



AUGUST 17, 2022

IMPACT ASSESSMENT - SSCC & SAYDET EL ZALZALE

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CONTENTS

<i>Contents</i>	1
<i>SSCC – PV System Installation</i>	2
Existing Situation:	2
Comparison with 2019 Bills	3
Financial Impact	5
Environmental Impact:	5
<i>Saydet Al Zalzale –Battery Bank Installtion</i>	6
Existing Situation	6
Financial Savings	7

SSCC – PV SYSTEM INSTALLATION

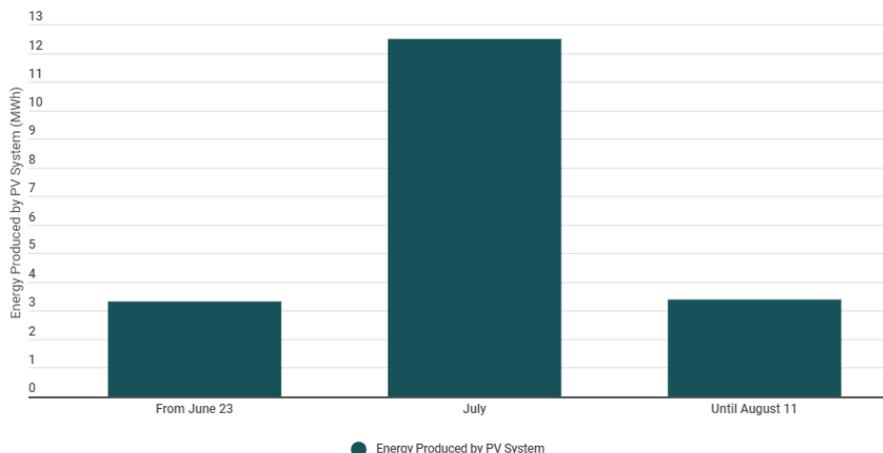
Existing Situation:

The PV system installed at SSCC is a 92.22 kWp PV-Diesel On Grid System, which means that the system is operational with both EDZ and the private generator owned by the school. This report aims to display the impact of this system on the school's electrical consumption from EDZ, which will, in turn, affect the electrical bills paid by the school.

The PV system became fully operational on June 12, 2022, and has been delivering electrical energy to the school since then. The electricity produced by the PV system can be monitored and recorded on a platform specific to the inverters used.¹

Month	Production
From June 23	3.33 MWh
July	12.50 MWh
Until August 11	3.38 MWh
Total	19.21 MWh

Energy Produced by PV System (MWh)



¹ Solarweb.com

Comparison with 2019 Bills

For comparison purposes, the Electric Consumption of the facility during the abovementioned months can be obtained from the 2019 bills. The year 2019 was chosen since it accurately demonstrates the facility's operation before the Covid-19 pandemic and the economic crisis. The total electrical consumption of the facility is displayed below:

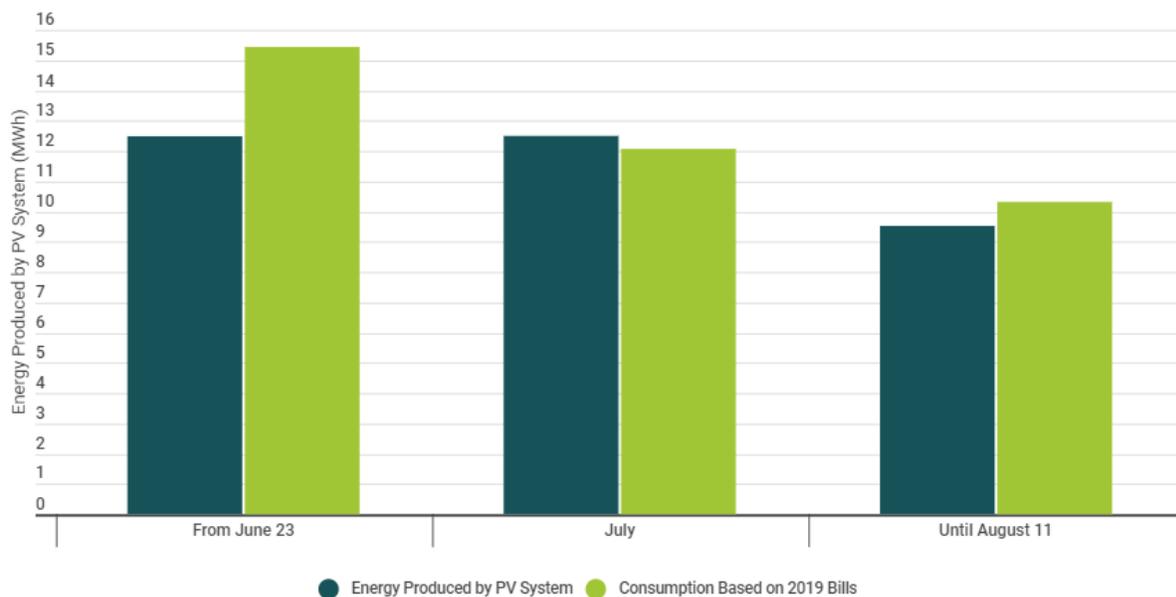
Bills 2019	Total Consumption (in MWh)
19-Jun	15.44 MWh
19-Jul	12.07 MWh
19-Aug	10.32 MWh

The only complete month recorded by the monitoring system is July, so to compare the remaining two months, the electrical energy produced by the PV system was extrapolated. The extrapolation was made by finding the average electrical energy produced per day based on the recorded information and multiplying this number by the number of days per month.

June	
From June 23	3.33 MWh
Days of Production	8 Days
Production per Day	0.42 MWh/Day
Number of Days per month	30 Days
Estimated Production for June	12.49 MWh
August	
Until August 11	3.38 MWh
Days of Production	11 Days
Production per Day	0.31 MWh/Day
Number of Days per month	31 Days
Estimated Production for August	9.53 MWh

Comparison Table			
Month	Consumption Based on 2019 Bills	Production	Percentage Covered
June	15.44 MWh	12.49 MWh	81%
July	12.07 MWh	12.50 MWh	104%
August	10.32 MWh	9.53 MWh	92%
Total	37.84 MWh	34.51 MWh	91%

Comparison Chart



Based on the above table and graph, the system can cover 91% of the facility's electrical consumption. However, it is important to note that in July, the production exceeded the expected consumption by approximately 4%, this excess energy produced is recorded by the smart meter installed by EDZ and is used at a later stage when the consumption exceeds the production.².

² A net metering subscription with EDZ was made to allow for this process to happen.

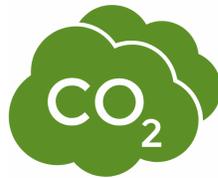
Financial Impact

The total energy produced by the PV system till this date is 19.3 MWh, the adopted LCOE³ for this analysis is 0.35 \$/kWh. By multiplying the total energy produced by the unit cost of energy, the total savings of the system till this date are obtained.

Month	Production	Savings
From June 23	3.33 MWh	\$ 1,165.50
July	12.50 MWh	\$ 4,375.00
Until August 11	3.38 MWh	\$ 1,183.00
Total	19.21 MWh	\$ 6,723.50

Environmental Impact:

The installed solar system is estimated to generate significant environmental benefits. These benefits come primarily from avoided power plant emissions. Below is a representation of the lower carbon footprint in several reduction equivalents obtained to this date:



10.23 Tons
of CO₂ Saved



262 Acres
of Plants Planted



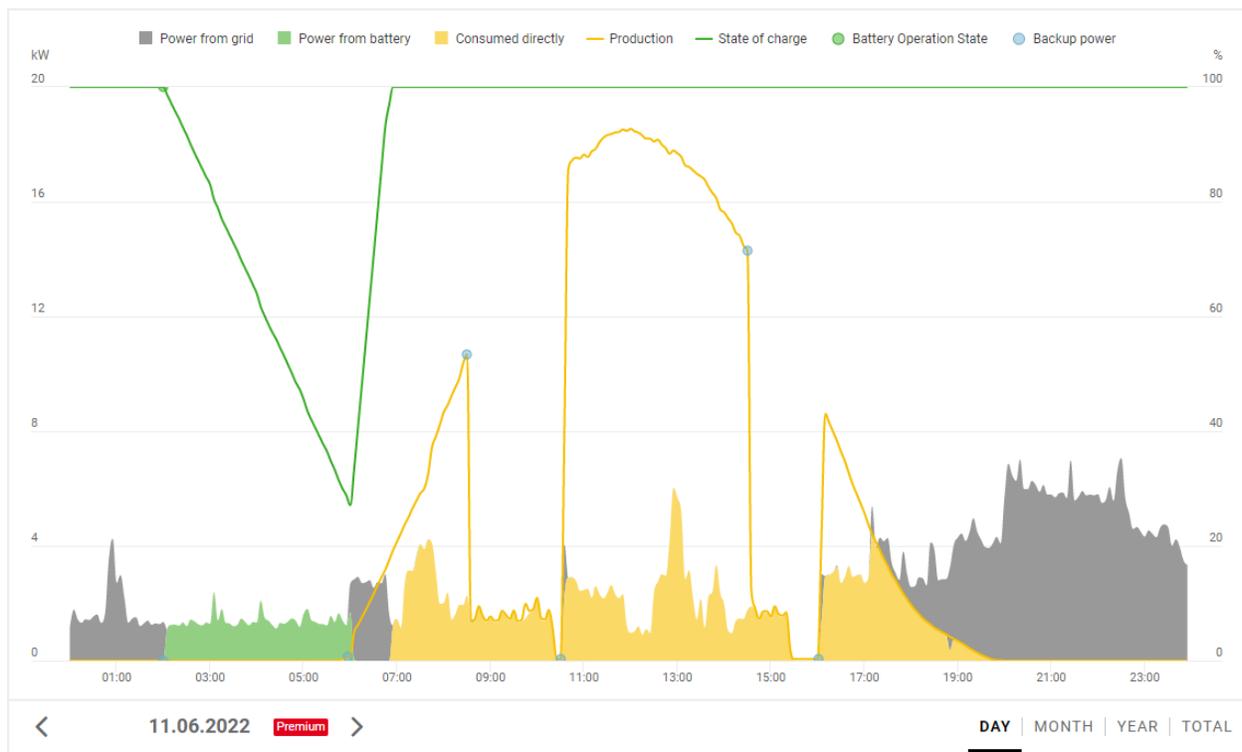
41,048 km
Traveled

SAYDET AL ZALZALE – BATTERY BANK INSTALLTION

³ Levelized Cost of Energy: Cost (\$) per Energy Consumed (kWh)

Existing Situation

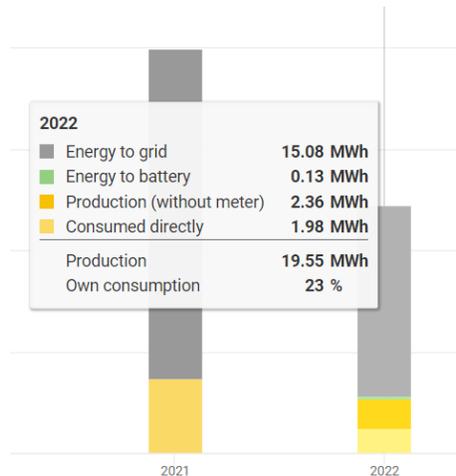
The battery bank system installed at Saydet el Zalzale is a 7.7 kWh Lithium-Ion Battery System. This system was installed to permit the facility to operate normally during EDZ's cut-off hours. However, the facility can still benefit from the PV system by installing a battery bank even though EDZ is off. This, in turn, improves the system's performance and increases its yield knowing that the two cut-offs during the day are at peak sun hours. Furthermore, in most cases, the battery bank during the day is not discharging and recharging since the electrical energy directly produced by the solar system is enough to sustain the load. The below graph displays the information stated above.



Financial Savings

As mentioned earlier, the battery system allowed the PV system in the facility to

operate without the need for EDZ⁴ and allowed several hours of autonomy to sustain the facility during cut-offs. The production without meters from May, when the battery bank was implemented, is 2.36 MWh.



The savings, in this case, can be obtained by comparing the cost of producing this energy using a diesel generator. To do so, a conversion factor of 2.6 kWh/L was taken to convert the energy produced to liters of diesel. As a result, the average diesel price during this period was 33,000 LBP/L, equivalent to approximately 1.14 \$/L.

Energy (without meter)	2,360.0 kWh
Conversion Factor	2.60 kWh/L
Liters of Diesel	907.69 L
Unit Price of Diesel	1.14 \$/L
Total Savings	\$ 1,034.77

⁴ Production without meter