Transportation and Port Environmental Impacts

Lee Kindberg
Director, Environment
Ocean shipping is the most energy-efficient mode of transportation

90% of all goods transported globally are carried by ship

Maersk Line
- >470 container vessels
- Moves ~1.8 million containers/yr.
- Consumes over 10 M tonnes of heavy fuel oil annually
Vessels travel the world on routes that take weeks or months.

Multiple vessels are scheduled on each route to provide regular (weekly) service.

<table>
<thead>
<tr>
<th>Transpacific 6 (TP6) - Eastbound</th>
<th>ARRIVES</th>
<th>DEPARTS</th>
<th>TRANSIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanjung Pelepas, Malaysia</td>
<td>MON 1900</td>
<td>WED 0300</td>
<td>--</td>
</tr>
<tr>
<td>Yantian, Mainland China</td>
<td>FRI 2100</td>
<td>SAT 2200</td>
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<td>Hong Kong, Mainland China</td>
<td>SUN 0400</td>
<td>MON 0400</td>
<td>4</td>
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<tr>
<td>Los Angeles, CA, USA</td>
<td>FRI 1800</td>
<td>TUE 0200</td>
<td>16</td>
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</tbody>
</table>

Note: Weekly Service

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles, CA, USA</td>
<td>FRI 1800</td>
<td>MON 1700</td>
<td>--</td>
</tr>
<tr>
<td>Yokohama, Japan</td>
<td>THU 0100</td>
<td>THU 1600</td>
<td>17</td>
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<tr>
<td>Nagoya, Japan</td>
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<td>FRI 1800</td>
<td>18</td>
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<td>Xiamen, Mainland China</td>
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<td>Tanjung Pelepas, Malaysia</td>
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</tr>
</tbody>
</table>
Burning hydrocarbon fuel creates air emissions.
Port area emissions sources

Baseline Year NOx Emissions Contributions by Source Category

- Rail Locomotives: 13% (4,533 tons)
- Ocean-Going Vessel: 36% (12,834 tons)
- Heavy Duty Vehicles: 26% (9,264 tons)
- Harbor Craft: 13% (4,603 tons)
- Cargo Handling Equipment: 12% (4,234 tons)

Source: San Pedro Ports Clean Air Action Plan
Ports must coexist with other water-front activities
“Green field” opportunities are rare in US ports

Dedicated highway exits
Automated gates
Electrified cargo handling equipment
On-dock rail
Buffers
Transportation does have a significant impact on the environment, but...

We are actually doing something about it.
Maersk Line environmental initiatives

- 25% reduction in relative CO2 emissions (2007-2020)
- Drive our own and industry SOx emissions to zero
- Drive negative impacts on the marine environment to zero
Maersk Line fuel switch initiative started in 2006 in California

- Over 1800 port calls
- Reduced over 3000 tons of air emissions in port areas
  - SOx – 95%
  - PM – 85%
  - NOx – 6-12%

- Houston -- Aug. 2010-2012 funded by EPA DERA grant
- Hong Kong in Sept. 2010.
Vessels are using fuel more efficiently, so are reducing emissions

Due to

- Technologies
- Operations
- Speeds
- Vessel size

- NOx emissions are down 21% per container
- Reduced over two million tonnes CO$_2$
- Reduction target for 2020 is 25% below 2007 levels
Industry is making efforts to measure and reduce environmental impacts

Clean Cargo Working Group is a business-to-business forum with the goal “to promote more sustainable product transportation.”

- Standardized footprint calculation tools
- Annual survey of carrier environmental performance
- Emissions factors by trade lane.

www.bsr.org
Take home messages

1. Major shippers and carriers are international

2. Rules need to be clear and consistent

3. Focus on CO2 vs. “criteria pollutants”

4. Public – private partnerships and voluntary programs can and do work
Best practices for ports

Vessels
- Low sulfur fuel in port
- At-berth technologies
- Fuel efficiency

Marine Terminals
- On-dock rail
- Cargo handling equipment
- Automated gates

Equipment
- Energy efficient reefers
- Neutral chassis model or chassis pool

Port Authority
- Be a focal point for transportation planning
- Engage both community and industry in developing strategies
- Structure contracts and costs to encourage environmentally responsible actions

Government
- Align regulatory structures with international (IMO) and national
- Engage the industry in planning and implementation
Thank you