

From complexity to opportunity

NORDEN



Many different factors influence the fuel economy of a large ship, and in combination these factors create a very complex system. GreenSteam is a new solution made to handle this complexity in order to achieve the best possible fuel economy for large ships

When a 200 meter long ship is propelled through the sea by a 10.000 kW engine, it is not an easy task to calculate the resulting speed. The direction and speed of winds and waves, the loading of the ship and the angle of the rudder are some of the factors that affect the amount of resistance that the ship must overcome. Some factors, such as the propeller settings – typically revolutions per minute – and the ship's trim, can be controlled by the crew, but many factors relate to systems only manageable through complex calculations.

Yet, all these factors interact. For instance, if the ship is fully loaded, a greater part will be submerged than when the ship is partly loaded.

Adjusting the controllable factors so that the fuel economy of the ship is optimized is therefore a very complicated problem, and even more so when adding non-constant factors such as wind direction and speed.

An exciting opportunity

At the same time this presents a great opportunity. If the controllable factors can be adjusted correctly to the ship's changing conditions, it will be possible to improve the fuel economy significantly.

GreenSteam achieves this through advanced mathematical modelling of the complex realm of ship fuel economy. All of the involved factors are measured and recorded over a long period of time. For some of these factors, specially adapted sensors are used to capture the necessary information. This comprehensive data collection is then 'fed' to the GreenSteam software which is able to observe and correlate the interplay and patterns that exist in the data. This means that instead of calculating your fuel economy based on a long range of simplified assumptions, you use the actual data from the individual vessel.

The optimal controls are dynamically calculated by GreenSteam and displayed on the bridge through a carefully designed user interface that allows the captain to quickly and easily determine any needed adjustments.

GreenSteam is currently being operated on board one of Damskibsselskabet NORDEN A/S's tanker vessels. Current estimates indicate that this vessel can improve fuel economy by around 4 percent. Such an improvement corresponds to a reduction in annual CO₂ emissions of roughly 1,200 metric tons and reduces annual fuel costs by around €100,000.



Project facts

Category: **Operation**

Emission reductions:

CO₂ 4 %
NO_x 4 %
SO_x 4 %

Partners:

GreenSteam
Norden

