



## EBAA Visits: Solar Sailor - Sydney



*“Green technology for blue highways”*

Second in this series of ‘Member Visits’, we catch up with Dr Robert Dane, founder and CEO of Solar Sailor, onboard the eponymous boat on Sydney Harbour.

It is a sunny morning when I board the Solar Sailor in Sydney’s Darling Harbour, where it lies patiently at its dock opposite the Aquarium, solar panels folded down to collect a maximum of rays. While Dane gives me a tour of the 21 metre long, 30 tonne vessel it becomes apparent that this is a very exceptional boat, especially when one takes into account that it has been around for over 10 years and completed thousands of trips carrying more than a million passengers in that time.

When former GP Dr Robert Dane attended a solar boat race in Canberra in the mid 90’s it made him ponder if there was a way to harness two powers of nature simultaneously; wind and sun, in one efficient device. His inspiration led to the idea to integrate solar panels into rigid ‘wing sails’ that could be continually adjusted in position to optimally benefit from the available breeze and sunlight. After an initial round of raising finance and gathering a group of likeminded people such as the Hon Bob Hawke (who is now chairman of the venture) and securing a number of pivotal grants, Solar Sailor Holdings Ltd was founded and work started on the first commercially viable prototype in late 1998.



*The Solar Sailor docked in Darling Harbour, Sydney*



*40 kW electric motor*

This led to the launch of the ‘Solar Sailor’ in Sydney in the year 2000, the world’s first true hybrid marine powered passenger ferry, still operating on the harbour today. Like a hybrid car, the Solar Sailor drive system combines the torque and efficiency of an electric motor with the power and endurance of a combustion engine. Add to this the ‘solar sails’ which are rigid, but moveable wings covered in solar panels and one of the most efficient and versatile marine propulsion systems is a fact. This first Solar Sailor is fitted with a serial hybrid set-up utilising a relatively clean LPG generator, but the system can also be set up as a parallel drive combined with diesel or biofuel engines.

According to Dane, the ‘hybrid marine power’ and ‘solar sail’ technology can be used for all kinds of craft, such as ferries, cargo carriers, luxury private yachts and even unmanned inspection or military vessels for which a separate US based branch was accepted to further develop the technology for such applications.



The Sydney Solar Sailor is powered by twin 40kW Schneider Electric AC motors and runs from 80 pcs 70Ah Gel/AGM batteries at a voltage of between 240-300V. In full electric mode it will run for approximately 3 hours at 5 knots giving it a range of 15 nautical miles. The onboard computer and battery management system calculate the best mix of energy that is to be delivered to the motors. At higher speeds, the additionally required energy is supplied by the LPG generator and of course the wind.

*A look inside the compartment housing the battery bank.*

According to Dane, one of the most significant benefits is that the ferry is zero emissions at the wharf and when maneuvering around the docks. Ferries usually operate close to city centres (such as in Sydney's CBD) and anyone who has watched the Manly ferry pulling into Circular Quay knows that it belches out a considerable amount of black smoke right into the heart of the city. Cutting out the combustion engine altogether when pulling into and away from the wharves can dramatically reduce the amount of pollution in this busy part of town. Obviously a commuter ferry requires speed to complete its timetable but the Sydney Solar Sailor which is currently leased to Captain Cook Cruises performs most of its 2-4 hour sightseeing trips at low speeds so it can actually complete its daily runs with a minimum use of fossil fuels.



*Solar Sailor underway \**

Robert explains that the skipper too can make quite a difference to the total energy consumption by 'trimming the system' during the trip. It makes sense to go into a strong headwind with the sails folded down and running on the LPG motor. With the wind in the back the sails are put up and the propulsion is switched to electric only, increasing the efficiency dramatically. It all comes down to the bottom line he explains; compared to a conventional diesel ferry, the Solar Sailor can save between 10-25% on overall energy and ownership costs over a 15 year life span.

So as we see more often with electric boats and drive systems, while the initial investment may be higher, this is easily recouped and turned into savings over a longer period of time. Raising fuel prices will only help to make hybrid technology more viable. And we already know that electric motors are more reliable than combustion engines, which is confirmed by Robert, who mentions that the onboard LPG generator is the one that requires most service.



*One of the new craft fitted with solar sails, recently delivered in Hong Kong \**

The biggest challenge Dane is facing while pitching his products and technology to the international marine market is unfamiliarity with the technology and budgets. The marine industry is not well-known for easily embracing new technologies, but with the electric car being on the doorstep of a worldwide breakthrough and the bottom of the oil well in sight, there is no reason while both the commercial and recreational marine industry should not follow suit and adapt new, clean technologies.

After years of international campaigning Dane's invention is not going unnoticed and ferry operators from around the world have expressed their interest in the technology. The first ferry using Solar Sailors hybrid marine power technology outside of Australia was launched in Shanghai, China, in June last year. More recently 3 ferries fitted with a diesel-electric drive system were delivered to the Hong Kong Jockey club. A 4th ferry will be added in the near future that will (in addition to the hybrid drive train) also boast the moveable 'solar wings' to make it even more efficient and turning it into a true Solar Sailor. The company has further contracts to design for and supply to ferry operators in the USA and Asia and is working on applications of the technology in UAE, Japan, and UK. It is highly encouraging to see that a member of the Australian Electric Boat Association is right at the forefront of the next big thing in marine propulsion!



*Dr Robert Dane with the original Solar Sailor*

For more information on hybrid marine power and solar sails, visit [www.solarsailor.com.au](http://www.solarsailor.com.au)  
To book a trip on the original Solar Sailor on Sydney Harbour, visit [www.captaincook.com.au](http://www.captaincook.com.au)