Program Announcement

Adoption of an Energy Efficiency Design Index for International Shipping

The International Maritime Organization has adopted first-ever energy efficiency design standards for new ships. Under this new program, an Energy Efficiency Design Index (EEDI) will be required for new ships, with progressively more stringent efficiency targets phasing in beginning in 2013. These standards will result in significant reductions in fuel consumption, cutting fuel costs for ship operators, while reducing air and marine pollution from ships, including CO_2. This fact sheet contains an overview of this international energy efficiency program for ships.

Overview

On July 15, 2011, the International Maritime Organization (IMO) amended the International Convention for the Prevention of Pollution from Ships (MARPOL) to include energy efficiency standards for new ships through the designation of an Energy Efficiency Design Index. These EEDI standards phase in from 2013 to 2025, and by then will result in 30 percent reduction in fuel consumption, and hence CO_2, compared to today's vessels.

The EEDI creates a common metric to measure and improve new ship efficiency. This metric is calculated as the rate of carbon dioxide (CO_2) emissions from a ship per transport work performed by the ship. CO_2 emissions are directly related to energy efficiency and are calculated as fuel consumption multiplied by a fuel carbon factor. Transport work is calculated as a function of the cargo capacity of the ship and the design ship speed.

The EEDI applies to the most energy-intensive segments of the international shipping fleet, representing more than 70 percent of ship emissions. These segments include the following ship classes: container ships, general cargo ships, refrigerated cargo carriers, gas tankers, oil and chemical tankers, dry bulk carriers, and combination dry/liquid bulk carriers. In its present form, the EEDI requirements do not apply to other ship classes or ships with non-standard propulsion systems (e.g. diesel-electric, turbine, or hybrid propulsion systems). IMO is considering the extension of EEDI standards to other classes of ships.

EPA United States Environmental Protection Agency

Office of Transportation and Air Quality
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The Need for Efficiency Standards

Ships provide the most efficient means for transporting goods. However, emissions from ships represent a meaningful contribution to air and marine pollution around the world. Emissions from ships will continue to grow if left unchecked. Shipping today represents about 3 percent of global greenhouse gas emissions. Worldwide seaborne trade has been growing about 4 percent a year for decades. A recent study by IMO projects that emissions from shipping will increase 150 percent to 250 percent by 2050 in the absence of policies to reduce emissions.[1]

The IMO study also shows that many options exist to improve the efficiency of new ships, thereby reducing fuel consumption and emissions. The measures identified by the study include hull improvements, propeller/propulsion system upgrades, alternative power options (e.g., towing kite), hull coatings, propeller improvements, auxiliary systems, speed reduction, and main engine improvements.

Although technologies and methods are available today that can be used to improve energy efficiency and therefore achieve cost savings, standards in the form of energy efficiency targets such as the EEDI are needed to provide an incentive for the implementation of this technology. While many of these efficiency improvements will pay for themselves through fuel savings, there are non-financial barriers that prevent their use. These non-financial barriers include 1) fuel price uncertainty, 2) split incentives between owners, operators, and shipyards and 3) lack of good information on the fuel efficiency improvements for different technologies, and impact on life cycle costs.

EEDI Standards

The EEDI standards are expressed as percent emissions reductions from reference lines established for each ship class. These reference lines were developed by fitting a curve through data on the baseline EEDI values of the existing fleet. Therefore, the reference line for a given ship class represents the baseline EEDI values of that ship class, and is expressed as a function of ship size.

The EEDI standards for new ships will be implemented through four phases from 2013 to 2025, based on the contract date of the ship. Phase 0, beginning in 2013, calls for new ships to attain EEDI values at or better than the applicable reference line. Phases 1 and 2 begin in 2015 and 2020 and call for up to 10 and 20 percent improvements, respectively. Phase 3 calls for new ships from 2025 to attain EEDI values up to 30 percent better than the applicable reference line.

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[1] Second IMO GHG Study 2009. International Maritime Organization. MEPC 59/INF.10. April 2009.

Benefits

When this program is fully phased in, new ships will be 30 percent more efficient than they are today. This efficiency improvement has beneficial energy implications due to reduced oil consumption. More efficient ships will also emit lower amounts of criteria pollutants such as oxides of nitrogen (NOx), oxides of sulfur (SOx), and particulate matter (PM). Emissions of CO_2, which are directly related to fuel consumption, will be reduced by 30 percent per ship over the long run compared to typical ships operating today. Reductions in these air emissions will benefit human health and the environment, including benefits from reduced acid deposition in our oceans.

For More Information

Information on EPA's international efforts at IMO and our national efforts related to shipping emissions is available at EPA's Office of Transportation and Air Quality web site at:

www.epa.gov/otaq/oceanvessels.htm

Further information on the IMO actions may be directly obtained from the International Maritime Organization at:

www.imo.org

For additional information, please contact the Assessment and Standards Division at

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