



"The SunRider solar boat powered by Trojan batteries is ideal for achieving responsible and sustainable tourism in a wide range of locations that require eco-friendly boating options, such as in wildlife and bird sanctuaries."

*George Mathew, TeamSustain
CEO*

SunRider Solar Boat

India

System specifications:

- **Batteries:** Trojan T105-RE* – 6V, 824 Ah @ 48V
- **Qty:** 32 batteries for 20-passenger boat
- **Qty:** 16 batteries for 10-passenger boat
- **Solar Panels:** Emmvee Solar, ES 300 M72
- **Qty:** 12 (3.6 kWp) panels for 20-passenger boat
- **Qty:** 6 (1.8 kWp) panels for 10-passenger boat
- **Charge Controller:** Outback FM80 (80 A @ 1040F) with adjustable current limit

Conventional boats running on diesel and gasoline have been the primary mode of waterway transportation since the early 1900s. However, they are expensive to operate and require considerable maintenance to ensure reliability. In addition, their use subjects the surrounding areas to water, air and noise pollution emitted by these boats as a normal course of their operation.

The distribution of exhaust emissions, the considerable noise of boat engines, as well as the fuel and lubricant residue dispersed into lakes and rivers, have a harmful impact on the environment.

"The negative effect on aquatic life, birds, and other inhabitants that live near the rivers and lakes where diesel-powered boats are used, endangers the overall delicate ecological balance," said George Mathew, CEO of TeamSustain.

With numerous tourist destinations around the world offering leisurely boat outings to view local wildlife or serene landscapes, the need for an alternative to the fossil-fuelled boats used today was recognized by TeamSustain.

Considering the growing popularity of "Eco Tourism" throughout Asia, as well as the need for waterway transportation by local residents, especially in India, TeamSustain designed and developed a solar-powered passenger boat called SunRider.

"In some countries, waterways are the only means of transportation for the local population, and in Kerala, India, SunRider has provided an ideal environmentally friendly solution," Mathew said.

Unlike conventional boats, solar boats are powered by the sun and have zero-emissions, therefore, they do not pollute lakes and rivers. In addition, due to their inherent silent operation, neither people nor animals are disturbed by noisy diesel motors. For these reasons, solar boats are particularly suitable for water tourism, recreational activities and use in nature reserves.



SunRider Solar Boat

India



TeamSustain initiated a research and development (R&D) project in 2005, which resulted in the development of India's first and Asia's largest solar-powered passenger boat for commercial applications. Launched in 2008, the first solar-powered boat named "Surya" accommodated 25 passengers and remains in operation on Kumarakom Lake in Kerala, India ferrying passengers across the waterway.

Improving on the initial design, TeamSustain developed a more rugged solar boat in 2009 named "SunRider." The TeamSustain R&D team used space optimization techniques to improve the overall design which resulted in a faster and more efficient boat.

An updated version of SunRider was launched in November 2014 and is now operating at The Mermaid Hotel and Resorts in Cochin, India. It integrates the most efficient components available in the world including Trojan deep-cycle Smart Carbon™ batteries, electric outboard motors, advanced solar panel modules, solar MPPT charge controllers, and an LED navigation system and deck lighting.

Trojan Smart Carbon™ deep-cycle batteries were selected for the SunRider solar boat based on their reputation for high quality and reliability. Trojan Battery's Smart Carbon Premium line of deep-cycle, flooded batteries are specifically engineered to withstand the rigorous conditions of renewable energy applications such as extreme temperatures, remote locations and the intermittent nature of solar power generation.

Smart Carbon is Trojan's proprietary carbon formula which offers improved performance when batteries operate in partial state of charge (PSOC). PSOC occurs when batteries are not fully charged or discharged each day, a common occurrence in renewable energy applications due to the varying levels of irradiance, temperature, and available sun hours.

"SunRider and solar-powered boats in general are ideal for achieving responsible and sustainable tourism at wildlife and bird sanctuaries, where the sound of motor boats and resulting fuel emissions are serious threats to the ecology," Mathew said.

SunRider has a runtime of four hours each day, with a total reduction in diesel fuel of 14,600 litres per year. This has resulted in the significant decrease of 40 tons of CO2 emissions per year.

As a result, SunRider has helped TeamSustain clients earn a "Green Tag" designation which recognizes the project for its positive impact on the environment.

"The Green Tag recognition of the SunRider solar boat showcases the perfect example of responsible tourism," Mathew said. "The project eliminated our customer's diesel consumption, and in turn, reduced the carbon footprint by 100 percent. By eliminating the use of fossil fuels, SunRider has made a positive impact on the reduction of water pollution and environmental harm."



SunRider Solar Boat

India



Technological Innovation Elements

- Dual-hull design provides more reliability and stability of the boat. Typically, most boats have single hulls, so if the hull is compromised, the boat will sink. However, dual-hull designs provide added protection.
- PV panels lie flat on the roof of the boat to save space and ensure the best sun exposure.
- Layout of the battery bank uses optimal spatial design to allow maximum number and comfort of passengers.

For more information contact:

Trojan Battery Company
www.trojanbattery.com

TeamSustain Ltd.
www.teamsustain.com

Battery Bank

Battery capacity is designed to accommodate the specific operation of each of the 10-passenger and 20-passenger boats. The on-board battery charger features a multistep charging design with temperature compensation. The table below outlines the details of the battery banks.

* The T105-RE battery has transitioned to the Solar Premium SPRE 06 255 battery.

	20-Passenger Boat	10-Passenger Boat
Make	Trojan Battery	Trojan Battery
Model	T105RE – 6V	T105RE – 6V
Capacity	824 Ah @ 48V	414 Ah @ 48V
Number of Batteries	32	16
Type	FLA	FLA
Speed	7-9 knots	
Battery Charge Time	7.5 hours @ STC	
Continuous Running at 7 Knots	3 hours (batteries full to 20%)	
Continuous Running at 4 to 4.5 Knots	9 hours (batteries full to 20%)	
Optional Power Supply	Shore charging	
Type	FLA	



Trojan batteries are available worldwide through Trojan's Master Distributor Network. We offer outstanding technical support, provided by full-time application engineers.

For a Trojan Master Distributor near you, test call 800.423.6569 or + 1.562.236.3000 or visit www.trojanbattery.com

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