Auto Fuel Economy Policy: An Opportunity to Choose Clean Mobility
Technology Choosers vs. Technology Takers
Global Fuel Economy Initiative

UN Sec General’s Climate Summit - GFEI launched as accelerator

Sustainable Energy for All

2011

2013
Doubling Energy Efficiency in the Transport Sector in SDGs

2014

2015, 2016, 2017

G20 Energy Efficiency Action Plan includes Fuel Efficiency
Auto fuel economy: *rate of energy use/unit of travel*

- Fuel economy: km/l
- **Fuel consumption: l/100km**
- Fuel efficiency: MJ/pkm or MJ/tkm

Source: IEA Technology Roadmap: Fuel Economy of Road Vehicles
Doubling LDV fuel efficiency worldwide by 2050

- Slowing improvement in OECD countries
- Increasing improvement in non-OECD but not enough
- Global targets cannot be met without developing markets

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<td><strong>OECD &amp; EU average</strong></td>
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<td>7.4</td>
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<td>8.2</td>
<td>8.0</td>
<td>7.9</td>
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<th>GFEI target</th>
<th>required annual improvement rate (% per year)</th>
<th>2005 base year</th>
<th>-2.8%</th>
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<td></td>
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<td>2015 base year</td>
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<td>-3.7%</td>
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Source: IEA/ GFEI, 2017
Evolution of Global Fuel Economy

- Solid lines: historic GFEI values
- Dashed lines: enacted or proposed regulation
- GFEI target

Legend:
- Brazil
- Canada
- China
- India
- Japan
- Mexico
- South Korea
- USA
- EU 28
- OECD
- Non-OECD
- World
How to improve vehicle fuel economy?

- Most energy lost as heat, only 20% of the energy is converted into movement

  Engine losses: 67% to 72%
  thermal such as radiator, exhaust heat, etc. (57% to 62%)
  combustion (3%)
  pumping (4%)
  friction (3%)

  Parasitic losses: 4% to 6%
  (e.g., water pump, alternator, etc.)

  Power to wheels: 5% to 21%
  dissipated as:
  wind resistance (7% to 10%)
  rolling resistance (4% to 6%)
  braking (4% to 5%)

- Lightweight materials
- Optimized vehicle design
- Low rolling resistance tires
- Turbocharging
- Direct injection
- Low friction lubrication
Steps in Auto Fuel Economy Policy
/What We Do

• **FE Baseline** – What is the average fuel economy of passenger vehicles registered for the first time?
• **Target** – Where will fuel economy need to be in the future?
• **Identification of policies** – Which measures are appropriate to reach the target?
• **Impact assessment of policy measures** – Regulatory/standard, fiscal and ‘soft’
Baseline Light-Duty Vehicle Fuel Economy and Trends for New LDVs

Global progress on auto fuel economy
Zambia: GFEI workshop August 2017
Uganda Feebate study, FE label August 2017
Ghana, Mali, Togo, Liberia: GFEI baselines
Kenya, Ethiopia: GFEI baselines
Uganda Feebate study, FE label August 2017
Zambia: GFEI workshop August 2017
Zimbabwe, Malawi: GFEI baselines

South Africa: GFEI Baseline, FE Label since 2008, CO2 registration tax since 2010
Mauritius: GFEI Baseline, Feebate in 2011
## Fuel Economy Policy Options

<table>
<thead>
<tr>
<th>Category</th>
<th>Options</th>
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</table>
| **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. |

Source: ICCT
VEHICLE FUEL EFFICIENCY STANDARDS

- Introduce and regularly strengthen mandatory standards
- Establish and harmonize testing procedures for fuel efficiency measurement.

In the EU, mandatory CO₂ standards for new cars have quadrupled the reduction rate

Regulation (EC) 443/2009:

2015: 130 g CO₂/km (5.6 l/100km)

2020: 95 g CO₂/km (4.1 l/100 km of petrol or 3.6 l/100 km of diesel)

2025/2030: -15%/-30% over 2021 WLTP
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.

Thai vehicle excise tax rates combine CO₂ ratings and engine capacity

Mandatory eco-sticker

<table>
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<tr>
<th>Types of Vehicles</th>
<th>Fuel type / Tax rates</th>
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<tbody>
<tr>
<td>CO₂/ engine capacity</td>
<td>E10/ E20</td>
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<tr>
<td>Passenger vehicles – cars and vans with less than 10 seats</td>
<td></td>
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<tr>
<td>≤ 100 g/km</td>
<td>30</td>
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<tr>
<td>101-150 g/km</td>
<td>30</td>
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<tr>
<td>151-200 g/km</td>
<td>35</td>
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<tr>
<td>&gt;200 g/km</td>
<td>40</td>
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<tr>
<td>&gt;3,000 cc</td>
<td>50</td>
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</tbody>
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Electric vehicle/ fuel cell

- ≤ 3,000 cc (180 Kw) | 10 |
- > 3,000 cc (180 Kw) | 50 |
INFORMATION MEASURES

- Vehicle fuel economy labels
- Improving vehicle operational efficiency through eco-driving and other measures.

Directive 1999/94/EC
Labeling and taxation in Chile

- Adopted a mandatory fuel economy labelling scheme from February 2013 becoming the first Latin American country to adopt such a scheme.
- In September 2014 adopted a taxation scheme that puts a tax on less efficient and polluting vehicles, based on CO$_2$ and NOx ratings.
- In 2015 adopted a scheme to provide subsidies for cleaner and more efficient taxis based on the fuel economy labeling scheme, with the aim to replace the 60,000 taxi fleet over the next 8 years.
Summary

• High growth rate of passenger car sales (and other vehicles) with relatively high fuel economy will continue in African countries
• Implementing fuel economy can substantially reduce CO₂ emissions – supporting the Paris Agreement and reduces fossil fuel consumption and national expenditures on imports, and improves air quality through adoption of more advanced vehicles
• Countries need to put in place now -- fiscal and non-fiscal policies to encourage cleaner and more efficient vehicles
Thank you

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