

## Case Study 139: Electric River Cruise

### SPECIFICATIONS

<b>Waterjets:</b>	<b>DJ140HP x2</b>
<b>Engines:</b>	<b>Yaskawa Electric Corp. 45kW electric motor</b>
<b>Gearboxes:</b>	<b>All Torque M10 (2.0:1)</b>
<b>Vessel:</b>	<b>20m L.O.A 18.7m L.W.L 22 tonne</b>
<b>Performance:</b>	<b>8 knots</b>



### Gold Green Hygen – Electric River Cruise

Funded by a Korean government R&D program, this prototype vessel is built and commissioned to showcase the credentials of exploiting green technologies in day-to-day domestic marine transport applications; The boat is equipped with hydrogen fuel cells and is driven by electric motors, providing for zero emission operation of this river cruiser whilst also reducing the day to day running costs by 20%.

Power is provided by 25kW H2 fuel cells plus 300A battery bank that drive twin 45kW 3-phase electric motors, which are coupled to the DOEN DJ140HP waterjets through a simple 2.0:1 reduction gearbox. The DOEN 15-inch (380mm) diameter high volume axial flow impellers provide excellent low speed efficiency and cruise capability enabling long range at reduced energy consumption.

The DOEN balanced steering nozzle gives fast and precise response. These are controlled using a conventional manual hydraulic steering system. Inboard cylinders are mechanically connected to the waterjets inboard steering tiller. This provides the vessel with exceptional easy control in both high and low speeds. A simple mechanical tie bar is used to connect the waterjets providing synchronized steering at all times.

The DJ140HP waterjets are fitted with DOEN's Jogstick Reverse System (JRS); an electro hydraulic control system that provides non-follow up jog lever control of the waterjets reverse buckets. An analogue indicator is used to show the reverse bucket position. This robust, simple and cost effective system remains very popular with operators in remote and rugged use environments. For this particular application, waterjets are supplied with a tailor-made DC powered hydraulic system that allows the JRS to operate when required without placing any continual parasitic load on the electric motors.