How to Successfully Build an Electric Narrowboat

A talk by Caroline Badger

Going Green with Ortomarine

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Ortomarine – History & Pedigree

- Electrical engineering roots
- Exclusively build all-electric and hybrid boats

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Ortomarine – History & Pedigree

- Electrical engineering roots
- Exclusively build all-electric and hybrid boats
- 3 all-electric trip boats built for charitable trusts
- 11 parallel hybrids built to date
- Currently building our 11th serial hybrid
- 1 x conversion from diesel to serial hybrid (hire boat)
- Have built over 40 boats since 2015

By 2025 we expect that:

i. All vessels operating in UK waters are maximising the use of energy efficiency options. All new vessels being ordered for use in UK waters are being designed with zero emission propulsion capability. Zero emission commercial vessels are in operation in UK waters.

ii. The UK is building clean maritime clusters focused on innovation and infrastructure associated with zero emission propulsion technologies, including bunkering of low or zero emission fuel.

Department for Transport

Clean Maritime Plan

maritime 2050 NAVIGATING THE FUTURE

Clean Maritime Plan

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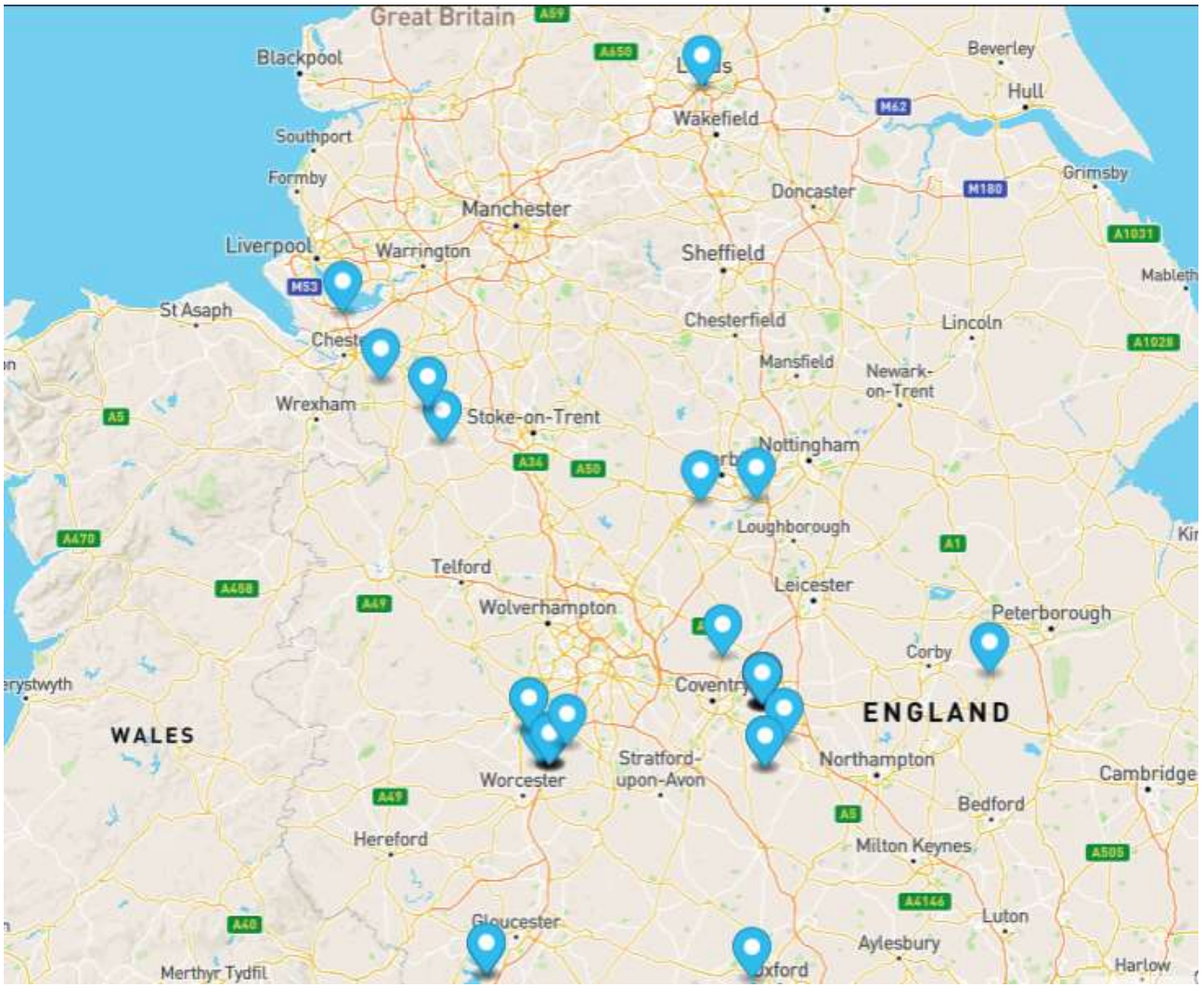

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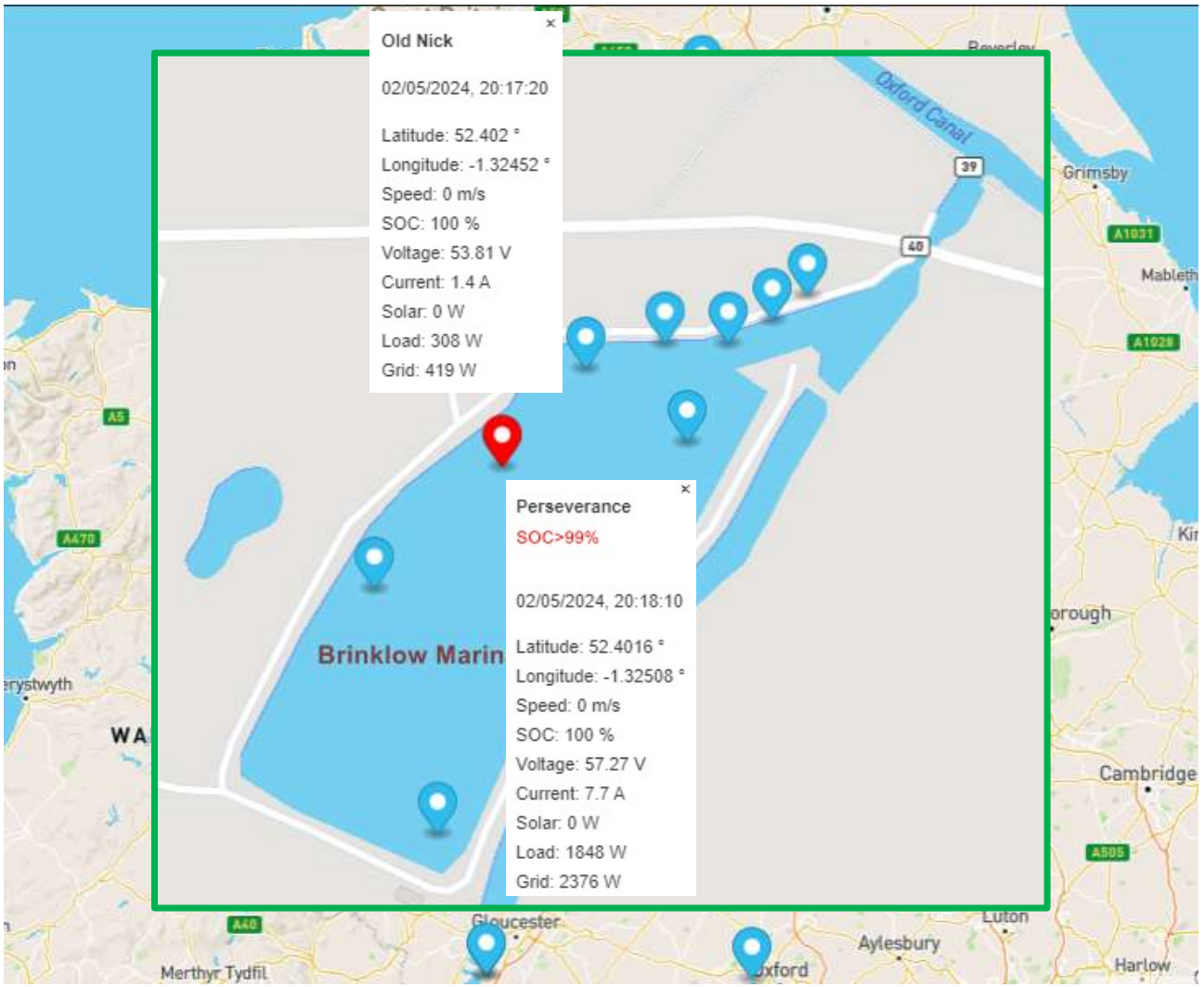

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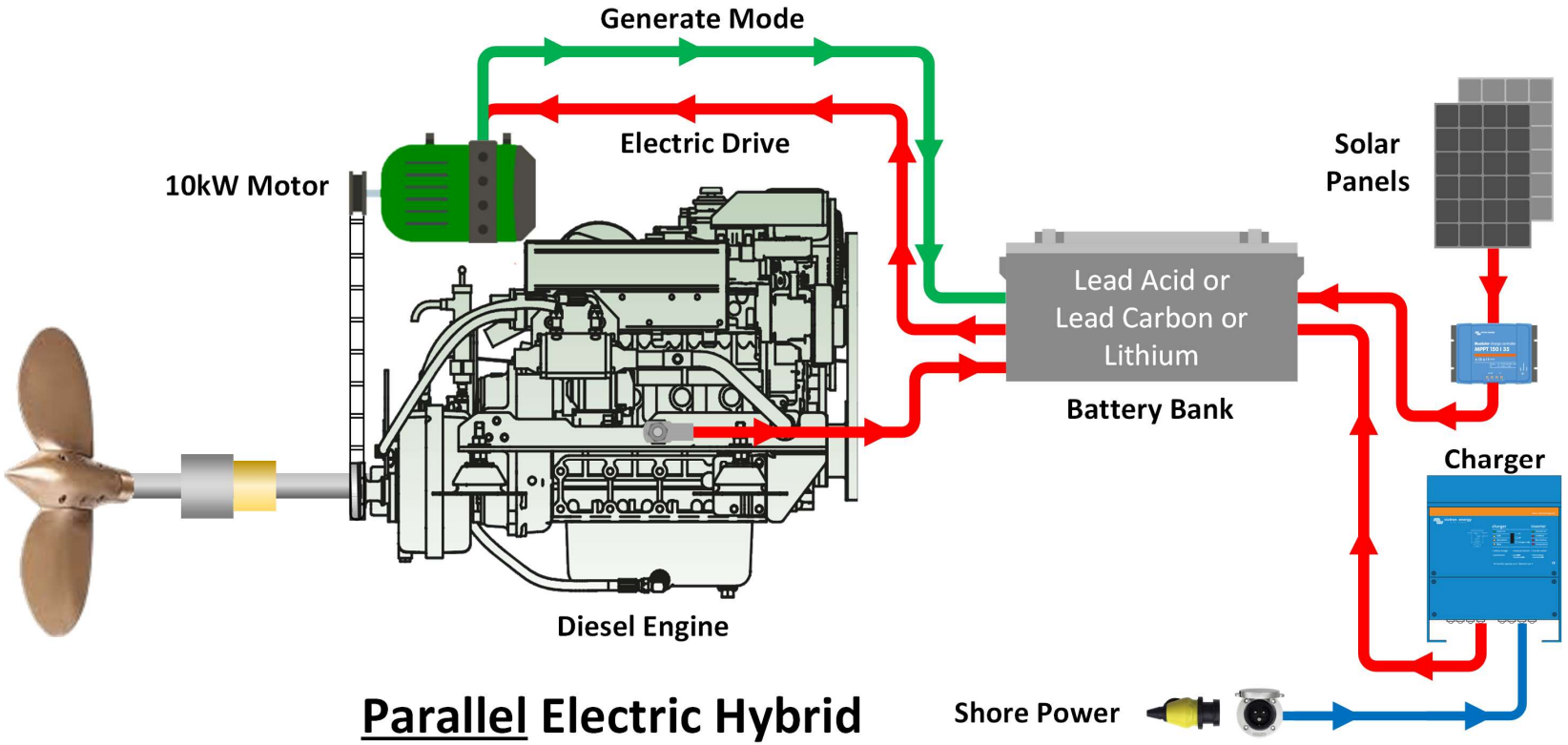
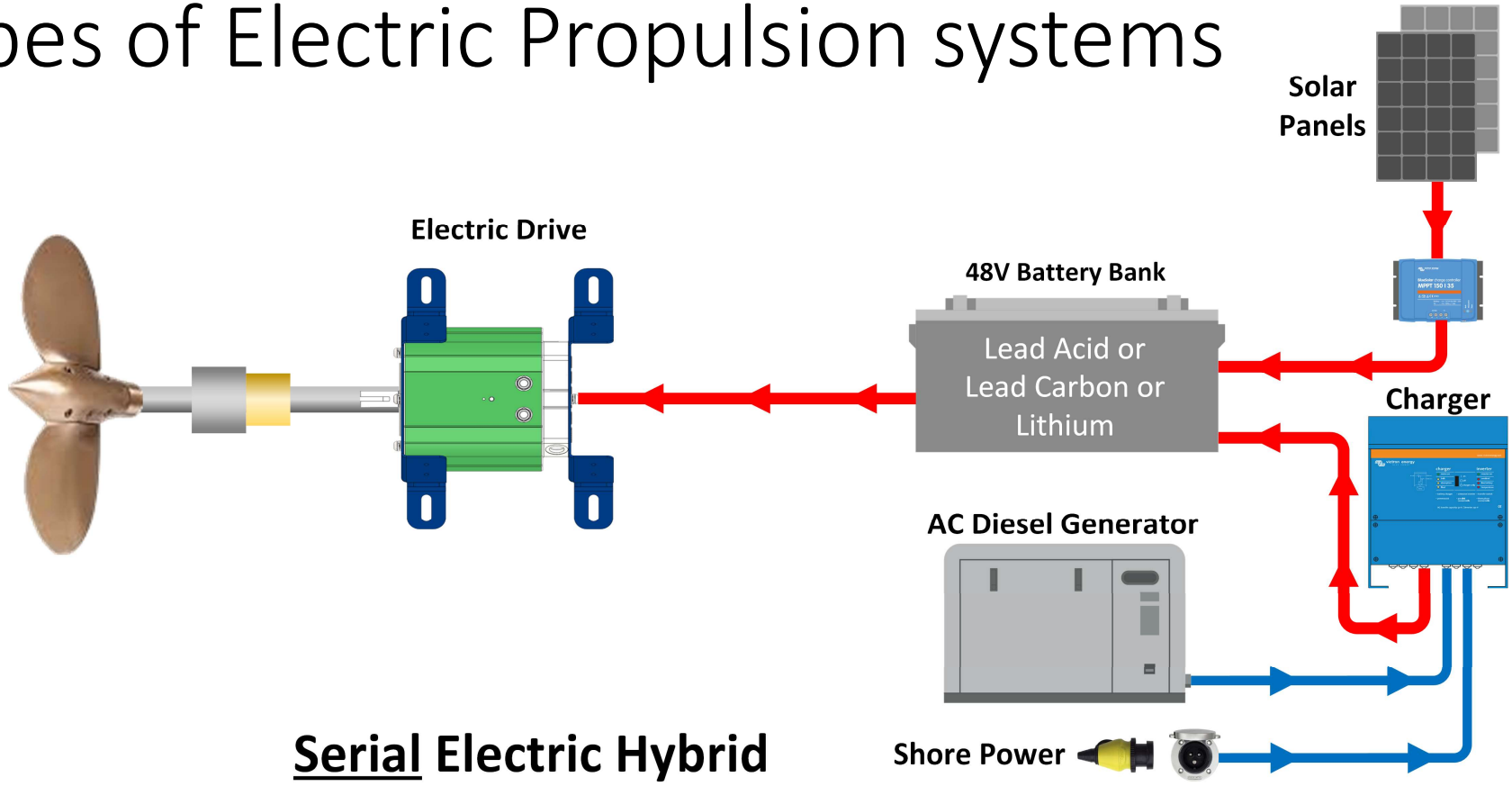
Types of Electric Propulsion systems



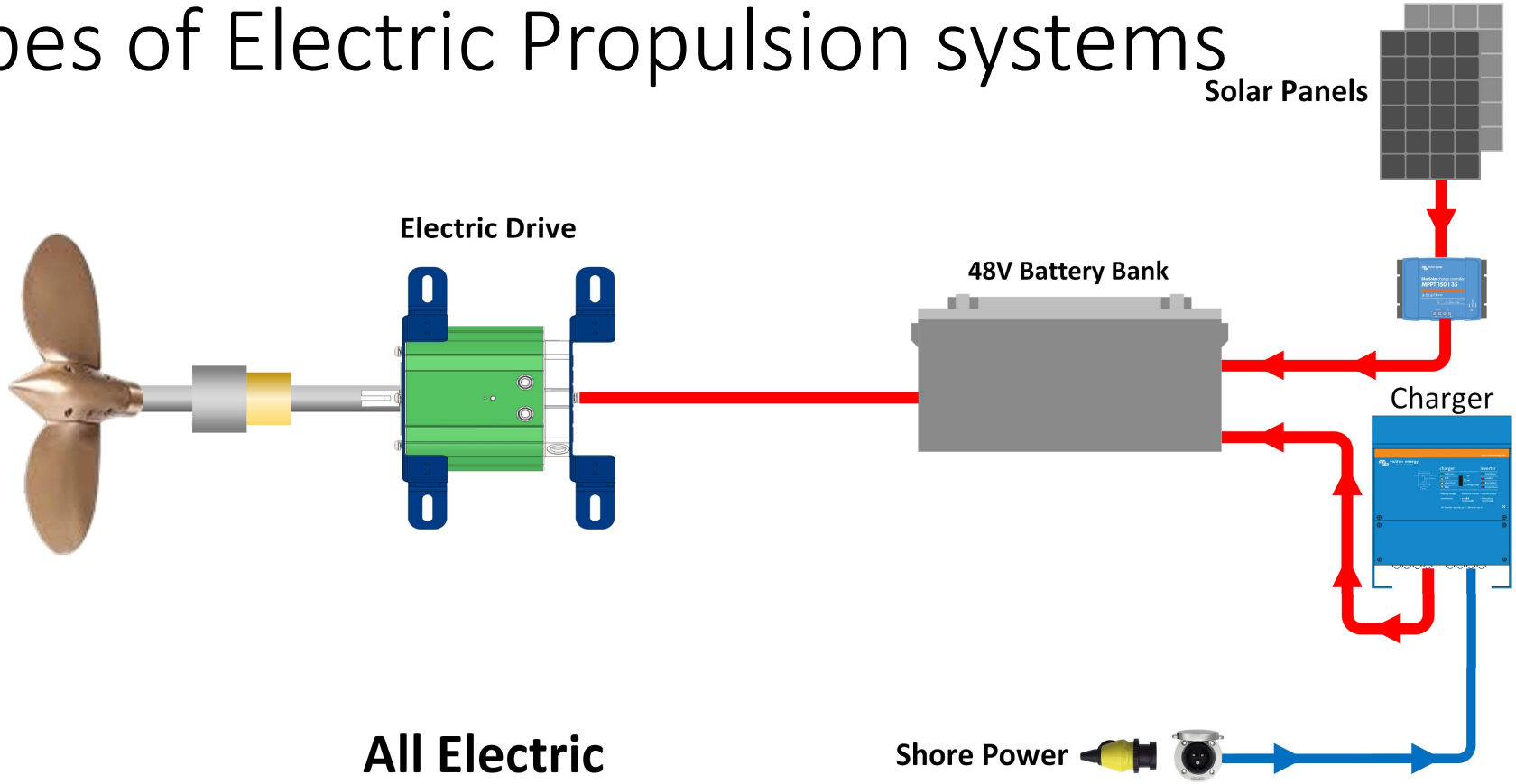
Parallel Electric Hybrid

Types of Electric Propulsion systems



<u>Serial</u> Electric Hybrid

Types of Electric Propulsion systems



All Electric

Electric Narrowboats

- Ideal vessel for electric propulsion:
  - Weight not an issue
  - Slow speed of travel
  - Large roof area for solar panels
- Assessing customer's expectations - Vital
  - Cruising style – continuous cruisers or seasonal second home
  - "White knuckle waters"
  - Efficiency v Speed
  - Domestic living

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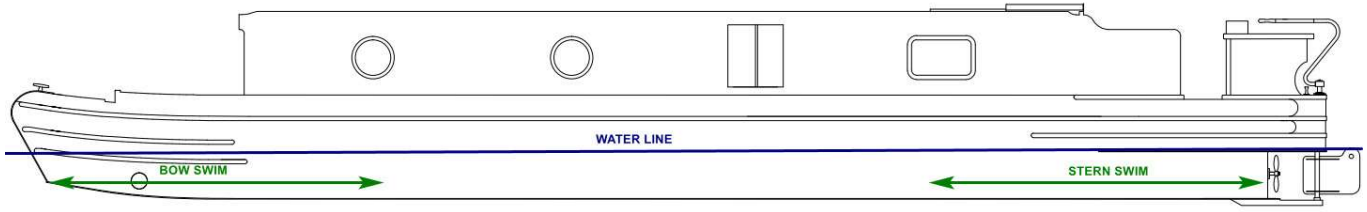
Hull Design & Draught

- Old work boats – optimum design
- Explanation of swims.



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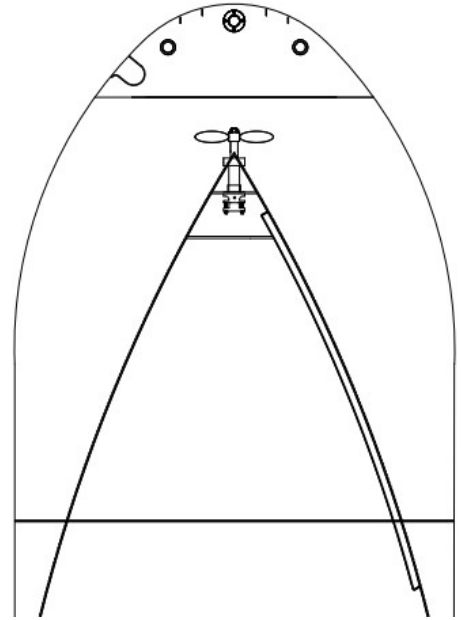
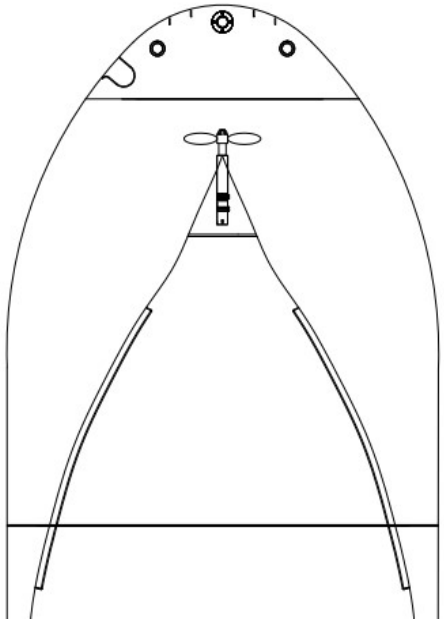
Hull Design & Draught

- Old work boats – optimum design
- Explanation of swims
- Stability & internal space v efficiency





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Hull Design & Draught

- Old work boats – optimum design
- Explanation of swims
- Stability & internal space v efficiency
- Poor state of the canal network & lack of funding for dredging

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Equipment Choice – Serial Hybrid & All Electric

- Motor – type & power rating
- Batteries – type & bank size
- Inverter/charger – type & size
- Solar panels - type & array
- Generator (serial only) – type & size
- Heating – diesel, solid fuel, all-electric or combination

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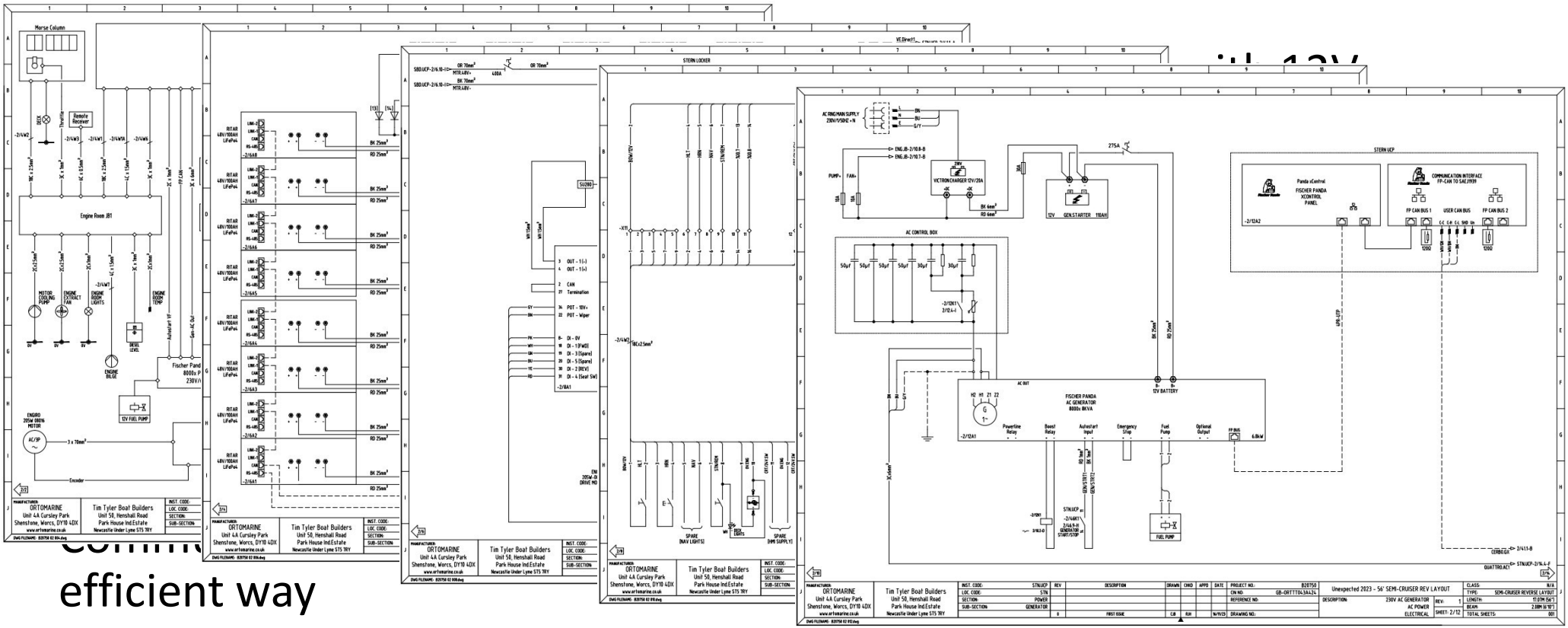
System Design, Data & Comms – VITAL



efficient way

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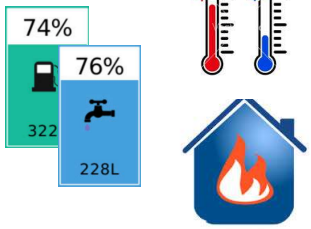
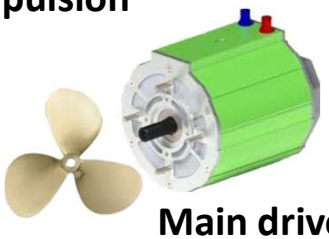
Domestic



Ortomate

GPS / WiFi

Propulsion

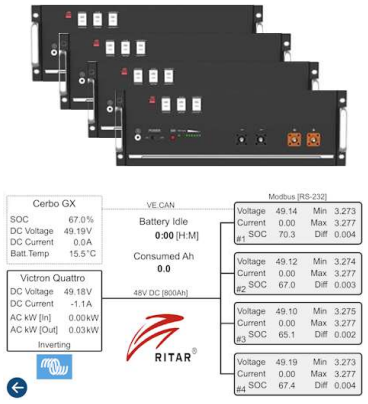


Main drive

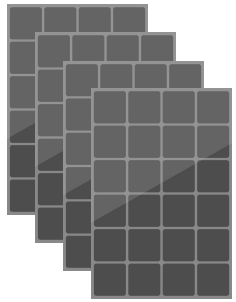
Brushless Thrusters (Bow/Stern)

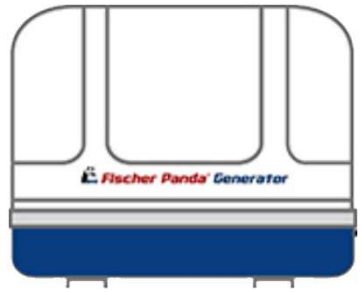
Ortopilot

Battery Management



Power Sources





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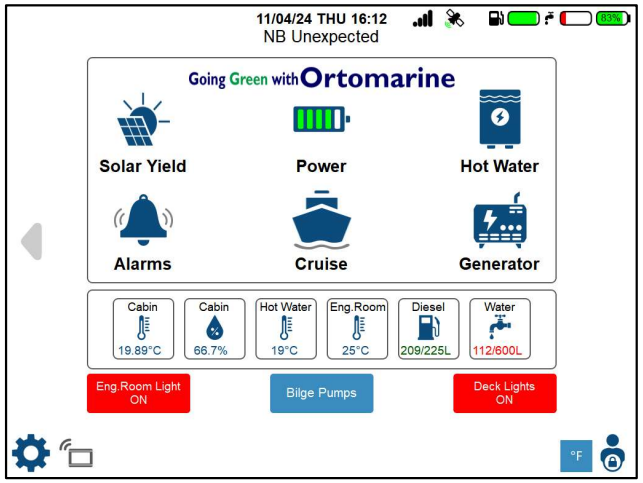
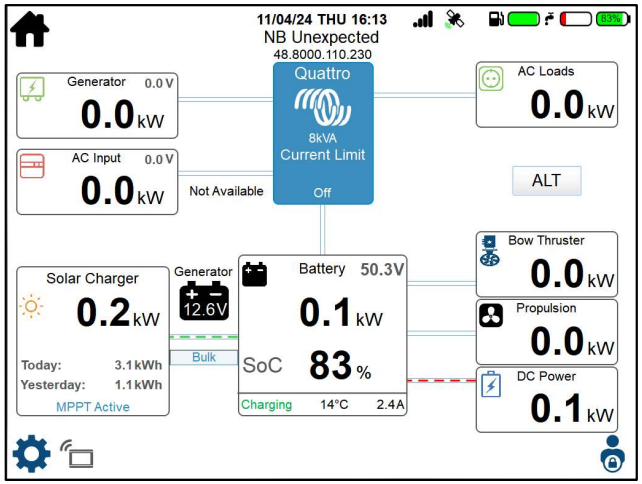
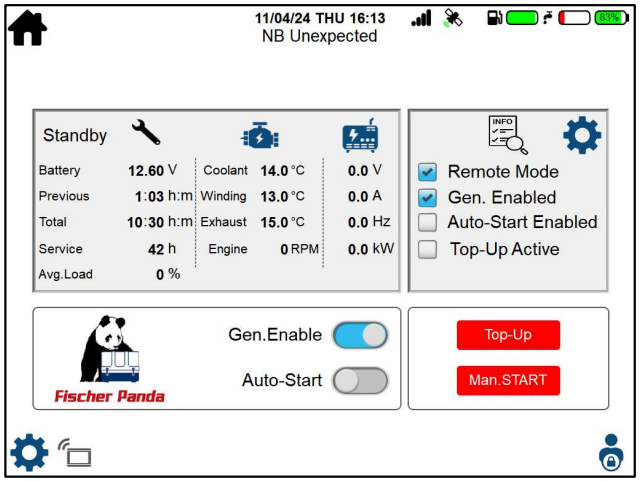
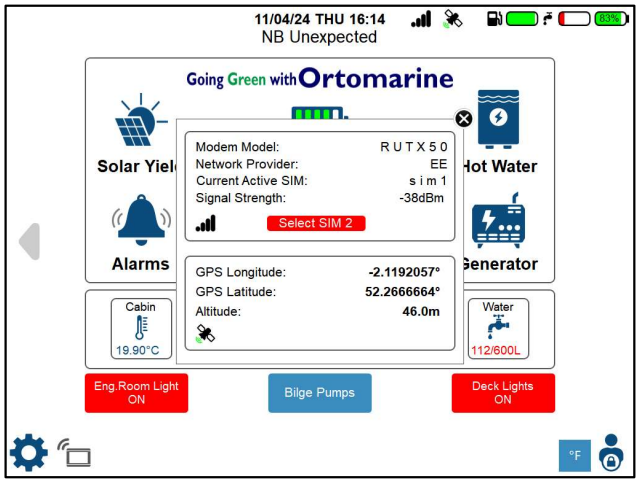
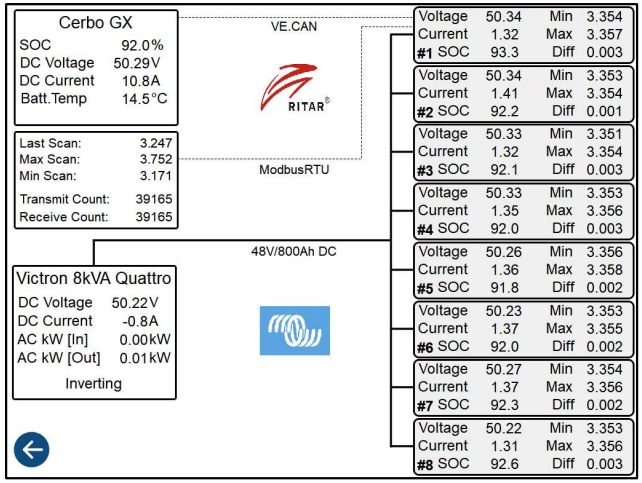
Sample **Ortomate** Screens











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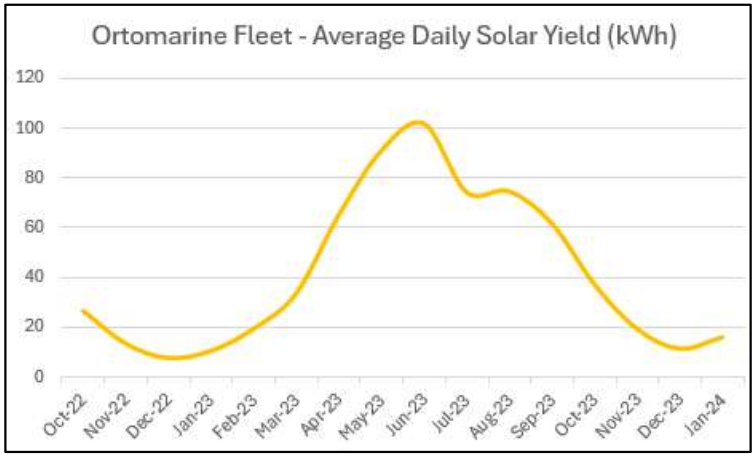
Useful experience & data gathered

- Trials event data
- Real life liveaboard data
- Running costs of generator v shore power cost
- Solar Bell

Genset Rating:		8 kVA	12 kVA
Fuel Consumption Litre/Hr	@ 80% load	1.8	2.8
	@ 30% load	0.7	1.1
Cost per hour	@ 80% load	£2.16	£3.36
	@ 30% load	£0.84	£1.32
Cost per kW	@ 80% load	£0.34	£0.35
	@ 30% load	£0.35	£0.37
Based on Red Diesel £/l		£1.20	



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Conversion from Diesel to Electric

- Budget
- Ollie Owl - £40K conversion costs

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Conversion from Diesel to Electric

- Budget
- Ollie Owl - £40K conversion costs
- Engine room & cabin space
- Battery choice & ballast
- Existing electrical system
- Motor and generator cooling

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Conversion from Diesel to Electric

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Alternative forms of power

- Wind
- Hydrogen
- Heat Pumps

Shore Power – Charging Points

- Not like car charging
- Most marinas have 16A shore hook up points
- Occasional 32A shore power points (more in future)
- Must occasionally plug into shore power for battery maintenance

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How to choose a boat builder

- Depends on choice of type of electric propulsion
- Parallel Hybrid usually Hybrid Marine, many experienced boat builders
- Serial Hybrid & All-electric, ask about experience – how many built?
- Confidence in electrical design – ask to see example schematics, single line diagrams, documentation provided to existing customers
- Customer testimonials
- After sales service
- Owner's group?
- ***Already found a preferred builder, but not experienced with electric propulsion installations? We're here to help!***

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Collaboration with Aqua Narrowboats

Watch out for No 58
"Thistledown"

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Come & talk to us for more information and to see our demo system …

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Ortopilot

Free phone charging available ☺

Thank you & enjoy the show!

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