



Adoption of an Energy Efficiency Design Index for international shipping

While ships provide the most energy efficient means for transporting goods, their emissions contribute to global air pollution around the world, and will continue to increase if left unchecked. Shipping currently represents about three per cent of global greenhouse gas (GHG) emissions. Worldwide seaborne trade has been increasing by around four per cent a year for many years. A recent study by the International Maritime Organization (IMO) projects that GHG emissions from shipping would increase by between 150 – 250 per cent by 2050 in the absence of policies to reduce emissions.

The Marine Environment Protection Committee (MEPC) of IMO has been working to develop technical and operational measures to reduce GHG emissions from ships, in particular to develop an Energy Efficiency Design Index (EEDI) for new ships. The EEDI regulations were developed in the form of amendments to Annex VI of the International Convention for the Prevention of Pollution from Ships (MARPOL) entitled *Regulations for the Prevention of Air Pollution from Ships*. Although technologies and methods to improve energy efficiency of ships are currently available, international standards in the form of energy efficiency targets such as the EEDI are needed to provide an incentive for the implementation of this technology.

After several years of work, the amendments to Annex VI of MARPOL were adopted at the 62nd session of MEPC in July 2011. The new regulations represent the first ever mandatory global greenhouse gas reduction regime for an international industry sector. They apply to ships of 400 gross tonnage and above and are expected to enter into force on 1 January 2013.

The amendments to MARPOL Annex VI add a new Chapter 4 titled *Regulations on Energy Efficiency for Ships* to make mandatory the EEDI for new ships, and the Ship Energy Efficiency Management Plan (SEEMP) for all ships. The EEDI is a non-prescriptive,

performance-based mechanism that leaves the choice of technologies to use in a specific ship design to the industry. As long as the required energy-efficiency level is attained, ship designers and builders will be free to use the most cost-effective solutions for the ship to comply with the regulations.

The SEEMP establishes a mechanism for operators to improve the energy efficiency of ships. Potential operational efficiency measures include improved hull and propulsion system maintenance, voyage planning, weather routing, speed optimisation and use of automated engine management systems. Each ship will be required to keep a ship specific SEEMP on board which may form part of the ship's Safety Management System. The SEEMP for each ship will be developed taking into account guidelines adopted by the IMO.

Other amendments to Annex VI add new definitions and the requirements for survey and certification, including the format for the International Energy Efficiency Certificate.

In general form, the EEDI formula may be expressed as:

$$\text{EEDI} = \text{CO}_2 \text{ emission/transport work}$$

Where:

- the CO₂ emission represents total CO₂ emission from combustion of fuel, including propulsion and auxiliary engines and boilers, taking into account the carbon content of the fuels in question; and
- the transport work is calculated by multiplying the ship's capacity (dwt), as designed, with the ship's design speed measured at the maximum design load condition and at 75 per cent of the rated installed shaft power.

The EEDI regulations apply to container ships, general cargo ships, refrigerated cargo carriers, gas tankers, oil and chemical tankers, dry bulk carriers, and combination dry/liquid bulk carriers. These types of ships overall represent more than 70 per cent of ship emissions.

The new regulations will not initially apply to passenger ships and roll-on roll-off cargo ships. IMO is continuing work to develop an appropriate means of regulating the energy efficiency of these types of ships.

The new chapter 4 also includes a regulation on promotion of technical cooperation and transfer of technology relating to the improvement of energy efficiency of ships. This requires governments to promote and provide support, as appropriate, directly or through IMO to countries, especially developing countries, that request technical assistance.

The EEDI standards will be phased in from 2013 to 2025. According to IMO, the introduction of the EEDI for new ships will reduce CO₂ emissions by between 45 and 50 million tonnes annually by 2020, compared with 'business as usual' and depending on the growth in world trade. For 2030, the reduction will be between 180 and 240 million tonnes annually.

Amendments will be made to Australian legislation that will give effect to the new EEDI and SEEMP requirements.