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READER'S STORY

Our Technical Guru
Greg Copp
Email: gregory_copp@ipcmedia.com

The Deep Blue is very well engineered and ran for an hour, mostly at planing speeds, during our test with 1.5 miles of charge still remaining in the batteries

On test: 80hp electric outboard

We sea trial Torqeedo's first 80hp electric outboard engine

Often the best ideas are born of necessity. Christoph Ballin had just bought a waterside home complete with boathouse. A big ski-boat was next on the list but there was one major problem. If you want to blast down Lake Starnberg in Bavaria in a petrol or diesel-powered ski-boat while watching the sun set over the snow-capped Alps, there is a 17-year waiting list for a permit. If that is not enough to put you off, the permit only lasts five years with no renewal option. The only way to dodge the queue is to buy a zero-emissions craft, such as a sailing dinghy. Spotting this loophole in the law, Christoph bought himself a classic launch and fitted an electric outboard.

That was the catalyst in 2005 that launched German company Torqeedo, now the market leader for compact electric outboard engines.

Launched and featured in *MBY* last November, Torqeedo's Deep Blue – the world's first 80hp electric outboard – has already made an impact. It won the DAME award at METS followed by the NMMA product innovation award at the Miami Boat Show in February 2013. Last month *MBY* was invited to conduct the first ever trial of Deep Blue on Lake Starnberg.

ON TEST

The noise, or rather lack of it, takes some getting used to. Turn the key and the instrument panel lights up but silence still rules. Only when you engage forward or astern do you notice that the engine is working. Even then all you can hear is the muted sound of the five-blade propeller slowly churning through the water. You don't even get the reassuring clunk as you shift between neutral, forward and astern – the motor simply stops and starts spinning in the other direction. That's because an electric motor produces maximum torque all the way through its rev range, so there is no need for a gearbox. It is raw-water cooled in the same way as a petrol outboard but runs considerably cooler.

Once out on Lake Starnberg's empty waters a quick thrust of the throttle gave us our first impression of electric

MY TAKE: I can see this working brilliantly on lakes or as a superyacht tender where range is unimportant and recharging is simple but it will be a while before it's a viable alternative for sea-based sportsboats. **Hugo Andreae**

torque. The response is immediate. In fact the Deep Blue produces such an instantaneous surge of torque that it has a restrictor to prevent drivetrain damage. At higher speeds you can make out the distinctive whirring of a powerful electric motor, which deepens under load in the turns.

OUT OF RANGE?

We soon hit the boat's maximum speed of 27 knots, which is quite healthy given that the 20ft mahogany-built Rivers and Tides Palena weighs 600kg, with the engine adding 110kg (equivalent to a 60hp petrol 4-stroke outboard) and the 28.4kW battery bank another 290kg on top of that. All up the boat displaces around a tonne even when empty, so it's hardly surprising that with four people on board (around 380kg) the top speed dropped to 22 knots. With this many people weighing it down, the boat did feel over-propped so we'd expect a lighter 5.5-metre RIB to be a much livelier ride and a perfect match for this set-up.

Clear instrument panel makes it easy to keep tabs on power consumption

Range is always going to be a critical factor on a battery-powered craft and at 5 knots this boat should comfortably manage 44 miles but once you start buzzing about at planing speeds this drops substantially. At 18 knots the range is 9.2 miles with four people on board. At 21 knots this drops to 8.5 miles. With just one person on the boat this increases to 11 miles at 21 knots or just over nine miles flat out at 27 knots. Space permitting you can add a second battery bank but due to the extra 290kg this will only increase the range by 70%.

This may sound restrictive but the Deep Blue is most likely to be used on inland waters where fossil fuel is banned or as a superyacht tender or watersports boat. In all three cases long range is not normally needed. Our test lasted an hour with lots of stopping, starting and driving round at full power in a similar pattern to pulling and dropping a skier, and we still had 1.5 miles left in the battery.

The power supply is 325V DC from a double 26kWh battery bank. The recharge rate is 3kWh so it takes over eight hours to recharge a fully discharged battery bank. The estimated cost of recharging a 26kWh battery bank 150 times a year is £430 at today's prices. For a commercial operator clocking up the hours, this should prove cost effective.

The Deep Blue is available in 80hp and 40hp variations and uses a Selva leg. In either form it weighs 110kg, the same weight as a 60hp 4-stroke outboard engine

Both the engine and the battery bank are rated to IPX67 (waterproof to a depth of one metre) so an inch or two of water in the bilges is unlikely to cause a problem. Torqeedo has also fully submerged the engine to check its safety. The battery bank is guaranteed to maintain its capacity to at least 80% for nine years and the engine is guaranteed for two years (six months for commercial use) compared to five years for most petrol outboard engines. A double 26kWh bank costs a princely £24,500, which can be financed at an annual rate of 5%. In effect you pay for most of your fuel up front. The engine costs £14,999. Both prices include VAT.

Contact www.torqeedo.com

Silent speedboat: the electric runabout we tested had a top speed of 27 knots so a lighter RIB should prove even quicker

30 SECOND BRIEFING: CIGARETTE AMG

With 2,220hp on tap this bad boy can hit 87 knots on battery power alone

- The Cigarette AMG Electric Drive is the fastest and most powerful electric-drive leisure boat in the world with a claimed top speed of 87 knots.
- It has been built jointly by Cigarette and Mercedes-AMG. The super-fast electric boat comprises a 36ft Cigarette hull with the powertrain from the Mercedes SLS AMG Coupé Electric Drive supercar.
- Its power output through two MerCruiser racing drives is a combined 1,656kW. In engine power terms this is a whopping 2,220hp with 2,213ft/lbs of torque being produced from zero to maximum rpm.
- This level of bottom-end torque is huge. Few if any performance boats will have this much grunt resulting in gut-wrenching acceleration from rest all the way to its top speed.
- Despite this exceptional performance the Cigarette AMG Electric Drive will still have very little noise and no vibration.
- Each propeller is driven by six liquid-cooled permanent magnet synchronous electric motors.
- Power is supplied to each set of six electric motors by a bank of four 400V 60kWh liquid-cooled lithium-ion batteries connected in parallel providing a maximum of 240kWh.
- Each battery bank weighs over two tonnes but the lightweight motors and lack of any additional fuel tanks help offset this
- It takes seven hours to fully charge these batteries from flat using a regular charger or three hours with an uprated one.
- The most staggering figure is that at constant full power the batteries can be flattened in just one minute!