

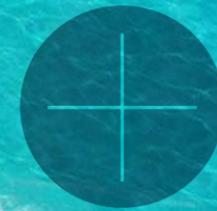
True Ecotourism

A state-of-the-art autonomous solar electric catamaran has been developed that can save 142 tons of CO₂ per year

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Soel Yachts and Naval DC have teamed up to design and engineer the SoelCat 12, a trailblazing autonomous solar electric catamaran for coastal waters and inter-island transportation. Measuring 11.8m in length, 5.8m in width and with a shallow draft of only 0.7m, the vessel has the capacity to operate in shallow lagoons, reefs and bays – key areas that otherwise would have remained inaccessible. The keel of the SoelCat 12 features a reinforced wear-strip, which protects the vessel against accidental coral impact and enables it to be beached on sandy shorelines. A nominal design displacement of 6tons holds a payload of 1,300kg for cargo and passengers, enabling the boat to take up to 24 passengers and two crew members on board.

According to Soel Yachts and Naval DC, the SoelCat 12 is a better and 100% clean alternative solution for coastal water leisure and passenger transportation. The deck space is fully customizable and can host a variety of seating arrangements and layouts, from luxurious and comfortable yacht-like features, to practical and economical deck gear for water taxi services, eco-tourism and water-bound resorts. The vessel features a large sunroof in order to provide shadowing for the guests on board. As an extra option, the forward area can be fully enclosed with a glass front for added passenger and helmsman protection from harsher conditions. The vessel's standard and most economical layout is the twin-bench setup, which leaves a comfortable surplus of moving space on



board. The SoelCat 12 benefits from large luggage storage compartments in the bulwarks next to the seats, as well as dedicated wet storage compartments next to the bathing platform at the aft. A rigid stainless-steel swim ladder provides easy and comfortable water access and for dedicated diving excursions, a stainless-steel diving ladder can be fitted as an option.

Electric operator from the start
The SoelCat 12 has been specifically designed for electric propulsion right from the first line drawing during the very beginning of the development project. As such, the partners say that every aspect of the vessel contributes toward high-efficiency solar electric sailing. The lightweight yet tough and durable fiberglass construction, the large solar roof and the super slender hulls are the major key factors for the vessel's high autonomous performance when it comes to speed and range. With an installed battery capacity of 2 x 60kWh, the SoelCat 12 can sustain a maximum speed of up to 15kts for one hour in case of emergencies. The vessel's standard operational profile is set to a cruising speed of 8kts with a range of six hours on battery power only. Once the sun starts to shine and power generation of the large 8.6kWp commences, the vessel's already impressive cruising speed of 8kts is prolonged to 7.5 hours. Lowering the speed to the so-called 'break-even point' results in a 24-hour range at 6.5kts – and this is even throughout the night when there is no energy harvest from the solar array. This results in a range in excess of 150nm.

The solar array produces around 25.6kWh (NOCT) daily on average, with the annual

Left: The pioneering SoelCat 12 is ideally suited for sustainable coastal water transport



energy production averaging in excess of 9.3MWh. However, this is influenced by local circumstances such as latitude and longitude, sunshine days per year, as well as the hours of sunshine per day. Around the equator, the annual harvest can even achieve 13MWh. Even though the SoelCat 12 features 2x 5kW three-phase shore power chargers (2x 3kW if only single-phase AC is available) on board, the vessel is perfectly able to solely rely on the power harvested by its solar array. In order to achieve this, the operational duty profile of the vessel is adjusted toward a lower service speed or shorter running time.

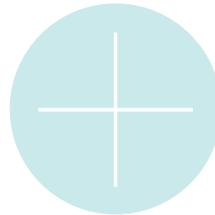
The SoelCat 12 is aimed at not only private or commercial operators, but also for governmental and scientific research projects. With a customized deck layout, the vessel presents an ideal yet 100% environmentally friendly alternative as a base for all kinds of coral reef, sea-life and ocean studies, researches and expeditions. Given that the SoelCat 12 does not need any fuel other than sunlight, it can also operate perfectly in remote areas. The vessel can even be used as a mobile AC power station, given that the SoelCat 12 is capable of providing 6kVA of AC inverter power.

The SoelCat 12 is built to IMO / SCV guidelines and international rules and safety regulations. Having more than 12 passengers on board is often very challenging in terms of legal allowance and safety regulations, but the

Above: The helm station with all controls and the redundant Naval UI monitoring and alarm notification system

Above left: A system page showing all data of the solar electric propulsion system

Below: In total, the SoelCat 12 has a CO₂ emissions neutral range in excess of 100nm at 7.5kts speed



SoelCat 12 is certified for 16 (CE C) passengers plus two crew members for all ferry service runs. When the vessel is used for diving excursions, the number of passengers is limited to 12 (CE B) because of the extra equipment that's required for such an expedition.

The SoelCat 12 has been designed to be demountable and fit into two high cube 40ft containers. As a result of such compact dimensions, the vessel can easily be transported at affordable rates to remote areas or islands all over the world and can be assembled by a local build crew. Neither lamination processes nor specialized tools are required for the SoelCat 12's assembly.

Solar electric propulsion
Naval DC's acclaimed solar electric propulsion system is an integral design matched to the SoelCat 12's requirements and duty cycle. Achieving the best possible overall propulsive efficiency was the highest goal for Naval DC engineers, and as a result the system consists of 2x 60kWh of Naval DC's marine lithium polymer batteries including all safety features and BMS; 2x 5kW Naval DC chargers with BMS communication; 2 x 30kW PM synchronous electric inboard motors; and a system-wide monitoring and alarm unit, called Naval UI. Next to presenting vital in-depth system data to the operator, the Naval UI is also supplying Naval DC with the latest vessel and system information. This enables Naval DC to remote monitor all vessel and system parameters and provide assistance for system maintenance.

The autonomous SoelCat 12 saves 142 tons of CO₂ annually compared with a conventional propelled vessel with a 200-liter-per-day fuel consumption. The overall financial savings accumulate to more than US\$126,000 for a typical 300-day operational profile per year. +

SoelCat 12 - Speed [kn] vs. Autonomy [h] & Range [nm]

