Sustainable Transport in APAC

United Nations ESCAP Conference

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Automatic Identification Signal (AIS) was used to capture vessel movements* for calendar year 2021

*Does not include small vessels not equipped with AIS transponders

# Passenger + General Cargo + Ro-Ro Cargo

^All other types

<table>
<thead>
<tr>
<th>Ship Type</th>
<th>Fuel Cons. (mt)</th>
<th>CO2e (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk</td>
<td>2,659</td>
<td>8,419</td>
</tr>
<tr>
<td>Container</td>
<td>1,695</td>
<td>5,394</td>
</tr>
<tr>
<td>Oil</td>
<td>1,013</td>
<td>3,218</td>
</tr>
<tr>
<td>Chemical</td>
<td>622</td>
<td>1,980</td>
</tr>
<tr>
<td>Passenger#</td>
<td>594</td>
<td>1,813</td>
</tr>
<tr>
<td>Gas</td>
<td>849</td>
<td>2,692</td>
</tr>
<tr>
<td>Other^</td>
<td>675</td>
<td>2,004</td>
</tr>
<tr>
<td>TOTAL</td>
<td>8,107</td>
<td>25,520</td>
</tr>
</tbody>
</table>
Enabling the energy transition in the marine transport sector

• Decarbonizing – how can this be achieved?

• Significant **GHG reduction** can be achieved by technical and operational measures

• **Up to 100%** GHG reduction can only be achieved with Alternative fuels. Barriers to implementation includes:
  • Cost
  • Availability and infrastructure
  • Onboard storage
  • Government policy

Available technologies to decarbonise shipping and the GHG emission reduction potential
Alternative fuels must evolve over time to increase market penetration

Gradual steps allow for:
- maturing of technology
- scaling of supply and infrastructure

Not all the options have the potential to reach the deep-sea stage, mainly due to limited energy density

It took LNG around 20 years to climb all steps. To reach the IMO targets, carbon-neutral fuels must mature faster!
Key fuel technologies facilitating the transition will be available in 4-8 years

Timeline for expected availability of alternative fuel technologies – our best estimate for when these may be available for onboard use
The fuel transition in shipping has started and is gaining momentum

Ships on order, alternative fuel uptake in number of ships

<table>
<thead>
<tr>
<th>Year</th>
<th>Hydrogen</th>
<th>Methanol</th>
<th>LPG</th>
<th>LNG</th>
<th>Battery</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019</td>
<td>0.04%</td>
<td>0.08%</td>
<td>0.13%</td>
<td>2.73%</td>
<td>3.07%</td>
<td>6.05%</td>
</tr>
<tr>
<td>2021</td>
<td>0.06%</td>
<td>0.30%</td>
<td>1.51%</td>
<td>6.10%</td>
<td>3.85%</td>
<td>11.84%</td>
</tr>
</tbody>
</table>
Possible most-likely options

For bigger ships
- Bio-fuels
  - Drop in fuel
  - Quickly scaled
  - Little change to technology
- Critical Success Factors
  - Production and supply in main hubs
  - Non-financial incentives by regulators

For inter-island ships
- Fuel cells
  - Portable
  - Suitable range with DF
  - Liquid or compressed
- Critical Success Factors
  - Supply-chain & maintenance
  - Storage at hub/spoke location

For local vessels
- Battery
  - Zero emission
  - Solar/wind charging
  - Safety and operations
- Critical Success Factors
  - On-shore storage/infrastructure
  - Maintenance/training
Thank you

For more detailed information please contact …

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