Truck efficiency standards and the potential for Latin America,
Overview of the Global Green Freight Action Plan

Rachel Muncrief

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Mitigation Action Implementation Network
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Background: HDV CO\textsubscript{2} emissions

- Heavy-duty vehicles are a major, growing energy demand and CO\textsubscript{2} source
- Policies for light-duty are well underway, but policies for HDVs are in early phases

Source: ICCT Roadmap Model, 2013
### Integrated Vehicle Efficiency Policy Portfolio

**Vehicle Fuel Efficiency Standards**
- Introduce and regularly strengthen mandatory standards
- Establish and harmonize testing procedures for fuel efficiency measurement.

**Fiscal Measures**
- Fuel taxes and vehicle taxes to encourage the purchase of more fuel-efficient vehicles.
- Infrastructure support and incentive schemes for very fuel-efficient vehicles.

**Market-Based Approaches**
- Voluntary programs such as U.S. SmartWay and other green freight programs

**Information Measures**
- Vehicle fuel economy labels
- Improving vehicle operational efficiency through eco-driving and other measures.
Policies Drive Emissions Reductions

- Regulatory policies drove the introduction of vehicle emission reduction technologies and will reduce emissions of NOx and PM by 50% by 2030.
- CO\textsubscript{2} emissions will double in the same time period.

Global TTW On-Road Emissions Relative to 2000

Source: ICCT Global Transportation Roadmap
Countries in Latin America have not yet adopted the most stringent emission standards for heavy-duty trucks

Source: transportpolicy.net
## Status of HDV efficiency regulations

- Efficiency regulations under consideration in major freight markets
  - Markets represent 80% of HDV population

<table>
<thead>
<tr>
<th>Country</th>
<th>HDV efficiency regulation in place</th>
<th>Regulations under consideration</th>
<th>Heavy-duty freight vehicle fuel use (million BOE/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>✓</td>
<td>✓</td>
<td><img src="graph.png" alt="Graph" /></td>
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<tr>
<td>China</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>EU-27</td>
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<td><img src="graph.png" alt="Graph" /></td>
</tr>
<tr>
<td>India</td>
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<td></td>
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</tr>
<tr>
<td>Japan</td>
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<td>✓</td>
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</tr>
<tr>
<td>Brazil</td>
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<td><img src="graph.png" alt="Graph" /></td>
</tr>
<tr>
<td>Canada</td>
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<tr>
<td>Russia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S Korea</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: ICCT Roadmap, 2013; BOE = barrel of oil equivalent energy
Growth in HDV energy consumption (and CO₂ emissions) will outpace growth in other modes in most of Latin America.
There is a significant reduction potential in energy consumption and GHG emissions.

Heavy-Duty Truck Fuel Consumption in Latin America

Source: ICCT (2014)
Opportunities for Efficiency Improvements

- Class 8 Tractor-Trailer Energy Balance

- **Aerodynamic Drag**
  - Highway 21%
  - Urban 5%

- **Engine**
  - Highway 59%
  - Urban 58%

- **Auxiliaries**
  - Highway 2%
  - Urban 7%

- **Drivetrain**
  - Highway 2%
  - Urban 5%

- **Inertia/Braking**
  - Highway 0%
  - Urban 16%

- **Rolling Resistance**
  - Highway 16%
  - Urban 9%

Sources: National Academy of Sciences (2010) and DOE Supertruck
Regional HDV considerations, differences

EUROPE
- Diesel price – ~1.2-1.7 €/L ($6-8+/gal) drives technology/operational efficiency
- Speed – 88 kph/55 mph speed limit
- Aero – Cab over engine
- Tires – Supersingles / LRR widely used
- Idle – Rarely idle even at truck stops

UNITED STATES
- Diesel price – ~0.8 €/liter (~$4/gal)
- Speed – High highway speed (~65 mph)
- Distance – long daily, annual distances
- Length/weight restrictions vary by state
- High engine idling

CHINA
- Diesel price – ~1 €/liter (~$5/gal)
- Speed – Typically lower speed (~43 mph)
- Weight – Generally significantly higher gross weight (108k lbs+ vs 80k lbs US)
- Euro IV engines, 50 ppm S

JAPAN
- Diesel price – ~1.2 €/liter (~$6/gal)
- Shorter distance for intercity driving
- Grade is important

OTHERS
- Situations all vary greatly…
HDV regulatory test procedures

Simulation Model

Payload
- ~1/2 payload
- Full Payload

Rolling Resistance/Aerodynamic Drag
- Testing
  - Standard Value

Separate Engine Standard
- (base vehicles tested, variants simulated)

Engine Map
- From Testing
  - Standard Value

Test Cycles
- 3 cycles (weighted)
- 2 cycles (weighted, incl grade)
- 1 cycle (weighted)
  - Mission based (may incl grade)
Efficiency captured by regulatory test?

- Differing regulatory test procedures differently “give credit” for various efficiency technologies

<table>
<thead>
<tr>
<th></th>
<th>Japan</th>
<th>U.S., Canada</th>
<th>China</th>
<th>EU #</th>
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</thead>
<tbody>
<tr>
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<td>Yes</td>
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<tr>
<td></td>
<td></td>
<td>Separate engine standard</td>
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<td>Transmission</td>
<td>Somewhat</td>
<td>Optional; by demonstration outside of standard protocol</td>
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<td>Yes</td>
</tr>
<tr>
<td>Hybridization</td>
<td>Unclear</td>
<td>By demonstration outside of standard protocol</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Aerodynamic drag, rolling resistance</td>
<td>No</td>
<td>Yes</td>
<td>Yes*</td>
<td>Yes</td>
</tr>
<tr>
<td>Trailer</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

* Option to use default values

# Refers to ongoing government research and testing protocols; No standards in place
Progress in Green Freight Efforts

Source: Green Freight Europe, Green Freight Asia Network, Transport & Travel Research Ltd
Global Green Freight Action Plan

- Work being done under CCAC
- Three Goals of the Action Plan
  1. Harmonization/Alignment of existing green freight efforts
  2. Establishment and development of national green freight programs
  3. Inclusion of Black Carbon into green freight programs
- Major Tasks
  - Development of a Global Action Plan
    - Define actions necessary to achieve the stated goals, and identify stakeholders to perform the actions
  - Development of a global green freight website
    - Portal to information and resources to assist in developing a green freight program
  - Targeted work in Mexico, Vietnam, Bangladesh
    - Assist with development or establishment of national green freight programs
Global Green Freight Action Plan

- Over 50 Organizations have endorsed the Action Plan
  - Includes NGOs, Nation States, and Private Sector
  - For more information: rachel@theicct.org
The case for freight efficiency in Latin America

- Truck traffic is growing faster than other transportation modes
- Vital for economic development
- Higher diesel subsidies in many countries
- Lack of modal substitutes
- Complementary benefits for the whole region
- There are proven policies and programs that can drive the introduction of innovative technologies and operational practices to improve truck efficiency
- Win-win for industry and the environment

Green Freight programs promote **FUEL SAVINGS AND CLIMATE BENEFITS** through improved efficiency of the freight system

Green Freight programs promote **BETTER AIR QUALITY AND HEALTH BENEFITS** through reduced emissions of harmful pollutants
Conclusions/Summary

- Abundant drivers for Freight Efficiency programs in Latin America
  - Increasing importance of HDV segment - fuel consumption and emissions
- Green Freight programs are a good pathway to HDV efficiency regulations
- Transporte Limpio – only existing national green freight program in Latin America
Obrigado  Gracias  Thank you

Rachel Muncrief
rachel@theicct.org

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