IMO’s technical cooperation and capacity building work to support the implementation of international regulations on energy efficiency for ships

ICAO/IMO Side Event
UNFCCC COP 21, 2 December 2015

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Head, Air Pollution and Energy Efficiency, International Maritime Organization (IMO)
Study found that for international shipping, the CO$_2$ estimate dropped from 2.8% in 2007 to 2.2% in 2012.

<table>
<thead>
<tr>
<th>Year</th>
<th>Global CO$_2$</th>
<th>Total shipping</th>
<th>IMO GHG Study 2014 CO$_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>International shipping</td>
</tr>
<tr>
<td>2007</td>
<td>31,409</td>
<td>1,100</td>
<td>885</td>
</tr>
<tr>
<td>2008</td>
<td>32,204</td>
<td>1,135</td>
<td>921</td>
</tr>
<tr>
<td>2009</td>
<td>32,047</td>
<td>978</td>
<td>855</td>
</tr>
<tr>
<td>2010</td>
<td>33,612</td>
<td>915</td>
<td>771</td>
</tr>
<tr>
<td>2011</td>
<td>34,723</td>
<td>1,022</td>
<td>850</td>
</tr>
<tr>
<td>2012</td>
<td>35,640</td>
<td>938</td>
<td>796</td>
</tr>
<tr>
<td>Average</td>
<td>33,273</td>
<td>1,015</td>
<td>846</td>
</tr>
</tbody>
</table>
Trade growth

- Food, energy, raw materials and finished products
- Around 90% of global trade by volume

Source: “Global Marine Trends 2030”, Lloyd’s Register/ QinetiQ/University of Strathclyde, 2013
GHG emissions from ships

- Shipping CO₂ emissions are projected to increase by 50% to 250% in the period to 2050, despite fleet average efficiency improvements of about 40%

Ref: Third IMO GHG Study 2014

IMO’s work to address GHG emissions has three distinct routes:
- Technical
- Operational
- Market-based Measures (MBM)

Energy Efficiency of Ships
- Energy Efficiency Design Index (EEDI)
  - Applicable to all ships 400 gross tonnage and above
- Ship Energy Efficiency Management Plan (SEEMP)
  - Applicable to all ships in operation
- Energy Efficiency Operational Indicator (EEOI) – voluntary
- Data collection system (under development)
Potential energy efficiency improvements

Operational
- Weather routing: 1-4%
- Autopilot upgrade: 1-3%
- Speed reduction: 10-30%

Auxiliary power
- Efficient pumps, fans: 0-1%
- High efficiency lighting: 0-1%
- Solar panel: 0-3%

Aerodynamics
- Air lubrication: 5-15%
- Wind engine: 3-12%
- Kite: 2-10%

Thrust efficiency
- Propeller polishing: 3-8%
- Propeller upgrade: 1-3%
- Prop/rudder retrofit: 2-6%

Engine efficiency
- Waste heat recovery: 6-8%
- Engine controls: 0-1%
- Engine common rail: 0-1%
- Engine speed de-rating: 10-30%

Hydrodynamics
- Hull cleaning: 1-10%
- Hull coating: 1-5%
- Water flow optimization: 1-4%

Source: International Council on Clean Transportation (ICCT), Long-term potential for increased shipping efficiency through the adoption of industry-leading practices, Wang & Lutsey, 2013
Promotion of technical co-operation and transfer of technology relating to the improvement of energy efficiency of ships

1 Administrations shall, in co-operation with the Organization and other international bodies, promote and provide, as appropriate, support directly or through the Organization to States, especially developing States, that request technical assistance.

2 The Administration of a Party shall co-operate actively with other Parties, subject to its national laws, regulations and policies, to promote the development and transfer of technology and exchange of information to States which request technical assistance, particularly developing States, in respect of the implementation of measures to fulfil the requirements of chapter 4 of this annex, in particular regulations 19.4 to 19.6.

Resolution MEPC.229(65)
IMO’s response path to promote technology transfer and capacity building

Reg. 23, MARPOL Annex VI, MEPC Res. 229(65), TT-EG

ITCP: Awareness raising and capacity building tools

Major Projects: Capacity building & private sector partnerships

Global network to promote technology cooperation and transfer?

Catalyze institutions and financing for sustainable marine transport
Transfer of technology for ships

Work plan tasks of TT-EG

Task 1 - Assess the potential implications and impacts of the implementation of the regulations in chapter 4 of MARPOL Annex VI, in particular, on developing States, as a means to identify their technology transfer and financial needs, if any

Task 2 - Identify and create an inventory of energy efficiency technologies for ships

Task 3 - Identify barriers to transfer of technology, in particular to developing States, including associated costs, and possible sources of funding

Task 4 - Make recommendations including the development of a model agreement enabling the transfer of financial and technological resources and capacity-building between Parties, for the implementation of the regulations in chapter 4 of MARPOL Annex VI

➢ Report to MEPC 69 (April 2016)
More information

- **UNDP-GEF-IMO Global Maritime Energy Efficiency Partnerships Project (GloMEEP Project) launched in September 2015**
  - focus in particular on building capacity to implement technical and operational measures in developing countries, where shipping is increasingly concentrated
  - 10 Lead Pilot Countries – support provided to enable governments to pursue legal, policy and institutional reforms
  - create global, regional and national partnerships to build the capacity to address maritime energy efficiency and for countries to mainstream this issue within their own development policies, programmes and dialogues
  - US$13.7 million budget (US$2 million cash)
  - Global Industry Alliance to support industry innovation to support the effective implementation

- **Global network of Maritime Technology Cooperation Centres (MTCC)**
  - maritime version of Climate Technology Centre & Networl concept proposed to act as a sustainable institutional framework to catalyze capacity building and technology transfer
Resolution MEPC.229(65)

- Technical cooperation and capacity building
- Contributions and support for implementation of energy efficiency measures
- Establish an Ad hoc Expert Working Group on facilitation of Transfer of Technology for ships (AHEWG-TT)
- IPR
- Promotion of provision of
  - transfer of energy efficiency technologies for ships;
  - research and development for the improvement of energy efficiency of ships;
  - training of personnel, for the effective implementation and enforcement of the regulations in chapter 4 of MARPOL Annex VI; and
  - the exchange of information and technical co-operation relating to the improvement of energy efficiency for ships;
Computer tool for appraisal of technical and operational measures

- IMO project using funds donated by Transport Canada
- Appraisal tool developed by DNV GL (based on their experience and analysis)

Energy Efficiency Appraisal Tool

- Input data calculated based on the input values provided
- Reference values based on vessel type and size segment applied
- Cost efficiency curves for each measure evaluated in the model (ranked from left to right). Each bar represents a measure (color coded and numbered) represented in the table below.
  - The height of the bar indicates the cost efficiency of the measure [$/ton CO₂] over the lifetime of the vessel while the width represents the effect measured in \( \Delta \text{EEDI} \) (left) and \( \Delta \text{EEOI} \) (right)

<table>
<thead>
<tr>
<th>Measure</th>
<th>ID</th>
<th>Methodology</th>
<th>Type of measure</th>
<th>Cost efficiency</th>
<th>( \Delta \text{EEDI} ) (%)</th>
<th>( \Delta \text{EEOI} ) ($/ton CO₂)</th>
<th>( \text{GAPX} )</th>
<th>Accumulated ( \text{GAPX} )</th>
<th>Time to achieve 1% reduction (years)</th>
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<tbody>
<tr>
<td></td>
<td>1</td>
<td>Steam Trench Improvement</td>
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<td>Total Bunkers Distillation</td>
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<td>Average Consumption</td>
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<td>Propulsion Efficiency Devices</td>
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<td>Engine &amp; Nozzle Efficiency</td>
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<td>Gearbox and Propulsion System</td>
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<td>11</td>
<td>Engine &amp; Nozzle Efficiency</td>
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<td>Efficiency of Engine Control</td>
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<td>13</td>
<td>Electromechanical Control</td>
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Instructions:
1. Select vessel type from the drop down menu and enter vessel price
2. Apply measures from the drop down menu or measure below
3. Press Calculate to run the model

Measure selection choosing what measure to include in the model

Resulting table with more detailed information on each measure evaluated in the model
highlighted need for enabling environments to be developed

current status of maritime technology and future trends highlighted

- smarter, data driven, greener ships
- fully connected wireless onboard & digitally connected via satellite
- new cleaner fuels
- new flexible propulsion technologies
- new materials

knowledge gap and readiness of maritime companies to effectively deploy new technologies could be addressed through the use of testing facilities, e.g. "Maritime Energy Test Bed" at Singapore's Nanyang Technological University

beyond the “hardware” aspect, the role of the seafarer needs greater consideration without which technology cannot be effectively utilised
Technical cooperation and capacity building efforts

- **Integrated Technical Cooperation Programme**
  - Includes funding for the training and capacity-building activities in ship energy efficiency

- **Major Projects on Capacity Building**
  - IMO-KOICA Project on “Building Capacities in East Asian Countries to Address GHG Emissions from Ships”

- **Global Maritime Energy Efficiency Partnerships Project (GloMEEP)**
  - GEF-UNDP-IMO partnership to support increased uptake and implementation of energy efficiency measures for shipping
  - Seeks to catalyze an innovative public-private sector partnership through a new Global Industry Alliance (GIA) for maritime energy efficiency

- **Maritime Technology Cooperation Centre Network (MTCCN)**
  - Preliminary concept to create regional outreach, capacity building, and information exchange
Thank you for listening

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