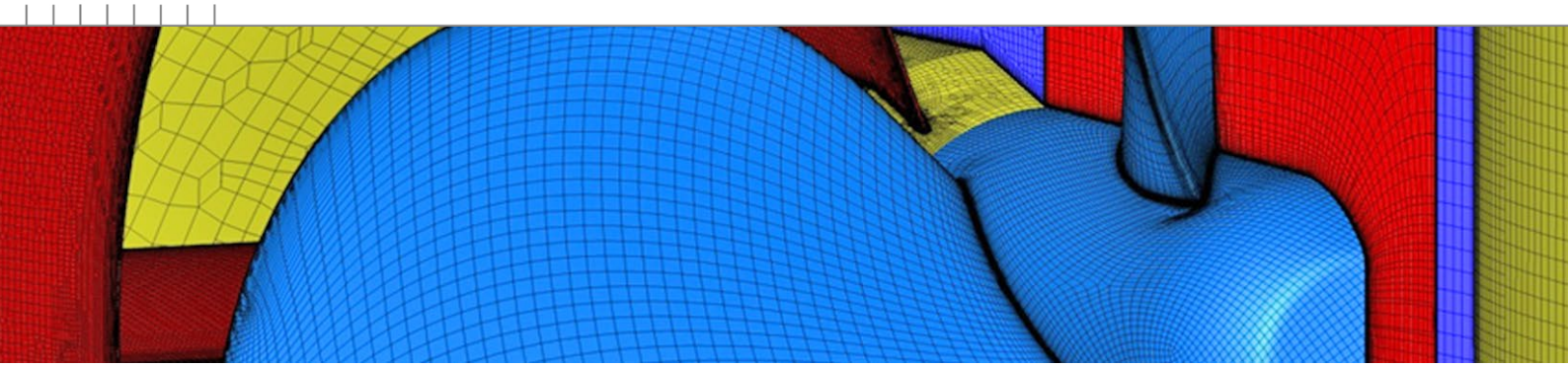


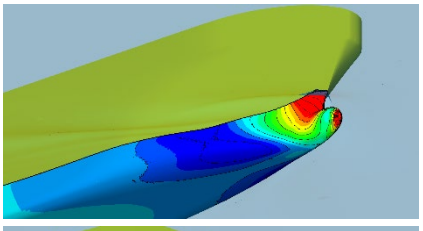
EEXI – Energy efficiency index existing ships

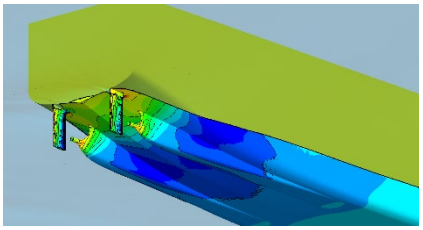
Determination and improving

The energy efficiency index for existing ships (EEXI) is about regulating carbon emissions for ships in service whilst continuing to meet speed and cargo requirements. As of January 2023, this is the challenge that will pose to almost every vessel. MARIN can help you to determine the current situation and explore options to improve your vessel's EEXI.

Services to

- Determine EEXI
- Verify EEXI with operational profile
- Obtain speed-power prediction at EEXI conditions with CFD
- Investigate power saving measures
- Evaluate energy saving devices including wind assist
- Trim tables for optimal trim condition





What is EEXI

The EEXI is a measure of a ship's energy efficiency in relation to CO2 emissions and is a computed formula for CO2 emissions. It describes the required minimum energy efficiency level per capacity mile (g/t*nm).

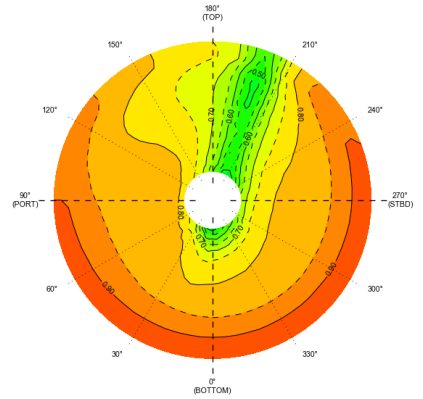
Determination of the current situation

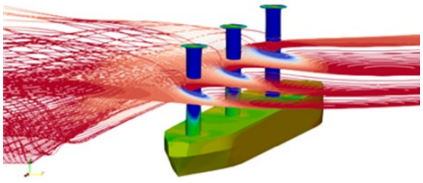
To obtain the current EEXI position of your vessel, the IMO recently published a formula. This formula requires two types of vessel data: the engine's characteristics and the power required to attain a specific speed.

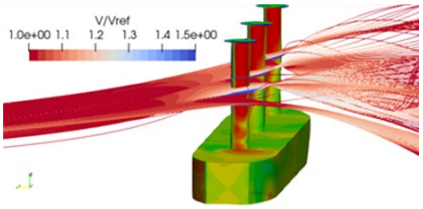
When available, your speed-power prediction at EEXI draught can be used to determine the EEXI at the desired speed. In case the required emission criteria are not met, you can either lower the maximum ship speed by applying an engine power limitation or try to increase the reference speed at the EEXI power. MARIN can help you with the latter.

If not available the first priority is to obtain a speed-power prediction at EEXI draught condition. A speed-power prediction based on CFD can be computed. It might also be required to perform a calculation at trial conditions to correlate the CFD to the trial data of your vessel. We are in close contact with the class society to determine the validity of the used methods.

After establishing the current EEXI of your vessel, we can take the next step to comply with regulations. Together we can discuss all possible options to help you decide on the best solutions for your vessel. The most common options are given in the next section.







Related products

- EEDI performance prediction
- Hull form optimization
- Propeller design
- ESD evaluation
- Voyage simulations

State-of-the-art tools

Even though EEXI speed-power curves are new, the used methods are not. Speed-power predictions based on CFD are common during the design phase of the vessel. This knowledge and hydrodynamic background can now be used to determine the speed-power prediction for your vessel at EEXI draught and provide valuable data to meet the EEXI.

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Improving the current situation – available options

- Engine Power Limitation

Limiting the power of the engine will limit the speed of your vessel. This may be a viable option when the vessel's operational profile is within this limitation and the vessel still maintains the minimum power requirement.

- Redesign of the propeller

Redesigning or evaluation of a redesigned propeller may be an option as the imposed power requirements could be different from the original design conditions. Using the latest knowledge on design, a more efficient propeller can be designed. This will reduce emissions and fuel consumption, thus offering economic benefit as well.

- Energy saving devices

Energy saving devices (ESD) can be an option when the required power has to be reduced to maintain operational speed. Using the current stern configuration, the energy losses can be determined in detail to locate the areas with the largest losses. This information could help in choosing several options, such as pre-swirls, ducts or post-swirl stators. A combination of ESDs may be considered as well.

- Wind assisted propulsion devices

Applying a wind propulsion device can be an alternative to lower fuel consumption, for example Flettner rotors or wing sails. Depending on the size of the installation, significant savings on fuel consumption and improvements of the EEXI can be obtained.

- Bulb modification

Modifying the bulb is an option if other measures are insufficient. This drastic measure can be especially beneficial if the bulb has been designed for contract speed and draught. A bulb designed for the EEXI speed could dramatically improve the speed-power prediction of your vessel because bulbs for high speeds usually imply a penalty at lower speeds.