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SUSTAINABLE TRANSPORTATION ENERGY PATHWAYS

An Institute of Transportation Studies Program

Fuel Economy – Key Concepts

Paris, 9 June 2016

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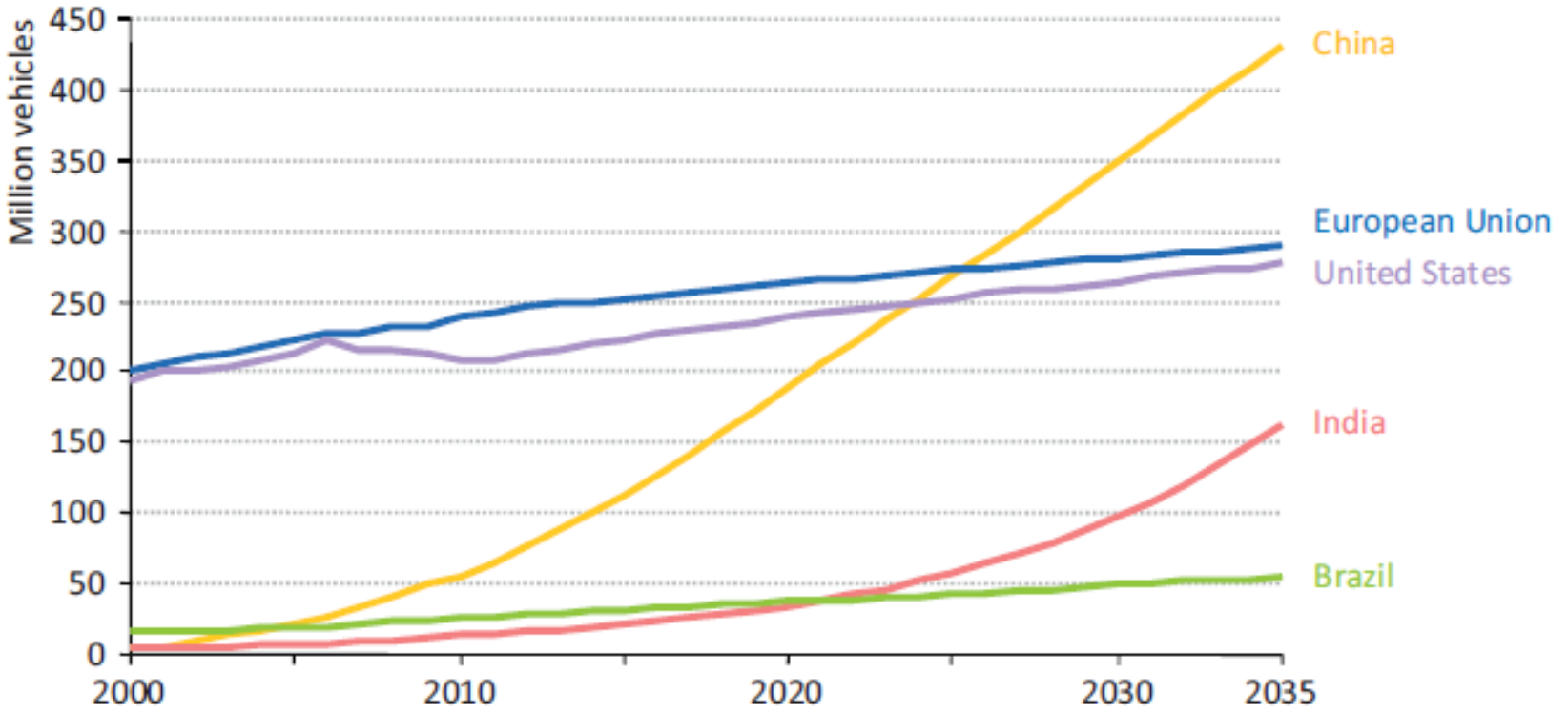
IEA WEO 2012: heading toward 2 billion cars

OECD is fairly saturated, but rest of the world is not.:

Figure 3.6 ▷ PLDV fleet in selected regions in the New Policies Scenario

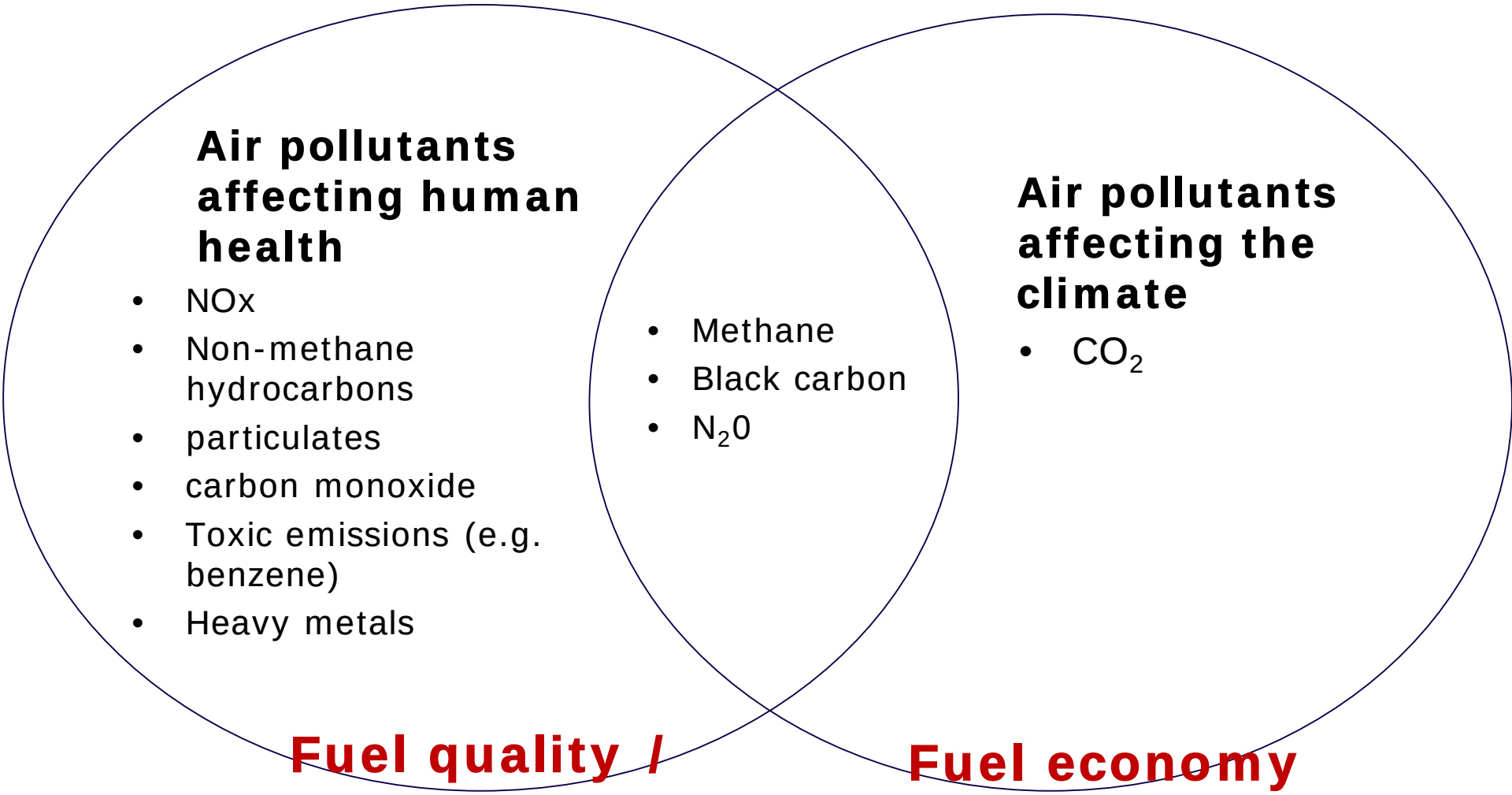


Typical national objectives related to transportation / fuels policies

- Improve mobility

- Reduce oil dependence (diversify fuels)
- Improve balance of payments
- Reduce pollutant emissions / improve air quality
- Reduce greenhouse gases
- Promote domestic economies / jobs
- Improve safety

Types of Air Pollutants



Fuel quality / tailpipe controls

Fuel economy improvement

What is fuel economy?

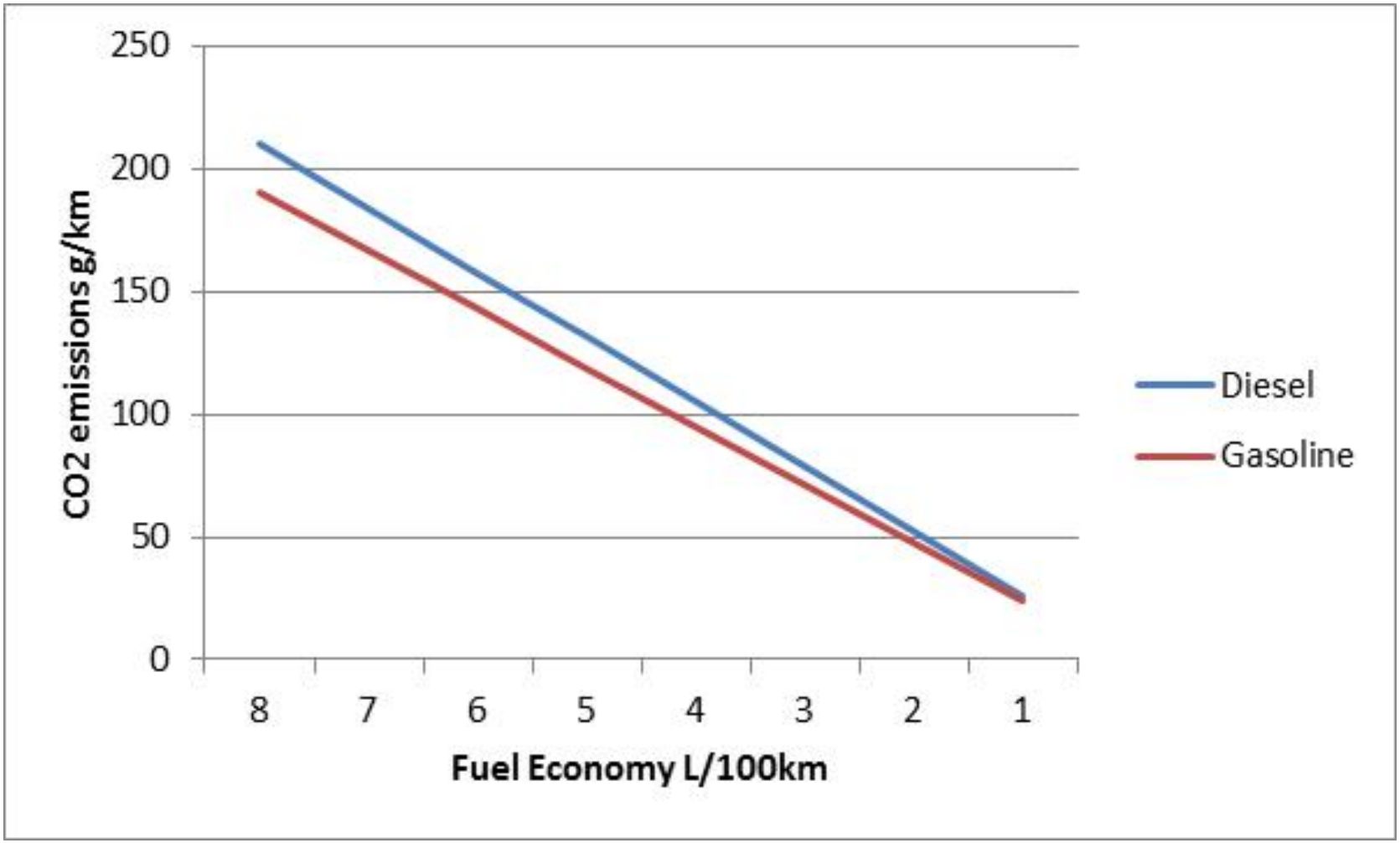
- **Vehicles use energy, and fuel economy measures energy per unit of vehicle travel. It is the RATE of energy use.**
  - Litres per 100km (Europe)
  - Km per litre (Japan)
  - Miles per gallon (United States)

- **Fuel economy, fuel efficiency, fuel intensity are all fairly interchangeable terms. But fuel economy always refers to fuel use relative to distance travelled.**

What is fuel economy? (2)

- **Important relationship: there is about 2.4 kg of CO_2 emitted per litre of gasoline burned, 2.6 for diesel.**
  - The only way to cut CO_2 emissions is to burn less fuel (you can't capture it at the tailpipe).
  - For gasoline vehicles, 8 L/100 km = 189 g/km CO2 emissions, 7 L/100 km = 165 L/100km, etc. It's a fixed relationship.
- **If you improve vehicle fuel economy, you:**
  - Save fuel
  - Reduce costs
  - Cut CO_2 emissions
  - **Don't** directly help air quality very much (though this is a complex and important topic)

Gasoline and Diesel fuel CO_2 emissions v. fuel economy

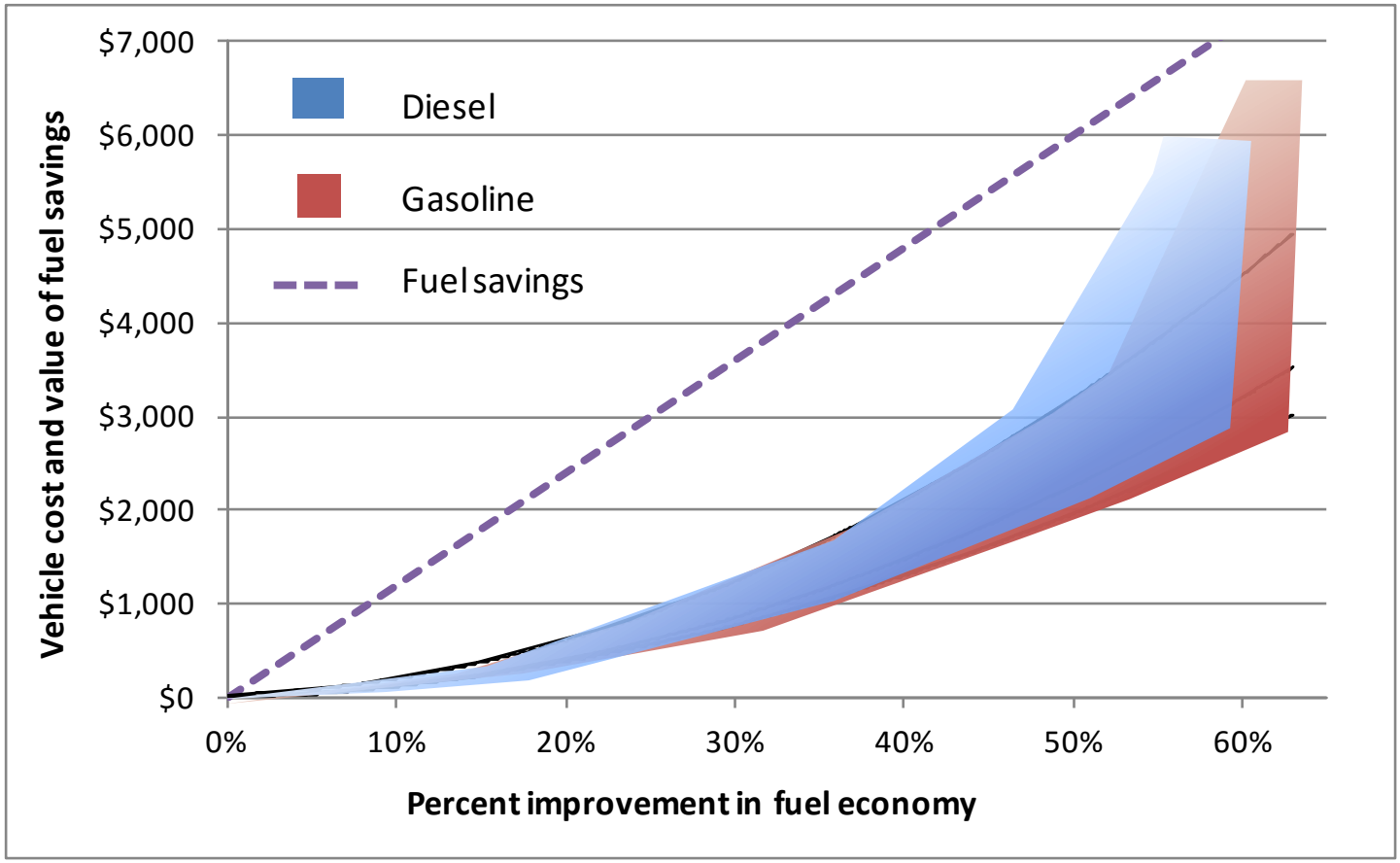


Fuel economy context

- **Fuel economy improvement can be achieved through**
  - Technical changes to vehicles
  - Changing the types of vehicles bought
  - Improving vehicle maintenance
  - Changing the way vehicles are driven (ecodriving)
  - Reducing traffic congestion
- **Fuel economy improvement to vehicles should be part of a broader strategy:**
  - Traffic management
  - City and regional planning
  - Promotion of public transit
  - Etc.

Fuel Economy Improvements are Cost-effective

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

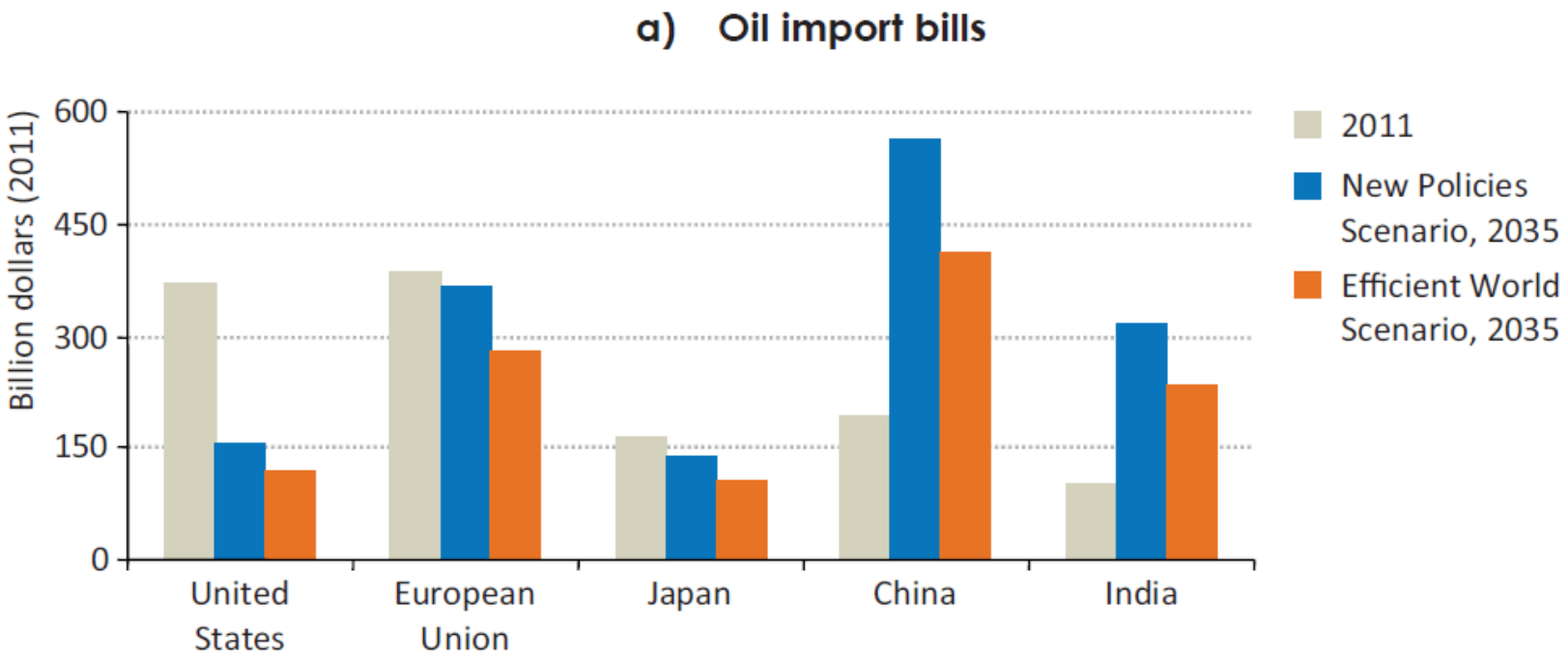


Source: IEA Fuel Economy Roadmap, July 2012

Improving efficiency can save $billions

Countries could dramatically cut their fuel import bills in the future…

Figure 10.9 ▷ Fuel import bills in selected countries by fuel and scenario



Source: IEA World Energy Outlook 2012

GFEI Targets

	2020	2030	2050
New Cars	**30%** reduction* in L/100km compared to 2005 Engines, drive- trains, weight, aerodynamics.	**50%** average improvement globally Hybridisation of most models.	**50% +** globally Significant contributions from Plug-in vehicles
Total fleet	**20%** reduction With lag time for stock turnover; includes eco-driving, maintenance	**35%** reduction	**50by50**

Fuel economy policies – 4 keys

- **Fuel economy labeling**
  - Based on tested fuel economy
  - Need to make available to consumers before purchase (internet, car window stickers)
- **Fuel pricing**
  - Taxation system should at least internalize externalities
  - CO2 tax will help differentiate fuels as well as encourage fuel economy

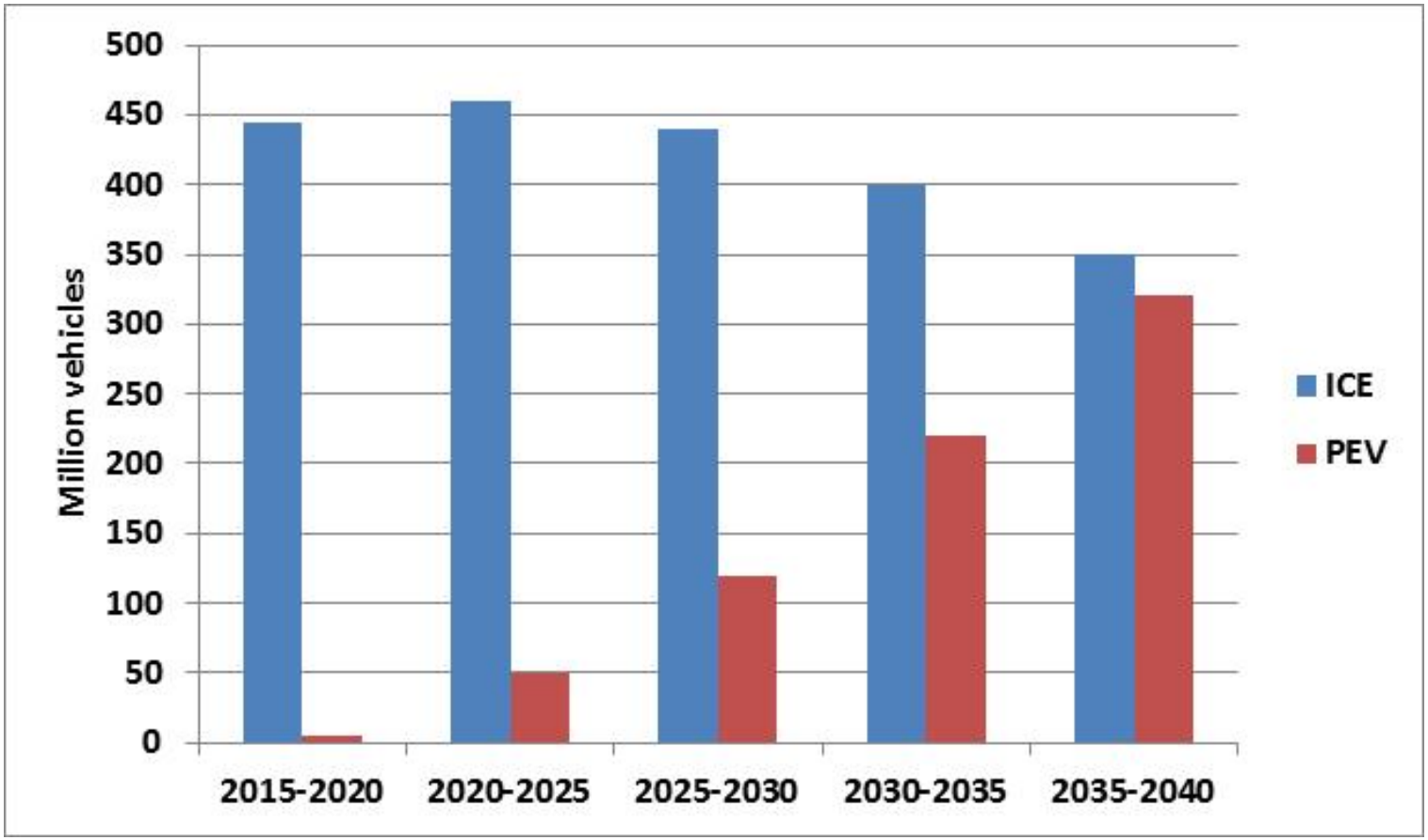
Fuel economy policies – 4 keys

- **Fuel Economy Standards**
  - Typically corporate average standards
  - Typically either vehicle mass or size based
  - Could be applied to 2nd hand vehicles
- **Vehicle purchase taxes**
  - Sales tax, registration tax, import duties
  - Can be differentiated by fuel economy or CO2 emissions
  - Germany also differentiates by pollutant emissions levels

What data do we need?
...to develop good policies

- **How many vehicles of what types?**
  - New v. 2nd hand vehicles
  - Information on origins of vehicles
  - Vehicle characteristics (sizes, fuel economy)
  - Make/model details
- **National registration databases are very useful**

The next 2-decades will likely be ICE-driven, even with rapid Plug-in Vehicle (PEV) growth



Note: this aligns with the IEA ETP 2012 2DS Scenario except with only 5 million PEV sales by 2020 instead of 20 million.

Conclusions

Reaching the GFEI target to cut by half specific light-duty vehicle fuel consumption by 2030 requires:

- **to keep scaling up the market coverage of fuel economy regulations;**
- **to set strengthened fuel economy improvement targets for the 2015-2030 period (especially in the non-OECD);**
- **to monitor the stringency of fuel economy improvement targets already in place;**
- **to keep monitoring the developments of fuel economy worldwide.**

Thank You!

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