ZERO POINT ENERGY

CASE STUDY

How we provided a filling station in Mpumalanga with a reduction in electricity bills, saving the client

R180 000 in 10 months

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OVERVIEW

Zero Point Energy is a specialised commercial and industrial renewable energy company based in Johannesburg.
We were tasked with reducing the energy consumption for a filling station based in Mpumalanga.

PROJECT DETAILS

Installer: Zero Point Energy

Installation Date: 22/012024

Location: Middleburg, Mpumalanga

3 x 50kW inverters - 150kw inverter capacity

36 x 5kWhr batteries - 180kWh battery capacity

150 x 550W panels - 82kWp solar capacity

Integration of a 300kVA diesel generator.

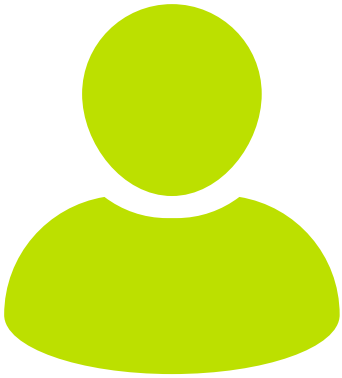
AC and DC electrical and earthing works.

System has remote monitoring functionality

Comprehensive electrical and structural engineering design.

Adherence to OH&S act safety and health and environmental compliance.

CLIENT BACKGROUND



The client is a well-established filling station located in Mpumalanga, South Africa. The station serves as a crucial stop for travelers and logistics companies, providing fuel, food, and convenience services. Operating 24/7, the station relies heavily on a stable and uninterrupted power supply to maintain operations, ensure customer satisfaction, and uphold safety standards.

OBJECTIVES

The primary objective of the project was to reduce the station's dependency on the national grid due to the frequent power outages and escalating electricity costs. The client aimed to achieve significant energy cost savings, ensure uninterrupted power supply, and enhance their sustainability profile by incorporating renewable energy solutions.

CHALLENGES

Despite a reduction in load shedding, businesses still face rising electricity costs annually and the risk of unplanned electricity outages due to utility maintenance issues or cable theft. This client wanted a solution that would provide a robust electricity supply solution 24/7 while reducing operational costs to increase profitability. The challenges faced for this project included tight construction timelines to match the new-build station, firm deadlines, strict Safety, Health & Environmental (SH&E) regulations, and multiple contractors on site simultaneously to achieve completion of the project timeously.

Frequent Power Outages:

Mpumalanga, like many parts of South Africa, experiences regular load shedding and power outages, which severely impacts business operations.

High Electricity Costs:

The rising cost of electricity that would erode the station's profit margins.

Integration with Existing Infrastructure:

The renewable energy solution needed to be integrated with the station's existing generator and electrical systems without disrupting ongoing operations.

SOLUTIONS

The client expected a solution that would:

- Provide significant savings on electricity bills.
- Ensure continuous power supply, even during load shedding.
- Be scalable for future energy demands.
- Have minimal impact on daily operations during installation.
- Be monitored and maintained with ease.

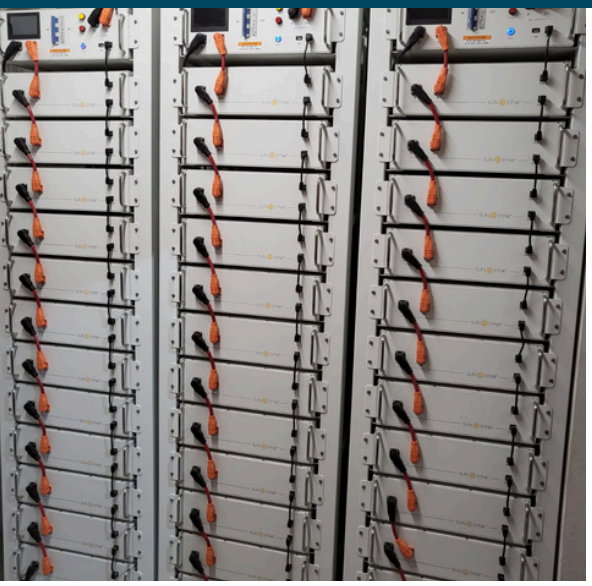
THE DESIGN

Zero Point Energy provided a customized renewable energy solution that addressed the client's needs:

Solar PV System: Installation of a 82kWp solar PV system comprising of 150 x 550W JA Solar panels to harness solar energy effectively within the limited space.
Hybrid Inverter System: Deployment of 3 x 50kW Sunsynk hybrid inverters, offering 150kW inverter capacity to manage and optimize energy flow from solar, batteries, and the grid.
Battery Storage: Installation of 180kWh battery capacity using 36 x 5kWh Sunsynk HV batteries to store excess energy and ensure a continuous power supply during outages.
Generator Integration: Seamless integration of a 300kVA diesel generator to provide backup power when needed, ensuring a multi-layered approach to energy security.
Electrical and Earthing Works: Comprehensive AC and DC electrical and earthing works to ensure system safety and reliability.
Remote Monitoring: Implementation of a remote monitoring system to track performance and manage the system proactively.
Engineering Design: A comprehensive electrical and structural engineering design that ensured the system met all safety, health, and environmental compliance standards as per the OH&S act.

DESIGN

The design phase involved detailed site assessments, taking into account the station's future estimated energy consumption patterns, available roof and equipment location space, as well existing infrastructure & other utilities. The system was designed to maximize solar energy capture while ensuring compatibility with the station's generator and existing electrical systems.



INSTALLATION

The installation was carried out with minimal disruption to the station's other construction and operations. The project team worked closely with the client to schedule installation activities during off-peak hours and used modular construction techniques to expedite the process.

SAFETY

A structural integrity assessment was conducted and a solar panel mounting structure was specified to ensure that all necessary wind-loading and other structural related regulations relating to the site and the existing canopy roof sheeting was fully considered.

RESULTS

Our hard work paid off with a 36.5% decrease in monthly electricity billing, from the first month

Electricity Bill Reduction	36.5%
Monthly Saving	R26 000 P/M
Projected Return on Investment	16%

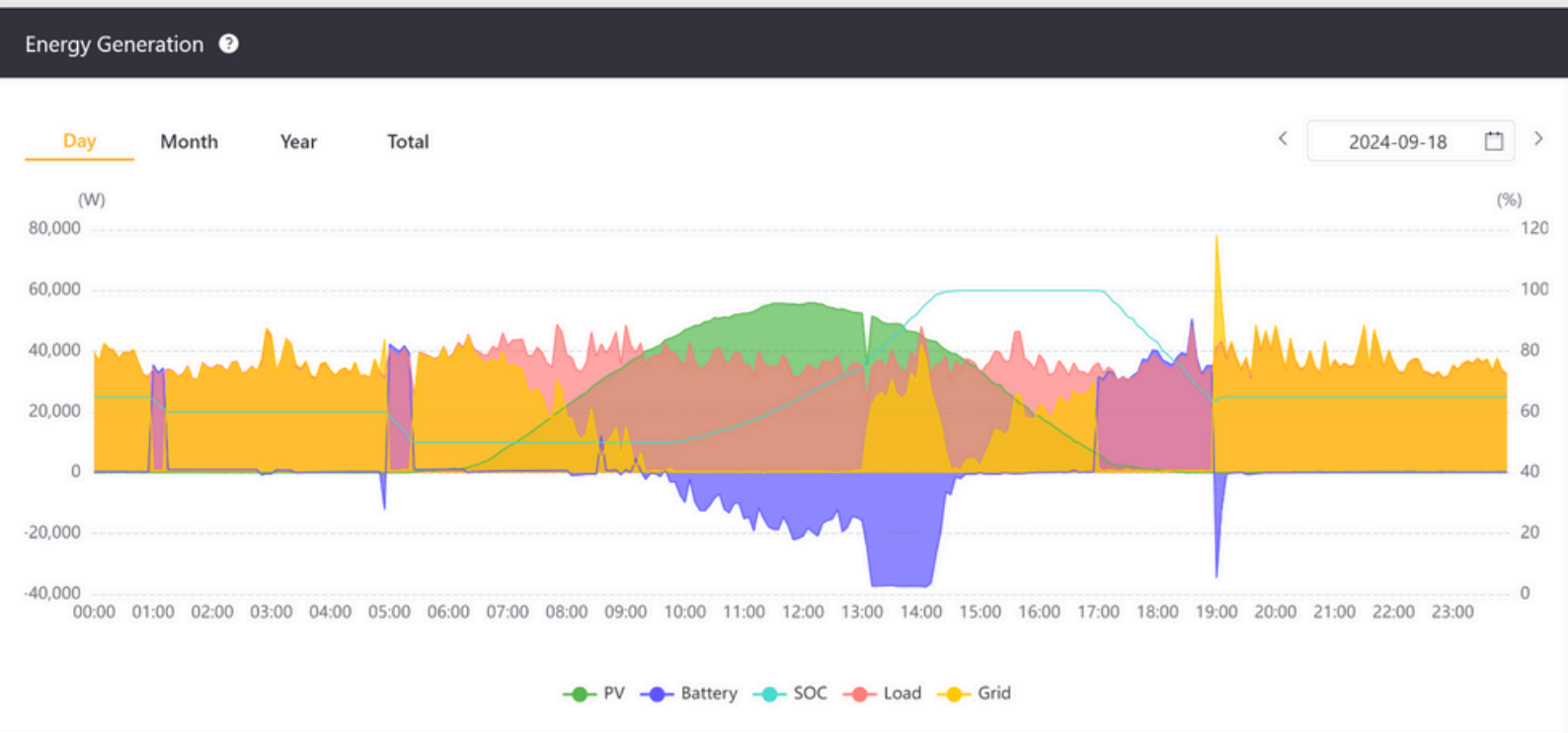
*Return on Investment based on an IRR calculation taking initial capex, current utility tariff and bill savings estimated over 10 years, assuming annual Eskom escalation of 12%

The installation has yielded impressive results:

Cost Savings: The filling station has saved R180,000 in electricity costs within the first 10 months of operation, exceeding initial expectations.
Reduced Grid Dependency: The station now operates with significantly reduced reliance on the national grid, particularly during peak hours and load-shedding events.
Enhanced Sustainability: The use of renewable energy has reduced the station's carbon footprint, aligning with global sustainability trends and enhancing the station's corporate image.

SYSTEM FEEDBACK

After 10 months of operation, the system has demonstrated consistent performance. The filling station has experienced no power interruptions during load shedding, thanks to the hybrid system's ability to switch seamlessly between solar, battery, and generator power. The remote monitoring system has enabled the client to optimize energy use, ensuring maximum efficiency and cost savings. The filling station's management has reported high levels of satisfaction with the system's performance, noting its reliability and ease of use.



Above graph depicts the typical daily solar generation and battery charge/discharge profile for the filling station taken from the online remote monitoring platform.

The above shows how solar generation is feeding daytime loads and excess solar is charging the battery that is discharged at night to further reduce operational electricity bill costs.

THANK YOU!

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Inspired by this success story? Get in touch with us to start your journey to renewable energy

ZERO POINT ENERGY

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