



Natural Gas in Transportation

Transportation Research Board 93rd Annual Meeting

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This presentation includes forward-looking statements. Actual future conditions (including economic conditions, energy demand, and energy supply) could differ materially due to changes in technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein and under the heading "Factors Affecting Future Results" in the Investors section of our website at: www.exxonmobil.com. The information provided includes ExxonMobil's internal estimates and forecasts based upon internal data and analyses as well as publically-available information from external sources including the International Energy Agency. This material is not to be used or reproduced without the permission of Exxon Mobil Corporation. All rights reserved.

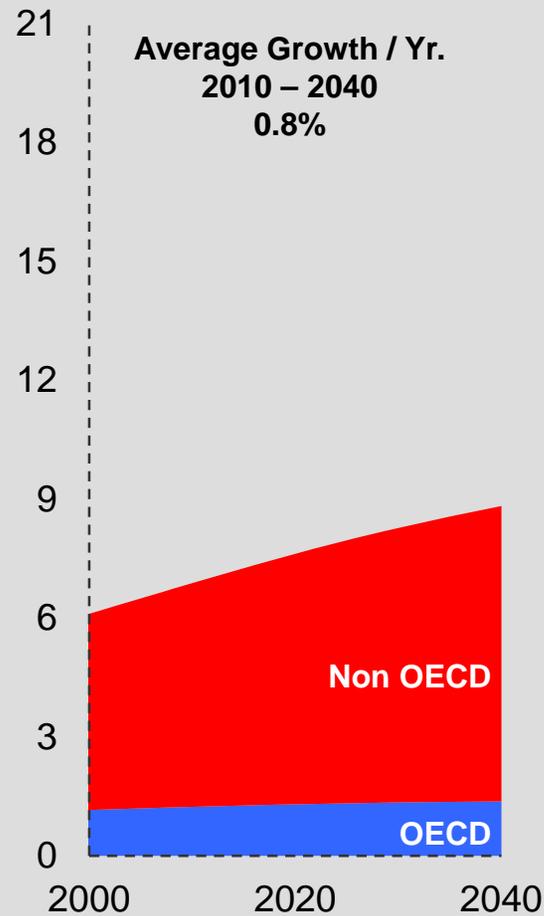


Global Drivers and Trends

Global Progress Drives Demand

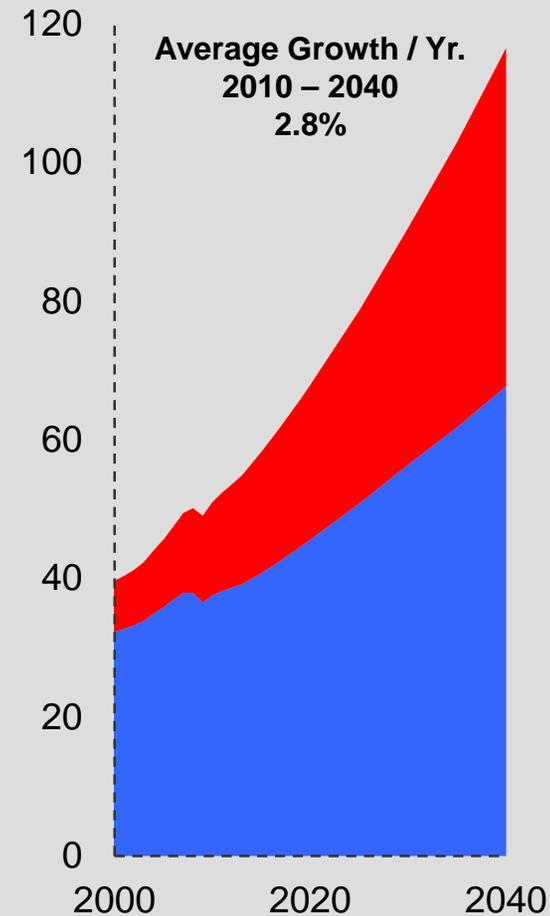
Population

Billion



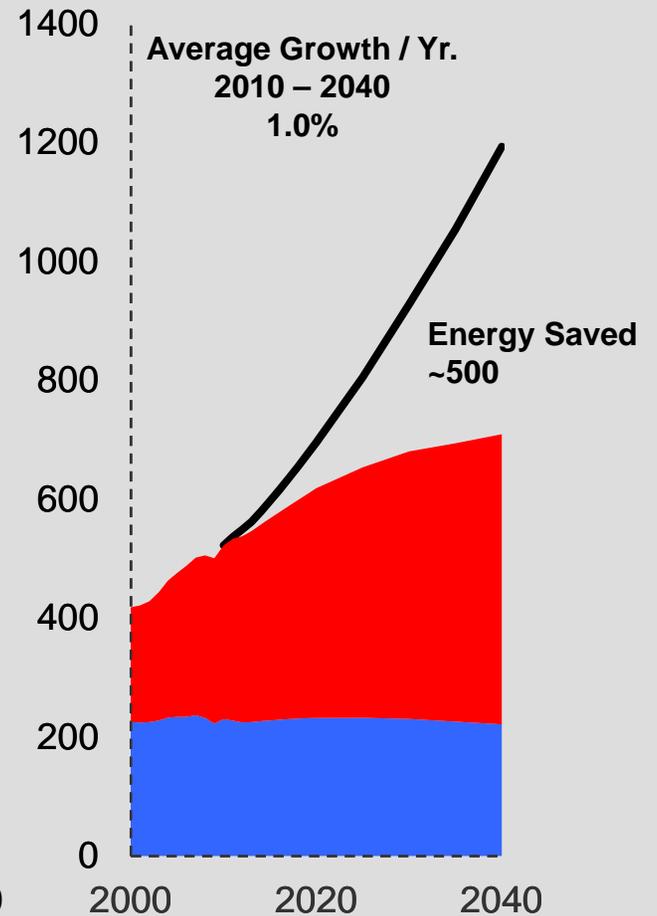
GDP

Trillion 2005\$



Energy Demand

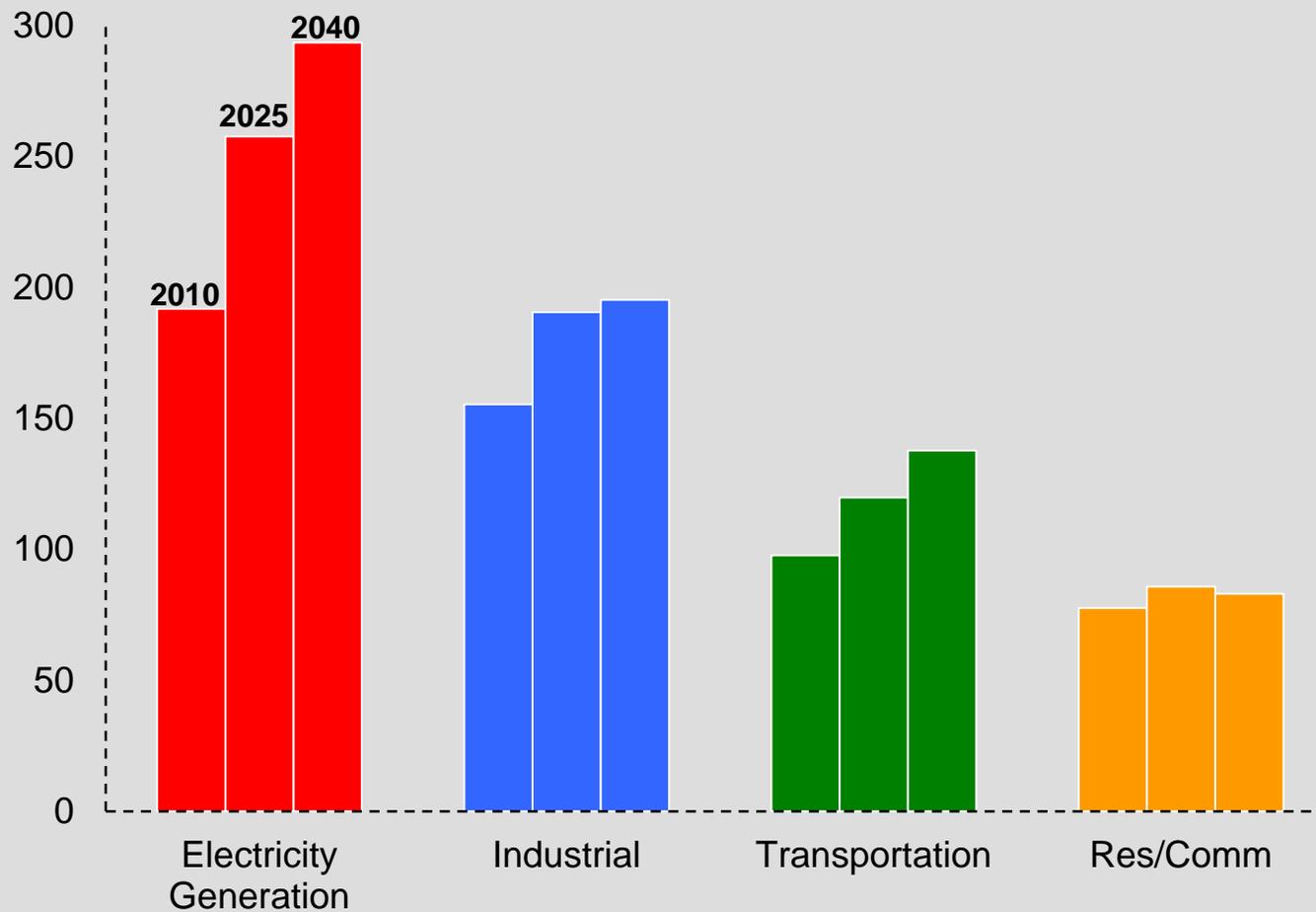
Quadrillion BTUs



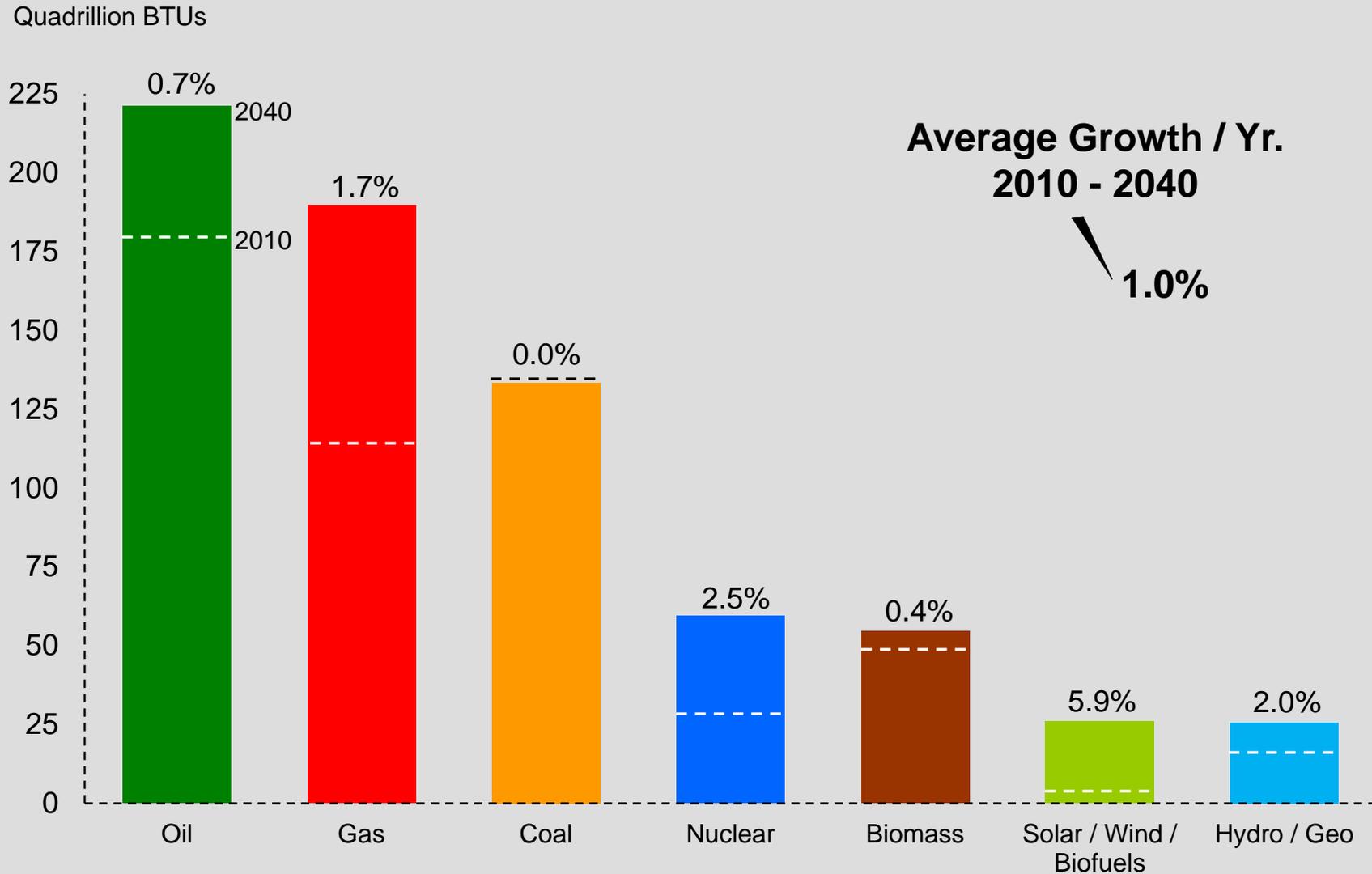
Electricity Generation Leads Growth

Energy Demand by Sector

Quadrillion BTUs



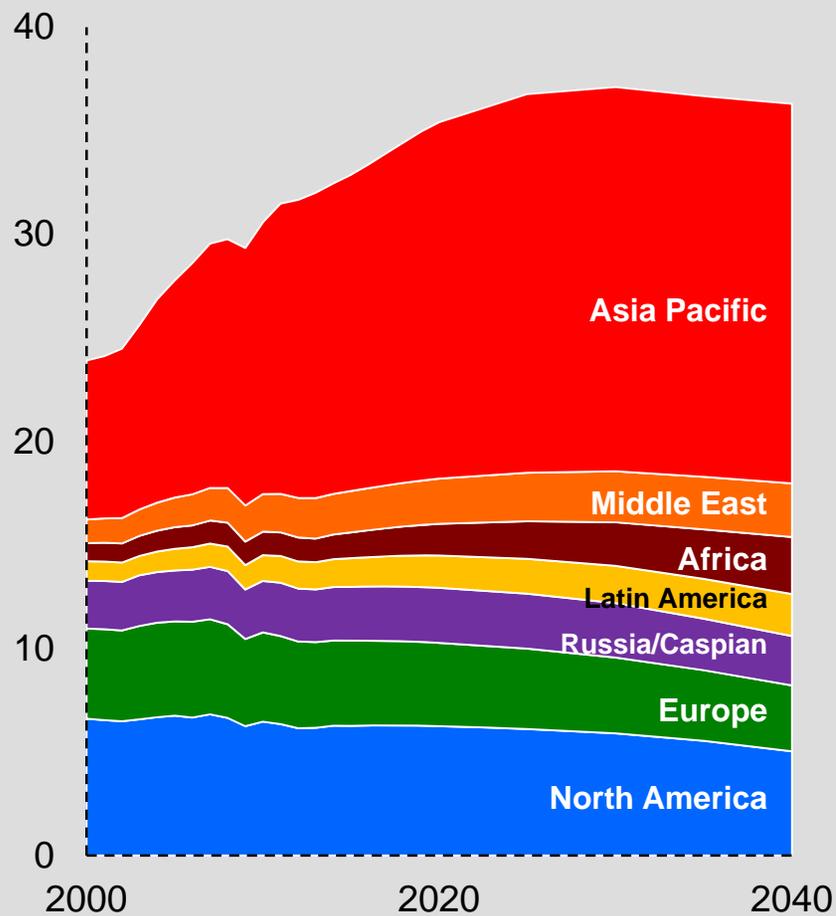
Energy Mix Continues to Evolve



CO₂ Emissions Plateau

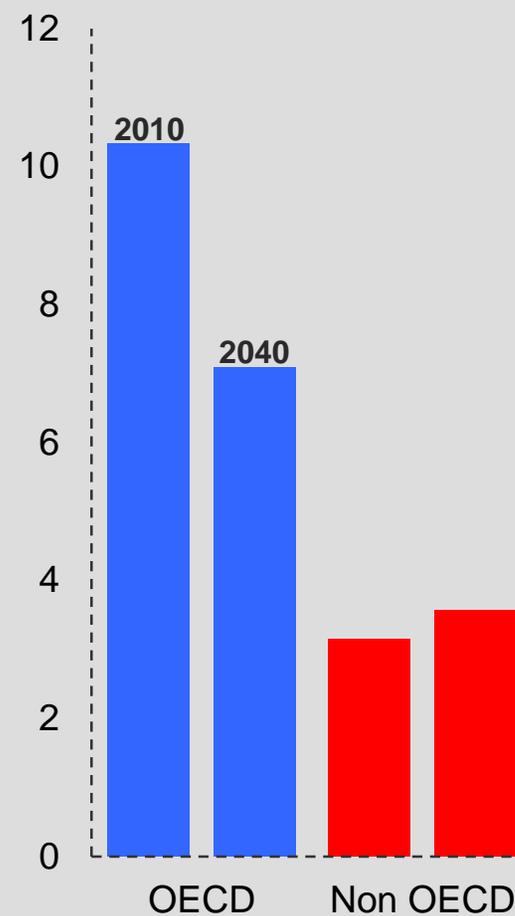
Energy-Related CO₂ Emissions by Region

Billion Tonnes



Emissions per Capita

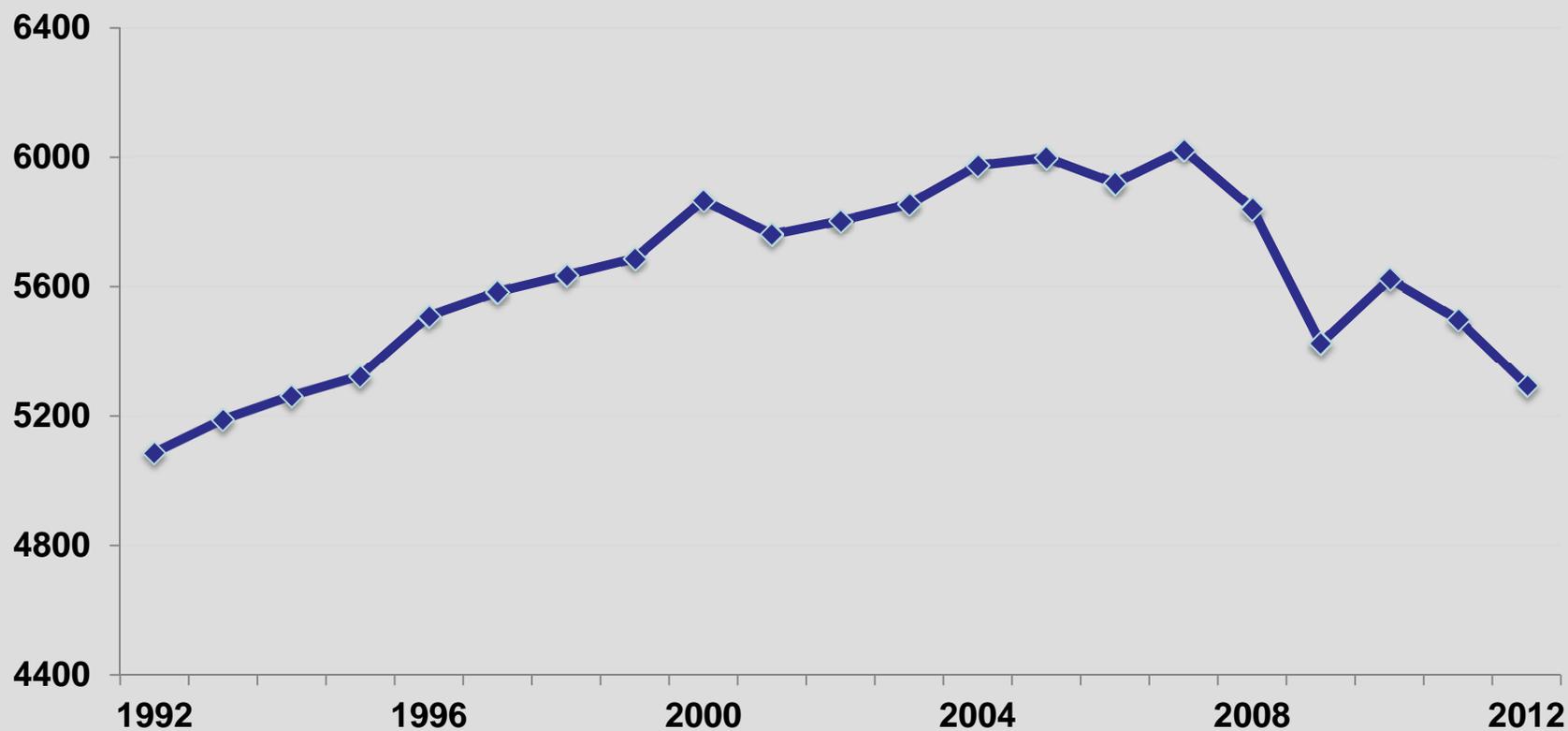
Tonnes / Person



U.S. Greenhouse Gas Emissions

U.S. energy-related CO2 emissions

Million Metric Tons



Sources: U.S. Energy Information Administration

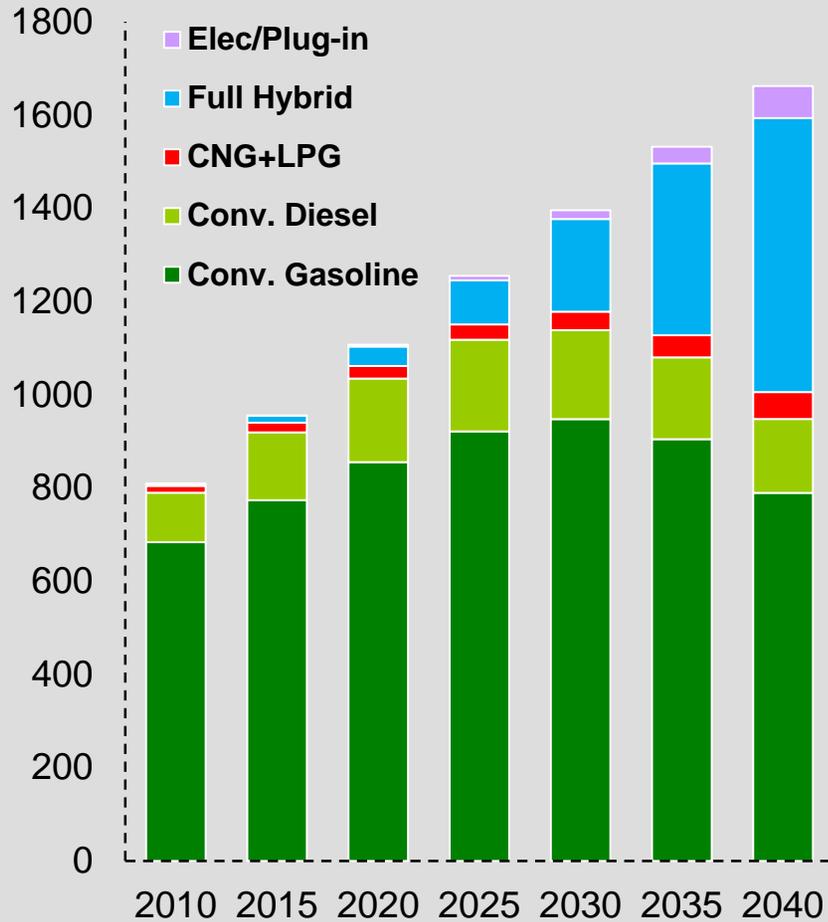
ExxonMobil

Transportation

Light Duty Vehicle Efficiency

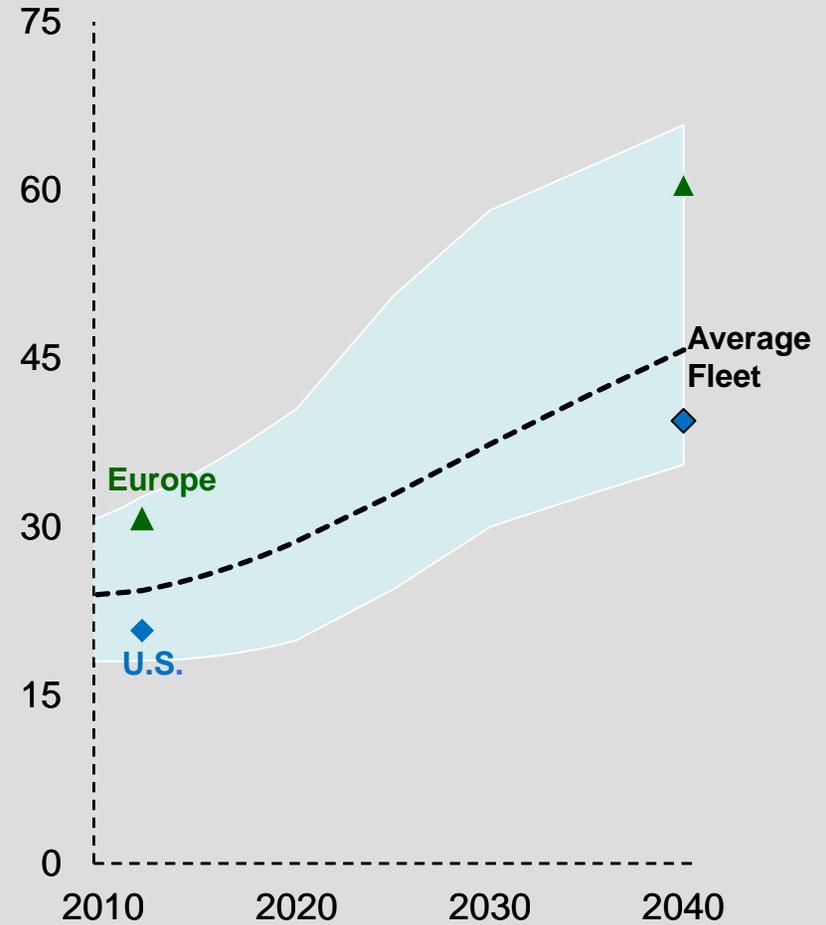
Car Fleet by Type

Million Cars



Range of Average Vehicle Efficiency

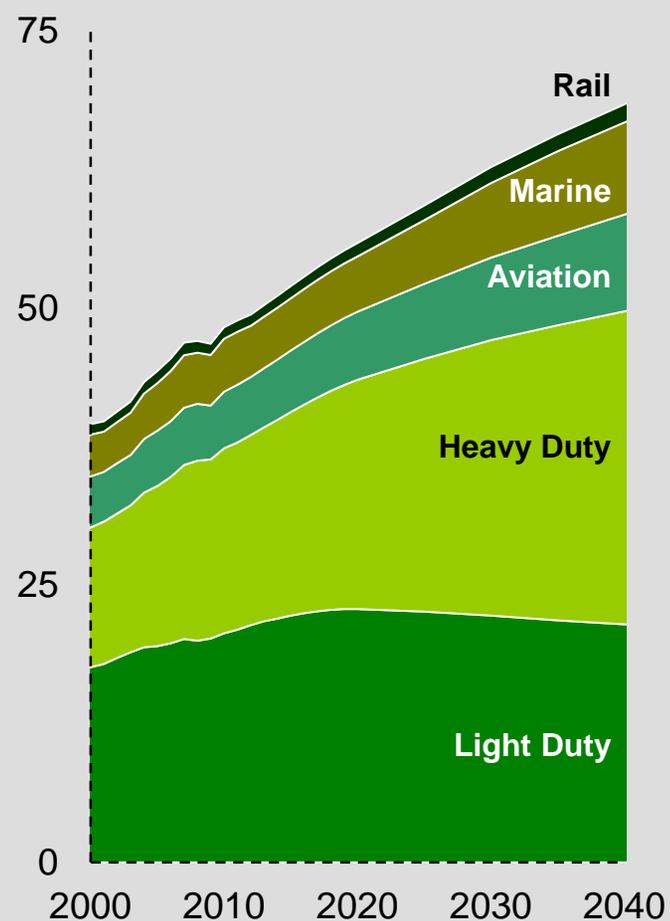
On-Road Miles per Gallon



Transportation Demand

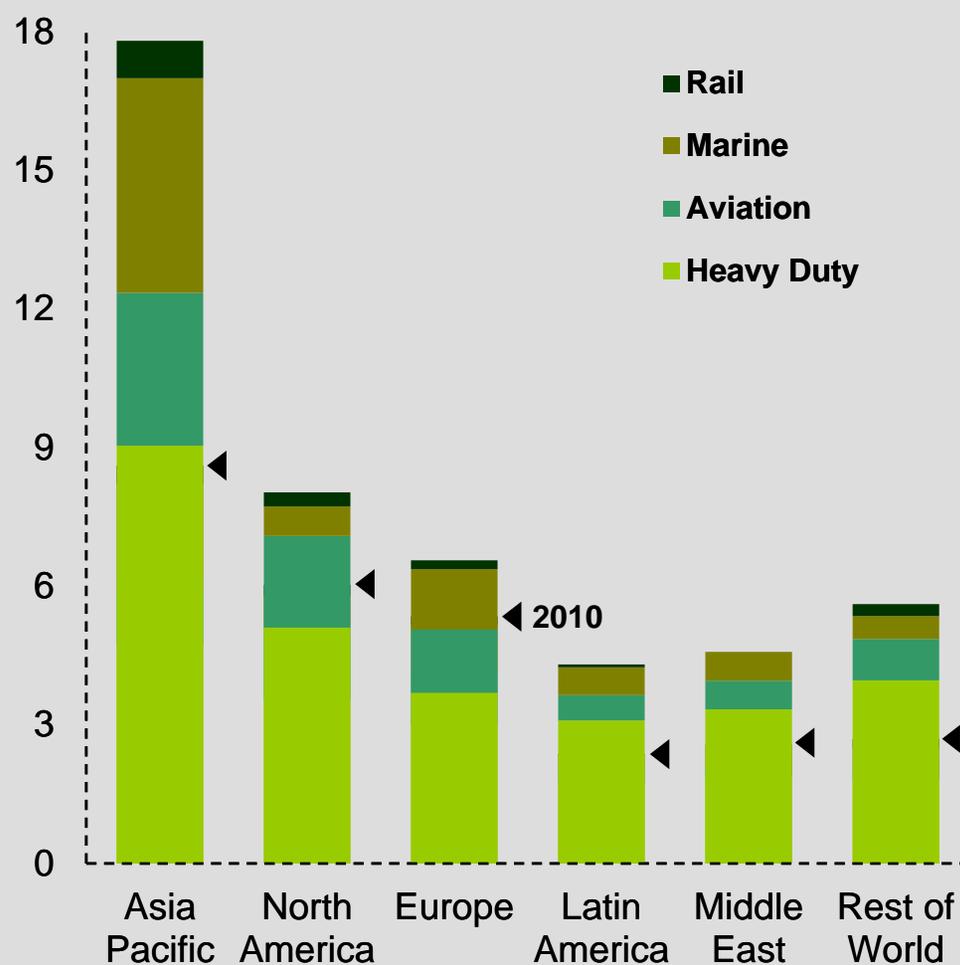
Sector Demand

MBDOE



Commercial Transportation by Region - 2040

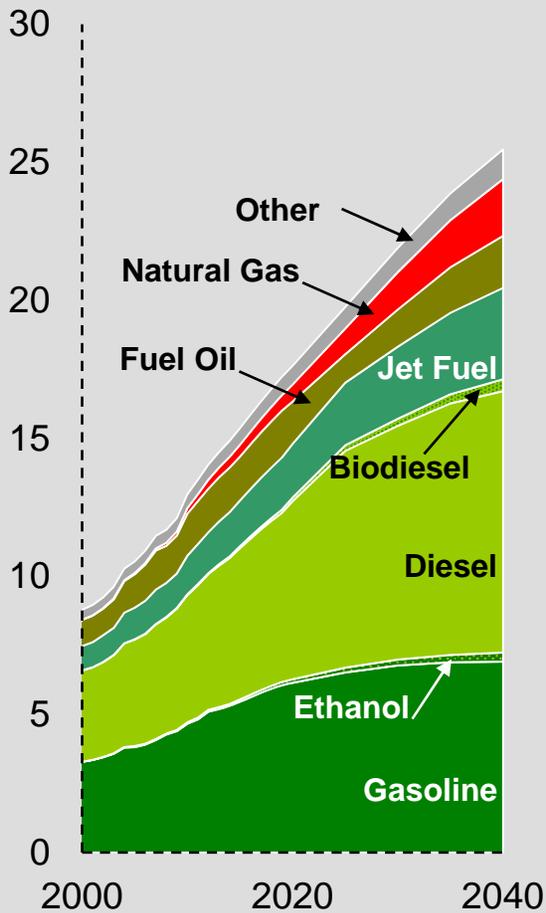
MBDOE



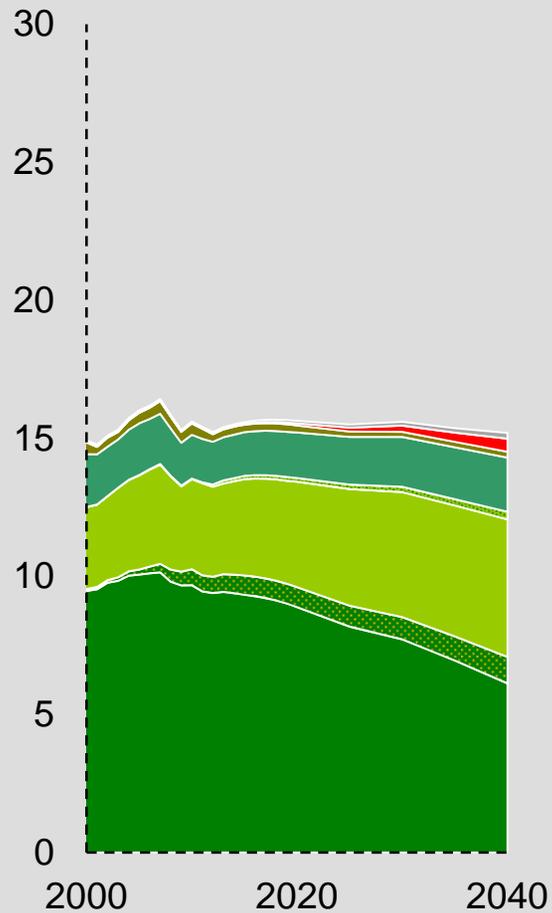
- Rail
- Marine
- Aviation
- Heavy Duty

Transportation Fuel Mix by Region

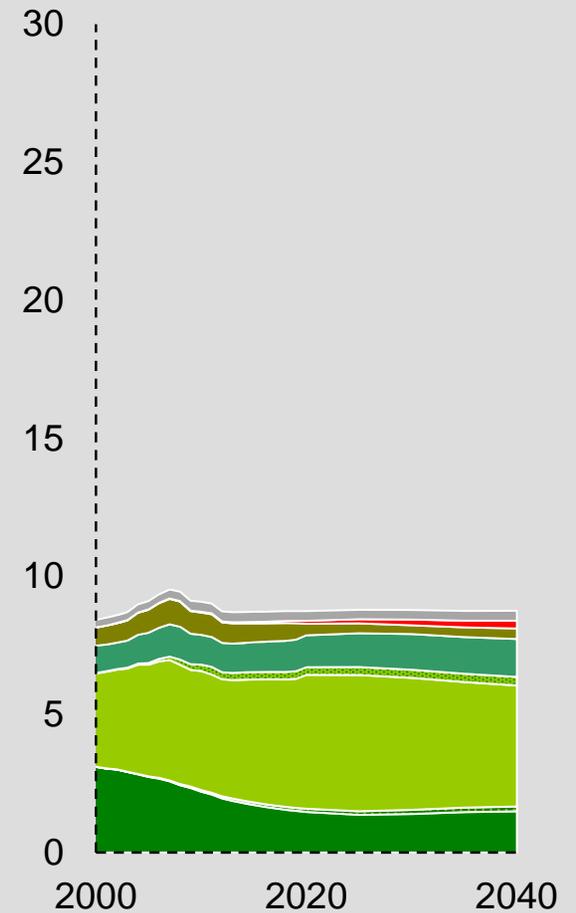
Asia Pacific
MBDOE



North America
MBDOE

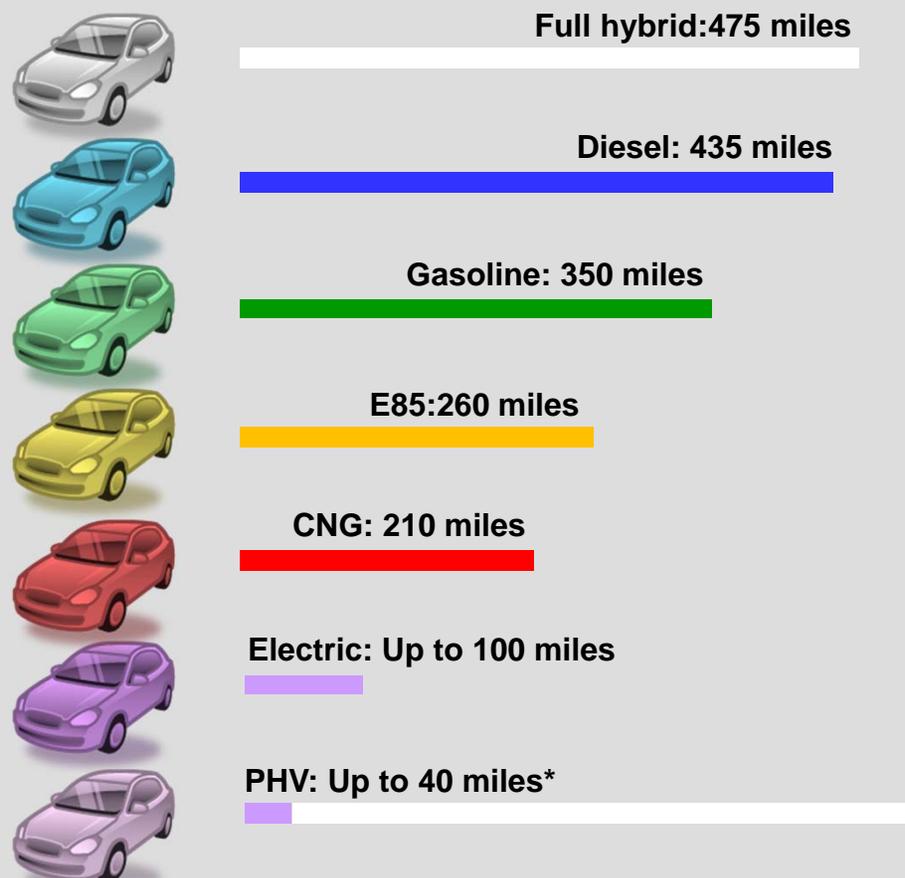


Europe
MBDOE



Today's Vehicle Technology Choices

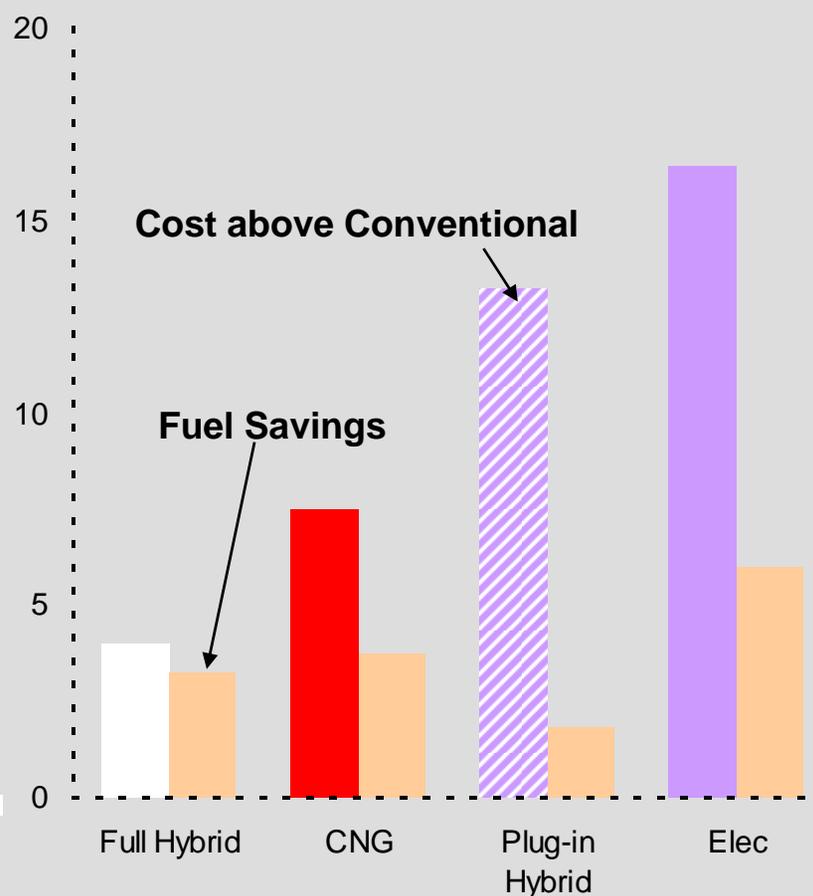
Estimated Driving Distance per Fill-up



*Capable of driving longer distances with range-extending gasoline-fueled engine

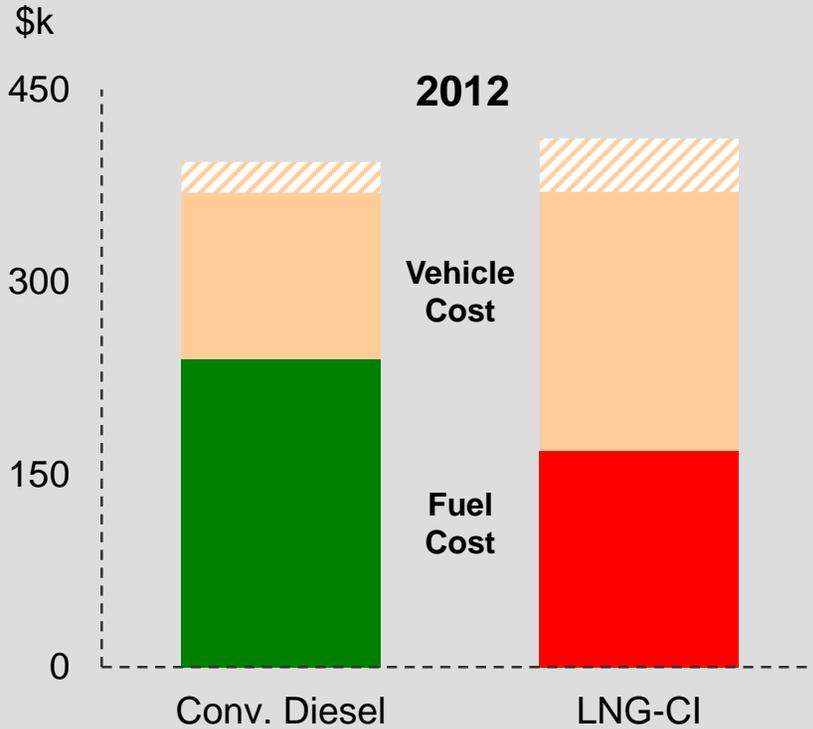
5-Year Cost & Savings

2012\$k

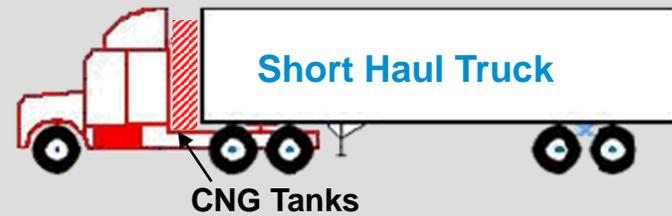
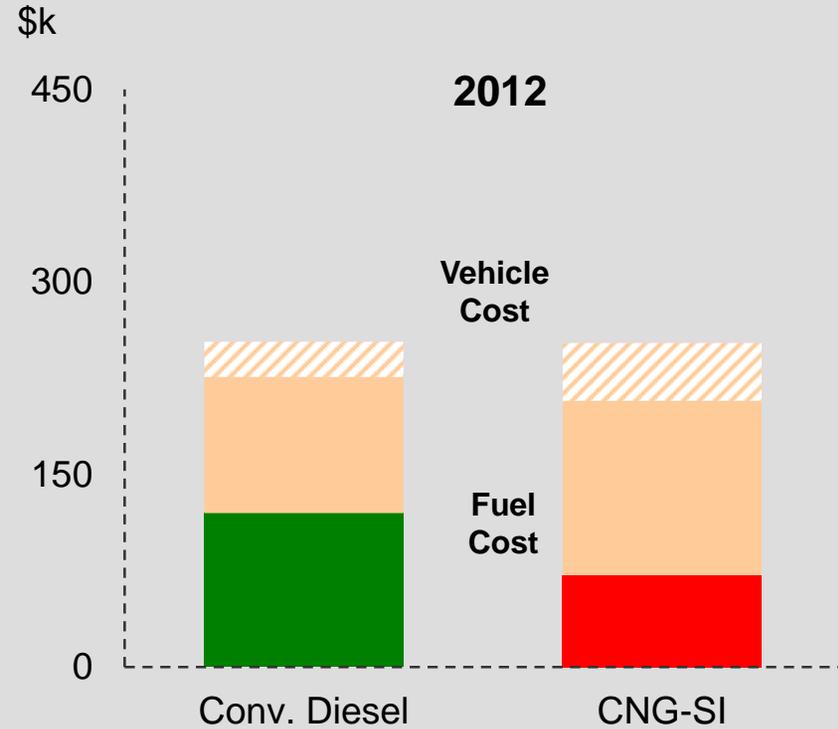


Costs Impact U.S. Heavy Duty Choices

3-Year Cost of Ownership

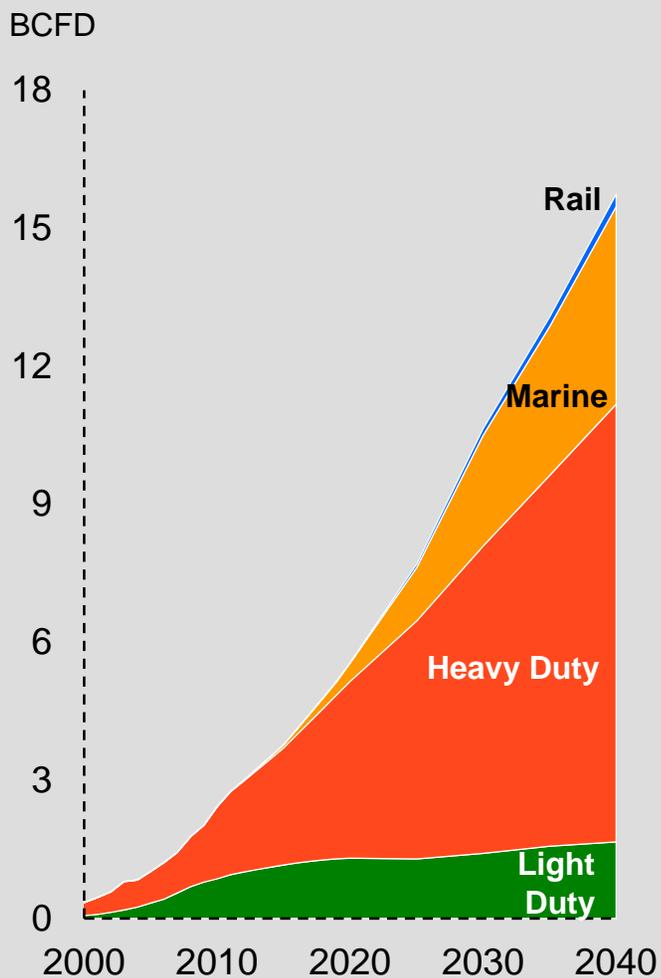


5-Year Cost of Ownership

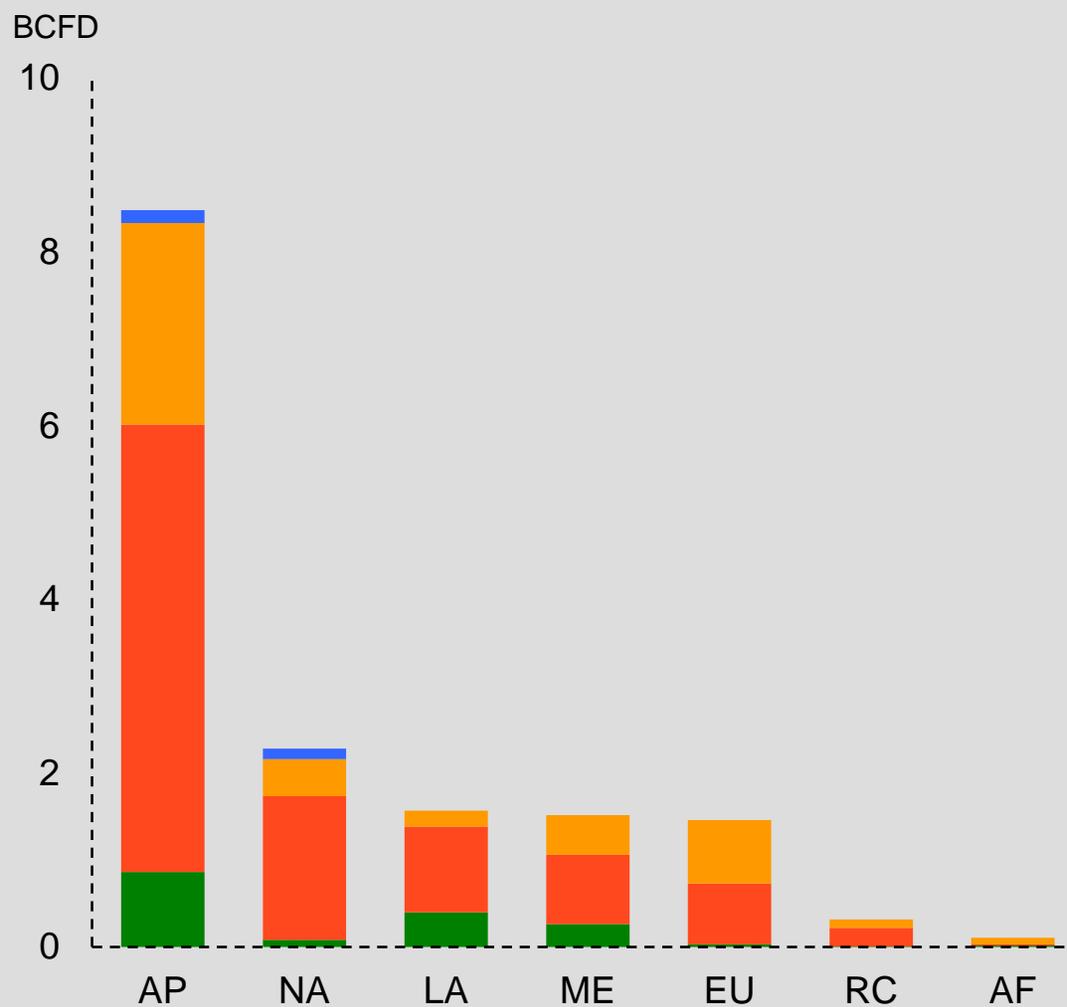


Gas Into Transportation

By Sector



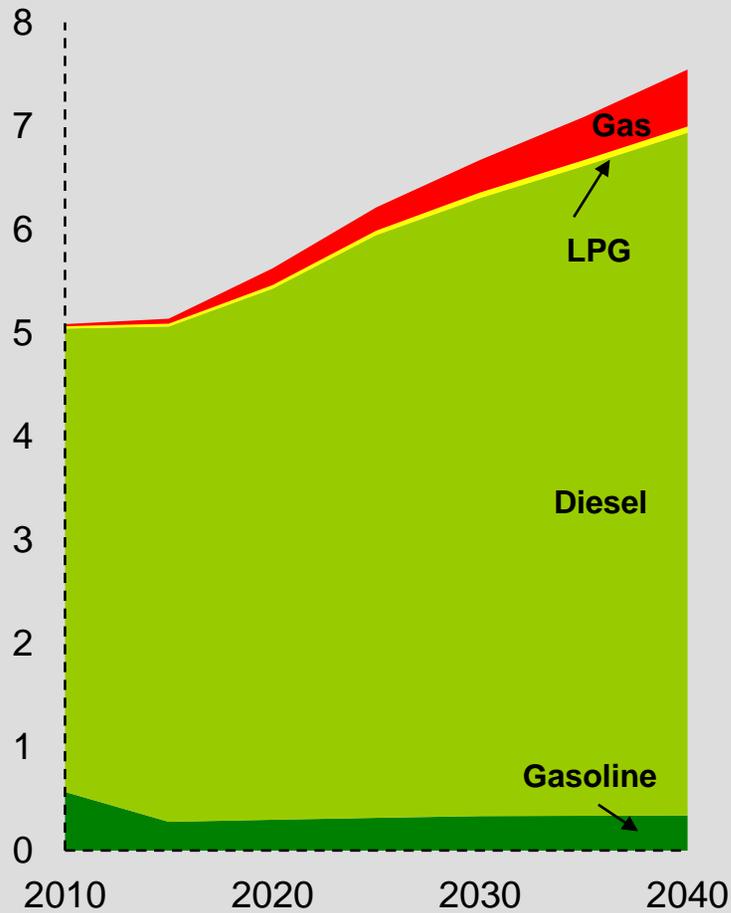
2040 by Region



U.S. Heavy Duty Demand and Natural Gas

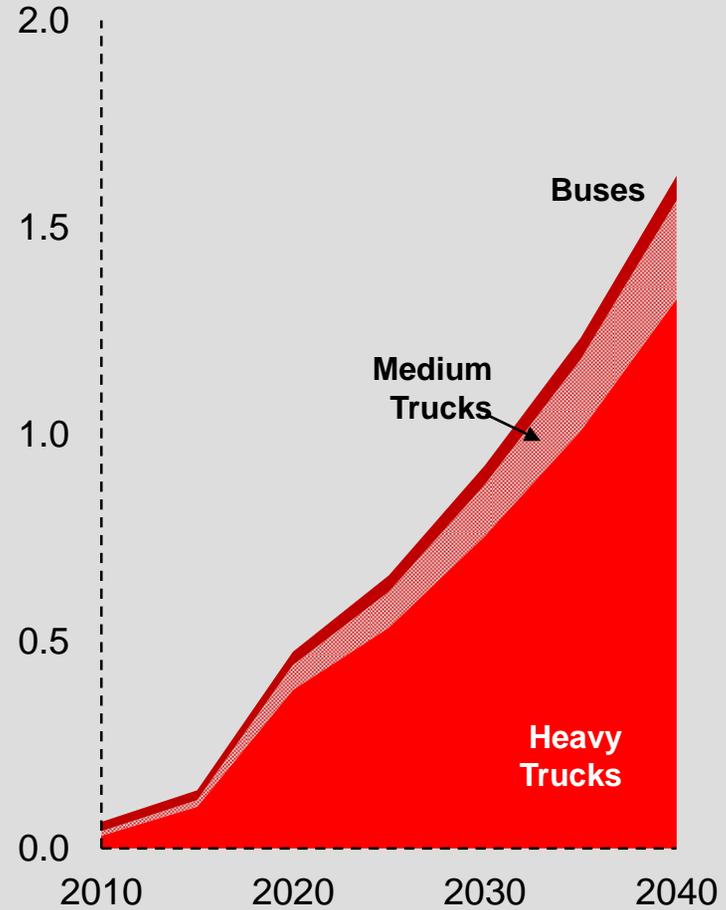
Heavy Duty Demand

Quadrillion BTUs



Heavy Duty Vehicle Natural Gas Demand

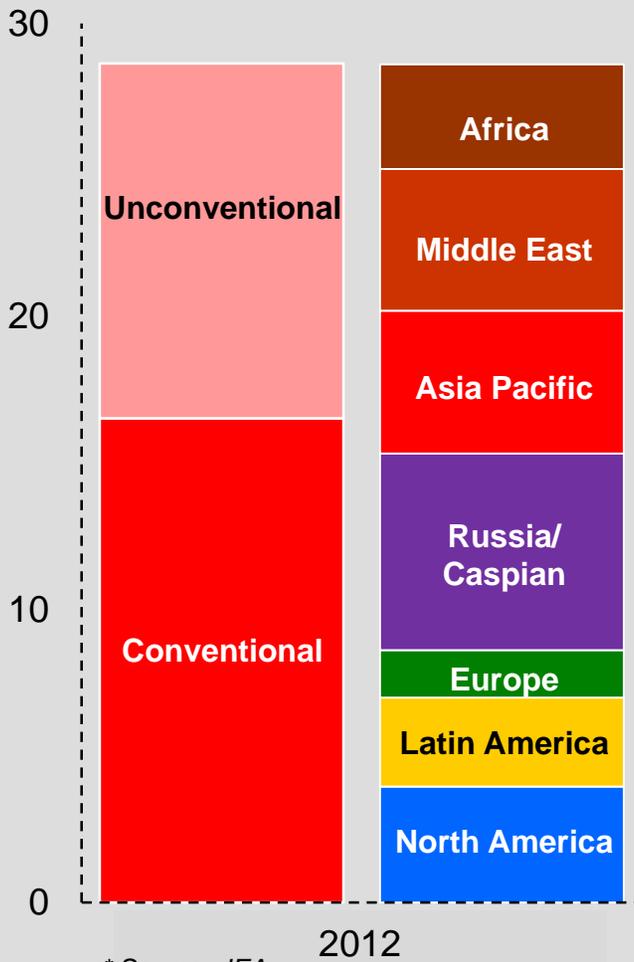
BCFD



Supply

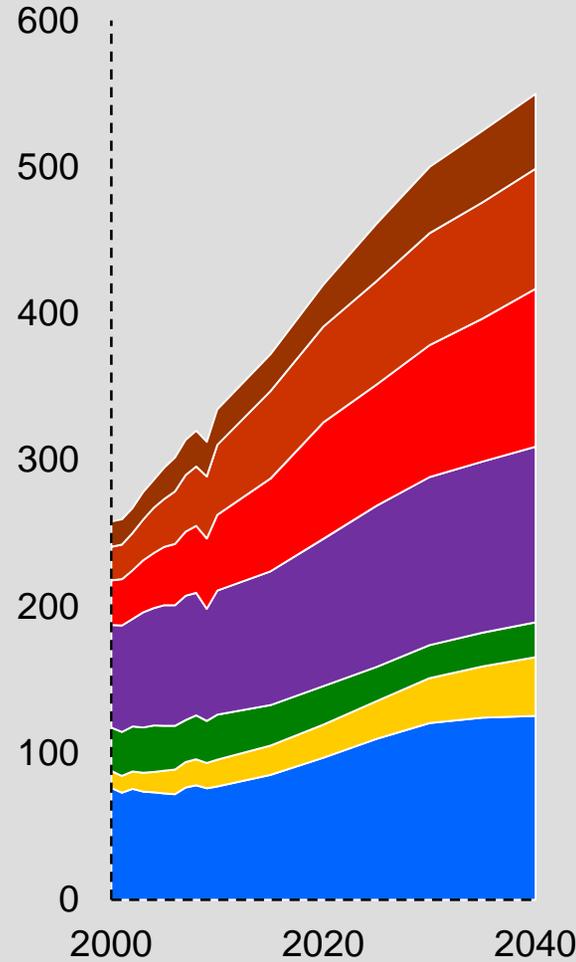
Gas Resources Abundant; Supply Diversifies

Remaining Recoverable Resource*
Thousand TCF

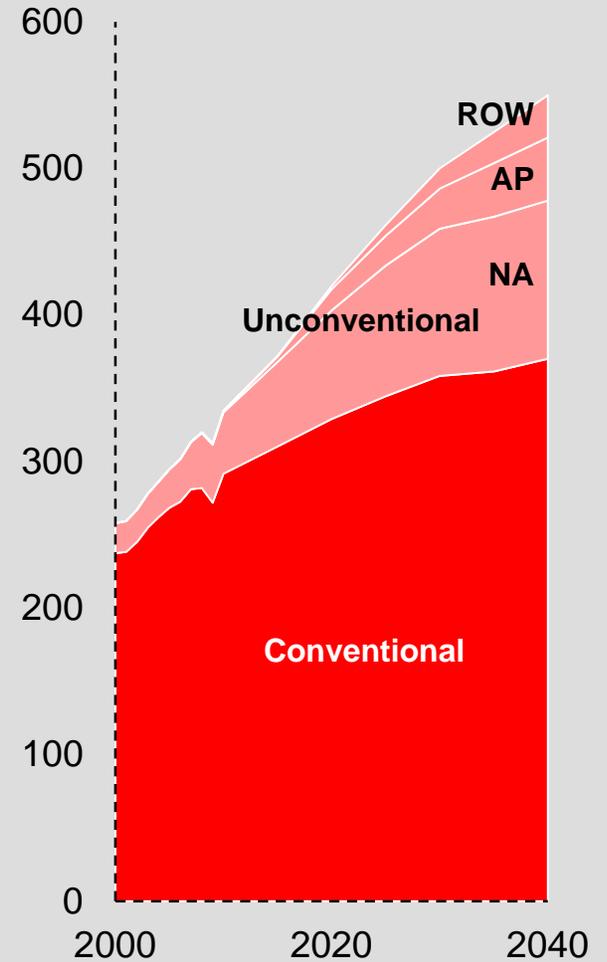


* Source: IEA

Gas Production by Region
BCFD

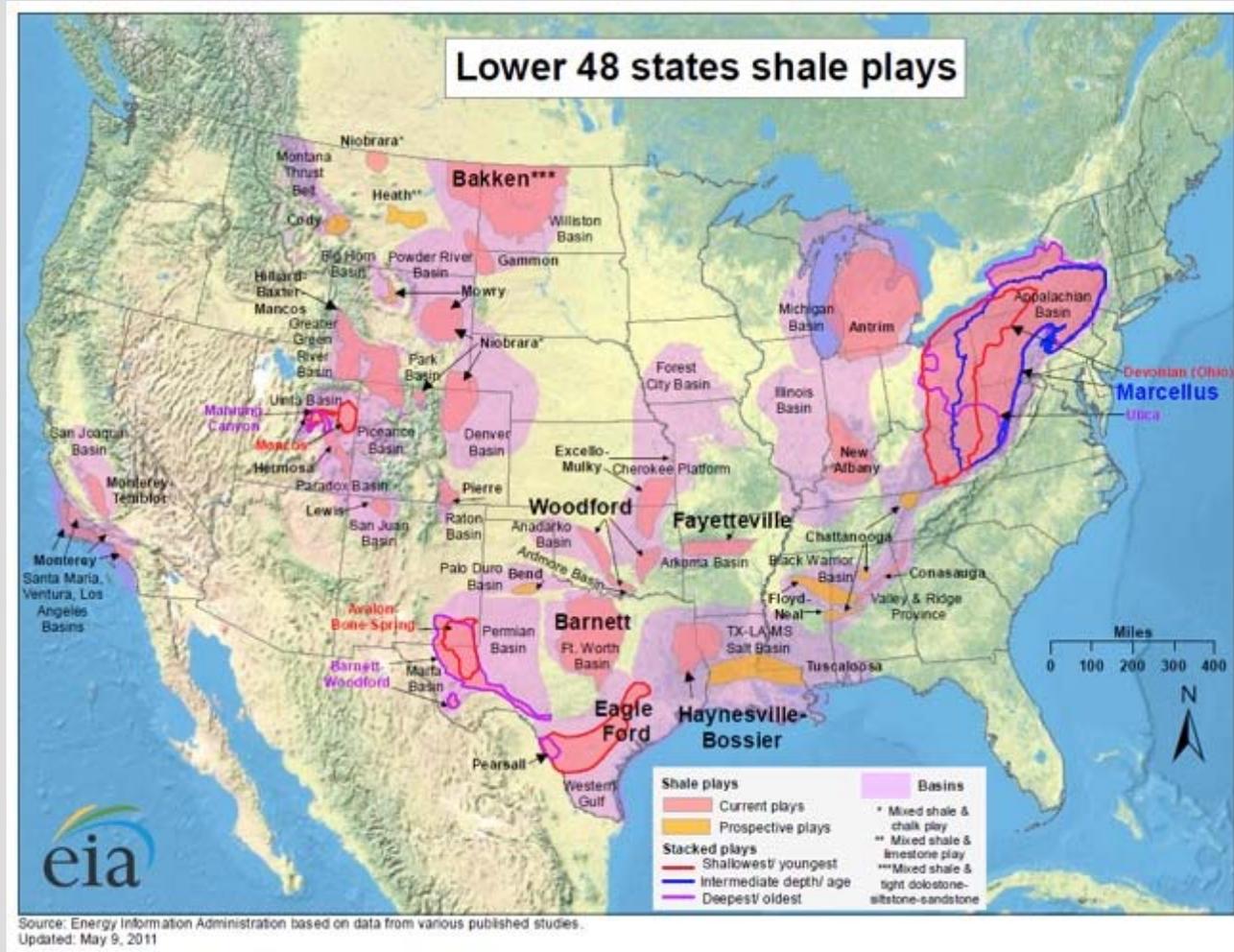


Gas Production by Type
BCFD



Natural gas is abundant

The U.S. has 100+ years of accessible natural gas resources.



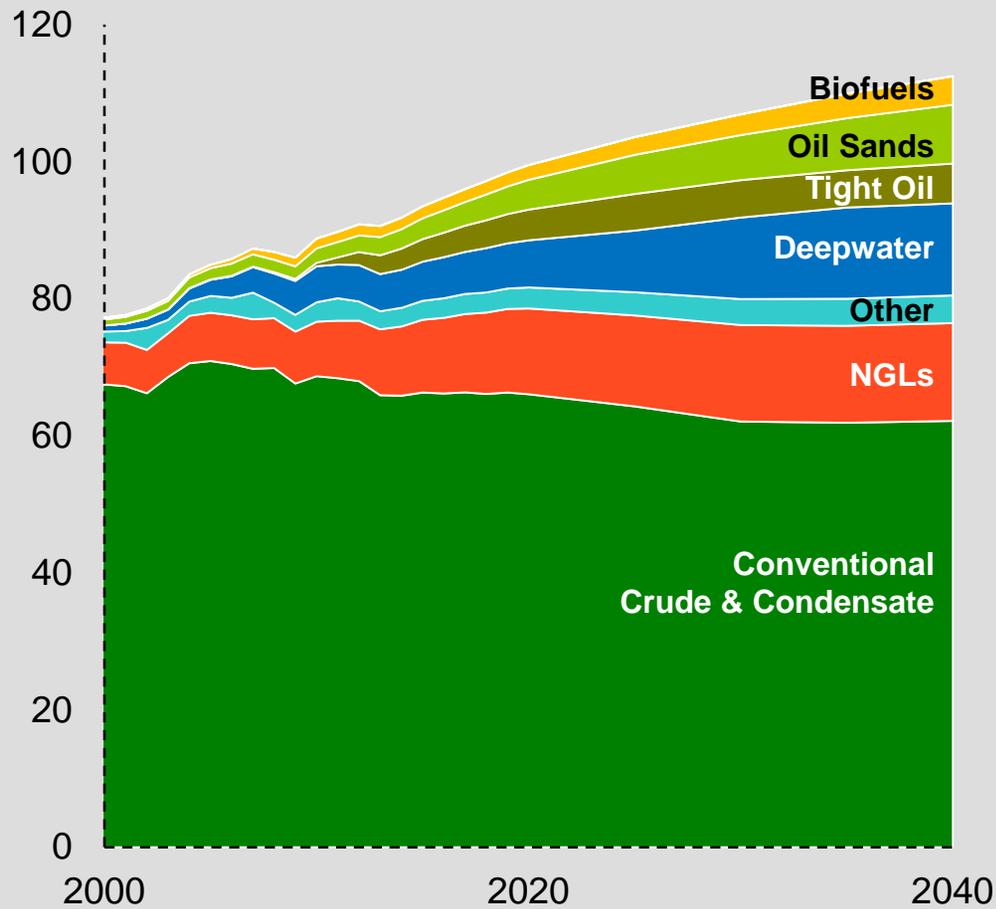
Source: Energy Information Administration ([link](#))

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Liquids Supply

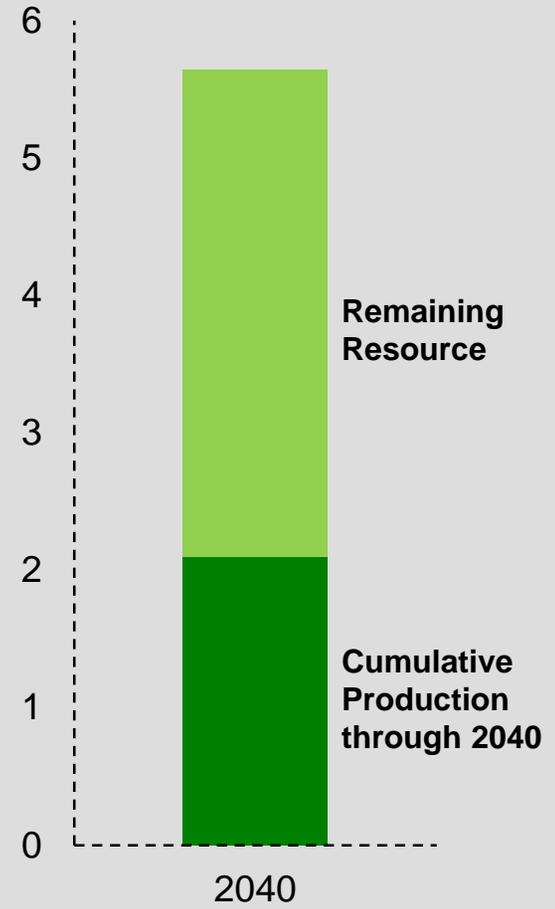
Liquid Supply by Type

MBD OE



Crude and Condensate Resource*

Trillion barrels of oil



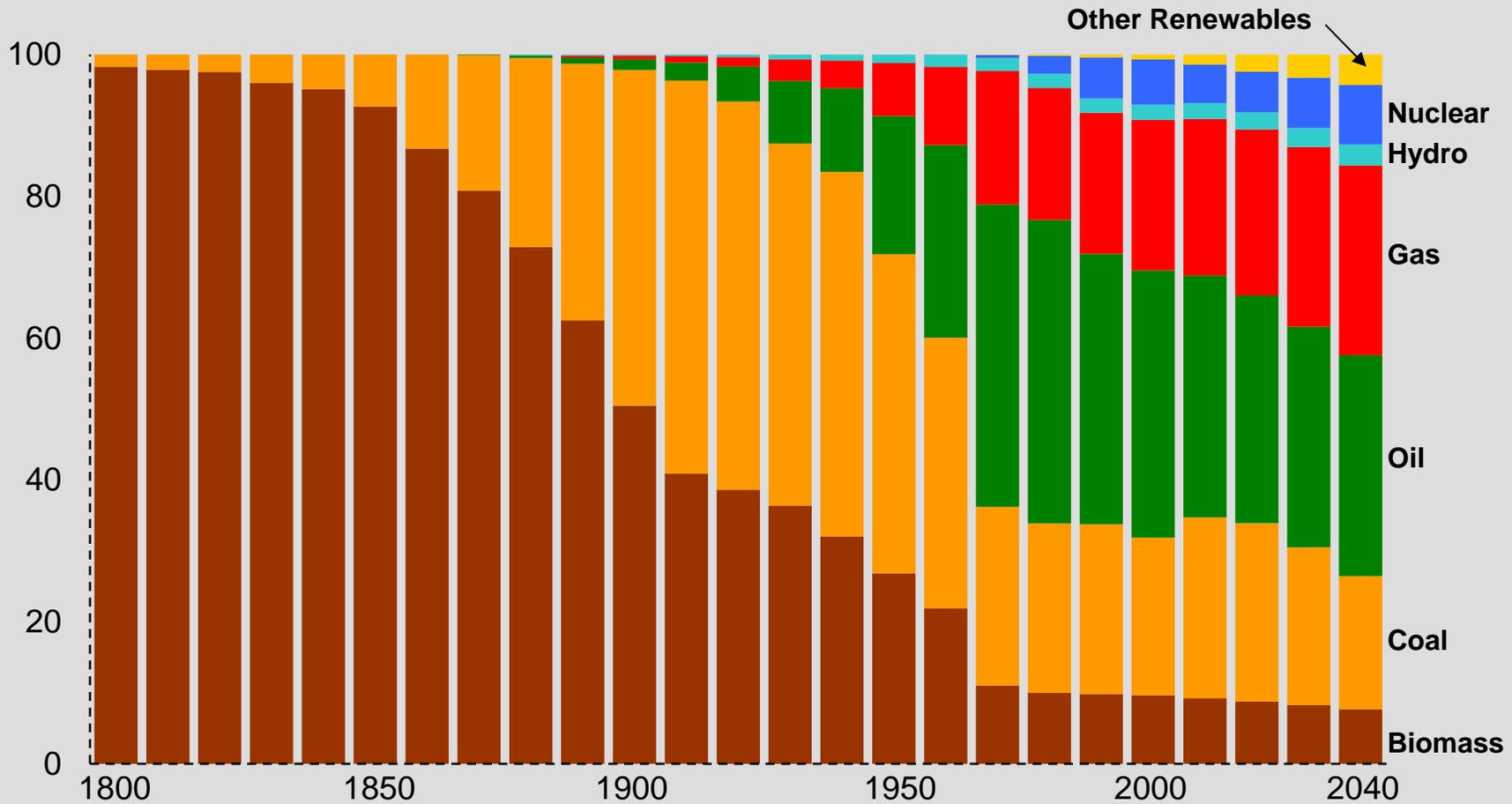
* Source: IEA

Final Thoughts

Energy Use Evolves Over Time

Global Percent Mix of Fuels

Percent



Source: Smil, Energy Transitions (1800-1960)

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Natural Gas in Transportation

- **Natural gas is seeing increased interest in certain transport segments and regions**
 - As a transportation fuel, natural gas can be competitive with liquid petroleum fuels
 - CNG light duty vehicles growth has been rapid in some countries with low-cost, local natural gas, and often government incentives
 - CNG is economically attractive for some centrally fueled fleets and short-haul trucks
 - There is potential for LNG into long-haul heavy duty trucking
 - Growth of LNG into select marine markets is anticipated if bunkering facilities are built
 - Challenges are vehicle cost, range, cargo space, infrastructure, and standards
- **By 2030 natural gas share of the total global transport fuel demand is expected to be 4%**

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