Annual Energy Outlook 2011: The Long-Term Outlook for Transportation

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National Conference of State Legislatures Task Force on Energy Supply

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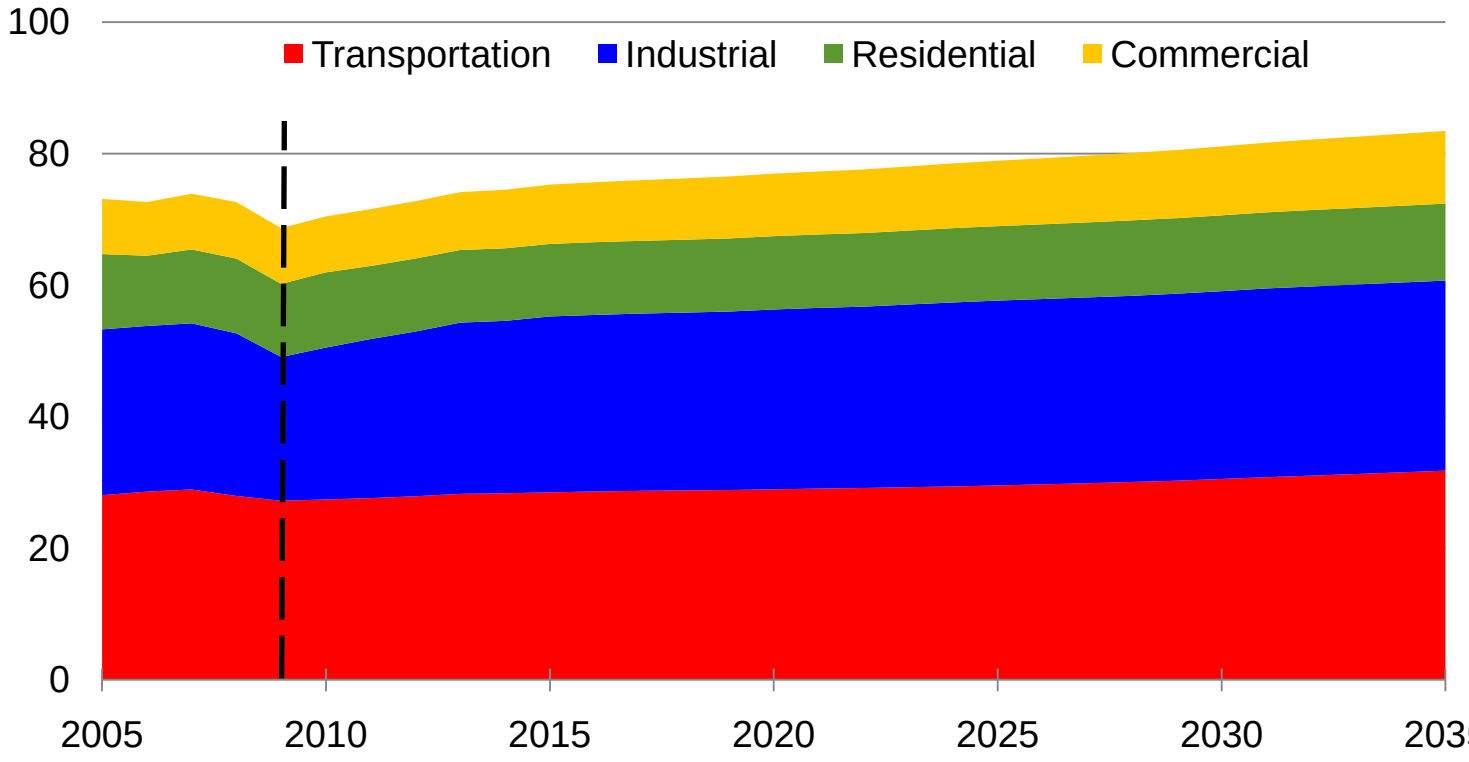
The *Annual Energy Outlook* 2011

- Focus on the factors that shape U.S. energy through 2035
- Reference case is a business-as-usual trend estimate, using known technology and technological and demographic trends, and is prepared under the assumption that current laws and regulations generally remain unchanged throughout the projection period
- The *Annual Energy Outlook* 2011 includes 57 side/sensitivity cases, such as:
  - Potential impact of more stringent light-duty vehicle fuel economy and greenhouse gas emissions standards 2017 to 2025 and for heavy-duty trucks
  - High and low world oil price, high and low macroeconomic growth, etc.

Transportation sector a major consumer of energy

delivered energy consumption, quadrillion Btu

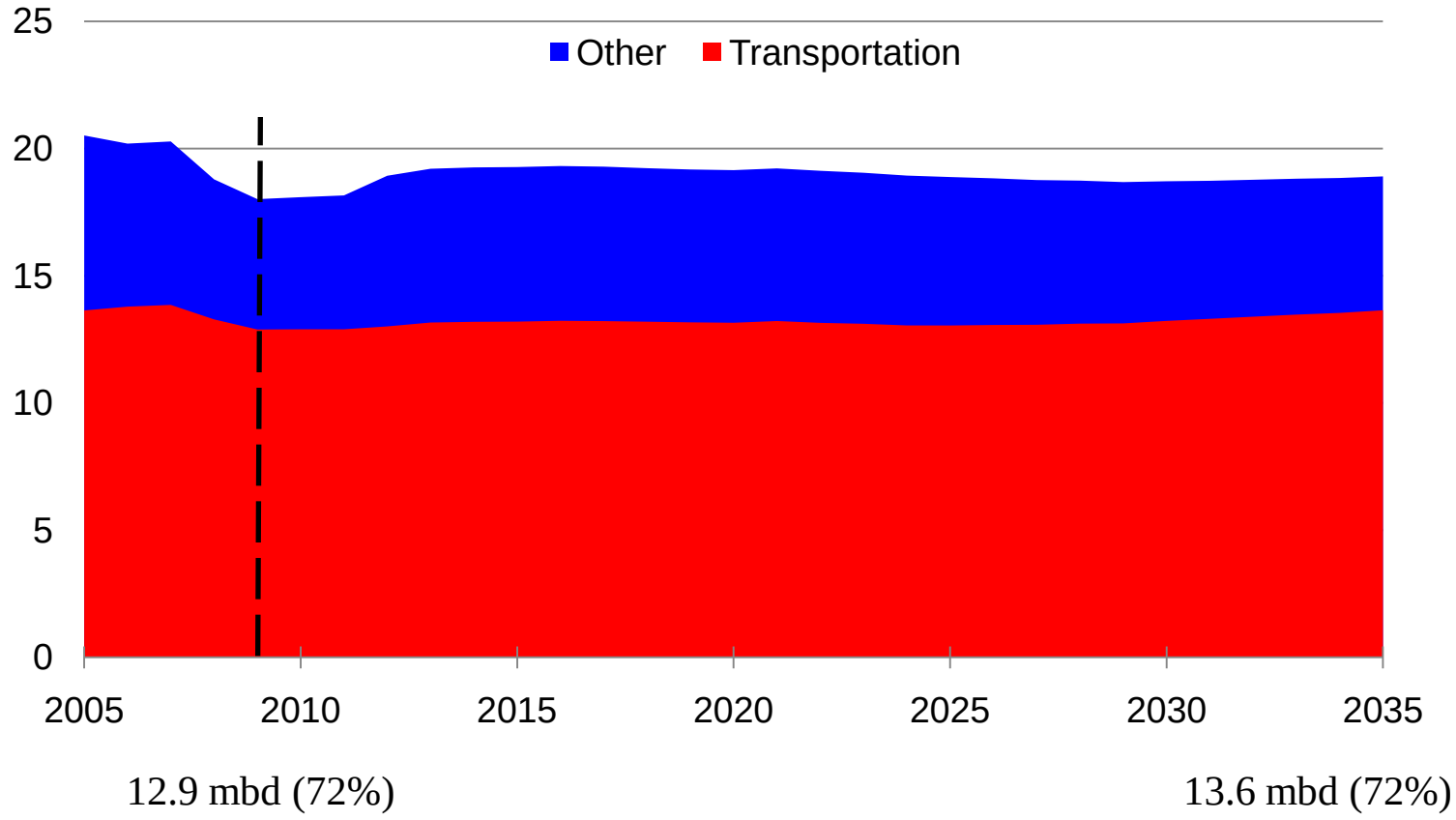


27.2 quads (40%)

31.8 quads (38%)

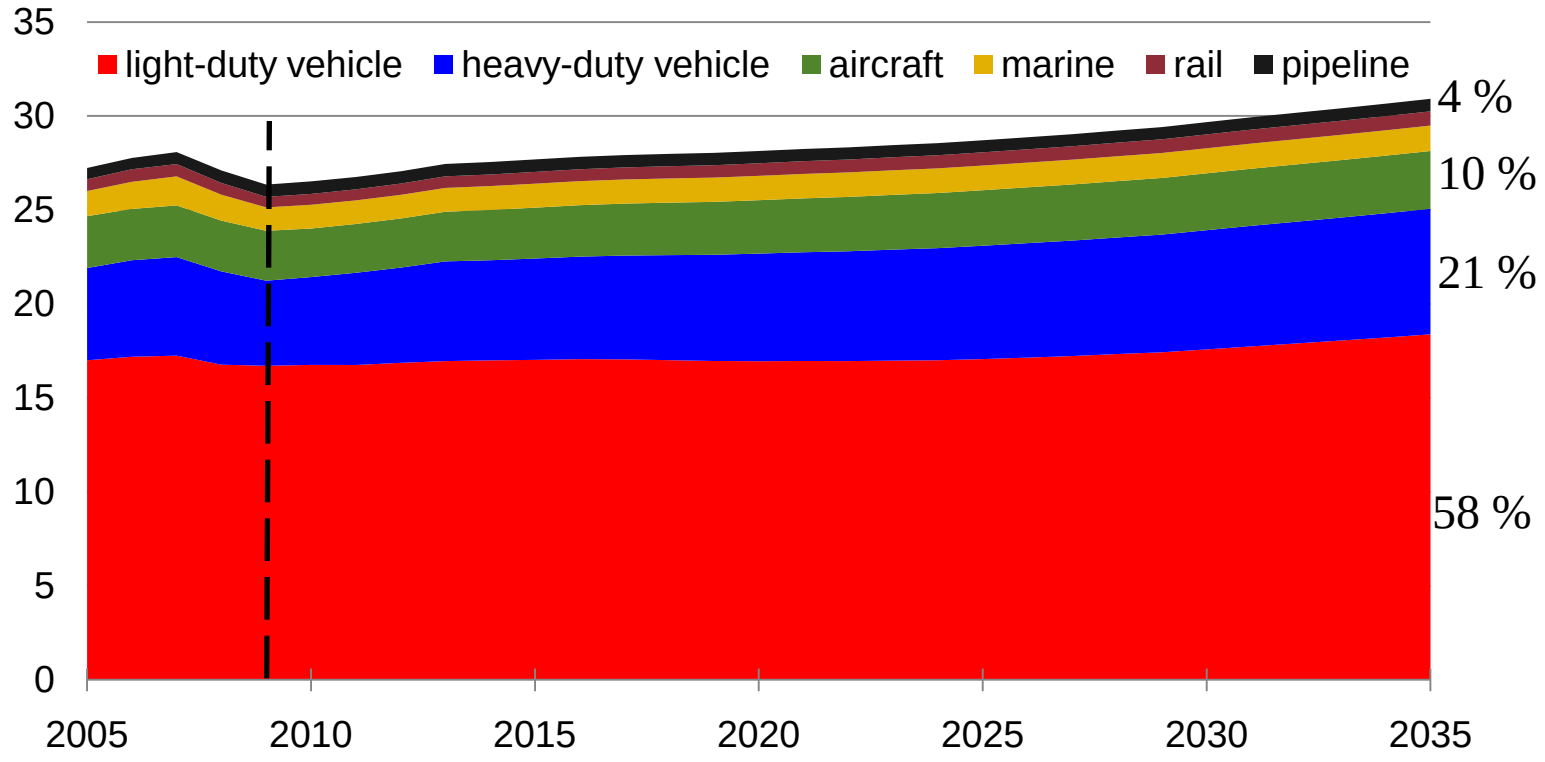
Transportation sector the largest consumer of petroleum

petroleum consumption, million barrels per day



Light-duty vehicles dominate transportation consumption

delivered energy consumption, quadrillion Btu

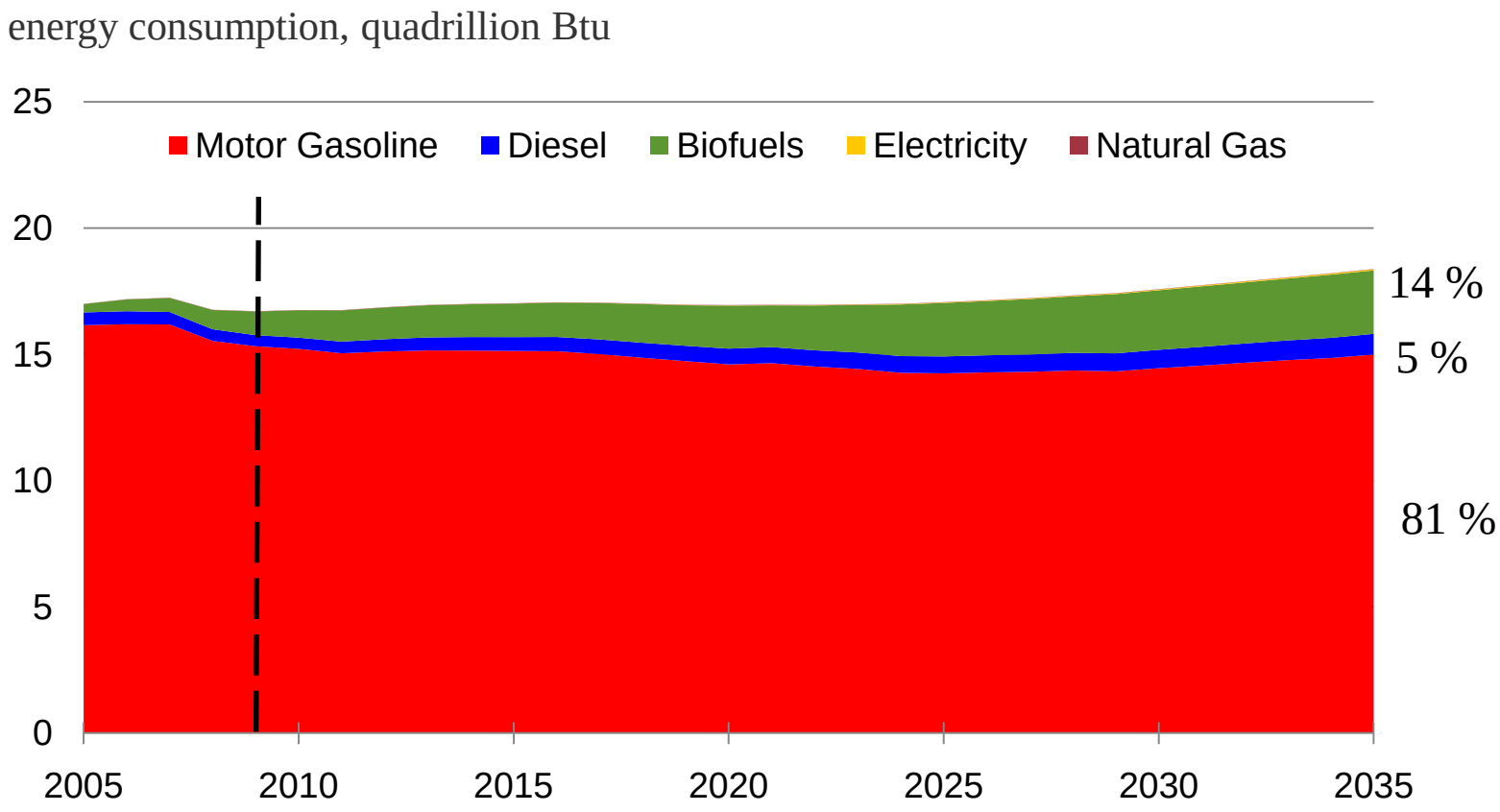


Fuel economy improvements partially offset underlying drivers of growth in transportation demand

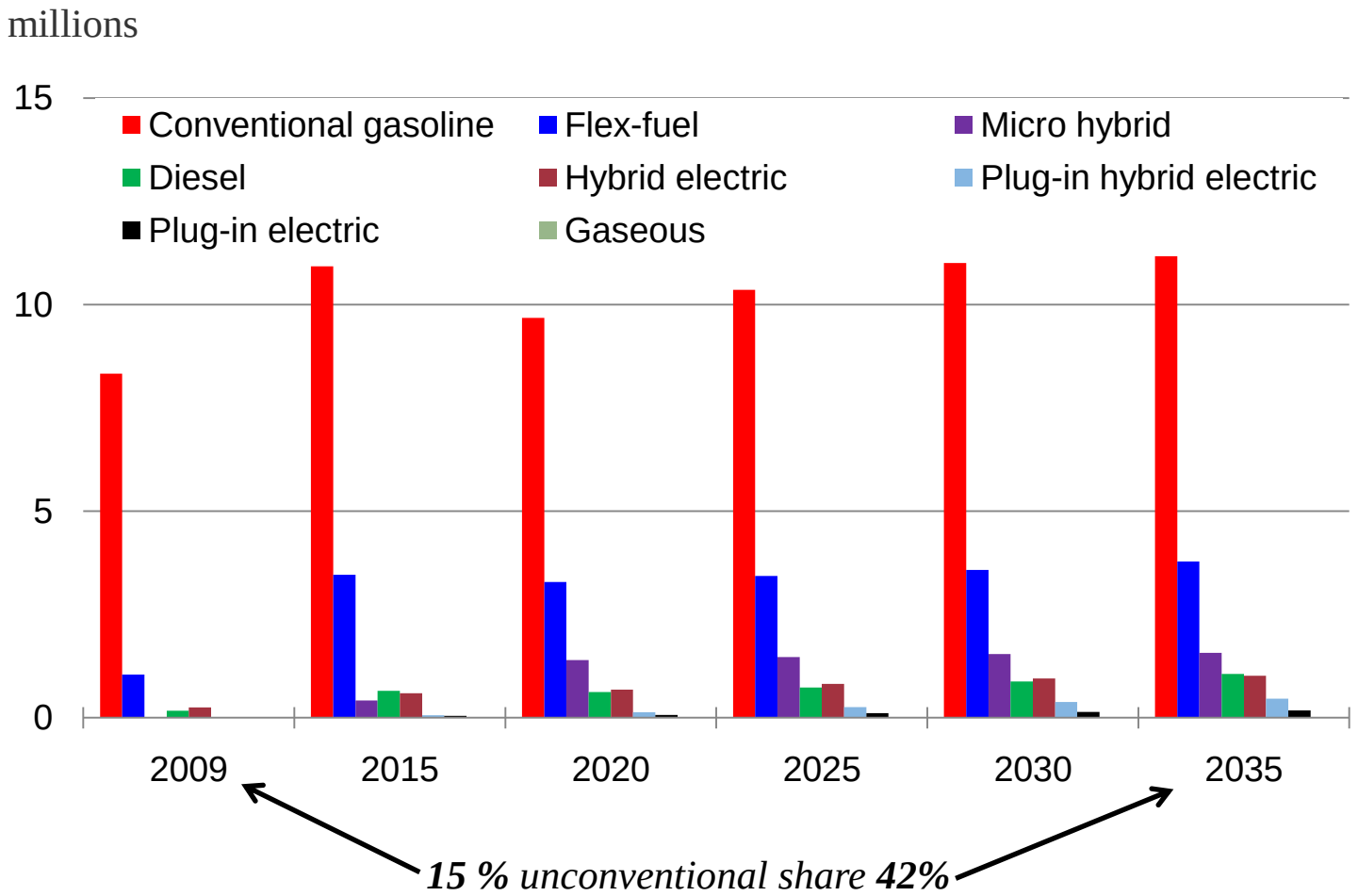
	2009	2035	Growth (2009-2035)
Light duty vehicles			
Fuel consumption (quadrillion Btu)	17.0	18.4	8%
Number of licensed drivers (millions)	207	265	28%
Miles per licensed driver	13,100	15,300	17%
Fuel economy of vehicle stock (mpg)	20.8	27.9	34%*
Heavy duty vehicles			
Fuel consumption (quadrillion Btu)	4.9	6.8	39%
Manufacturing output (billion 2005 dollars)	4,197	6,770	61%
Number of freight trucks (millions)	8.7	16.6	90%
Miles per vehicle	23,700	20,200	-15%
On-road fuel economy of vehicle stock (mpge)	6.1	6.6	9%**

** Equal to a 25% reduction in fuel use per mile. ** Equal to an 8% reduction in fuel use per mile.*

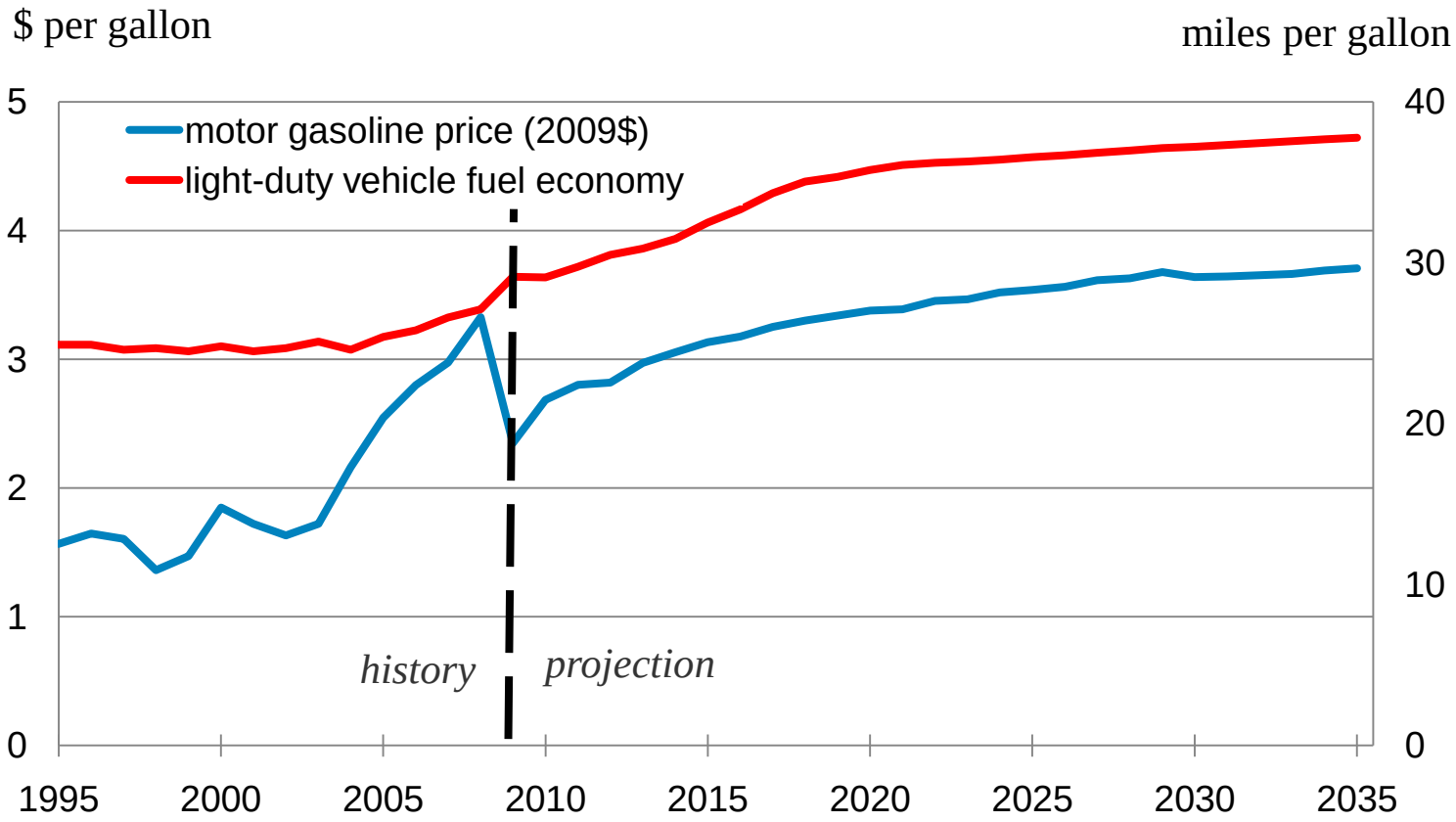
Petroleum products account for vast majority of light-duty vehicle energy consumption



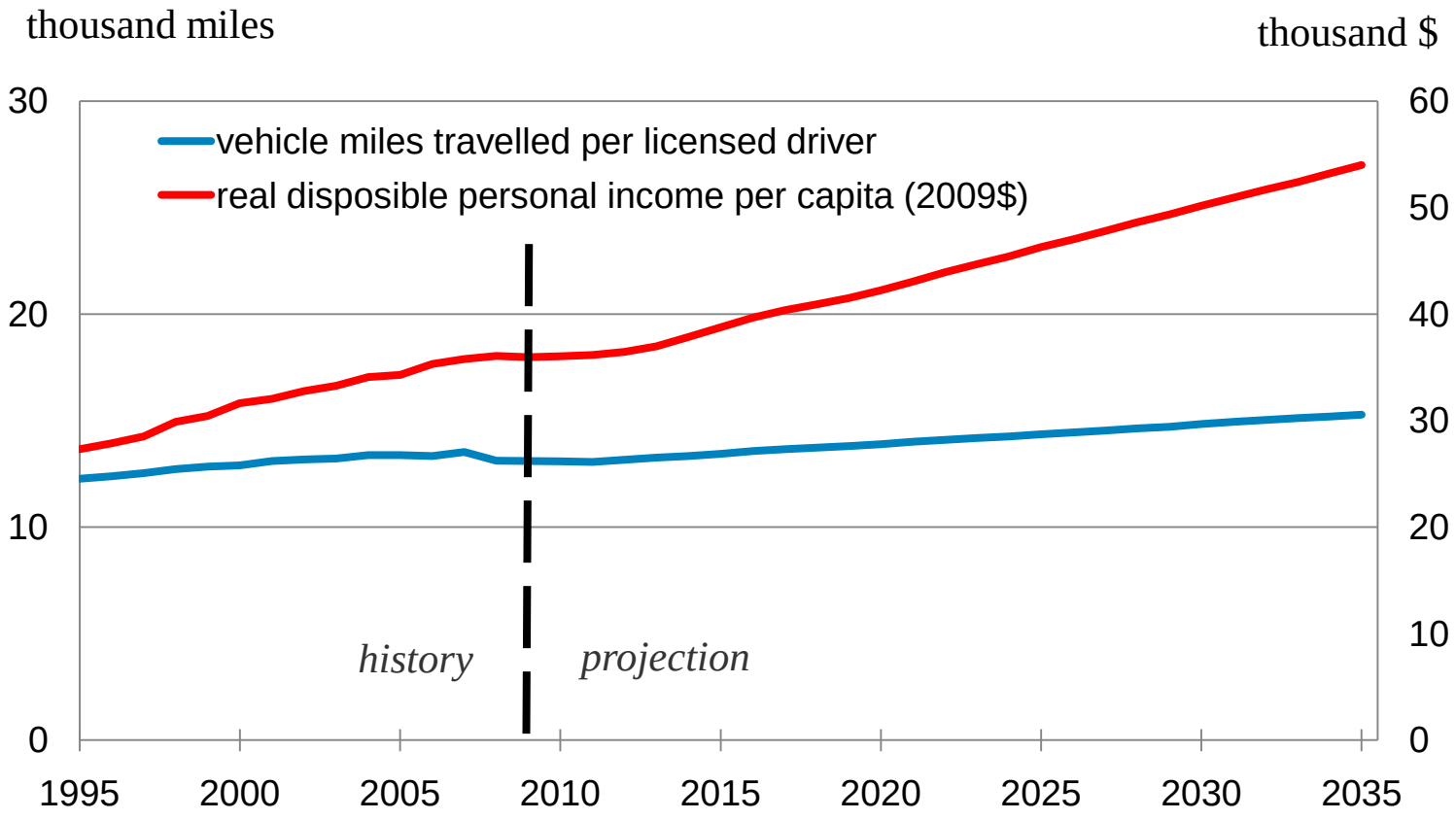
New light-duty vehicle sales



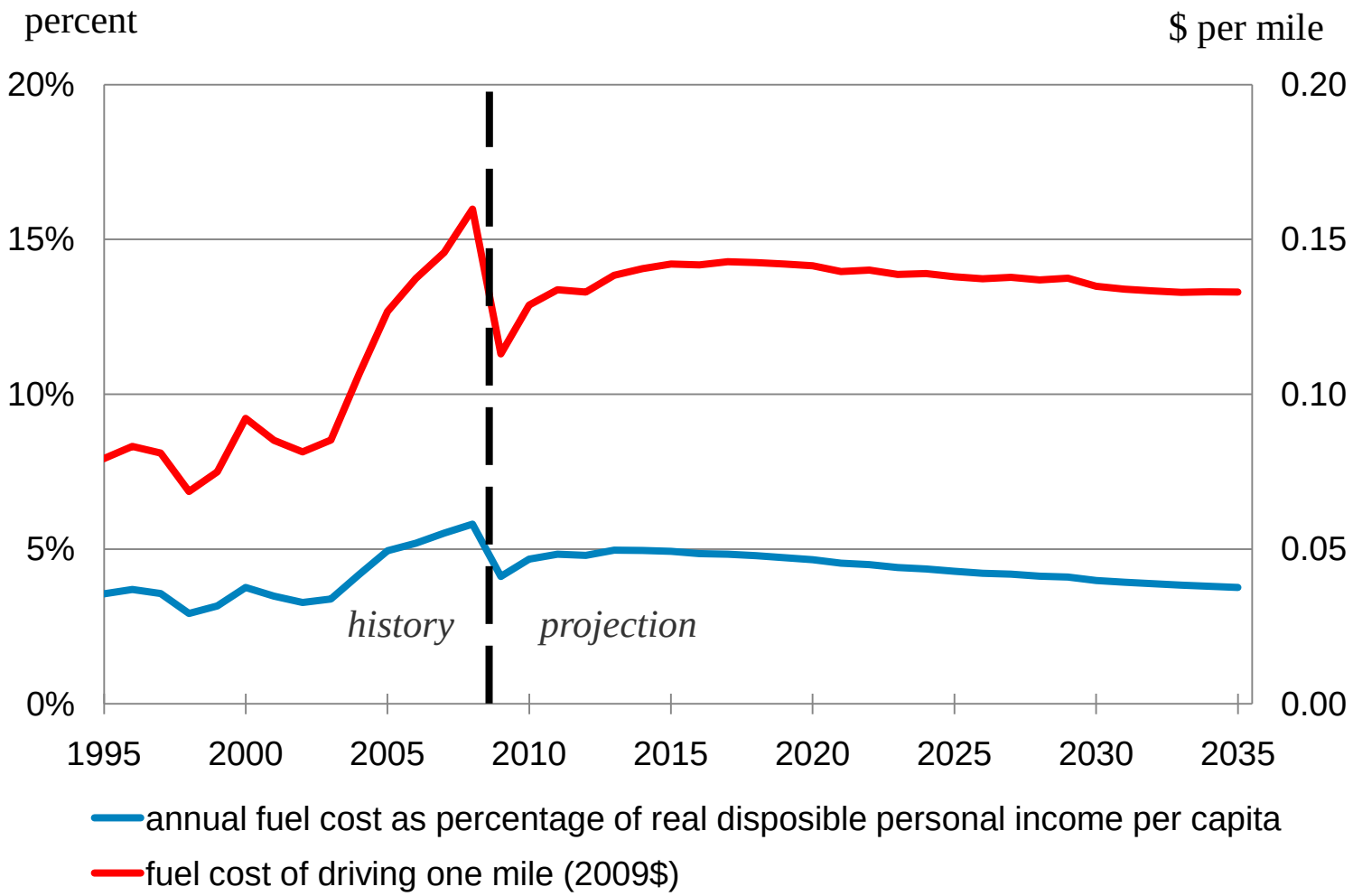
Major factors impacting light-duty energy demand (I)



Major factors impacting light-duty energy demand (II)



Major factors impacting light-duty energy demand (III)



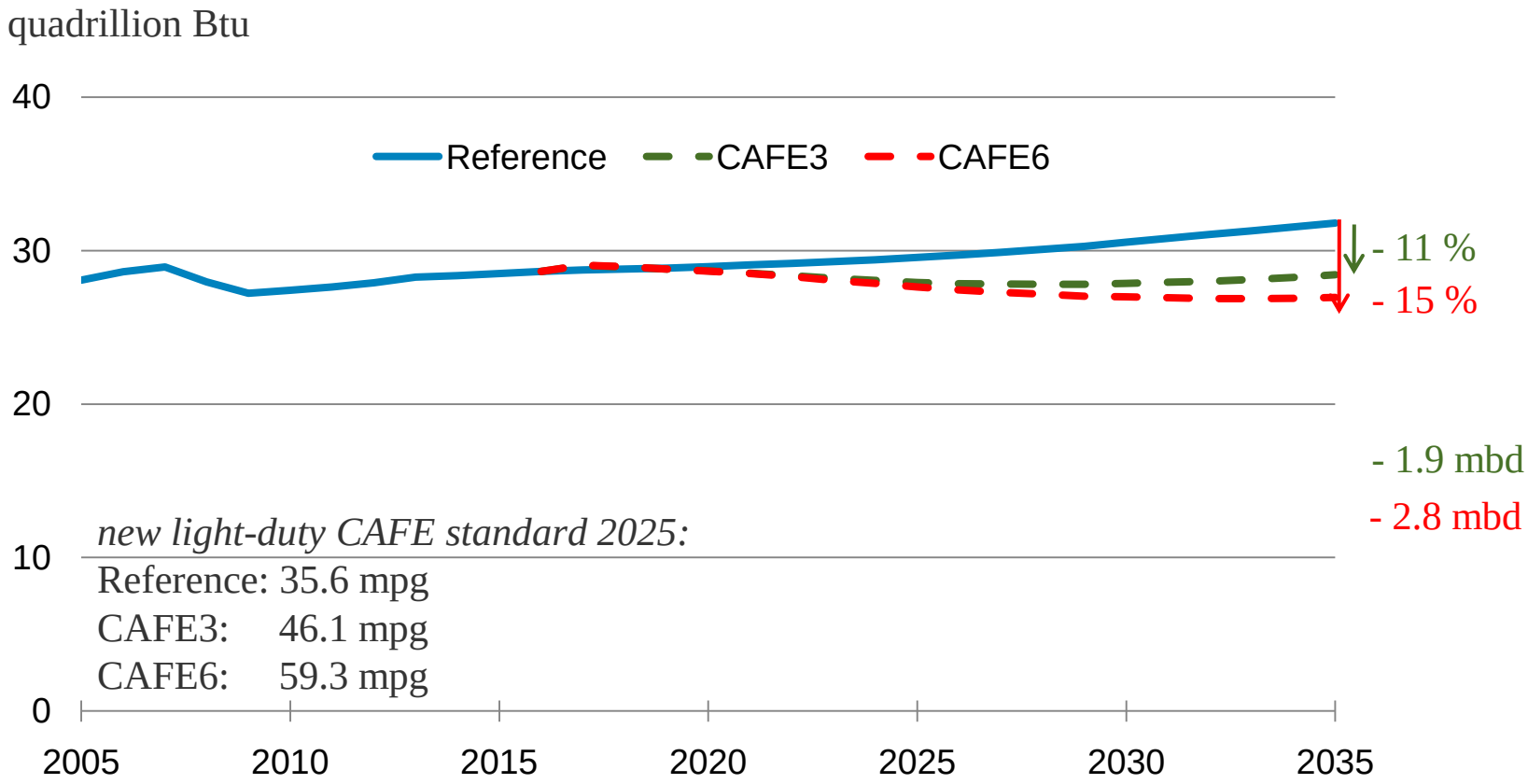
Uncertainty

- Fuel price (High and Low World Oil Price cases)
  - Fuel price significantly impacts the economic decision making between fuel choices
  - Relative fuel price spread
- Cost and effectiveness of technology (High and Low Tech)
  - Future cost of technologies
    - Batteries
    - Game changers?
- Consumer acceptance
  - Diminishing returns for fuel economy improvement
  - Early adopters
  - Uncertainty and consumer decision making (risk aversion and range anxiety)
  - Infrastructure

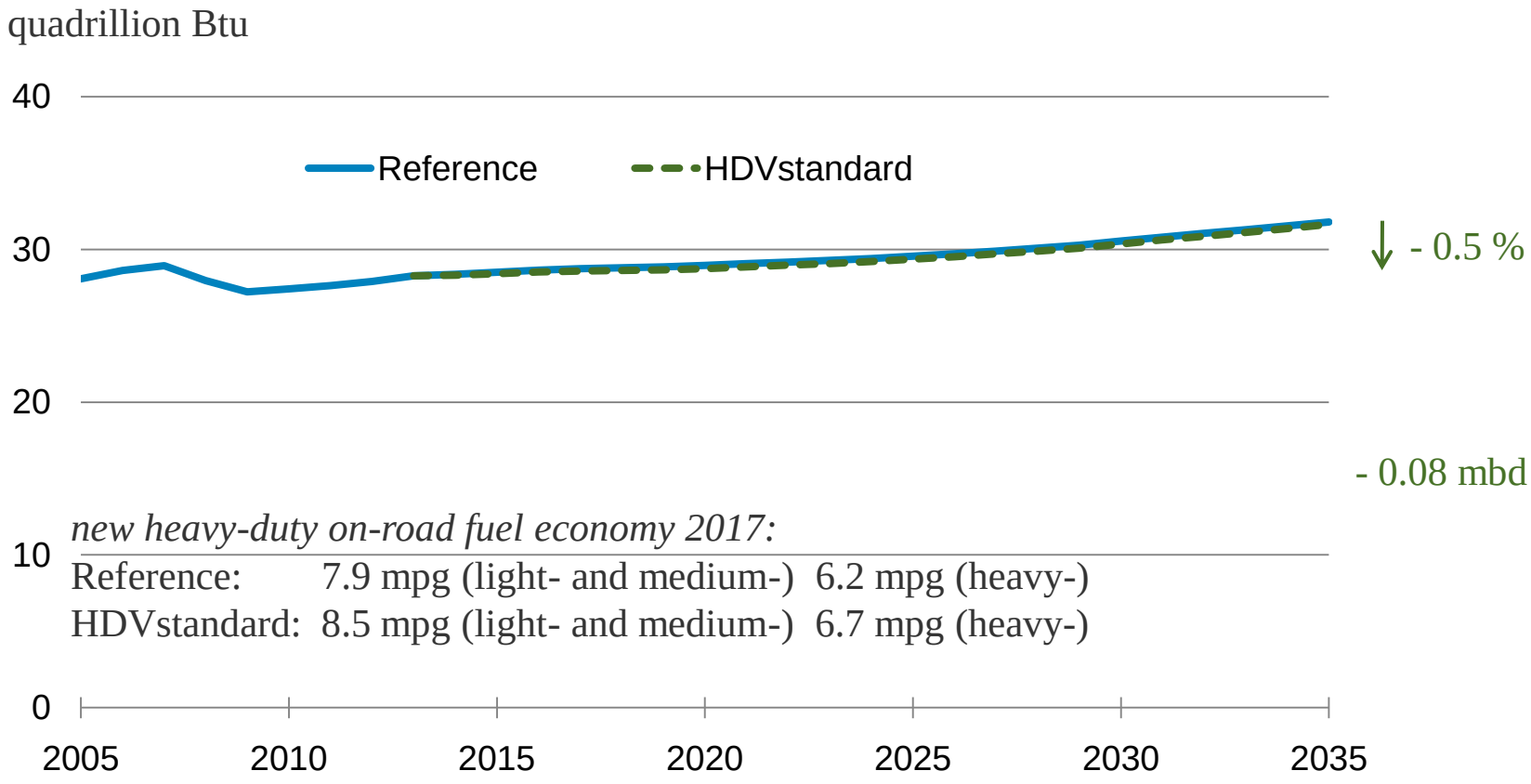
Policy uncertainty scenarios in transportation

- Light-duty vehicle increased fuel economy and greenhouse gas emissions standards, 2017 – 2025
  - 3 % annual increase in standards stringency
  - 6 % annual increase in standards stringency
- Heavy-duty vehicle fuel consumption and greenhouse gas emissions standards, 2014 – 2017
  - Light- and medium-heavy duty 8 % increase in on-road fuel economy
  - Heavy-heavy duty 10 % increase in on-road fuel economy
- Heavy-duty vehicle natural gas incentives, *Annual Energy Outlook* 2010
  - Vehicle, fuel, and infrastructure incentive; ‘expanded market potential’

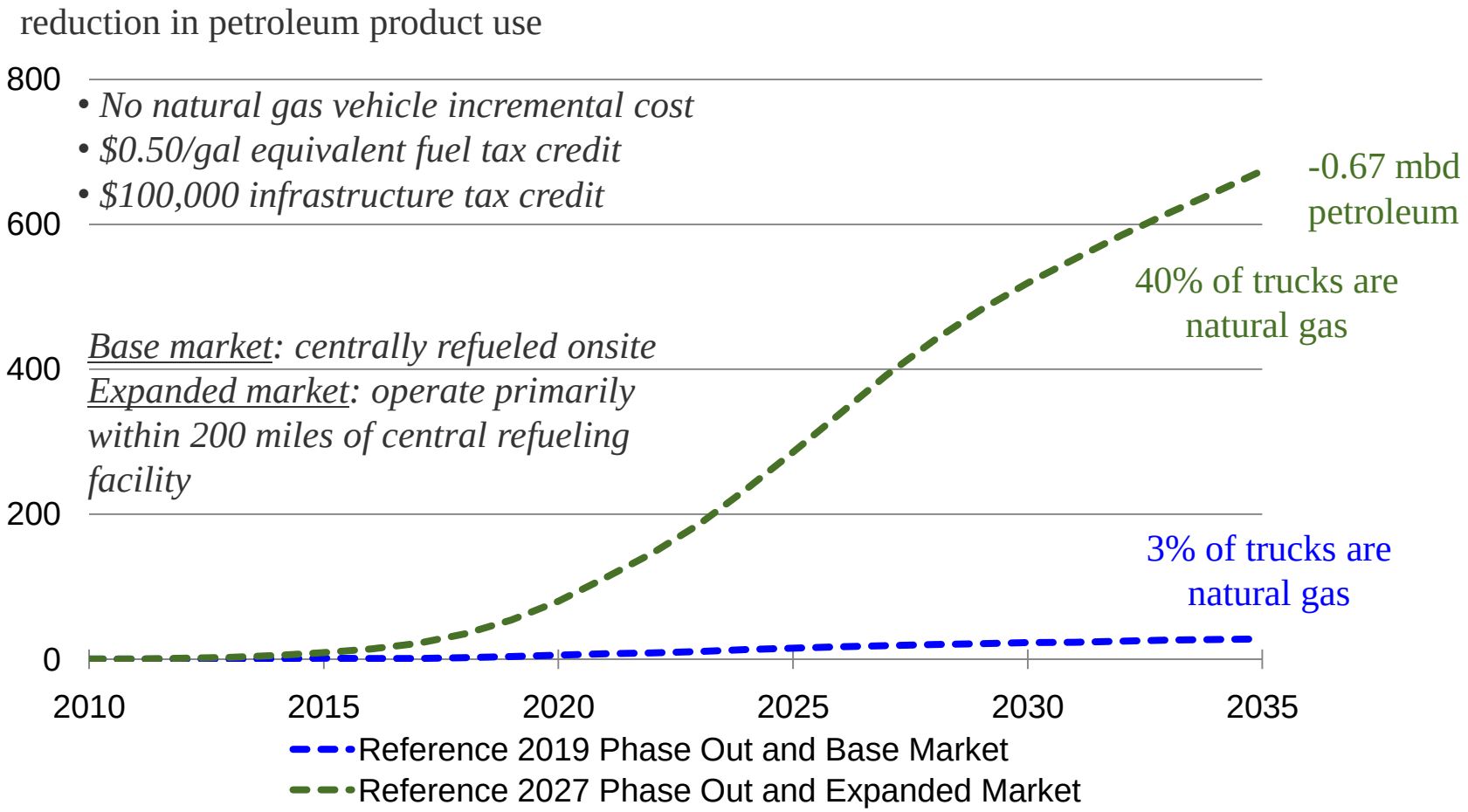
More stringent fuel economy standards reduce transportation energy consumption



Heavy-duty truck energy consumption declines due to fuel consumption standards



(2010) Incentives can increase natural gas use in heavy trucks under 'expanded market' case



Questions?

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