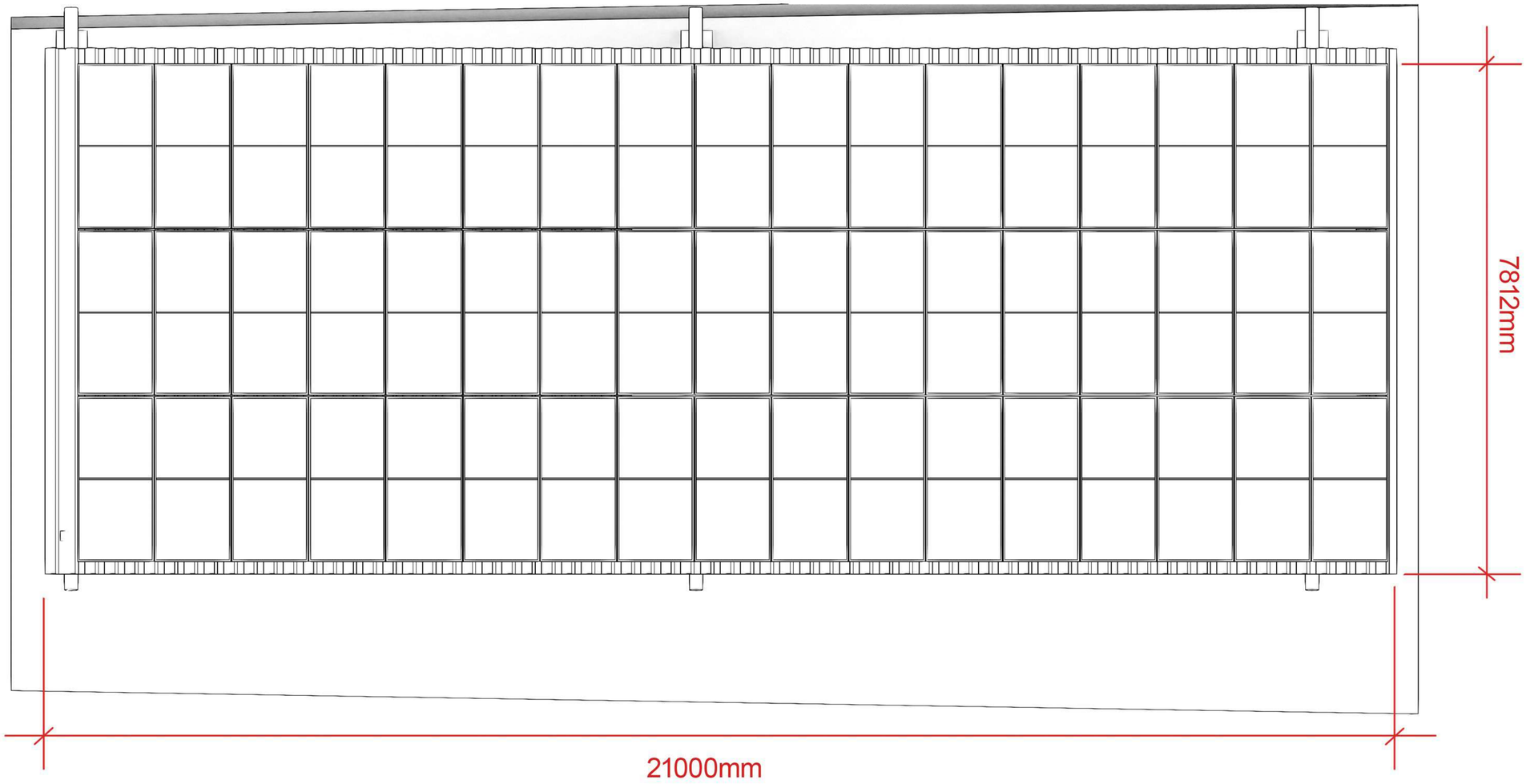

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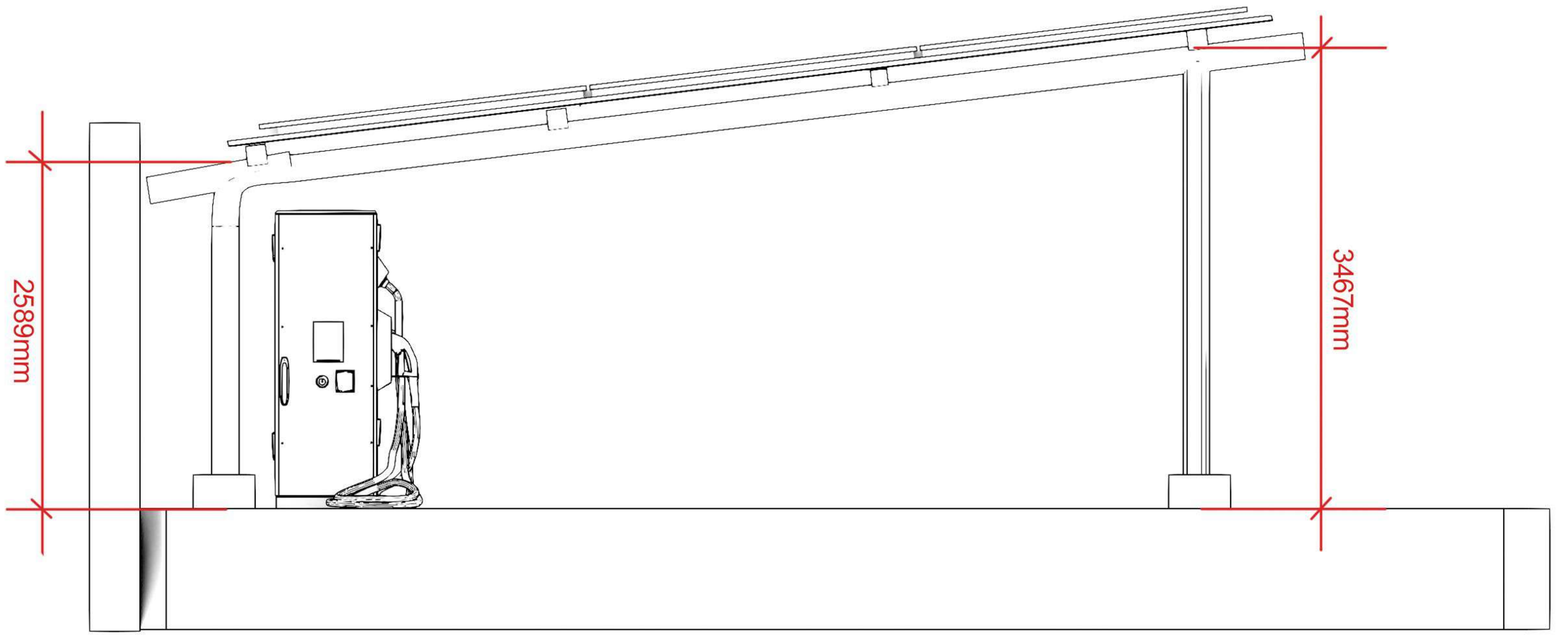

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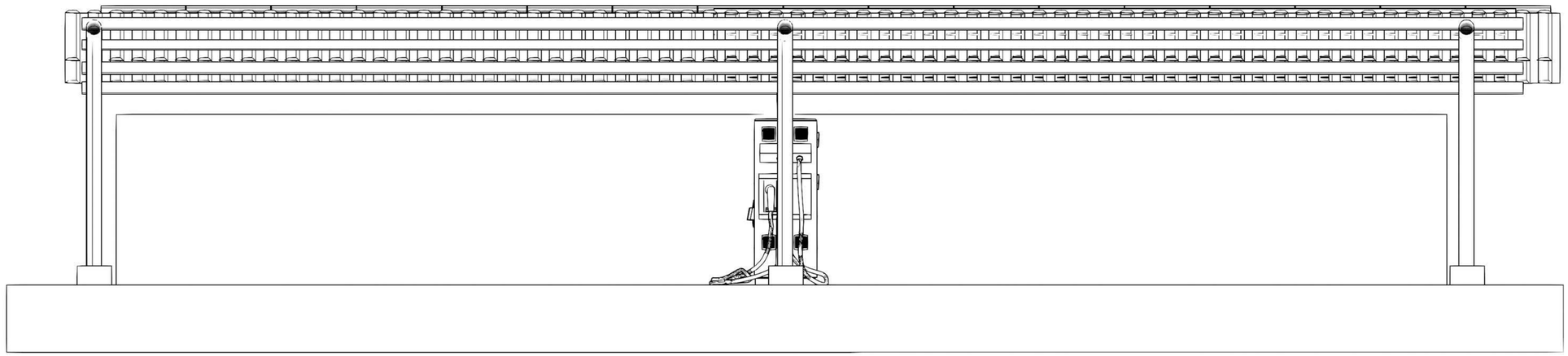

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