Vehicle Fuel Economy Standards and Feebate System

Zifei Yang
Researcher

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What is ICCT?

- ICCT is an independent non-profit research organization that provides technical support on transport efficiency and emission policies in major auto markets.
Motivation of reducing vehicle fuel consumption
Vehicles make up more than 20% of greenhouse gas emissions...

GLOBAL ANTHROPOGENIC EMISSIONS
≈ 38 GtCO₂

TRANSPORT EMISSIONS
≈ 8.8 GtCO₂

ROAD TRANSPORT EMISSIONS
≈ 6.5 GtCO₂

Notes:
Global anthropogenic CO₂ emissions in 2010 based on IPCC (2014).
Transport CO₂ emissions in 2010 estimated by ICCT (2014) include the full fuel lifecycle, including direct emissions from combustion & upstream emissions from extraction, refining, & distribution of fuels.

LEGEND

RAIL AVIATION ROAD MARINE HEAVY-DUTY VEHICLES LIGHT-DUTY VEHICLES
Performance standards, economic signals, and technological innovation complement each other.

- **VEHICLE PERFORMANCE STANDARDS**: encourage AUTOMAKERS to build efficient products
- **VEHICLE AND FUEL FEES AND INCENTIVES**: encourage CONSUMERS to demand efficient products and drive less

**Reducing cost**

- **Market-based approach**
- **Information measure**
- **Smart way**
- **Labeling**

**TECHNOLOGY INNOVATION AND DEPLOYMENT**
Fuel efficiency standards
U.S. fuel economy/GHG standards

Historical performance

- National FE standards
- California FE standards

Future target (2017-2025)
Technology innovation continues to lower projected costs of compliance with 2025 standards

- Costs of compliance with 2025 standards (vs. 2015) have decreased dramatically
  - 2012 rulemaking: $1800
  - EPA assessment (PD-2016): $1300
  - ICCT assessment (2017): $886

- Consumer payback period is shortened
  - EPA: 5 years due to lower oil price forecasts
  - ICCT assessment: 3 years

Consumer acceptance of energy efficiency technologies demonstrated by best selling cars

- Note: 2018 Toyota Camry does not rely on hybridization (not even stop/start), No weight reduction, no off-cycle, A/C or FFV credits.

Status of passenger car fuel economy standards, normalized to U.S. CAFE

2017 Global update: Light-duty vehicle greenhouse gas and fuel economy standards
https://www.theicct.org/publications/2017-global-update-LDV-GHG-FE-standards
Europe has released a proposal for establishing CO2 standards for HDVs. The standards are expected to run until 2030.
3 Fuel efficiency fiscal policies
Fuel consumption-based feebate program

- Feebates = fee + rebate
  - Higher fuel consumption vehicles receive rebates
  - Lower fuel consumption vehicles pay fees
The design of the feebate function matters

- Tax-optimized vehicles

Link to the report: Optimizing to the last digit: how taxes influence vehicle CO2 emission level
http://www.theicct.org/sites/default/files/publications/Tax_Step_Analysis_201510.pdf
Gradually optimized system

\[\begin{align*}
\text{CO}_2\text{-based Bonus-Malus system (fee} & \text{bate) in France 2008-2017} \\
\end{align*}\]

Fee

Rebate

CO\textsubscript{2} (g/km)

\(0\)
\(50\)
\(100\)
\(150\)
\(200\)
\(250\)

\(0\)
\(-2,000\)
\(-4,000\)
\(-6,000\)
\(-8,000\)

\(10,000\)
\(8,000\)
\(6,000\)
\(4,000\)
\(2,000\)

\(2008-2009\)
US: fuel economy related tax and incentive

- Gas guzzler tax
  - Passenger cars (only)
  - Tax for a model type having fuel economy below certain thresholds: 22.5 mpg
  - Very few cars fall below the taxable level of 22.5 combined city/hwy mpg (10.5 l/100km)

- Incentive for electric vehicles
  - Federal subsidy- a one-time bonus, depending on the battery capacity of the vehicle (2,500 USD - 7,500 USD)
  - State level incentives- fiscal, non-fiscal
Electric vehicle could be cost-competitive to conventional vehicles

Slowik et al. (2016). Evolution of incentives to sustain the transition to a global electric vehicle fleet. [http://www.theicct.org/evolution-incentives-electric-transition](http://www.theicct.org/evolution-incentives-electric-transition)
Final thoughts

- Fuel economy standards are one of the most cost effective and politically attractive energy reduction measures
  - US 2025 standards and onward

- Emerging markets are considering adopting fiscal measures such as feebates (which are easier to development and implement), especially in the context of vehicle electrification
4 Back up slides
Real world emissions are an issue that needs to be addressed.

Divergence between official and real-world CO₂ emission values

- Japan: JC08 phase-in
- Japan: JC08
- EU: NEDC
- U.S.: CAFE (for U.S. regulations)
- China: NEDC
- U.S.: EPA label values (for U.S. consumers)

Build year / Model year / Fleet year / Test year

https://www.theicct.org/publications/laboratory-road-intl
Implementation of vehicle fuel economy labeling scheme