

# Now it's quiet in the Seychelles



A hybrid photovoltaic system from IBC SOLAR ensures the energy supply of the research station on Aldabra Atoll without endangering the fragile ecosystem.

Photos (2): IBC SOLAR / SIF

**A new hybrid photovoltaic installation has replaced noisy diesel generators to provide a sustainable energy supply to a research station on Aldabra Atoll in the Indian Ocean.**

In the middle of the Indian Ocean, 1100 km from Mahé, the main island of the Seychelles, lies Aldabra Atoll. As well as hosting the world's largest population of giant turtles, Aldabra Atoll, which is a UNESCO World Heritage Site, is also home to numerous endangered plant and animal species, making it internationally valued as a research site for marine, coastal and island ecosystems. Since the 1970s, the research station on the otherwise uninhabited island has been delivering important information for the protection of ecosystems. But until recently, the efforts of the researchers to protect the site stood in contrast to the unsustainable energy supply of the research station. The delivery and storage of

**Delivering all the equipment to the small atoll in the middle of the Indian Ocean was especially challenging for the project developers.**



large quantities of fossil fuel for the four diesel generators created a permanent risk for the fragile ecosystem as well as posing a logistical challenge. The barrels of diesel fuel had to be moved by hand from the supply ship to the store – a constant danger both for the environment and for the people handling them.

The Seychelles Islands Foundation (SIF), the public foundation in charge of the management of the research station, therefore looked around for an environmentally friendly and fossil-fuel-independent solution to supply the station with power. The results of a feasibility study and a report on the energy-saving potential were conducted in cooperation with the Martin Luther University Halle-Wittenberg in Germany. They served as the basis for a hybrid photovoltaic system planned and implemented in conjunction with the German PV system integrator IBC SOLAR AG.

The experts for hybrid power from IBC SOLAR started planning the project in spring 2010. At the same time, the researchers received training on the use of the solar power installation. While running and maintaining the system is child's play, transporting the components to the site was more challenging. The parts could not be brought to the island directly as it has no quay, so they first had to be shipped to Mahé, before being loaded onto a supply ship for the 1100 km trip to Aldabra. Christina Quanz, Project Manager at the SIF, remembers the difficulties: "Because the supply ship can only dock at the atoll during particularly strong spring tides, the time frame was very small: the 25 tons of equipment had to be unloaded by hand within eight hours by the small crew on the island." The system went into operation on 31<sup>st</sup> March 2012, two years after planning began. A year and a half later, the first results are available.

The positive numbers show that the energy generation system on the island can be a model for other regions with similar geographic conditions.

## Positive results

The core of the new hybrid photovoltaic system consists of 108 polycrystalline solar modules produced in Europe with a capacity of 25.38 kW, on a total area of 176 m<sup>2</sup>. Three PV inverters convert the current and, together with an AC box specially developed by IBC Solar, feed the electricity directly into the island's grid. When there is an oversupply, the current is fed via six further inverters into the storage system of 96 batteries, which have a total capacity of 315 kWh at 48 volts. This power is then available during times of undersupply, for example at night. If the stored electricity is used up, for instance during the northwest monsoon, the main inverter of the storage system automatically fires up the diesel generator. The web-based monitoring system assists in the daily checks and in error diagnoses. Due to the isolation of the atoll, it is an important component of the system.

The hybrid photovoltaic system supplies the entire research station, which consists of 12 employee houses, a library, a laboratory, offices and an island shop. Most of the electricity is consumed by the air conditioning units in the offices, refrigerators, freezers, ventilators, computers, communication equipment, electric tools and, especially in the dry season, the desalination plant. Since 2008, old, energy-hungry equipment such as refrigerators and washing machines has been progressively replaced with modern equipment, reducing electricity consumption by 63%. "The big advantage is that the station is now more energy-independent due to the much lower diesel consumption and can use the modern equipment to study the impressive natural environment with only a minimal impact on the ecosystem of the island", says Alexander Müller, Team Manager Hybrid Power Supply at IBC SOLAR and project leader.

The numbers now available speak for themselves: 94% of Aldabra's energy needs are covered by the PV hybrid system, leading to a 97% reduction in diesel consumption, down to an average of 87 litres and 13 hours per month. So far, CO<sub>2</sub> emissions have been reduced by 31,000 kg. The financial figures are just as impressive: in the first year alone, € 42,000 were saved in buying and transporting the diesel fuel, which used to cost € 80,000 each year. With an investment of € 500,000 (including transport, construction, tests etc.), the complete system will be amortized within eight years – and the PV system, which cost € 170,000, in only three years. "We can now rely on a secure and environmentally friendly energy supply", says Frauke Fleischer-Dogley, General Manager of SIF. All participants agree that the Aldabra project not only demonstrates the efficiency and flexibility of photovoltaic systems but also serves as an international appeal for the increased use of solar energy.

*Christina Quanz,*

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