

# POWER

# FOR PARADISE

## Optimization of diesel generators in remote areas

TESVOLT  
*Free to go green.*



### PROFILE

**Client:**  
Turneffe Flats Resort

**Industry:**  
Tourism, hospitality

**Special characteristics:**  
A hurricane-proof system with a combined heat and power unit and PV

**Region, country:**  
Turneffe atoll, Belize, the Caribbean

### THE BACKGROUND

Off the coast of Belize lies the coral atoll Turneffe. With vast reefs, sea-grass beds, mangroves and coastal forests, it's a globally significant ecosystem that's home to hundreds of species of fish and plants as well as fish spawning grounds.

In the 1980s, two Texans discovered the atoll's tourist potential and built a holiday resort that has since been expanded and renovated several times. Today, 'Turneffe Flats' is an internationally renowned premium resort for its superior fishing, diving, guided snorkeling, and other eco-tours.



### THE CHALLENGE

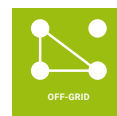
The founders and owners committed to environmental protection and thus to sustainable tourism early on. They were also instrumental in having the atoll declared an Environmental Protection Area in 2012 and focused particularly on sustainable building technologies.

In addition to a closed wastewater system, the resort uses excess energy in the form of ice batteries for air conditioning. For decades, the remote resort drew electricity exclusively from diesel generators. Four generators ran at alternating times to ensure a high level of resilience against failure and a long service life. But diesel generators don't just use expensive fossil fuels – they are also disadvantageous as the start-up times mean they often have to run for a longer period than that for which the electricity is required. In many cases, they aren't the most efficient of options. And that's why the resort installed a solar power plant with a capacity of 110.8 kWp in 2019. The client went on the hunt for a storage system to supplement this solu-

tion so that the electricity generated by the solar power plant could be used at night and the diesel generators' running times could be optimised. As Belize is so close to the equator (where the sun sets around 5:00 pm), the solar installation can only produce electricity for a relatively short period of time and operating processes between the solar installation, diesel generators and storage system have to be finely tuned to optimally reduce the resort's power consumption.

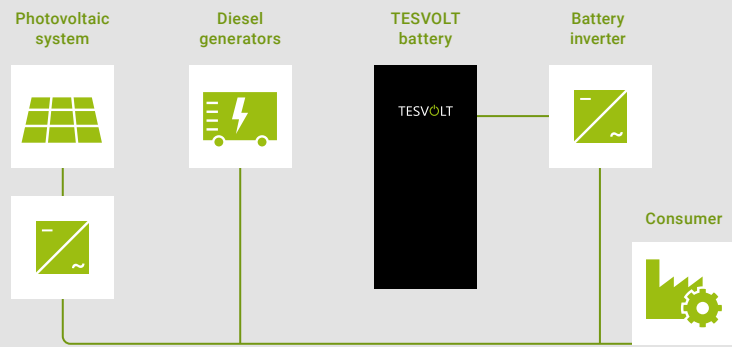
### Requirements for a storage solution:

- High-performance storage system with a high depth of discharge and many guaranteed cycles
- Easy installation and high operational reliability



## THE SOLUTION

Gietzen Solar's electricians and solar fitters designed the solar and storage system for Turneffe Flats together with microgrid experts from Boston-based CivicSolar. Gietzen Solar installed TESVOLT's TS 48 V as the storage system, which is predestined for demanding off-grid applications. It takes over the power supply in the resort, especially in the evening and overnight, when the generators shouldn't disturb the guests' peace and quiet and the sun has already set.



"We have focused on providing an exceptional guest experience while having the least possible impact on our environment. Our new energy system is part of a long-term effort to lower our carbon footprint."

Craig Hayes, owner and founder of the Turneffe Flats resort

"Working with TESVOLT products is truly satisfying. From packaging to servicing, there's so much professionalism packed in there that it's a real delight."

Joey Richardson, responsible installer at Gietzen Solar

"We sell Tesvolt products because we believe firmly in the product and also in the company's philosophy. High quality is everything when it comes to storage systems.."

Stuart Fox, Engineering and Sales, CivicSolar/CED Greentec

## THE ADVANTAGES

- 80 % of the resort's energy needs can now be met by the sun
- Diesel fuel consumption has been cut by 75 %, which is equivalent to around 17,000 gallons per year or about USD 85,000. Perhaps even more important for the operators is the fact that the costly process of procuring diesel by boat and maintaining the generators has now been drastically reduced
- The entire installation will have paid for itself after only ten years, based on the diesel savings alone
- **Hurricane-proof**  
extremely robust Samsung battery cells offer maximum safety against external influences
- **Durable**  
the system boasts an above-average service life of up to 30 years thanks to the unique battery management system that optimises cells not only within a single module but also between the modules in each cabinet
- **Expandable**  
TESVOLT systems can be expanded or exchanged at any time – not just after the first few months of operation but even many years later
- **Transparent**  
seamless monitoring of storage system health down to cell level. The installer monitors the system over a distance of almost 5,000 km

## PROJECT: FACTS AND FIGURES

Storage system	TS 48 V
Energy content	268.8 kWh
Discharge power	72 kW
Cell	Lithium NMC prismatic (Samsung SDI)
Efficiency (battery)	up to 98 %
Cycles	6.000–8.000 (0,5C- to 1C at 23 °C +/-5 °C with 100 % depth of discharge)
Operating temperature	-10 °C to 50 °C
Battery inverter	SMA Sunny Island
Installer	Gietzen Solar/CivicSolar

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