# Green Marine
# Retrofitting towards climate neutrality

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# Green Marine project

*Retrofitting towards climate neutrality*

- EU/UK funded project

- Duration: 4 years (Feb2023-Jan2027)

- 10 partners across Europe and UK

- A number of carbon reduction technologies to be developed and tested for marine use on land-based environment and onboard ships

- Website: https://greenmarine-project.eu/

- LinkedIn: https://www.linkedin.com/company/green-marine-project/?viewAsMember=true

# Project Partners

**Ship Owner; Testing site**

**Pre-treatment and air reuse**

**$CO_2$ and water capture with membranes**

**CCU with chemical absorption**

**Assessments**

**Software catalogue tool / Retro fitting protocols**

**Valorization**

**Onboard installation, Dissemination and communication**

# Green Marine outcomes

- Carbon capture technologies tested (post-combustion with membranes, chemical absorption)

- TEA, SEA tools

- Software catalogue platform tool

- Onshore installation and testing

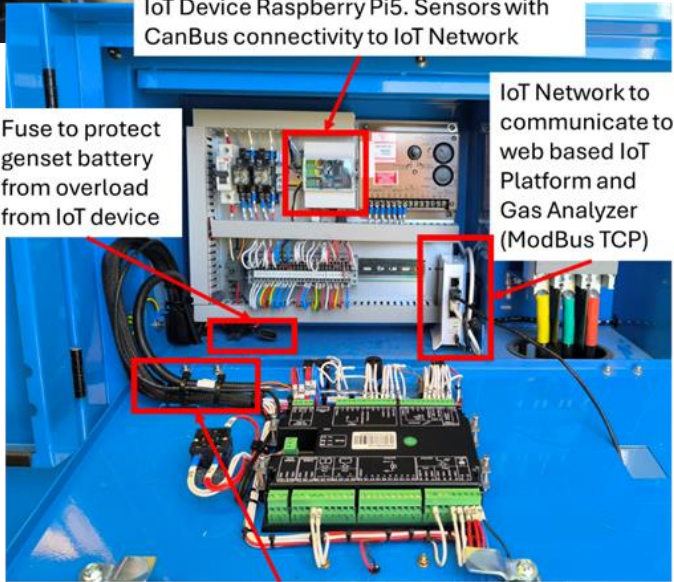- Onboard installation and testing

# Green Marine demo setup



BEFORE

AFTER

IoT Device Raspberry Pi5. Sensors with CanBus connectivity to IoT Network

IoT Network to communicate to web based IoT Platform and Gas Analyzer (ModBus TCP)

Fuse to protect genset battery from overload from IoT device

Cabling connectivity for: 1) sensor power supply from genset's battery, and 2) sensors (ModBus RTU) to genset's ECU. Information form ECU to IoT Raspberry Pi5.

climate neutrality

# Challenges

- Project stakeholders with different levels of:
  - Expertise and knowledge, from technology providers to regulators
  - Experience in the maritime sector
  - Direct/indirect involvement
- Comply will all relevant regulations/guidelines (UK MCA, Class, operator, shipyard etc.)
- Logistics for onboard installation
  - Vessel requirements and needs
  - Installation during vessel off operation (dry-docking interval)
  - Equipment to be transported and stored on site
  - Actual installation, testing and approval by different stakeholders
  - Remove equipment/technology after trial/pilot demonstration
  - Vessel remain in operation throughout pilot testing process

# Opportunities

- Explore maritime regulatory regime and different stakeholders requirements

- Iterative process informing project consortium and partners about maritime requirements, quite different to what might have been expected

- Investigate technology providers needs

- Expertise being developed and upgraded including vessel E/R 3D mapping, $360^o$ videos

- Seek AiP and further certification

- Lessons learned through iterative process

# Conclusions

- Multi stakeholder needs and requirements, some conflicting, some overlapping

- Iterative process which helps to clarify issues and communicate outcomes but also takes time to mature and inform relevant partners

- Expertise being developed and upgraded; lessons learned through iterative process

- There is no straightforward answer and silver bullet for all technologies and installation/testing onboard a ship, each one examined on a case-by-case basis

- Early commitment and involvement by all needed

# Thank you for your attention

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