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Italian Navy Green Fleet - case-study: a solution to increase overall efficiency of a military Ship

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The Italian Navy has always had, among its missions, the safeguard of the marine environment, and is strongly oriented to give its contribution to the targets fixed from the European Parliament with the European Green Deal.

In 2012, the Italian Navy launched the Green Fleet initiative, with the aim of reducing greenhouse gas emissions and improving national energy security.

To achieve these goals, the Italian Navy follows three main strategies:

- adoption of a renewable synthetic fuel;
- development and use of innovative eco-design technologies, which allow the reduction of the environmental impact of ships (LED lighting, SCR, foul release coatings);
- adoption of energy saving operating procedures (electric propulsion, energy dashboard).

The paper presents an overview of the Green Fleet initiative and a case study focused on increasing the overall efficiency of a ship by recycling the thermal energy normally released to the environment by diesel engines. In fact, the overall efficiency of a diesel engine is about 40%, which means that 40% of the energy coming from the fuel is normally converted into usable power and the remainder is waste, which is delivered as heat to the environment.

The case study identifies an effective solution to use a significant portion of that energy, while reducing the ship's energy consumption, thereby increasing overall efficiency and reducing fuel consumption and greenhouse gas emissions during operations.

At the same time, the identified technical solution makes possible to reduce electrical load peaks, making the electrical load diagram more homogeneous, with the further result of optimizing the working conditions of the diesel engines.

Finally, the case study compares the proposed solution with traditional systems, calculating the time for Return of investment.

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