

# Medium and Heavy-Duty Vehicle Movement in California

**Inputs and Methods for the  
2013 Transportation Energy Demand Forecast  
Hearing Room A**

June 26, 2013

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California Energy Commission

**DOCKETED**

13-IEP-1L

TN # 71426

JUN 25 2013



# Sectors of Medium-Duty and Heavy-Duty Vehicles

- **Freight (goods movement)**
  - Regional haul: medium-duty (MD) and heavy-duty (HD) trucks, GVWR Class 3 - 8
  - Long haul, rail and Class 7 and 8 tractor-trailers
- **Freight (services and local delivery)**
  - Utility, construction, agriculture, mining
  - Wholesale, retail, waste, landscaping, recreation
- **Urban and Intercity (bus and passenger rail)**
  - Transit rail and bus modes, intercity motor coach, Amtrak
  - School buses, paratransit van and bus, charters



# Key Data for Freight, Urban, and Intercity Models

- **Commodity volume by origin and destination**  
(2011 Freight Analysis Framework)
- **Truck activity and characteristics**  
(2002 Vehicle Inventory and Use Survey)
- **Transit agency data on ridership and buses**  
(National Transit Database)
- **Supplemental data on smaller transit agencies**  
(Annual Transit Report, California State Controller)
- **Freight rail commodities, volumes, route, rail car type**  
(Rail Waybill, U. S. Surface Transportation Board)
- **Additional transit district data**  
(CEC Transit Survey)



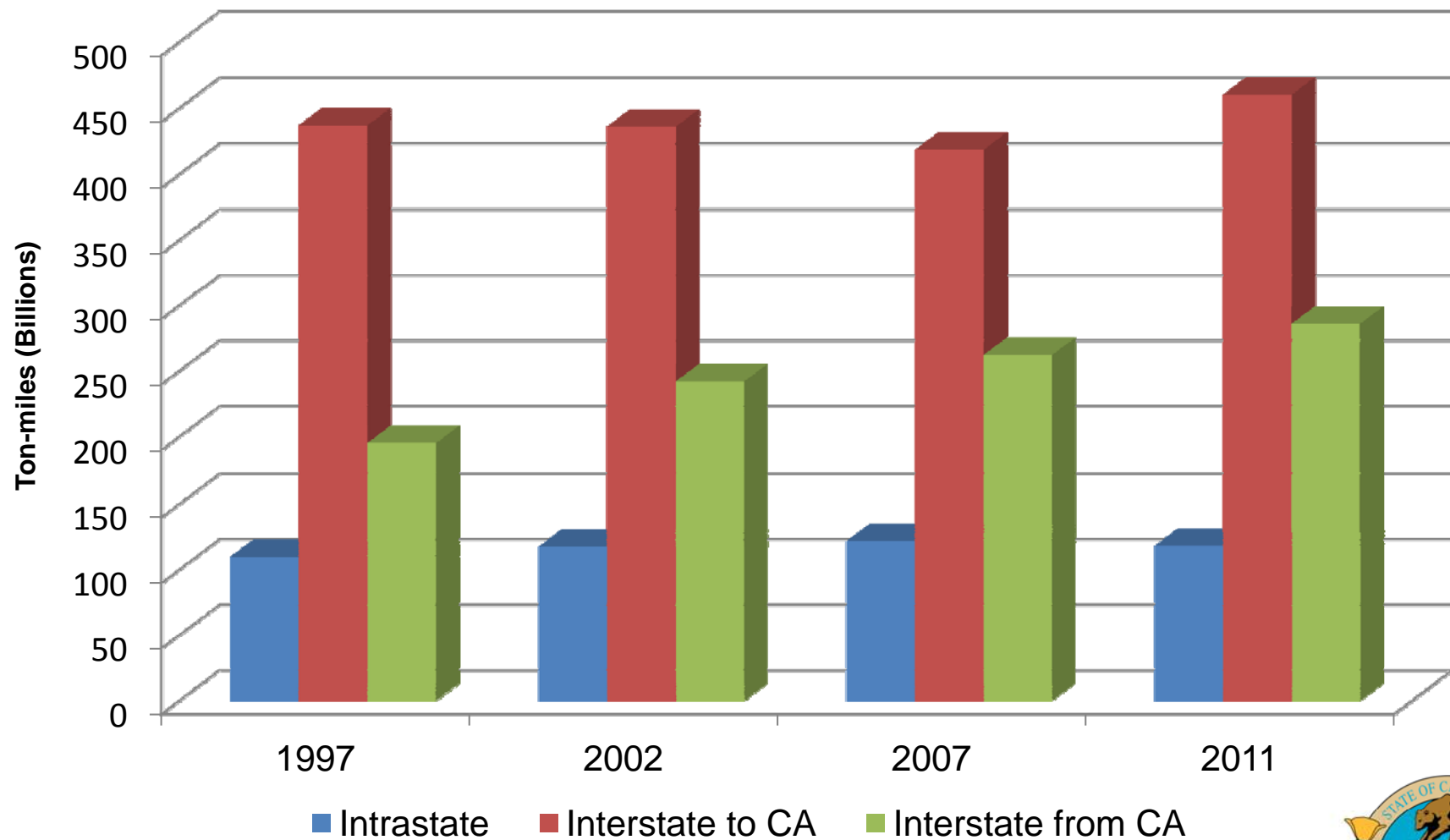
# Freight Analysis Framework

- Federal Highway Administration forecast prepared at Oak Ridge National Lab
- Intended for analysis of regional, statewide, and national commodity volume in tons, ton-miles
- 42 commodities
- 5 zones in California; 15 interstate routes
- Modes: truck, rail, and intermodal
- Domestic shipments **within, to, or from** California
- International shipments have domestic legs

<http://faf.ornl.gov/fafweb/FUT.aspx>



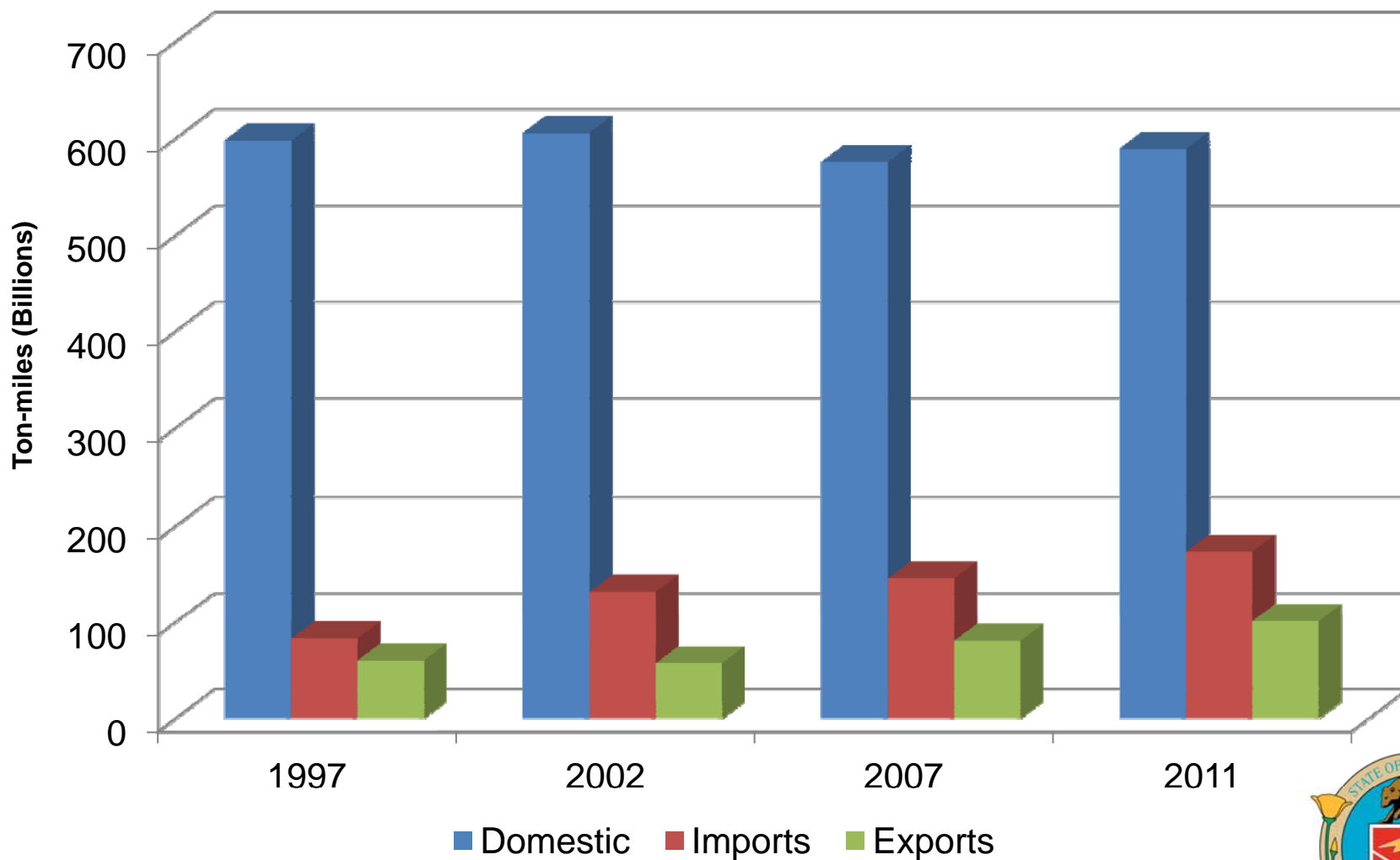
## Freight in California by Domestic Route



Source: <http://faf.ornl.gov/fafweb/FUT.aspx>



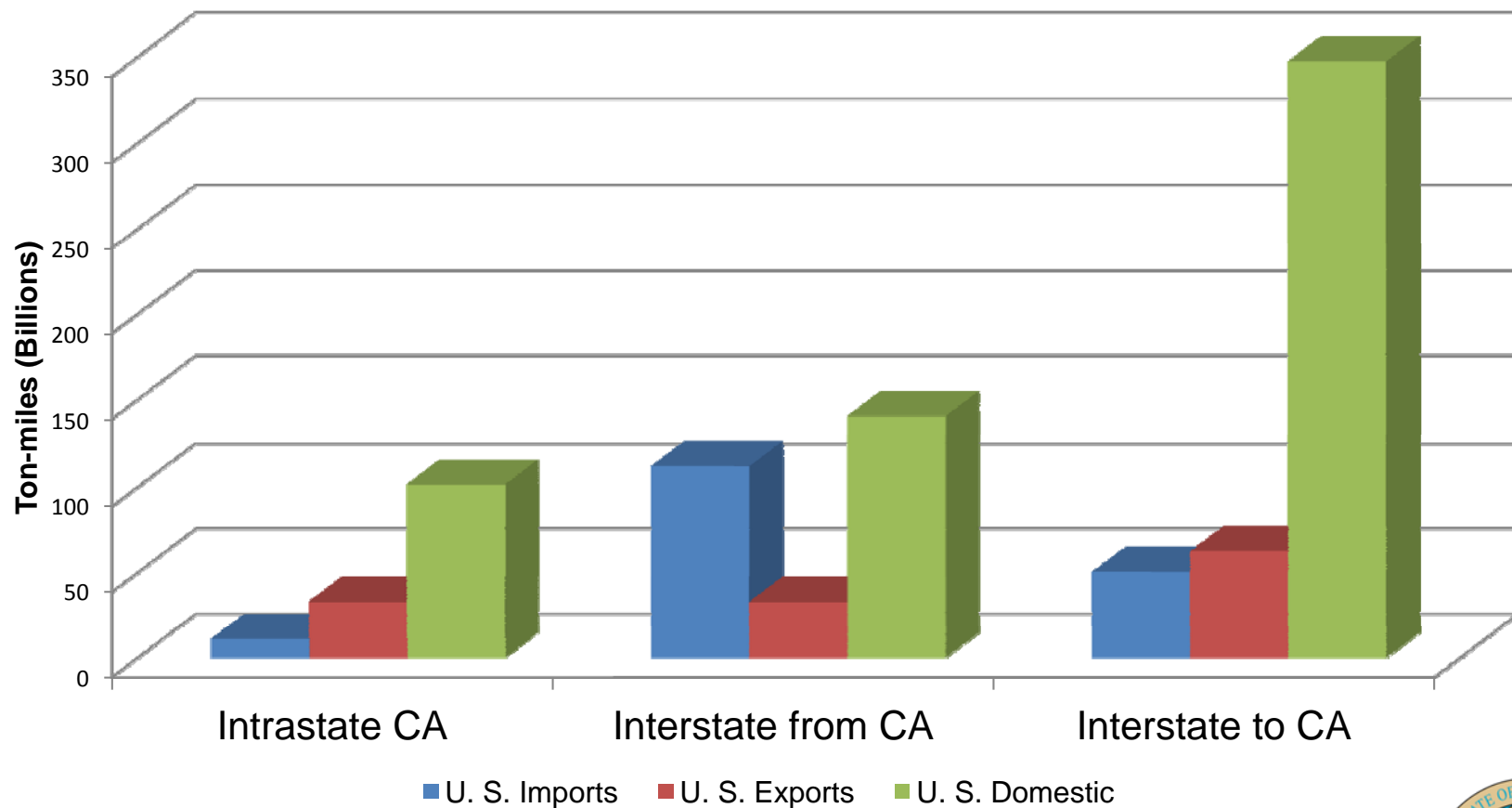
## Historic Freight in California: Domestic, Imports, and Exports



Source: <http://faf.ornl.gov/fafweb/FUT.aspx>



## Goods Moved\* in California by Origin and Destination

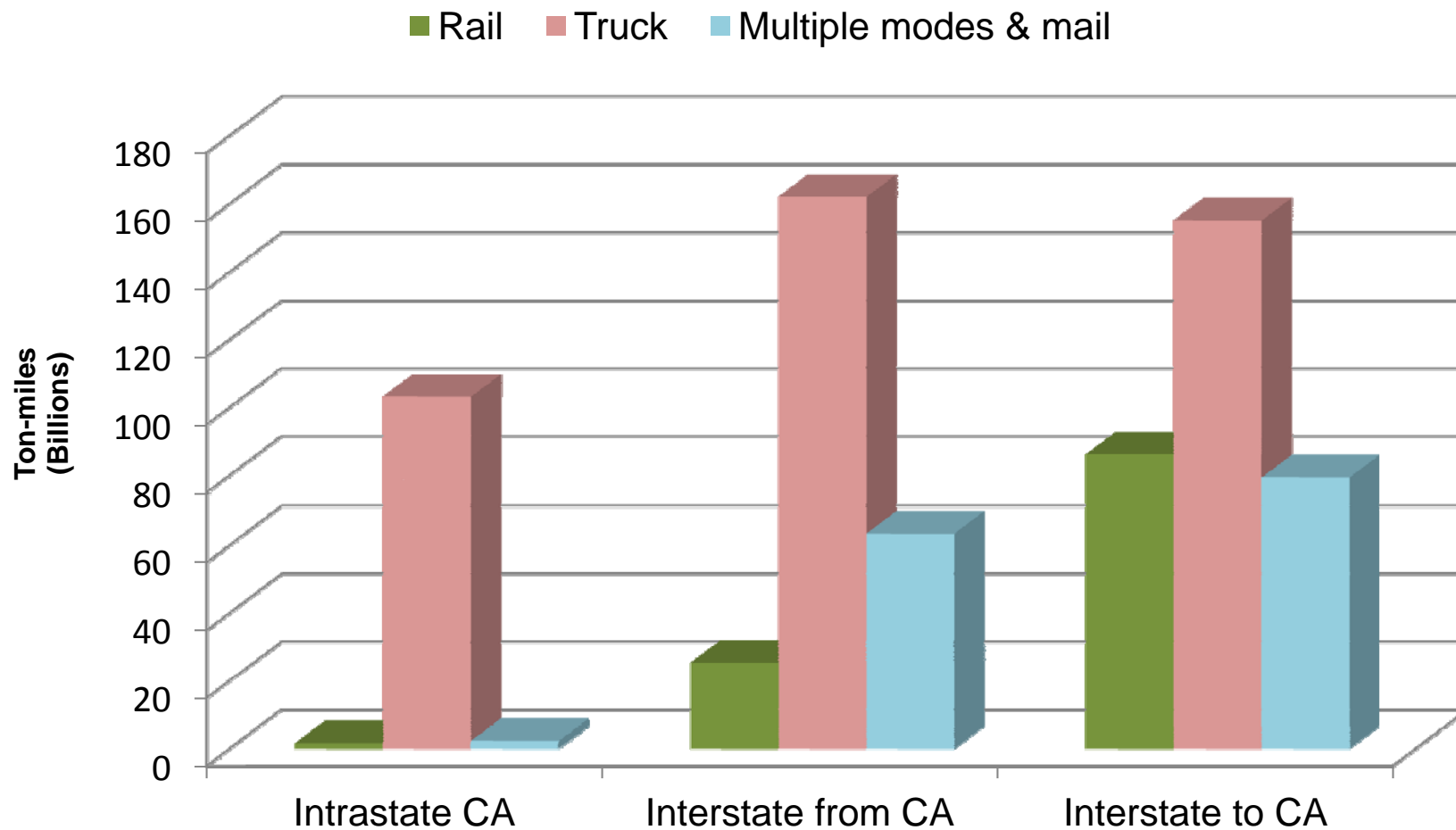


\*Most U. S. Exports and Imports have a domestic and a foreign leg

Source: <http://faf.ornl.gov/fafweb/FUT.aspx>



## Goods Moved\* in California by Mode (2011)



\*Most U. S. Exports and Imports have a domestic and a foreign leg

Source: <http://faf.ornl.gov/fafweb/FUT.aspx>





# Vehicle Inventory and Use Survey

- MD-HD vehicle attributes, business or goods
- Truck assignment is based on
  - Payload
  - Annual truck miles
  - Current commodity volume and service industry size
- We assign DMV stock by truck type to
  - 42 Commodities or 14 Service Industries
  - Routes and typical range of operation



# Bus and Rail Data Sources

- National Transit Database (NTD)
  - Passenger, bus, and rail miles by transit district
  - Fuel economy and use
- Annual Transit Report from California State Controller's Office
  - Supplement for smaller agencies not reported in NTD
- TEO survey of transit agencies
  - Supplement to NTD database and SCO report
- Bureau of Transportation Statistics
  - Intercity modes other than auto

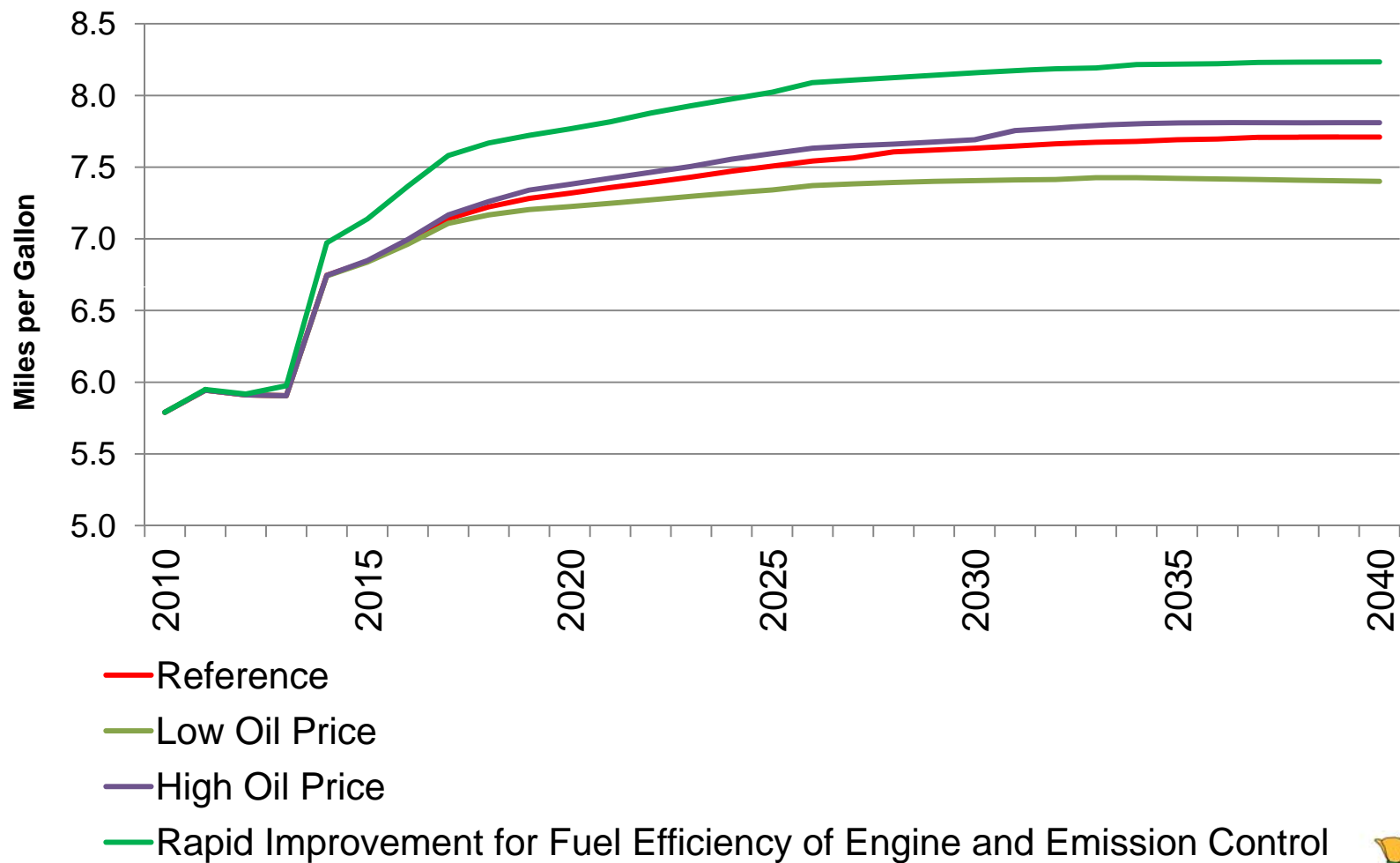


# Medium and Heavy-Duty Fuel Economy

- Energy Information Administration (EIA) forecasts of fuel economy to 2040
- Scenarios: a reference case, high and low fuel prices, high demand for efficient technology
- Fuels: diesel, gasoline, natural gas, propane



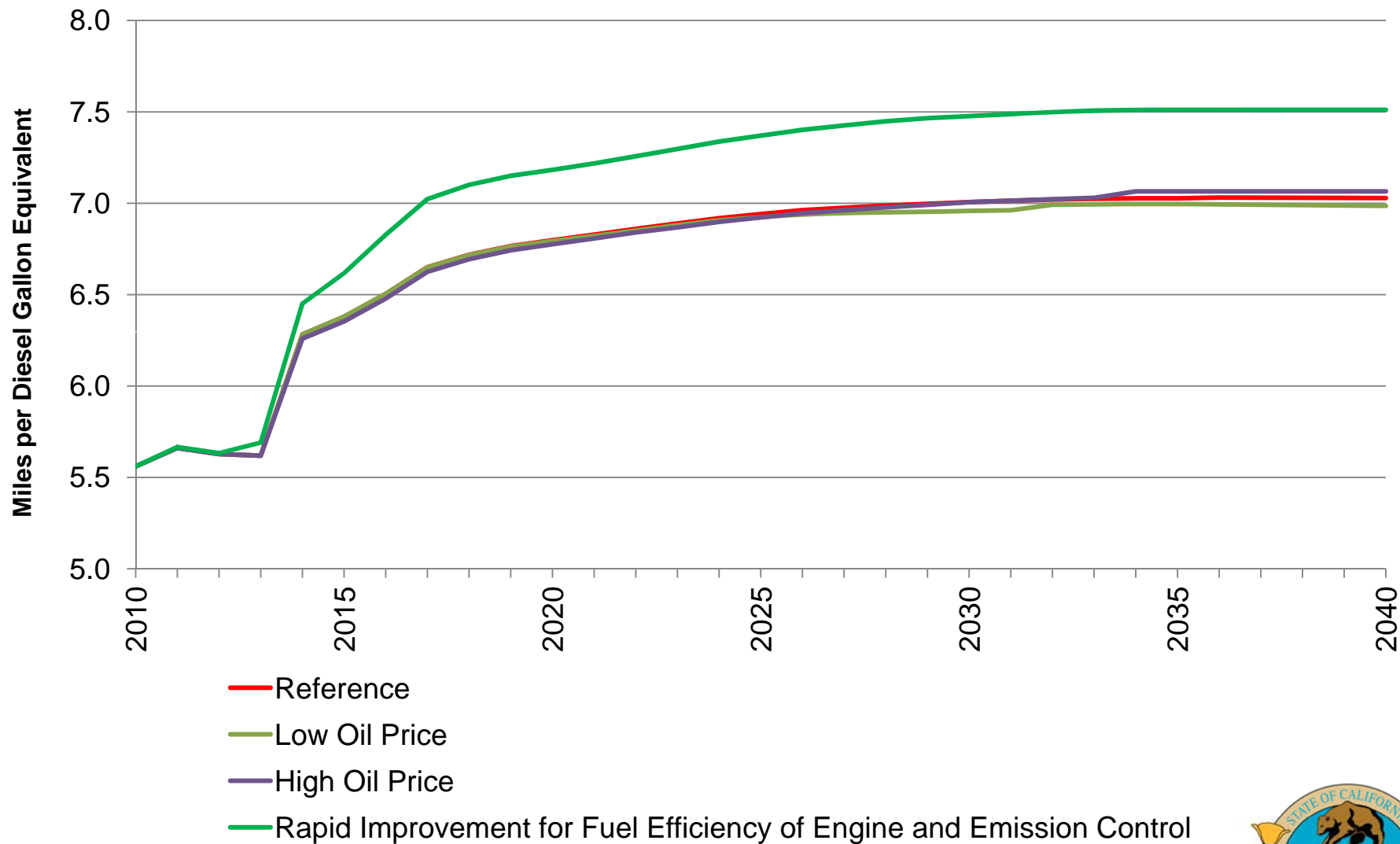
## Fuel Economy: New Heavy-Duty Diesel Truck



Source: Energy Information Administration, Annual Energy Outlook 2013



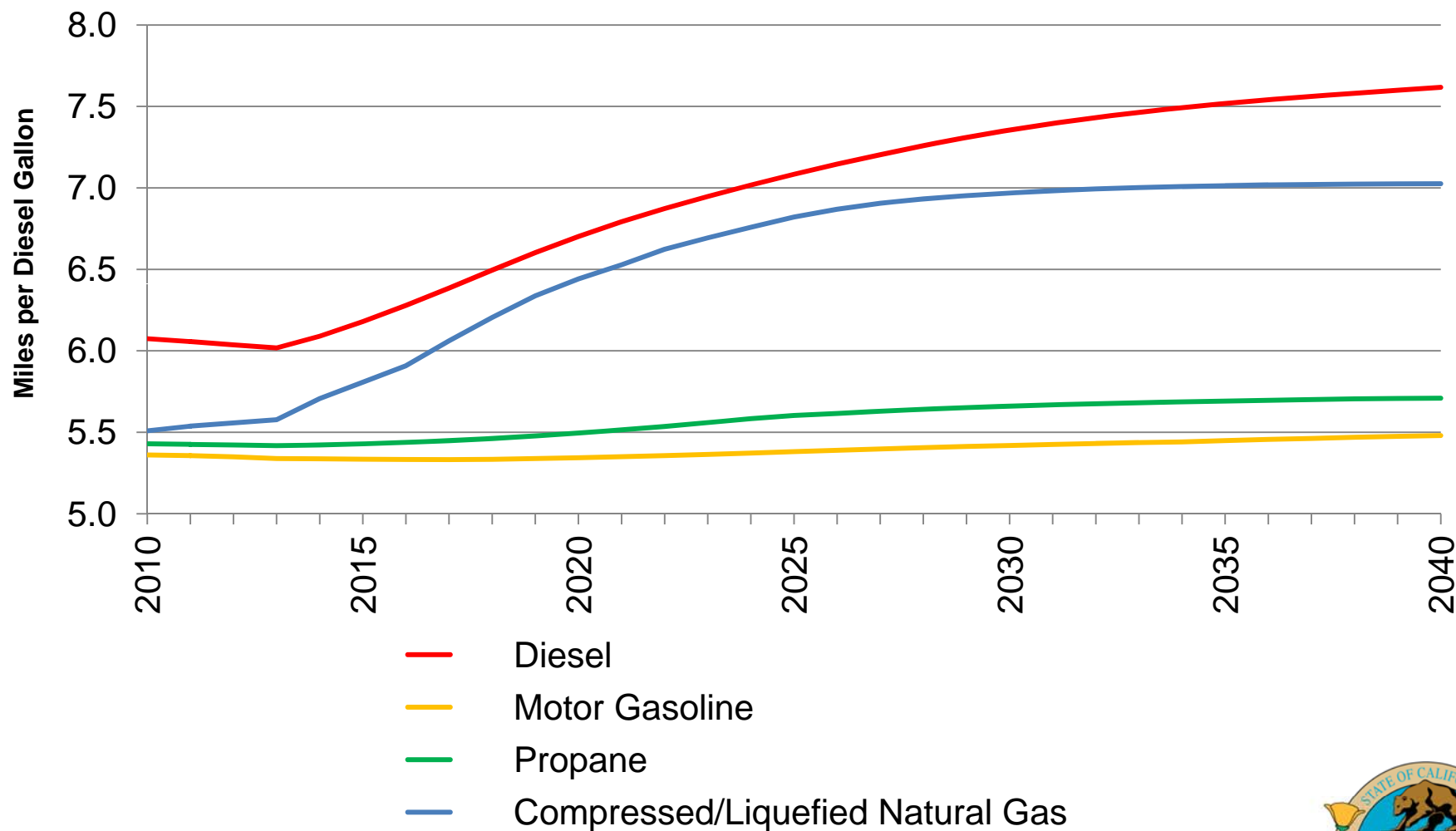
## Fuel Economy: New Heavy-Duty Natural Gas Truck



Source: Energy Information Administration, Annual Energy Outlook 2013



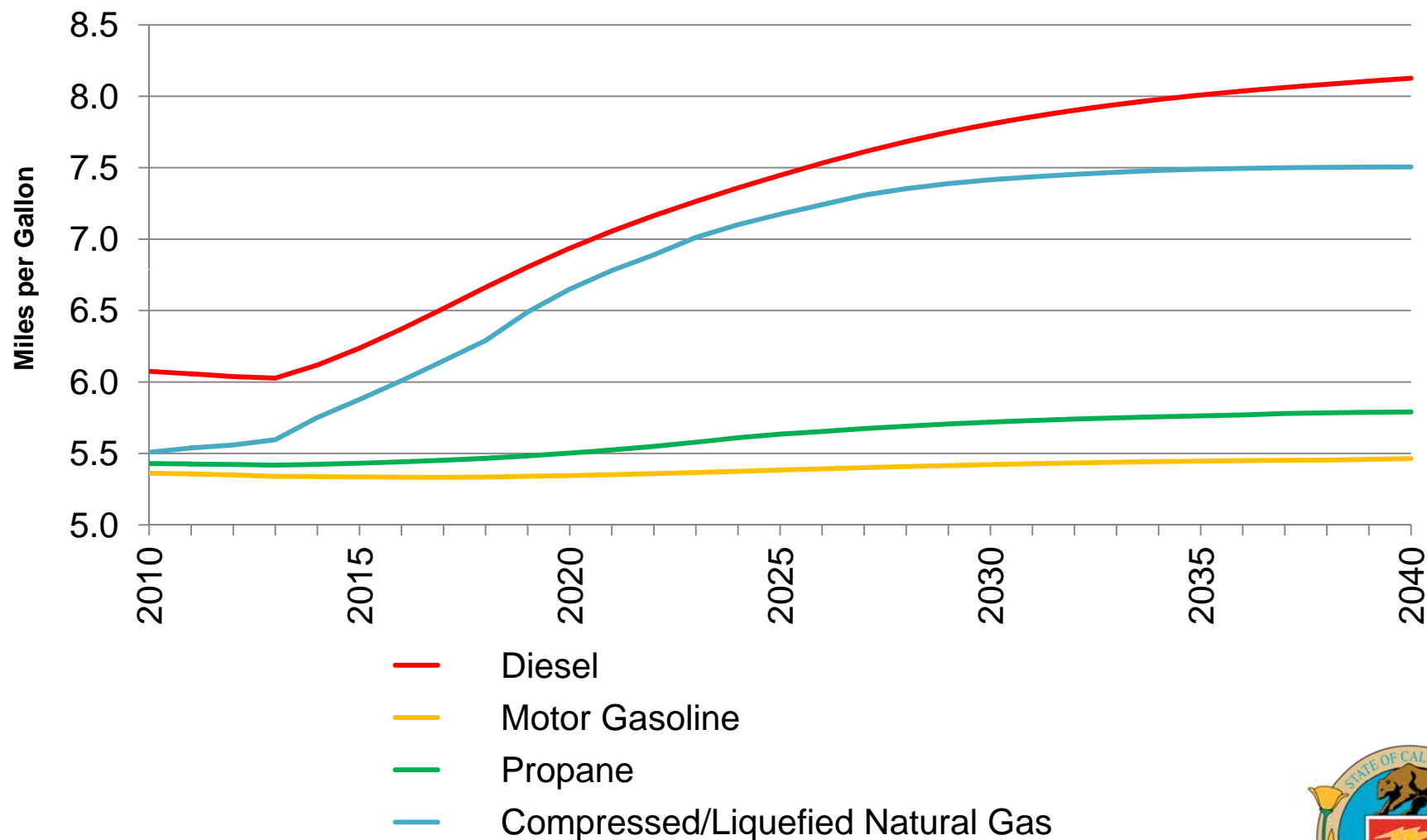
## Fuel Economy: Heavy-Duty Diesel Truck Fleet Reference Case



Source: Energy Information Administration, Annual Energy Outlook 2013



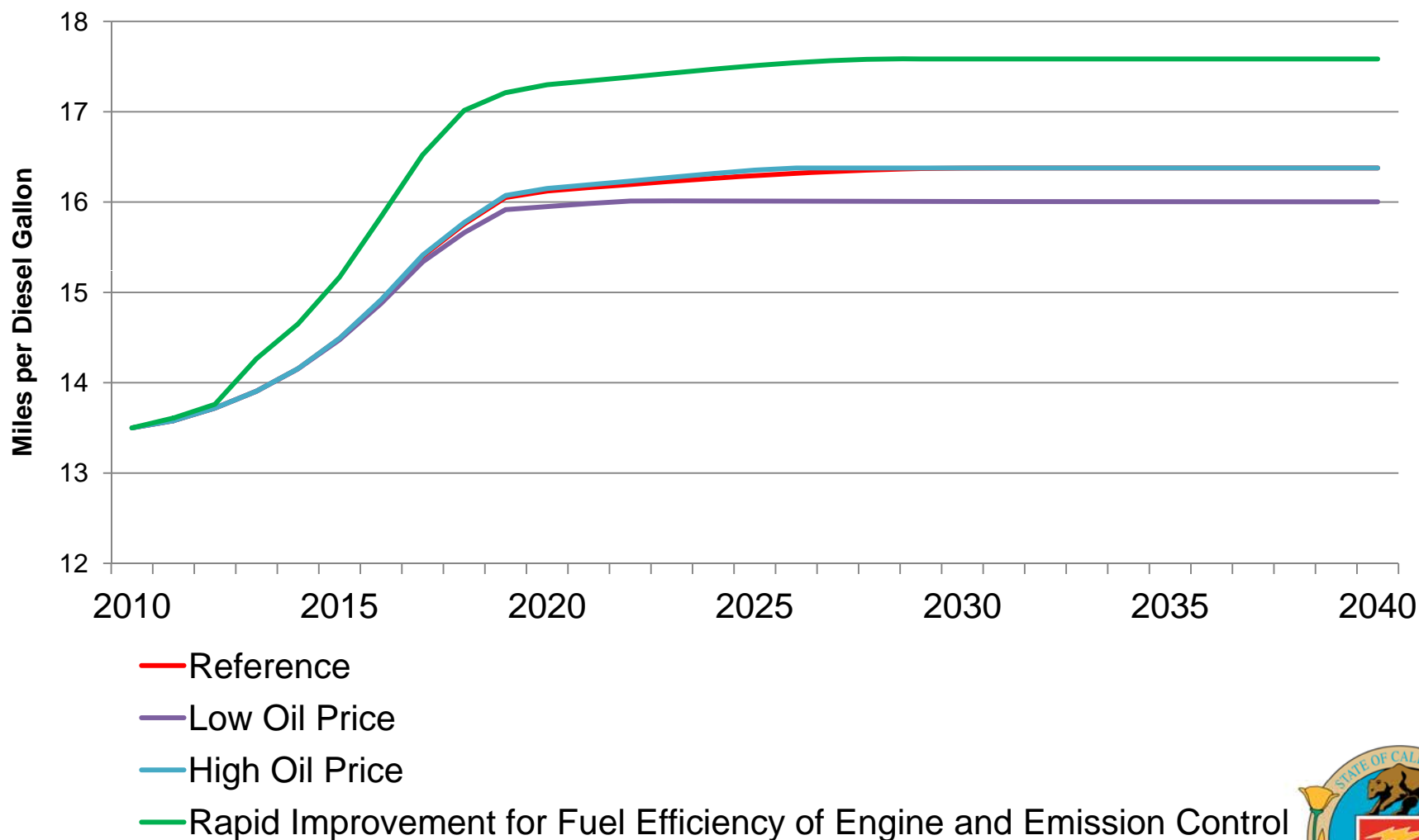
## Fuel Economy: Heavy-Duty Vehicle Fleet Rapid Improvement Case



Source: Energy Information Administration, Annual Energy Outlook 2013



## Fuel Economy: New Medium-Duty Diesel Truck

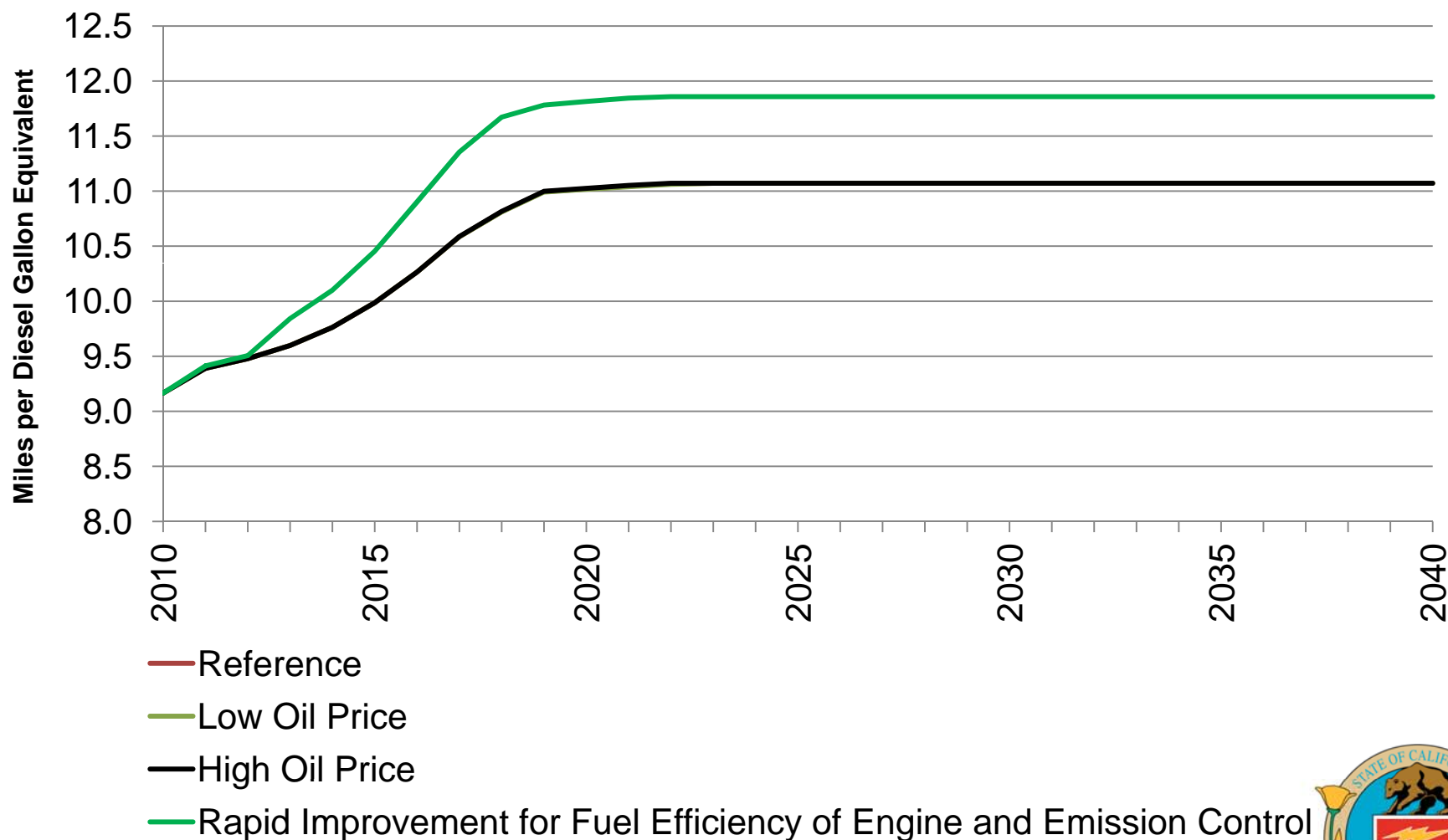


Source: Energy Information Administration, Annual Energy Outlook 2013





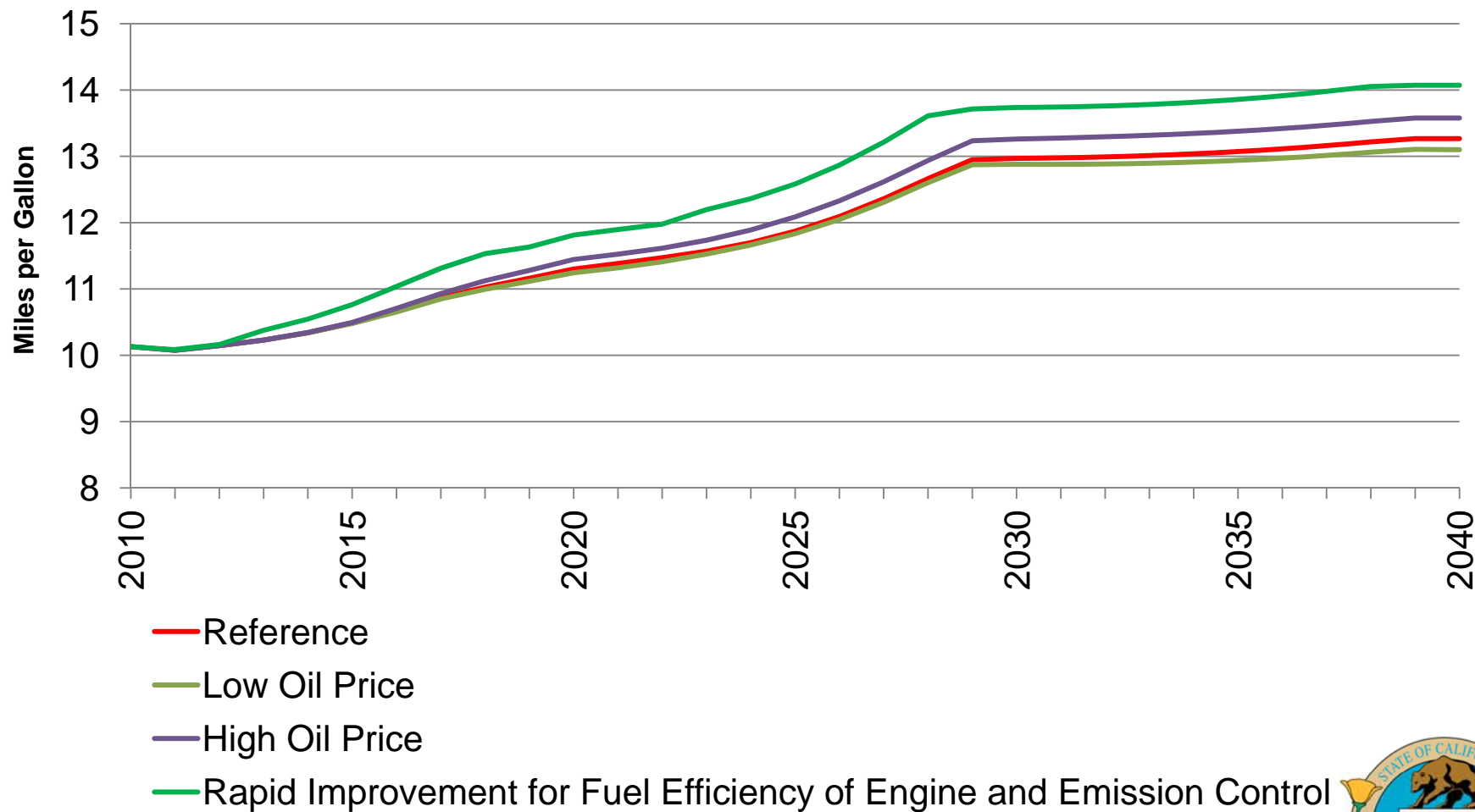
## Fuel Economy: New Medium-Duty Natural Gas Truck



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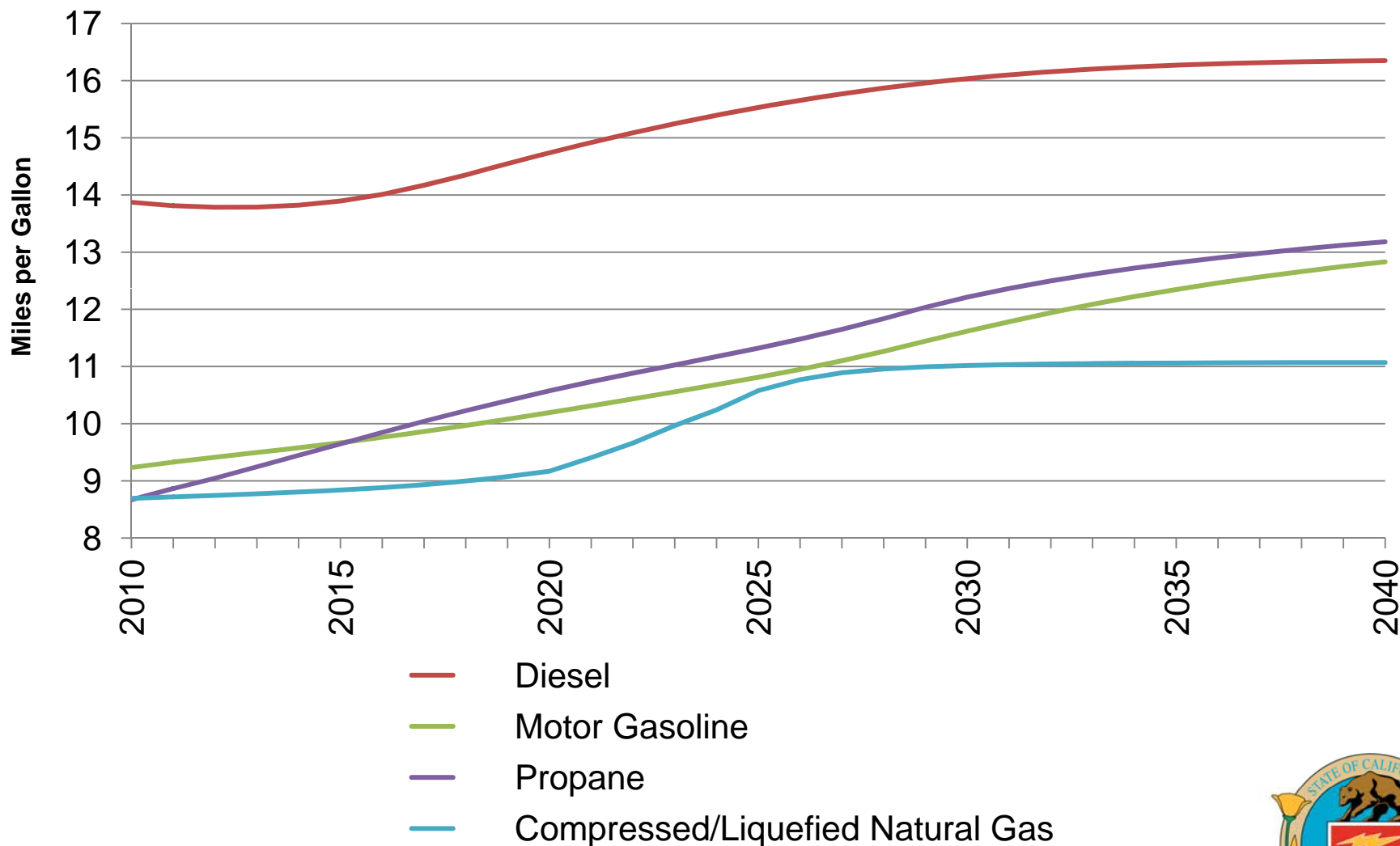
## Fuel Economy: New Medium-Duty Gasoline Truck



Source: Energy Information Administration, Annual Energy Outlook 2013



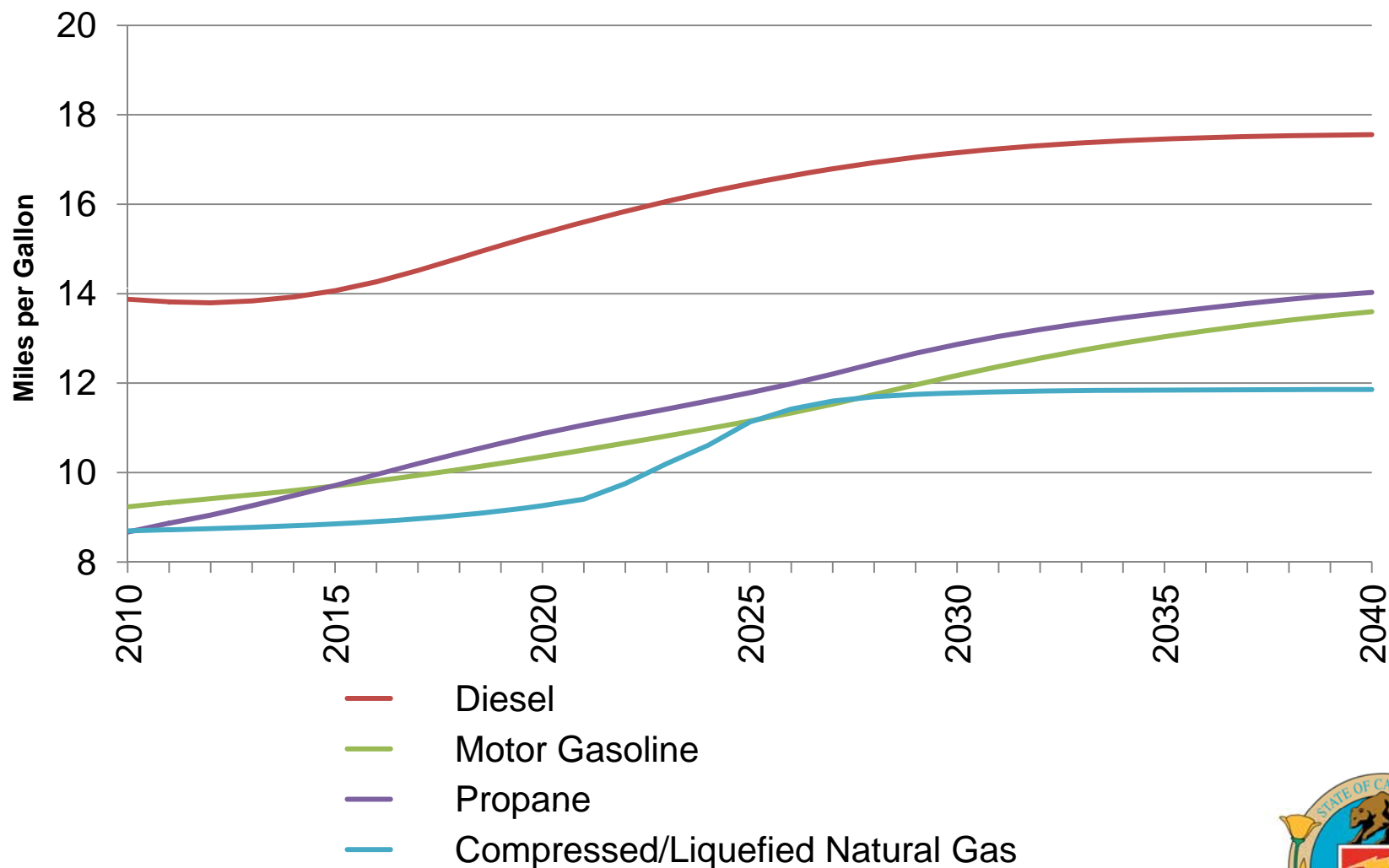
## Fuel Economy: Medium-Duty Truck Fleet Reference Case



Source: Energy Information Administration, Annual Energy Outlook 2013



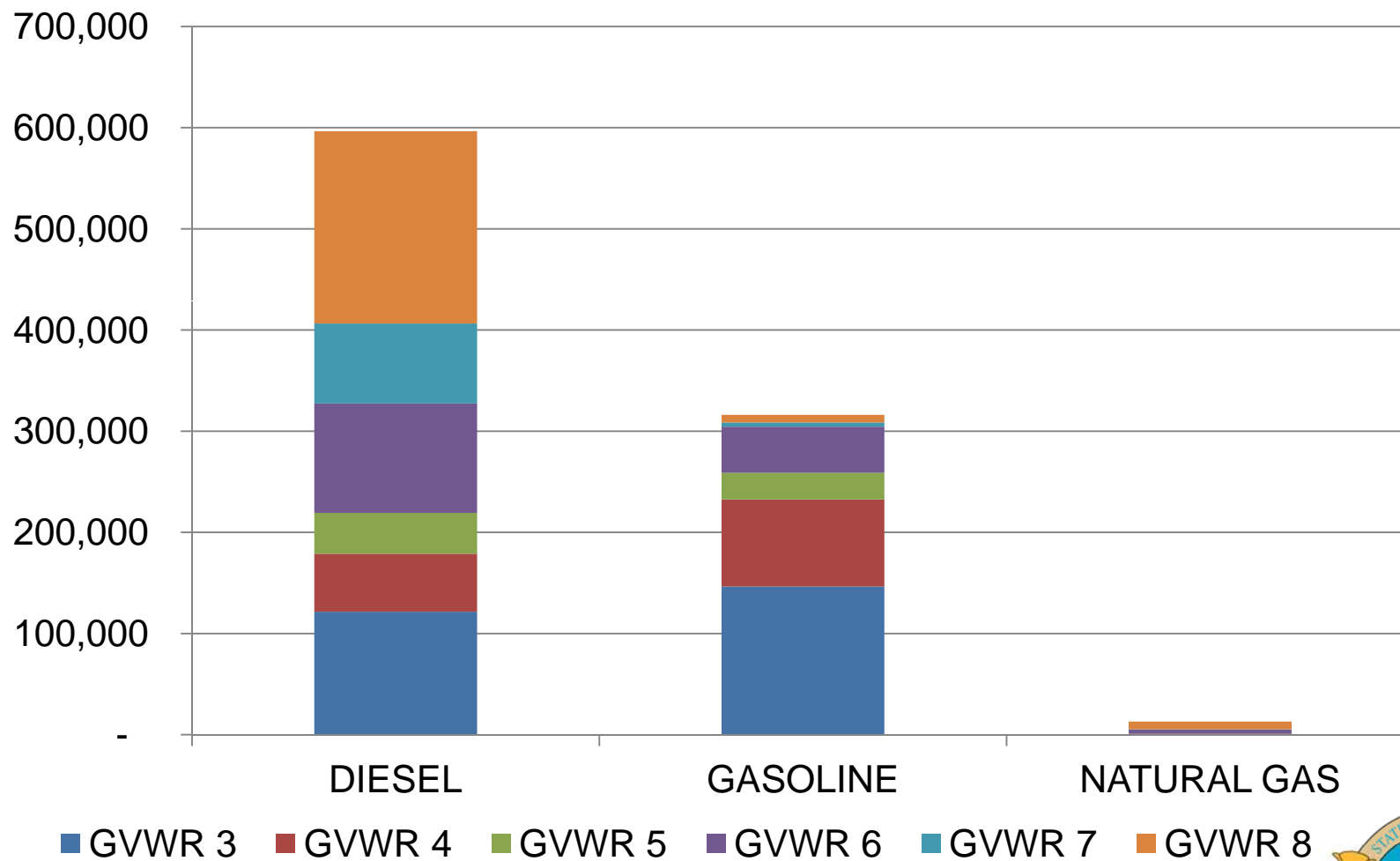
## Fuel Economy: Medium-Duty Vehicle Fleet Rapid Improvement Case



Source: Energy Information Administration, Annual Energy Outlook 2013



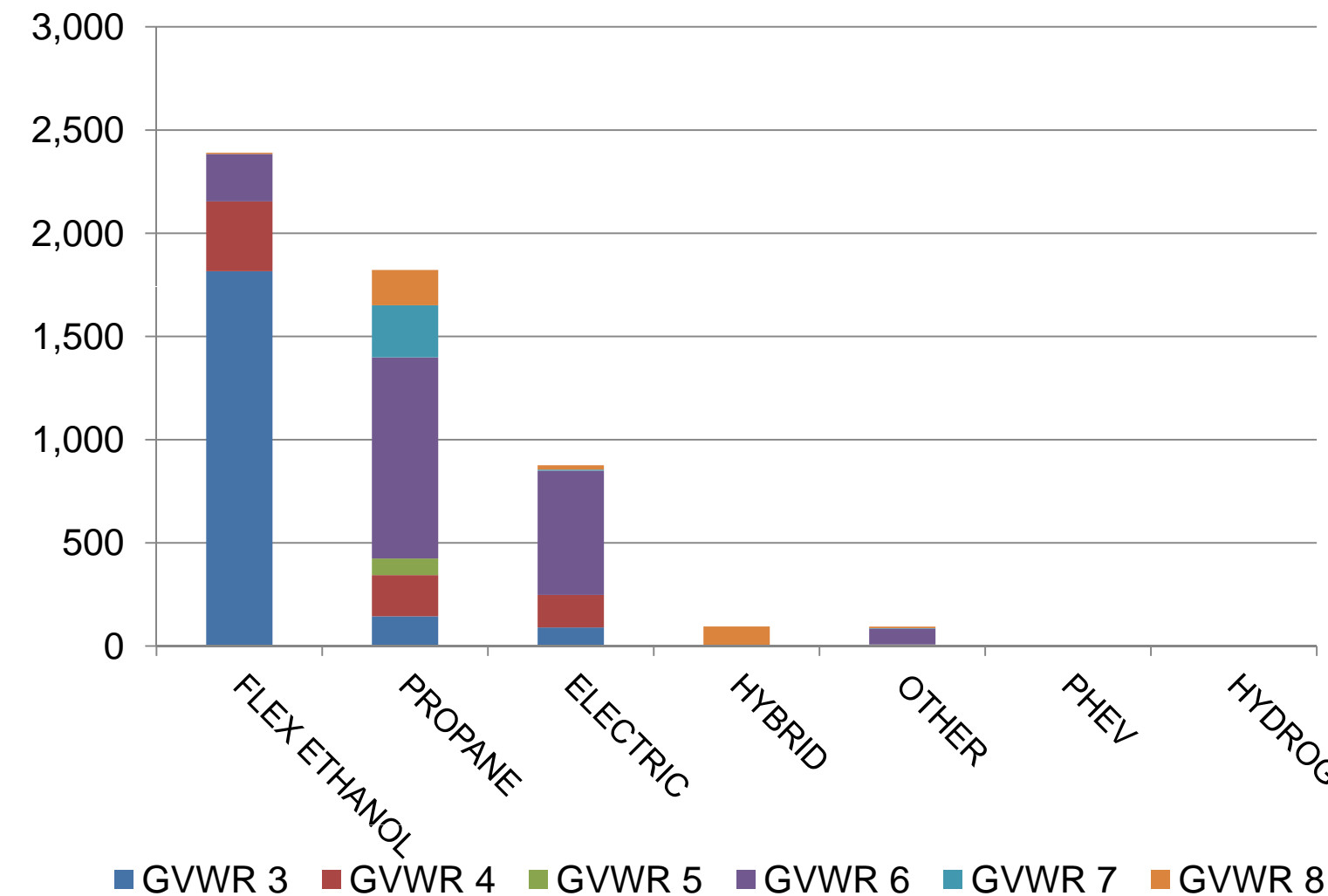
## Medium and Heavy-Duty Vehicles Registered in California



Source: CEC analysis of California DMV data



## (More) Medium and Heavy-Duty Vehicles Registered in California



Source: CEC analysis of California DMV data

