Environmental Ship Index (ESI) Program initiated by IAPH

12 July 2023
45th PMTA
Honiara, Solomon Islands

Masahiko FURUICHI, Ph.D.
E-mail: m_furuichi@iaphworldports.org
Secretary-General
International Association of Ports and Harbors (IAPH)
About IAPH and its Activities

IAPH is a non-governmental organization (NGO) headquartered in Tokyo, Japan. Some 100 world port leaders gathered in Los Angeles to announce the creation of IAPH in November 1955. Over the past 67 years, IAPH has developed into a global alliance of ports, representing today some 170 ports and 130 port-related businesses in 84 countries.

The member ports together handle well over 60% of the world’s sea-borne trade and over 60% of the world container traffic. To make IAPH more relevant and more widely promoted in the world port and maritime community, IAPH adopted a new Constitution in 2016.
NGO Consultative Status to UN Agencies

Recognized as the only international organization representing the voice of the world port industry, IAPH is granted NGO Consultative Status from five UN specialized agencies and one intergovernmental body:

1. UN Economic and Social Council (ECOSOC)
2. **International Maritime Organization (IMO)**
3. UN Conference on Trade and Development (UNCTAD)
4. UN Environment Program (UNEP)
5. International Labor Organization (ILO)
6. World Customs Organization (WCO)

The NGO consultative status has enabled IAPH to bring the views and interests of the global port industry as a whole to the UN Agencies.
IAPM Technical Committee Activities

Climate & Energy
- Decarbonization
- Port call optimization

Data Collaboration
- Maritime single window
- Cyber-security

Risk & Resilience
- Global port tracker
- Guideline for business continuity

Cruise
- Revitalization

Operation, Planning and Finance
- Guidelines for Small and island ports
- Port congestion

Legal
- Port liability risks and ship vetting
What is the ESI?

Environmental Ship Index (ESI) is the voluntary incentive scheme which was designed and used by port authorities and maritime administrations to incentivize ship owners, operators and managers to improve environmental performance of their vessels.

ESI was designed and created in 2011 and initially implemented by ports in close cooperation with IAPH. The subsequent ESI Working Group established administrative and operating procedures to refine and continuously improve the index.
IMO regulates emissions from International shipping

1. Air pollutant emission (SOx, NOx)
2. Greenhouse Gas emission (CO2)

<table>
<thead>
<tr>
<th>Year</th>
<th>SOx</th>
<th>NOx</th>
<th>CO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>4.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>1.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>3.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td>20% reduction</td>
<td>80% reduction</td>
</tr>
<tr>
<td>2020</td>
<td>0.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2026</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2027</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ESI Program started its operation.
Emission Control Areas (SOx and NOx)

Source: https://www.shipownersclub.com/louise-hall-sulphur-requirements-imo-emission-control-areas/
Brief history of IMO regulation on SOx

“IMO 2020”

Limits the sulphur in the fuel oil used on board ships operating outside designated emission control areas to 0.5% by mass

Source: DNV GL (2019)

Source) IMO -Norway GreenVoyage2050 Project, E4tech and Houlder, 2021: Alternative fuels and energy carriers for shipping Workshop
Voluntary Incentive Scheme of ESI Program

Incentive Receivers (IRs)

If environmental performance of ships are better than IMO regulation, Incentive Provider (Ports) will provide discounted port dues to the Incentive Receivers (Ships) based on their ESI score.

Discounted Dues

Accelerating investment on greener ships

Better air quality in and around the ports could be realized by ESI Program in conjunction with IMO regulation.

Incentive Providers (IPs)

Ports

Ships

Incentive Receivers (IRs)  Incentive Providers (IPs)
How is the ESI score calculated?

The Environmental Ship Index (ESI) identifies ocean-going ships that perform better in reducing air emissions than required by the current emission standards of the IMO.

The ESI evaluates the amount of Nitrogen oxide (NOx), Sulphur oxide (SOx) that are released by a ship and includes a reporting scheme on the greenhouse gas (GHG) emission of the ship.

The ESI is a good indication of the environmental performance of ocean-going vessels and will assist in identifying cleaner ships in a general way. All stakeholders in maritime transport can use the ESI as a means to improve their environmental performance and as an instrument to reach their sustainability goals.

ESI Air Score (capped at 100)

\[
\text{ESI Air Score} = \frac{\text{ESI NOx} + \text{ESI SOx} + \text{ESI CO2} + \text{OPS}}{\text{ESI NOx} = 2\times\text{NOx sub points} \\
\text{ESI SOx} = \text{SOx sub points} \\
\text{ESI CO2} = 5 \ (\text{for reporting of fuel and distance}) + z \ (\text{efficiency increase in % is added}) \\
\text{OPS} = 10 \ (\text{if On-shore Power Supply installation is fitted})}
\]

(ranging between 0 and 66.66)

(ranging between 0 and 33.33)

(total capped at 15)

(ranging between 0 and 10)
Incentive Providers Distribution Map

Source: https://www.environmentalshipindex.org/assets/img/lp_ports_map4.jpg

Masahiko Furuichi (IAPH)

Environmental Ship Index (ESI) initiated by IAPH
ESI-registered Ships and their score distribution

ESI Scores: 1 January 2023

IMO initial GHG Strategy (2018)

- Percentage of global CO₂ emissions from international shipping[^1]
- IMO initial GHG strategy target for greenhouse gas emissions reduction by 2050 compared with 2008 levels[^2]

[^1]: Fourth IMO GHG Study, July 2020. Anthropogenic emissions only. Figure for 2018.
[^2]: Strategy adopted in 2018 (resolution MEPC.304(72)).

Source: IMO - Norway GreenVoyage2050 Project, E4tech and Houlder, 2021: Alternative fuels and energy carriers for shipping Workshop

Masahiko Furuichi (IAPH)
- Energy efficiency improvements through the current framework (EEDI and SEEMP) are important, but will not be enough to reach the 2050 ambition.

- MEPC 75 (Nov 2020) approved amendments to MARPOL Annex VI introducing new regulations to reduce GHG emissions from existing ships (pending final adoption).

Source: IMO - Norway GreenVoyage2050 Project, E4tech and Houlder, 2021: Alternative fuels and energy carriers for shipping Workshop
IAPH is now moving forward to ESI 2.0

Ocean-going operation
NOx, SOx and CO2

At berth operation
More focus on CO2