Promoting Cleaner, More Efficient Transport in Africa

Jane Akumu, UNEP
World Population of Cars, Trucks and Buses

Source: Mike Walsh
Explosive growth
- Land freight up to 125% growth in OECD and 430% non-OECD countries between 2010 and 2050

High impacts
- 35% of transport fuel
- Logistics 5.5% of global CO₂ emissions
- Diesel emissions cause cancer
- Trucks major contributor to BC emissions

Inefficient
- Logistics costs <10% of GDP in US/EU; 15-25% in Asia and Latin America
- Up to 40% of trucks in developing countries are empty
- >90% of trucks companies in China are driver-owners

Smart Freight Centre, State of Play: Green Freight in Asia, 2014
New Vehicle Registrations in Kenya 1968-2017

Start of exponential growth, esp. motor cycles and station wagons

Source: KNBS Annual Surveys 1970,..,2018
Newly imported vehicles in Uganda

Figure 2: The Age Trend of Imported Vehicles

Main Sources of PM in Nairobi

Source: S. M. Gaita et al.: Source apportionment and seasonal variation of PM2.5 in Nairobi
Impact of Transport on Health

→ Small particulates (PM10 or PM2.5) estimated to cause over 3.7 million premature deaths per year worldwide;

→ In 2012, diesel PM was officially classified as carcinogenic (WHO);

→ The smaller part of PM is black carbon (BC), now believed the second most important climate pollutant;

→ Vehicular emissions, esp diesel vehicles, are responsible for 50-80% of the PM/BC pollution in cities

→ Exposure highest 300 - 500 meters from roadway
CO₂ Emissions from Transport

THE TRANSPORTATION SECTOR
A major contributor to global energy-related CO₂ emissions

GLOBAL ENERGY-RELATED EMISIONS
≈ 30 Gt CO₂

TRANSPORT EMISSIONS
≈ 7 Gt CO₂

ROAD TRANSPORT EMISSIONS
≈ 5 Gt CO₂

LEGEND

- RAIL
- AIR
- ROAD
- SEA
- HEAVY-DUTY VEHICLES
- LIGHT-DUTY VEHICLES

Sources:
Africa’s CO₂ Emissions
Reducing emission and improving efficiency

- Cleaner fuels – low Sulphur fuels
- Stricter vehicle emission standards – Euro IV and above
- Incentives/policies to promote fuel efficiency
- Voluntary awards
- Eco driving
- Green freight strategies
1. Adoption of cleaner fuels
Progress towards low Sulphur diesel

Comparison of Diesel Fuel Sulphur Levels: Global Status 2005 vs 2019
Progress in Lowering Sulphur in Diesel in Africa

- 2002
- 2016
- 2019

- 15 & Below*
- >15 - 50
- >50 - 500
- >500 - 2000
- >2000 - 5000
- >5000 & Above

* Information in parts per million (ppm)
Lower sulphur fuels reduce vehicle emissions

Sulphur levels proportional to PM and SO2 emissions in all cars - new and old cars
2. Stricter vehicle emission standards
**Strong:** 3 countries have a Euro 5 or above emission standard and/or ban used vehicles over 3 years and/or have strong tax, fee bate schemes

**Good:** 5 countries have a Euro 4 emission standard and/or ban used vehicles over 5 years and/or have a good taxation scheme in place

**Weak:** 17 countries have a Euro 3 or below emission standard and/or ban used vehicles over 8 years old and/or have a weak taxation scheme in place

**Very Weak:** 25 countries allow vehicles over 9 and have no emission regulations in place as well as having ineffective/ or no taxation schemes

**Banned:** 5 countries impose a total ban on used vehicles

### Snapshot of average age of vehicle imports

<table>
<thead>
<tr>
<th>Country</th>
<th>LDV age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burundi</td>
<td>8 years (2017)</td>
</tr>
<tr>
<td>Kenya</td>
<td>6.5 years (2016)</td>
</tr>
<tr>
<td>Liberia</td>
<td>10 years (2017)</td>
</tr>
<tr>
<td>Madagascar</td>
<td>15 years (2017)</td>
</tr>
<tr>
<td>Mauritius</td>
<td>1 year (2017)</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>15 years (2017)</td>
</tr>
<tr>
<td>Uganda</td>
<td>15.6 years (2017)</td>
</tr>
<tr>
<td>Zambia</td>
<td>13 years (2014)</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>13.3 years (2016)</td>
</tr>
</tbody>
</table>

*Images of Africa map are from the SSATP Africa Transport Policy Program.*
Results from tougher emission standards

Figure 4 • Tightening of selected emission standards on trucks, by country

Note: Other countries with pollutant emission standards for trucks in the range of those shown here include Argentina, Australia, Chile and Korea.
Source: ICCT and DieselNet (2016).
DIESEL VEHICLE EMISSION TESTING
(Cape Town)

failure rate
17% - 2000

7.2% - 2003

1.8% - 2005

1.07% - 2006
CCAC Global Strategy for Cleaner Fuels and Vehicles

1\textsuperscript{st} global plan to reduce PM and BC emissions from vehicles by >90% by 2030

Expected results:
- ↓ annual PM2.5 & BC from on-road vehicles by >85%
- 100,000/yr fewer premature deaths in 2020, & 470,000/year fewer in 2050
- ↓ cumulative BC emissions by 7.1M tons by 2050.

By end 2020, CCAC support in 35 countries
3. Incentivizing fuel efficient vehicles
Countries are at various points in developing fuel economy policies.

Note: light vehicle fuel economy values normalized or NEDC test cycle
Source: IEA ETP 2015 and ICCT
CO2 Emission Reduction in Japanese Transportation Sector

Year | CO2 emissions (million tons)
--- | ---
1990 | 210
1991 | 215
1992 | 220
1993 | 225
1994 | 230
1995 | 235
1996 | 240
1997 | 245
1998 | 250
1999 | 255
2000 | 260
2001 | 265
2002 | 270
2003 | 275
2004 | 280
2005 | 285
2006 | 290
2007 | 295
2008 | 300
2009 | 305

CO2 emissions reduced by:
- Fuel Economy: 22 million tons
- Traffic Flow: 11 million tons
- Eco-Driving: 18 million tons
- Alternative Fuels: 8 million tons
- Travel Distance (modal shifts, etc): 8 million tons
- Others: 8 million tons

Source: JAMA
Fuel Economy Improvements are Cost-effective

*Fuel savings more than pays for fuel economy improvements in light-duty vehicles*

Source: IEA Fuel Economy Roadmap, July 2012
## Fuel Economy Levels

<table>
<thead>
<tr>
<th>Market</th>
<th>Cycle</th>
<th>Payload (kg)</th>
<th>Baseline fuel consumption (L/100km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>US Phase 2 cycles</td>
<td>3,230</td>
<td>23.7</td>
</tr>
<tr>
<td>China</td>
<td>WHVC-China</td>
<td>3,045</td>
<td>21.2</td>
</tr>
<tr>
<td>Europe</td>
<td>VECTO Urban/Regional</td>
<td>2,750</td>
<td>23.0</td>
</tr>
<tr>
<td>India</td>
<td>ARB Transient</td>
<td>4,000</td>
<td>24.9</td>
</tr>
<tr>
<td>US</td>
<td>US Phase 2 cycles</td>
<td>2,836</td>
<td>27.6</td>
</tr>
</tbody>
</table>

### Uganda

<table>
<thead>
<tr>
<th>Weight Category</th>
<th>Diesel</th>
<th></th>
<th></th>
<th></th>
<th>Petrol</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Duty</td>
<td>11.6</td>
<td>11.7</td>
<td>11.9</td>
<td>13.4</td>
<td>10.6</td>
<td>10.8</td>
<td>11.1</td>
<td>11.8</td>
</tr>
<tr>
<td>Heavy Duty</td>
<td>24.2</td>
<td>24.9</td>
<td>27.7</td>
<td>29.3</td>
<td>22.2</td>
<td>21.4</td>
<td>21.5</td>
<td>22.9</td>
</tr>
<tr>
<td>Total average</td>
<td>15.3</td>
<td>15.5</td>
<td>16.5</td>
<td>18.4</td>
<td>10.7</td>
<td>10.9</td>
<td>11.2</td>
<td>11.9</td>
</tr>
</tbody>
</table>

*Source*: Computations based on combined dataset (URA e-tax dataset and MoW&T dataset)

### Mauritius

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Fuel Consumption (L/100km)</th>
<th>Average CO₂ Emissions (g/km)</th>
<th>Average Fuel Consumption (L/100km)</th>
<th>Average CO₂ Emissions (g/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>7.0</td>
<td>186</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2013</td>
<td>6.6</td>
<td>169</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2014</td>
<td>5.8</td>
<td>145</td>
<td>19.5</td>
<td>542</td>
</tr>
<tr>
<td>2015</td>
<td>5.9</td>
<td>146</td>
<td>17.8</td>
<td>497</td>
</tr>
</tbody>
</table>

*Source*: SSATP Africa Transport Policy Policy Program
Fuel economy policies & instruments

Target group:
- Consumer
- Manufacturer

- Monetary
  - Fiscal instruments

- Consumer information
  - Labelling

- Regulatory
  - Fuel economy or CO₂ emission standards
Baseline Light-Duty Vehicle Fuel Economy and Trends for New LDVs

Liters per 100 kilometers (L/100km) normalized to NEDC Test Cycle

Heavy-duty vehicle targets
Improve new vehicle fuel consumption
35% by 2035 - CO₂ reduction target of
70% by 2050
The SmartWay Model

• Public-private partnership with freight sector
• Market based, voluntary, no fee
• Standard carbon/emissions accounting system
  • Standardized tools and metrics for collecting & reporting data
  • Developed with extensive stakeholder input and peer reviewed
• Goal: Reduce emissions of GHGs and other pollutants
• How: Accelerate adoption of advanced technologies and operational practices in the freight supply chain
• Measured by saving:
  • gallons of fuel, barrels of oil, $
  • CO_2, NOx and PM emissions
4. Green freight strategies
What are Green Freight Programs?

Market-based public-private partnerships designed to help industry move goods in cleaner, more efficient ways.

- Enable industry leadership and action at scale through 4 broad approaches.
- Deliver business and societal value (win-win).
- Programs can be modal, national or local.

Source: Smart Freight Centre, Global Framework for Action
Green Freight Programs and Initiatives
Norther Corridor Targets

• Below are set short term targets for the period 2016 baseline to 2021:

• Improved fuel economy litres per ton-km for trucks by at least 5% by 2021.

• Reduction in Particulate Matter (PM), black carbon emissions and Oxides of Nitrogen (NOX) grams per ton-km by at least 10% by 2021.

• Reduction of CO2 emission intensity grams per ton-km by 10% by 2021.

• Reduction of road accidents by 10% per million truck-kilometer.
Northern Corridor Identified Action

- Vehicle loading, inspection and maintenance
- Improvement of Infrastructure
- Eco-Drivser Training
- Advocacy, Sensitization and Partnerships
- Recognition Scheme
- Fuels Standards
- Vehicle Technology
- Financing
Next steps

**Low Sulphur Diesel**
Regional support for East, West and Southern Africa

**HDV Emissions Standards**
Develop harmonized Standards
Mandatory Inspection and Maintenance

**Green freight strategies**
Supporting the Northern Corridor towards a green freight strategy

**Fuel Economy improvements/CO2 reduction**
Import of fuel efficient vehicles including electric mobility, through baseline data and policies, eco-driving, infrastructure improvements

**Reduce road accidents along the freight corridors; support non-motorized policies and investment for walking and cycling**
UN Environment Transport Programs

- Share the Road (StR)
- Global Fuel Economy Initiative (GFEI)
- Electric Mobility
- Partnership for Clean Fuels and Vehicles (PCFV)
- Climate and Clean Air Coalition (CCAC) incl Ports
Thank you

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