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Background Information

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Siemens technology delivers energy efficiency on the high seas

Technology and software from Siemens are helping ship operators and shipping companies reduce CO_2 emissions and increase efficiency on the high seas. Fuel costs and energy efficiency are becoming increasingly important for operators, since, for example, in ship propulsion systems alone, more than 50 percent of the energy contained in the fuel is lost in the form of waste heat. Through waste heat utilization technology such as the Siemens WHRS system (Waste Heat Recovery System) CO_2 emissions and fuel consumption can be cut by as much as twelve percent. Siemens offers cutting-edge systems and solutions for diesel-electric drive technology as well as automation solutions that give ship operators a competitive edge by maximizing energy efficiency.

Portfolio for the shipping industry:

- At the rated power of the main engine, the **Waste Heat Recovery System (WHRS)** converts the engine's waste heat into electrical power with a turbine-driven generator. To do this, part of the waste gas volume flow is conducted to a waste gas utilization turbine which acts upon a generator via two gear stages. Superheated steam, which acts upon the same generator via one gear stage, is also generated by further utilizing the exhaust gas heat with the aid of a dual-pressure exhaust gas boiler with a preheater and a superheater. Using this additional power generation, this additionally produced energy can reduce both fuel consumption and CO_2 emissions by **approximately twelve percent**.

- In addition to their diesel generators, E-class and Triple-E class container ships operated by the Maersk Group, such as the Eugen Maersk, have a dual propulsion system with two slow running (booster) engines, each with 9 MW of power. These two electrical add-on drives (shaft motors), which deliver a total

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output of 18,000 kW, can be connected to the main drive shaft and give the ship more speed as needed. The booster drives obtain electrical power from the generator of the exhaust gas recovery system, which is driven by the exhaust gas utilization turbine and the steam turbine or from the on-board electrical system fed by diesel generators.

- The **new EcoMAIN ship management and decision support system** from Siemens (which is not on board the Eugen Maersk) helps ship operators and shipping companies to make ship operations more energy efficient and resource friendly and save costs and energy. Numerous interfaces to the various on-board technical systems enable **EcoMAIN** to collect data from a great many technical (sub-) systems. This information is prepared in a standardized format and made available on a shared data platform for additional decisions and operational recommendations. Energy consumption, emissions, liquid storage, maintenance plans as well as document and knowledge management, among other things, can thus be evaluated and subsequently optimized. The greatest potential for optimization lies in energy consumption, environmental compatibility, preventing emissions and maintenance intervals.

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