NGOs and the Value Add

AAPA
Energy & Environment Seminar

Elena Craft, PhD
Senior Scientist
Sept 17, 2014
Freight Growing Globally

Personal transportation demand
Millions of oil-equivalent barrels per day

<table>
<thead>
<tr>
<th>1990</th>
<th>2015</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
<td>30</td>
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</table>

Light duty vehicles

Commercial transportation demand
Millions of oil-equivalent barrels per day

While heavy duty demand grows, we expect the energy intensity of onroad freight movements to improve by 30 percent.

<table>
<thead>
<tr>
<th>1990</th>
<th>2015</th>
<th>2040</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>20</td>
<td>50</td>
</tr>
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</table>

Heavy duty vehicles

Rail

Marine

Aviation
Record Setting Growth

Full Speed Ahead
PortMiami, the Cruise Capital of the World, is poised for new growth as it welcomes an impressive roster of new cruise lines and brand new vessels to its fleet – Regent Seven Seas Cruises, Regent Navigator and the Regent Marina Carnival Cruise Lines' newbuild Carnival Breeze; Oceania Cruises' newbuild ship, Celebrity Reflection; and Disney Cruise Line's Disney Wonder.

More
Video
PortMiami Wins World Travel Award

A New Chapter in the Evolving NY/NJ Waterfront
Research
Grants & Technology Advancement
Policy
Panama Canal expansion: emission changes from possible US west coast modal shift

Background: We analyzed the potential for the Panama Canal expansion to change CO$_2$ and criteria pollutant emissions (oxides of nitrogen, oxides of sulfur and particulate matter) from Asia–US container flows by estimating the modal shift from landside truck/rail network to larger ships enabled by canal expansion. We develop an intermodal case study comparison within the Geospatial Intermodal Freight Transportation framework, assuming potential diversion of 1.2 million 20-foot equivalent units (TEUs) to 5000 origin–destination pairs. Results: Potential TEU diversions of land-bridge transport through an expanded canal reduced mode-specific emissions substantially, but land-bridge emission reductions due to cargo diversion to post-Panamax vessels, with lower emissions per TEU, cannot offset higher waterborne emissions from longer routes. Conclusion: Green-freight policy measures must consider multimodal network solutions to maximize emission benefits.
Figure 5. Percentage change in CO₂ emissions from base-case to diversion scenario. (A) All modes, (B) truck, (C) rail, (D) Ship – North America and (E) Ship – trans-Pacific.
Figure 6. CO₂ emissions changes due to diversion scenario.
Figure 7. Particulate matter/black carbon emissions changes due to diversion scenario. PM on first (left) axis; BC on second (right) axis. BC: Black carbon; PM: Particulate matter. Please see color figure at: www.future-science.com/doi/full/10.4155/CMT.12.65.
## Comparison of drayage truck standards adopted at US Ports

<table>
<thead>
<tr>
<th>Model Year</th>
<th>LA/LB</th>
<th>CARB</th>
<th>SEA/TAC</th>
<th>OAKLAND</th>
<th>NY/NJ</th>
<th>HOUSTON</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-2003</td>
<td>RETROFIT BY JAN 2010</td>
<td>RETROFIT BY JAN 2010</td>
<td>BANNED JAN 2018</td>
<td>RETROFIT BY JAN 2010</td>
<td>BANNED JAN 2017</td>
<td>-</td>
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<tr>
<td>2004-2006</td>
<td>BANNED JAN 2012</td>
<td>RETROFIT BY JAN 2012</td>
<td>BANNED JAN 2018</td>
<td>RETROFIT BY JAN 2012</td>
<td>BANNED JAN 2017</td>
<td>-</td>
</tr>
</tbody>
</table>
Emissions reduction analysis of voluntary clean truck programs at US ports

Marcelo Norsworthy*, Elena Craft

*Environmental Defense Fund, 301 Congress Avenue, Austin, TX 78701, USA

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Comparison clean truck program replacement data.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Norfolk</td>
</tr>
<tr>
<td><strong>Truck program</strong></td>
<td></td>
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<tr>
<td>Baseline truck fleet size</td>
<td>2500</td>
</tr>
<tr>
<td>Number of trucks replaced</td>
<td>80</td>
</tr>
<tr>
<td>Avg. MY of replacement engine</td>
<td>2007</td>
</tr>
<tr>
<td>Avg. difference in years</td>
<td>11</td>
</tr>
<tr>
<td><strong>PM</strong></td>
<td></td>
</tr>
<tr>
<td>Emission standard change avg. retired engine to avg. replacement engine</td>
<td>0.10–0.01</td>
</tr>
<tr>
<td>Emissions reduced per truck per year (g)</td>
<td>19,653</td>
</tr>
<tr>
<td>Emissions emitted per replacement truck per year (g)</td>
<td>22,66</td>
</tr>
<tr>
<td>Yearly tons reduced</td>
<td>1.73</td>
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<tr>
<td>Reduction as percentage of baseline emissions</td>
<td>3.5%</td>
</tr>
<tr>
<td>Potential reduction 1 (pre-1994 to 2007+) as % of baseline</td>
<td>24.7%</td>
</tr>
<tr>
<td>Potential reduction 2 (pre-2007 to 2007+) as % of baseline</td>
<td>91.9%</td>
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<tr>
<td><strong>NOx</strong></td>
<td></td>
</tr>
<tr>
<td>Emission standard change avg. retired engine to avg. replacement engine</td>
<td>5.0–0.2</td>
</tr>
<tr>
<td>Emissions reduced per truck per year (g)</td>
<td>68,206</td>
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<tr>
<td>Emissions emitted per replacement truck per year (g)</td>
<td>50,895</td>
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<tr>
<td>Yearly tons reduced</td>
<td>60.15</td>
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<tr>
<td>Reduction as percentage of baseline emissions</td>
<td>3.6%</td>
</tr>
<tr>
<td>Potential reduction 1 (pre-1994 to 2007+)</td>
<td>12.8%</td>
</tr>
<tr>
<td>Potential reduction 2 (pre-2007 to 2007+)</td>
<td>95%</td>
</tr>
</tbody>
</table>
Environmental Defense Fund (EDF) Logistics Project: The Greening of Rubber-Tired Gantry Cranes in Ports

In partnership with the Port of Oakland

15.915 Laboratory for Sustainable Business
Mentor: Prof. John Sterman, MIT Sloan School of Management

Prepared by:
Kathy Lin (MBA 2015)
Chris Meier (SDM 2014)
John Nelson (MBA 2014)
Zaahir Papar (MBA 2015)

May 15, 2014
EPA Announces $9 Million SmartWay™ Funding

PHA, EDF, H-GAC partnered to help fund truck engine retrofits, upgrades

In a major move to help improve regional air quality, Environmental Protection Agency Administrator Gina McCarthy on Aug. 26 announced a $9 million American SmartWay™ Diesel Emissions Reduction Act (DERA) award to the Houston Environmental Defense Fund (EDF), with the Port of Houston Authority (PHA) on the grant application for SmartWay™ program funds to tackle one of the most difficult-to-address sources of pollution at any port: drayage trucks.

“The Port of Houston Authority is pleased to continue its support of pollution reduction of air emissions,” said PHA Chairman James T. Edmonds. “This funding is an important part of an important series of strategies in PHA’s Clean Air Stewardship program designed to help improve air quality in our region.”

Drayage trucks are diesel-fueled, heavy-duty trucks that transport shipping containers from and to the Port and the river, as well as on and off barges. The EPA’s SmartWay™ program provides funding, in the form of grants, to assist fleet owners in procuring and installing advanced technology and practices to improve fuel efficiency and reduce emissions.
Port of Houston's test trucks handle like golf carts

By Jeannie Kever

April 12, 2013 | Updated: April 12, 2013 9:32pm

For decades, the image of the 18-wheeler has been that of a smoke-belching behemoth, the grinding gears and hissing brakes synonymous with the power of the diesel engine.

But a 20-truck fleet powered by hydrogen fuel cells will begin rolling across the Port of Houston later this year in a test of whether the vehicles can improve air quality and still provide enough heavy lifting to handle cargo.

In the largest demonstration project of its kind, the electric fleet will unload containers from ships and deliver them to a Wal-Mart warehouse.

A federal grant will help pay for 20 hydrogen-powered trucks to make deliveries at the Port.
REQUEST FOR PROPOSAL (RFP)
ENVIRONMENTAL RECOGNITION PROGRAM FOR PORTS

ENVIRONMENTAL DEFENSE FUND
301 CONGRESS AVE SUITE 1300
AUSTIN, TX 78701

PROPOSALS DUE: AUGUST 2, 2013
Counts of Monitors Violating Primary 8-hour Ground-level Ozone Standards
0.060 - 0.070 parts per million
(Based on 2006 - 2008 Air Quality Data)
EPA will not designate areas as nonattainment on these data, but likely on 2008 - 2010 data which are expected to show improved air quality.

Notes:
1. No monitored counties outside the continental U.S. violate.
2. EPA is proposing to determine compliance with a revised primary ozone standard by rounding the 3-year average to three decimal places.

- 515 counties violate 0.070 ppm
- Additional 93 counties violate 0.065 ppm for a total of 608
- Additional 42 counties violate 0.060 ppm for a total of 650
Absolute Improvement in PM2.5 concentrations by 2020 due to emission control areas
Heavy-duty Diesel Vehicle Standards

**CUTTING TRUCK FUEL CONSUMPTION 40% BY 2025**

Strong federal fuel efficiency standards can dramatically cut oil use and greenhouse gas emissions from our nation's trucks. Combined with current standards for new trucks sold through 2018, the next round of standards could cut fuel consumption of new trucks 40% by 2025, compared to 2010 trucks.

**BENEFITS**

- **40% Reduction** in fuel consumption from new trucks
- **$30,000 Annual Fuel Savings** for tractor-trailer drivers
- **1.4 Million Barrels of Oil** saved daily by 2050
- **270 Million Metric Tons** of carbon pollution kept out of the atmosphere annually by 2050

**FUEL SAVING TECHNOLOGIES**

- Automated manual transmissions
- Electrification of accessories
- Aerodynamics (tractor and trailer)
- Efficient axle designs
- Engine downsizing and waste heat recovery
- Low-rolling resistance tires

**HOW TO GET THERE**

**Sources of Oil Consumption in the Truck Sector**

- **Tractor Trailers** 19%
- **Vocational Vehicles** 15%
- **Heavy-Duty Pickups and Vans** 15%

**Reduction in Fuel Consumption**

0% to 100%