Feasibility Studies with the Aim of Developing a Bilateral Offset Credit Mechanism FY2011

Studies for Project Exploration and Planning

Eco-shipping for Coastal Cement Tanker in Indonesia

New Energy and Industrial Technology Development Organization (NEDO)
Ube Shipping & Logistics,Ltd.
Japan Weather Association
Eco-shipping for Coastal Cement Tanker in Indonesia

Execution of experiments

Support and cooperation for the experiments

Effect evaluation by expert meetings

Effects of energy-saving and time-strict navigation

Information Service of weather forecasts and optimal navigation plans

Navigation plan display

safe navigation
Save FOC
referring Nav. plan

Navigation monitoring data

Bilateral Credit

F/S for Bilateral Offset Credit Mechanism

Category: Transportation

Japan Weather Association

Ube Shipping & Logistics, Ltd

Shipping company

FS by UBES&L, JWA
Baseline Modified EEOI

discussed by International Maritime Organization (IMO)

\[ MEEOI = \sum_{i} \frac{\text{FC}_{ij} \times C_{Fj}}{m_{\text{cargo},i} \times D} \]

ROLLING AVERAGE MEEOI = \frac{\sum_{i} \sum_{j} \left(FC_{ij} \times C_{Fj}\right)}{\sum_i m_{\text{cargo},i} \times D_i}

Where:
- \( j \) is the fuel type;
- \( i \) is the voyage number;
- \( FC_{ij} \) is the mass of consumed fuel \( j \) at voyage \( i \);
- \( C_{Fj} \) is the fuel mass to CO2 mass conversion factor for fuel \( j \);
- \( m_{\text{cargo}} \) is cargo carried (tonnes) or work done (number of TEU or passengers) or gross tonnes for passenger ships; and
- \( D \) is the distance in nautical miles depending on Origin and Destination port

Report: Estimated Modified EEOI

<table>
<thead>
<tr>
<th>Item</th>
<th>Full</th>
<th>Ballast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Oil Consumption[L]</td>
<td>17225</td>
<td>16314</td>
</tr>
<tr>
<td>Cargo[ton]</td>
<td>6035</td>
<td>-</td>
</tr>
<tr>
<td>Distance[mile]</td>
<td>585</td>
<td>585</td>
</tr>
<tr>
<td>CO2 emission-coefficient[t-CO2/t-fuel]</td>
<td>3.1144</td>
<td>3.1144</td>
</tr>
<tr>
<td>Fuel specific weight[kg/L]</td>
<td>0.911</td>
<td>0.911</td>
</tr>
<tr>
<td>MEEOI[g-CO2/ton • mile]</td>
<td>13.8</td>
<td>-</td>
</tr>
<tr>
<td>MEEOI(*round trip) [g-CO2/ton • mile]</td>
<td>13.4</td>
<td></td>
</tr>
</tbody>
</table>

Estimated CO2 Reduction

\[ ER = \left(\text{Rolling Average BMEEOI – Rolling Average PMEEOI}\right) \times (m_{\text{cargo}} \times D) \]
Experiment:

1st WP

Last WP

Usual route
Recommended route (with limitation)
Recommended route (with no limitation)
Actual route

FOC Reduction Rate (Simulation based estimation)
2.8-5.4% of 3 navigations

Indonesia Cement Tanker ("PERKASA")

Sea Surface Wind
Wave direction & height
Ocean/Tidal Current
The envisioned participants and roles (draft)

**Support of operational management**

- **Japan Radio Co., Ltd.** (JRC) - Shipboard hardware
- **Japan Weather Association (JWA)** - Forecast of meteorological and hydrographic conditions
- **Indonesia Shipping companies**
  - Monitoring data
  - Engine Data
- **NPO Marine Technologist**
- **National Maritime Research Institute (NMRI)** - Speed navigation planning application
- **National Maritime Research Institute (NMRI)** - MRV application
- **Japanese Marine Technology Association (JMTA)**
- **Japan Maritime University (JMU)**

Logistic companies
- **Design Forms**
- **Tracking actual movements**
- **Chart**
  - Prevention of accidents by safety operation
  - Reducing costs by improvement of fuel efficiency
  - Reduce CO2 emissions

Cargo owners and customers
- **Control actual movements**
  - Improving service by visualizing transport information

Indonesia - Japan
- **Create credits based on bilateral and multilateral agreements**

F/S for Bilateral Offset Credit Mechanism - Category: Transportation

**Japan Weather Association (JWA)**

- Information for Fuel Oil consumption
- MRV
  - Information for Fuel Oil consumption

**Ube Shipping & Logistics, Ltd.**