

TRB 91st Annual Meeting
Washington, D.C.
January 23, 2012

Unconventional/Alternative Fuel Sources: Transportation and Energy Security Implications

Tahmid Mizan
Exxon Mobil Corporation

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.

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Outline

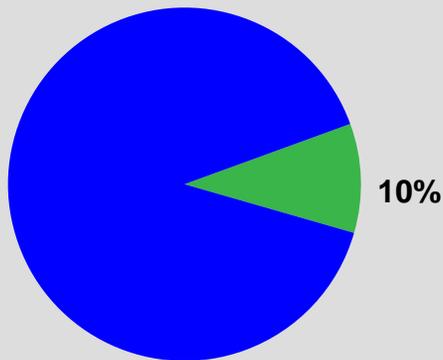
- **Transportation and economic growth**
- **Desirable features of transportation fuels**
- **Liquid fuels supply**
 - “Unconventional” liquids
 - Alternative fuels
- **Unconventional gas**
- **Energy security**
- **How do non-liquid fueled vehicles stack up ?**
- **Efficiency - the “virtual” alternative fuel**
- **Conclusions**

Economies Depend on Transportation

Mobility and transport of people and goods are essential elements for societal development, economic growth, and competitiveness

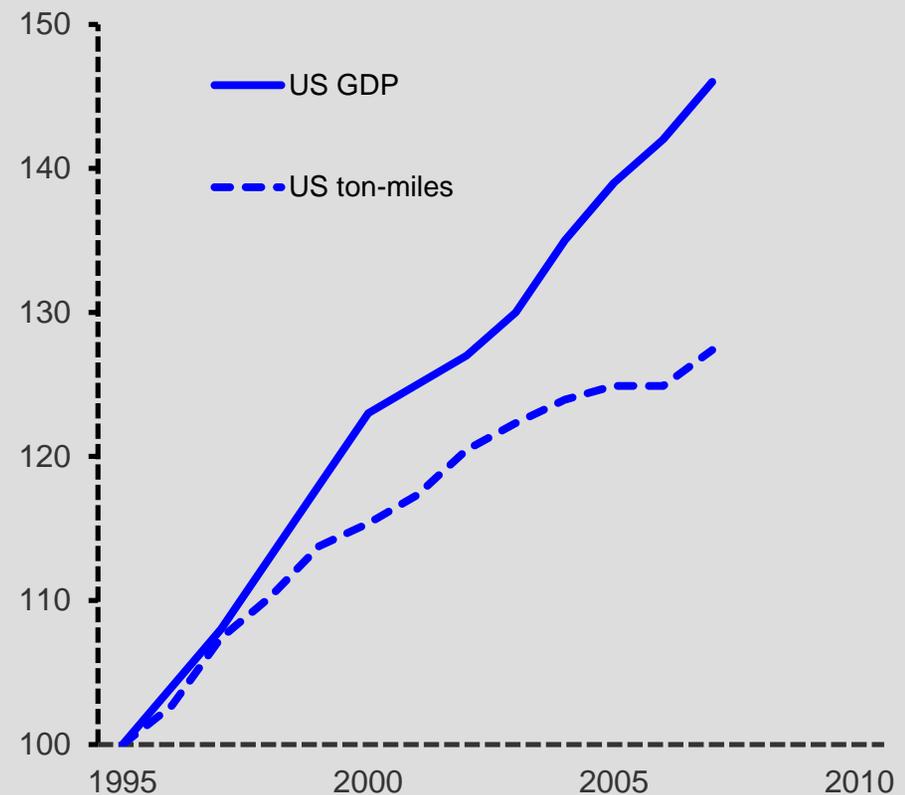
Transportation Share of GDP

Percent



GDP and Road Transportation Growth

Indexed to 100 in 1995



Sources: U.S. Bureau of Transportation Statistics

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Energy for Transportation: A Unique Need

Transportation fuels must meet many requirements to achieve broad consumer acceptance

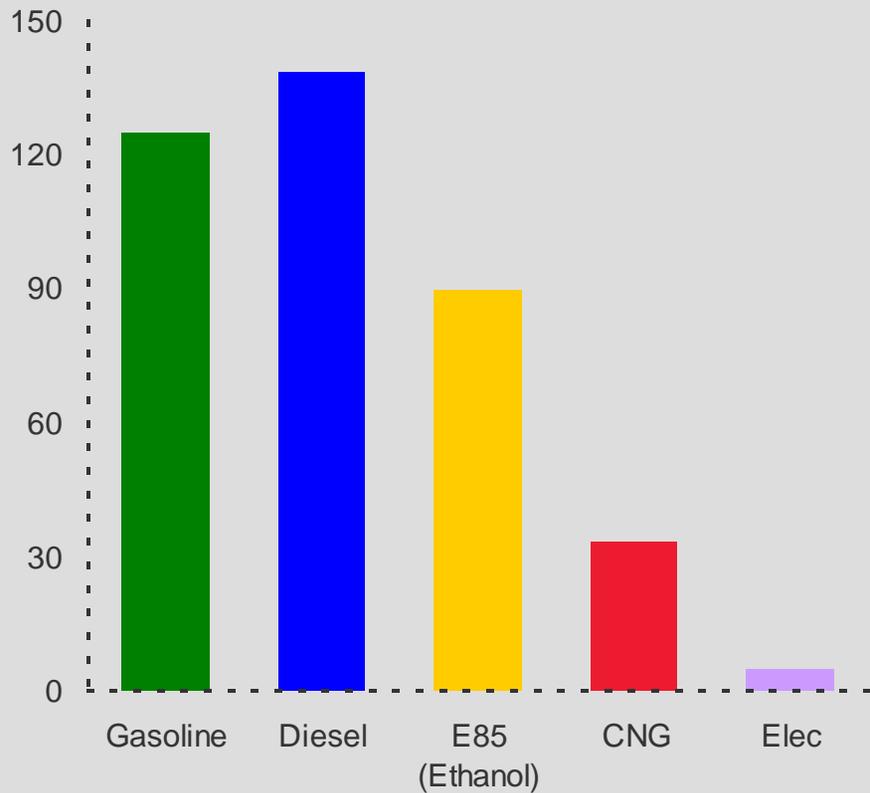
- **Safe during both filling and use**
- **Widely available at all times**
- **Economic over the life of the vehicle**
- **Carried in small volumes with the vehicle and its occupants**
- **Able to fuel the vehicles for hundreds of miles between fill-ups**

Energy Density Varies Widely

Gasoline and diesel provide a lot of energy in small volumes

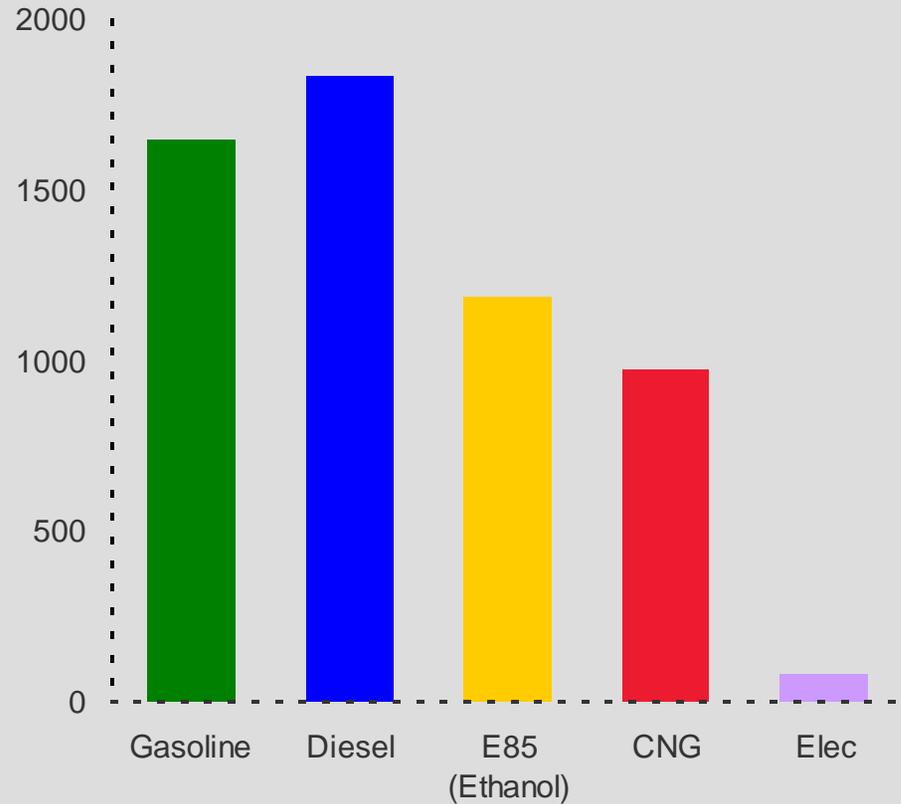
Energy Per Gallon

Thousands of BTUs



Energy Per Fillup*

Thousands of BTUs



*Based on vehicles available in the market today

Source: ExxonMobil analysis

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Unconventional Resources and Alternative Fuels

“UNCONVENTIONAL”

Tight Oil
Shale Oil
Heavy Oil
Oil Sands
NGLs
Deepwater Oil
Arctic Oil
Coal Bed Methane
Shale Gas
Tight Gas



ALTERNATIVE

Biofuels
(Ethanol,
Biodiesel,
2nd Gen)
Natural Gas
Electricity
Hydrogen

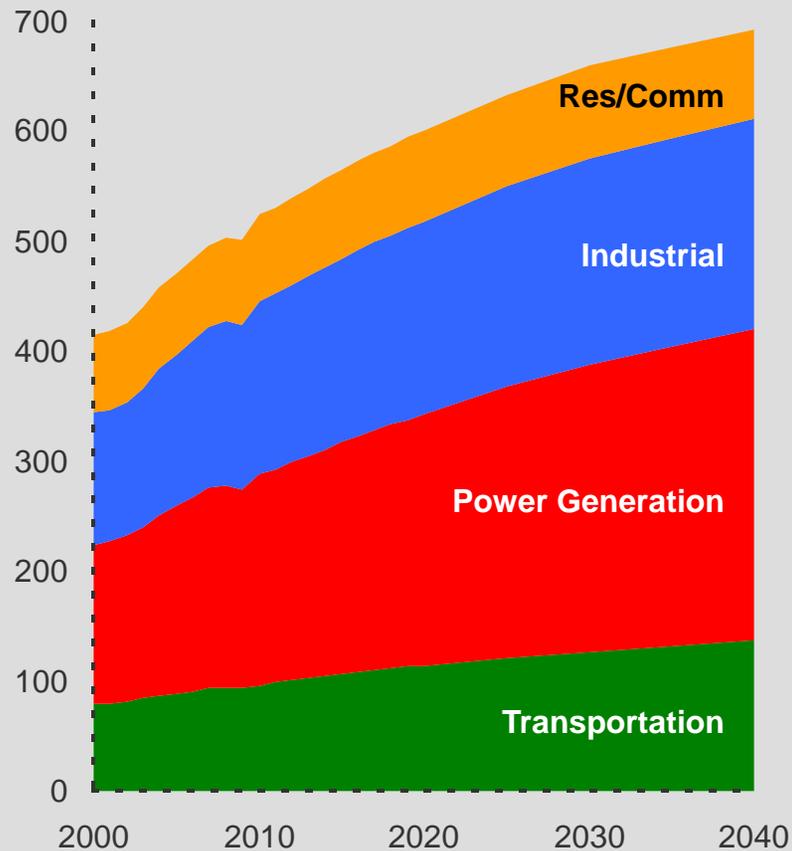


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Global Energy Demand and Supply

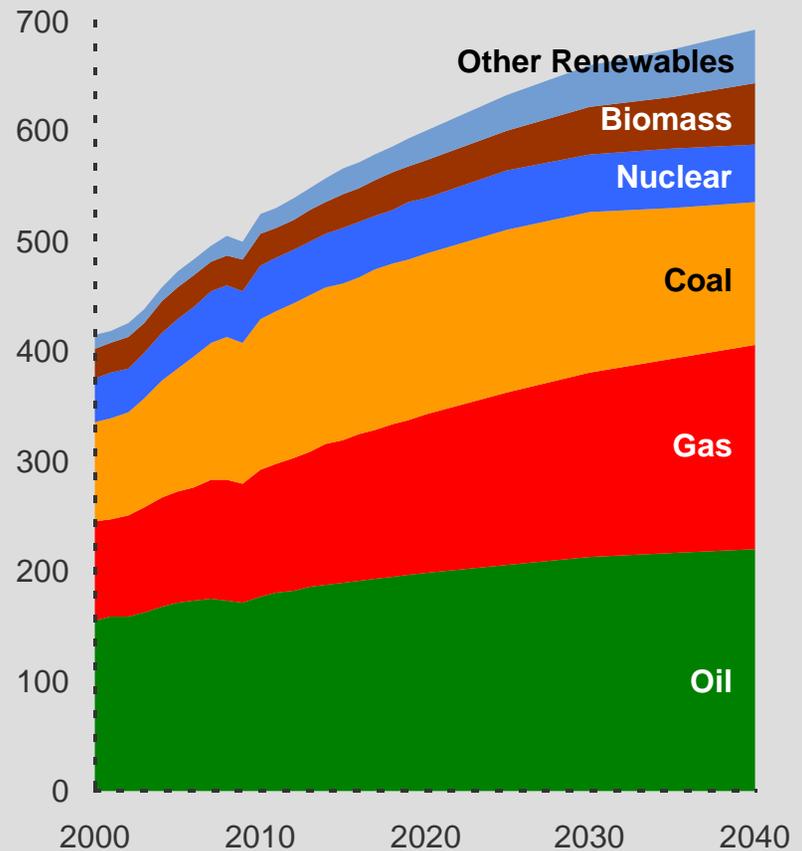
By Sector

Quadrillion BTUs

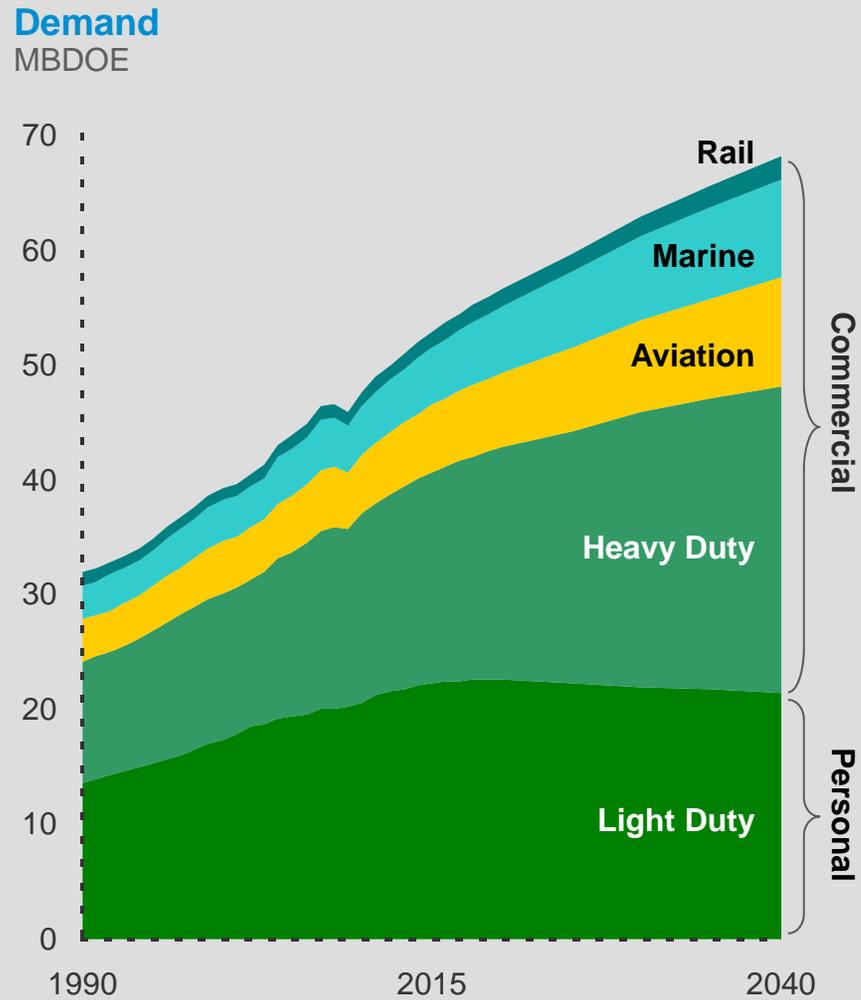


By Fuel

Quadrillion BTUs



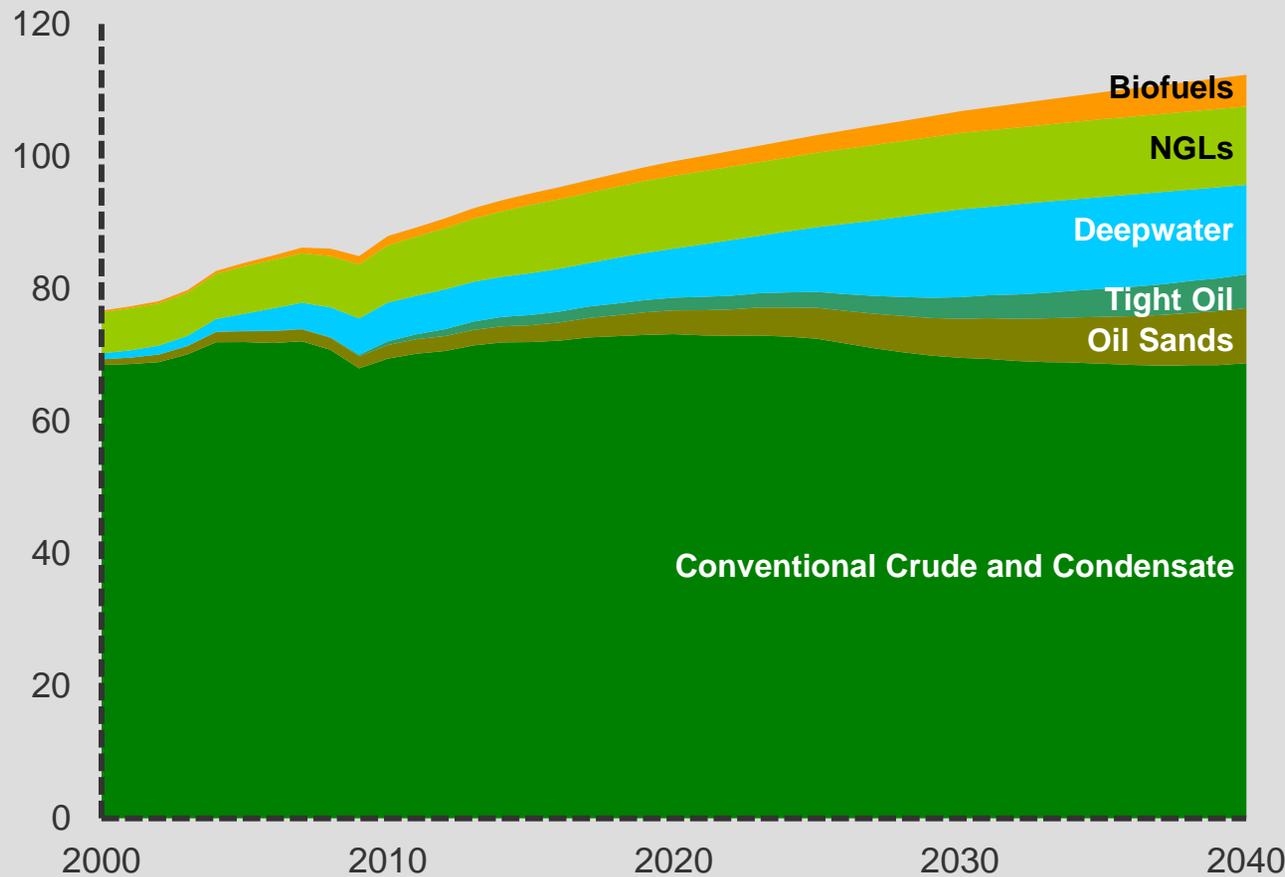
Transportation Energy Demand



Liquids Supply Continues to Diversify

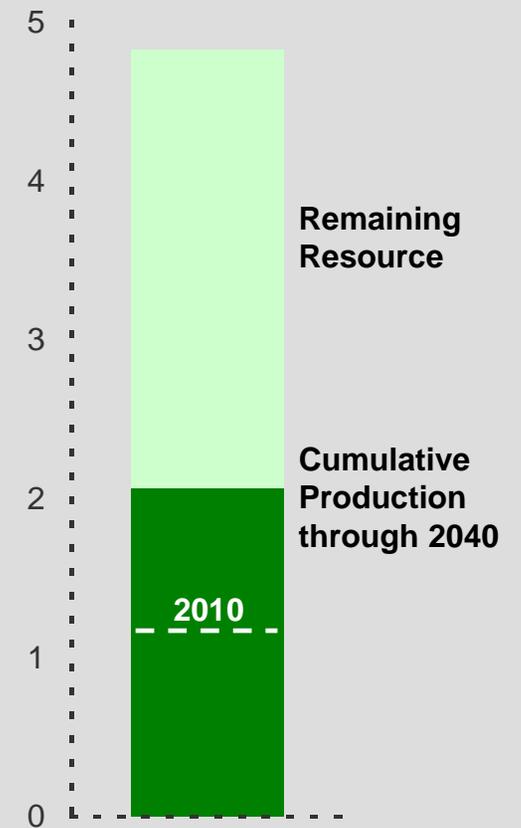
Liquids Supply

MBDOE



Resource *

TBO



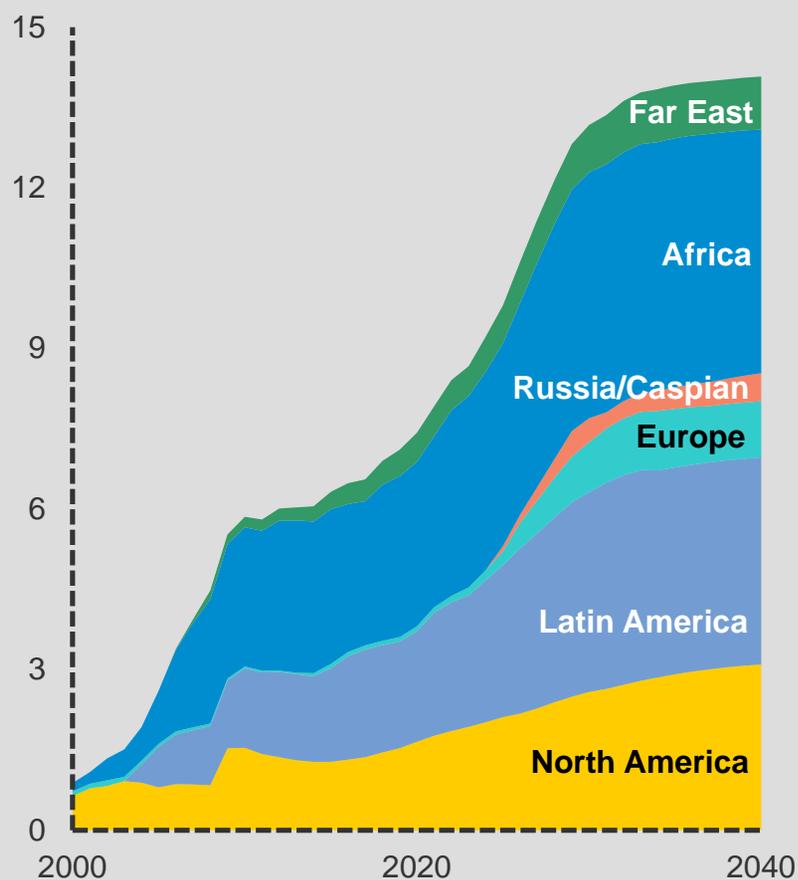
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* Source: Total resource from IHS Inc. The use of this content was authorized by IHS.

Technology Driven Supplies Expand Globally

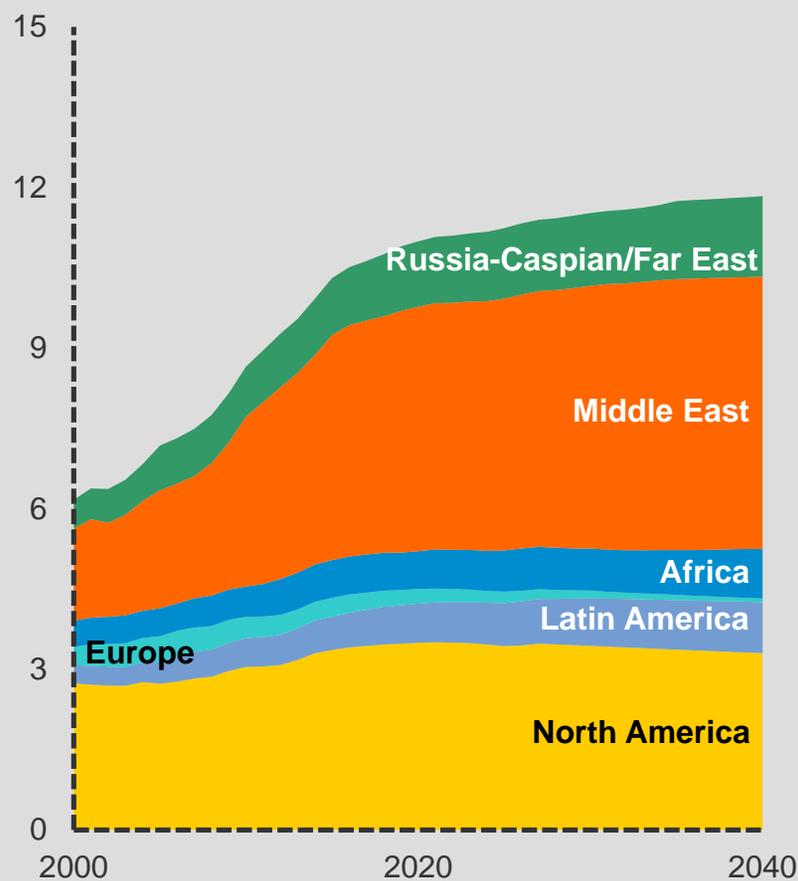
Deepwater by Region

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NGL by Region

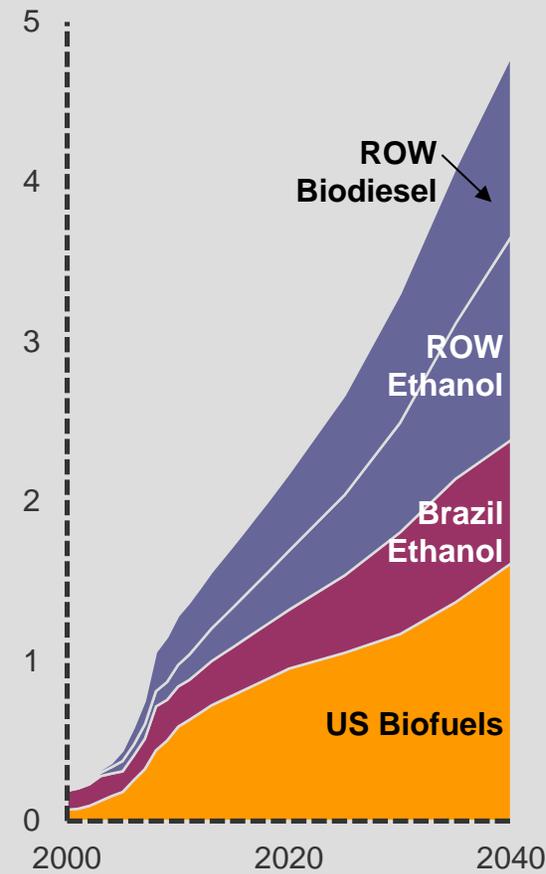
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Biofuel Growth Continues

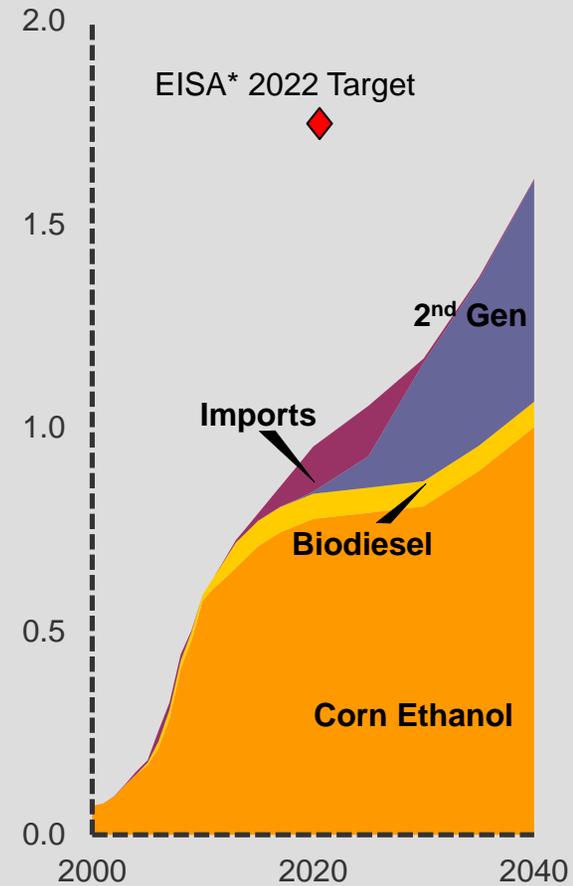
Production

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US Supply

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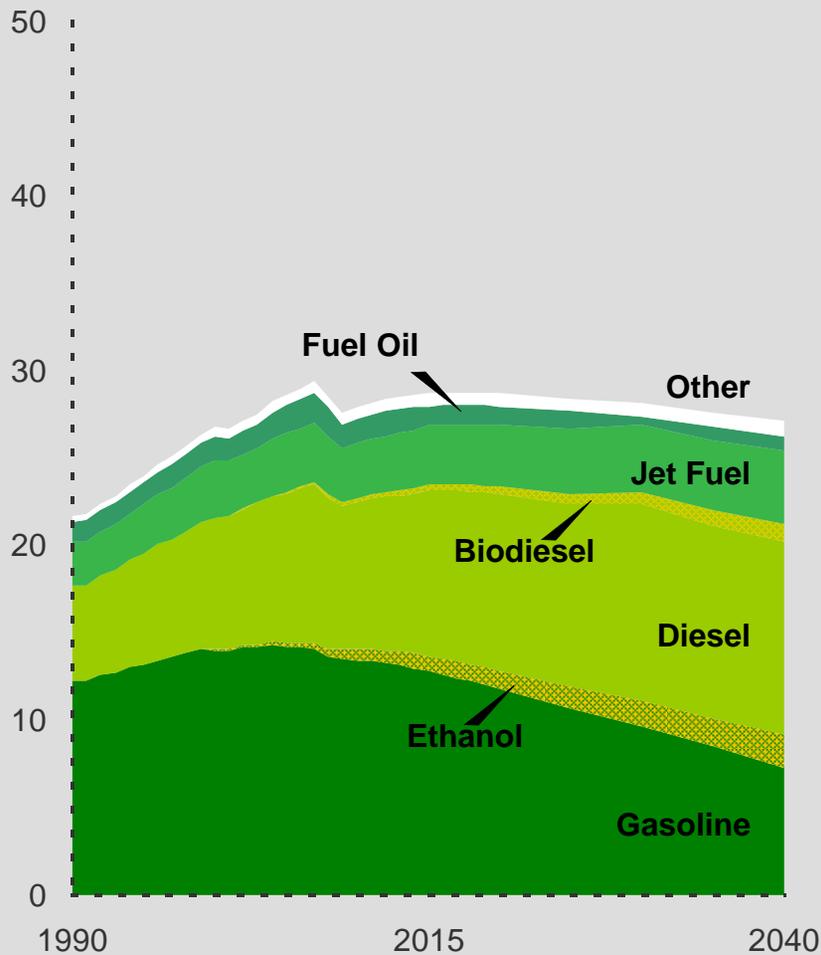
*EISA: Energy Independence and Security Act

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Transportation Fuel Demand Shifts to Diesel

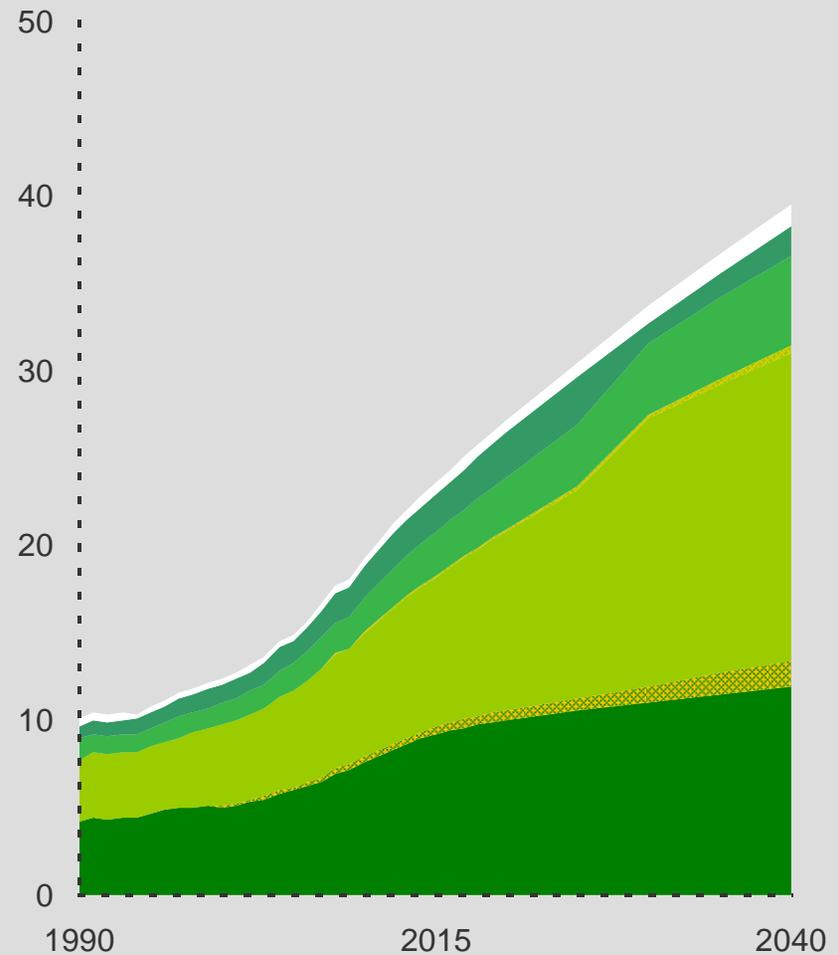
OECD

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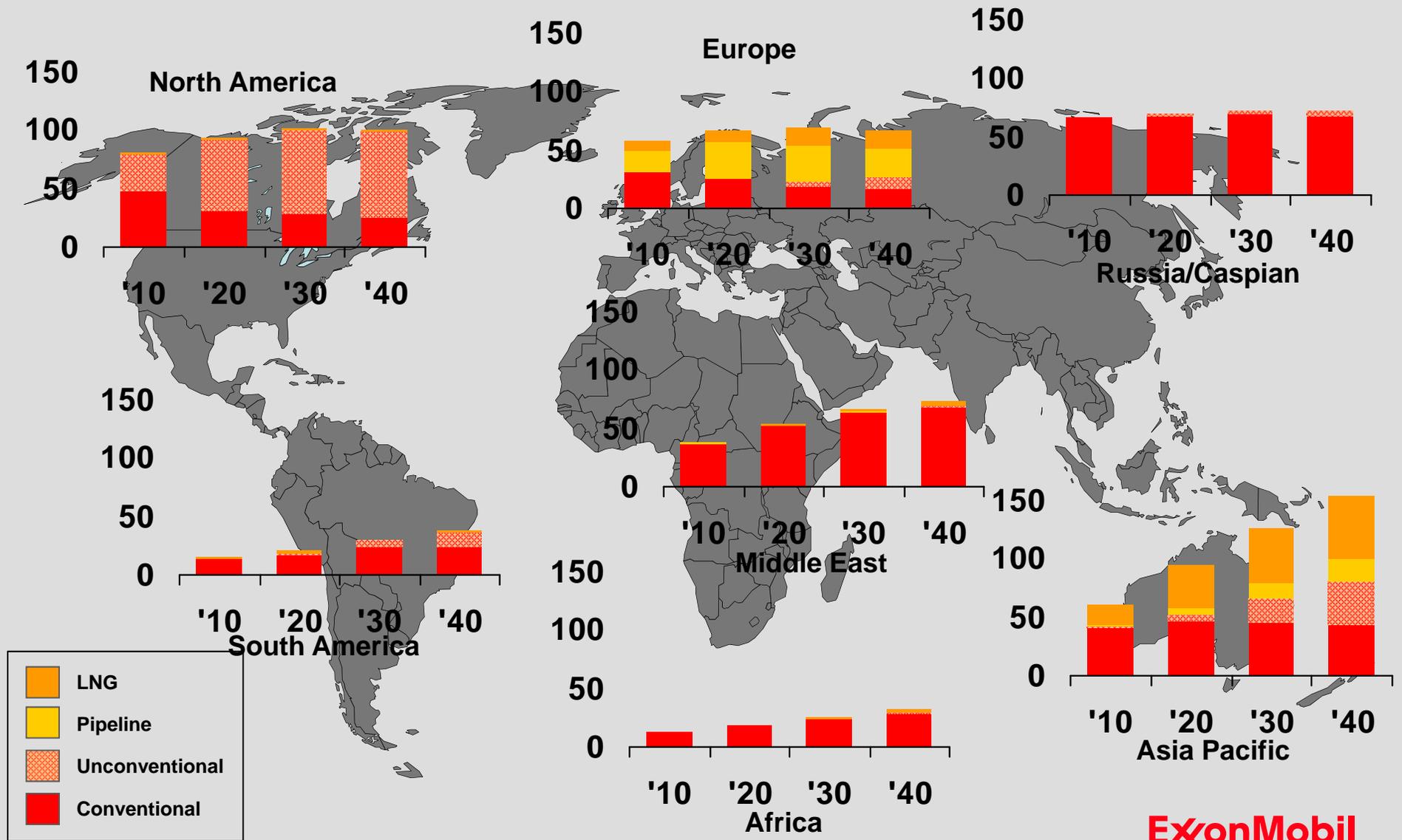
Non OECD

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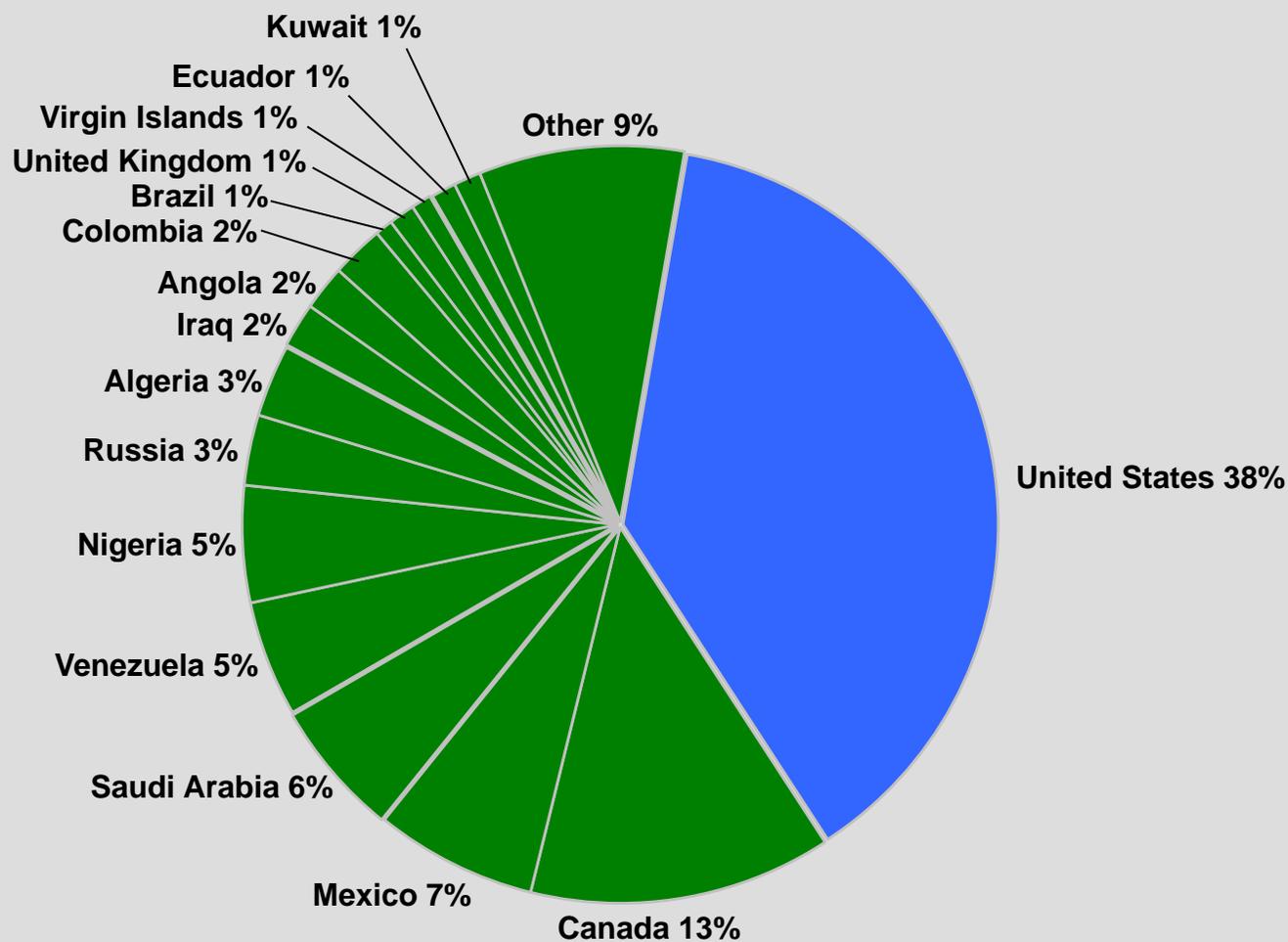


World Gas Supply

BCFD



2010 U.S. Crude and Oil Products Supply

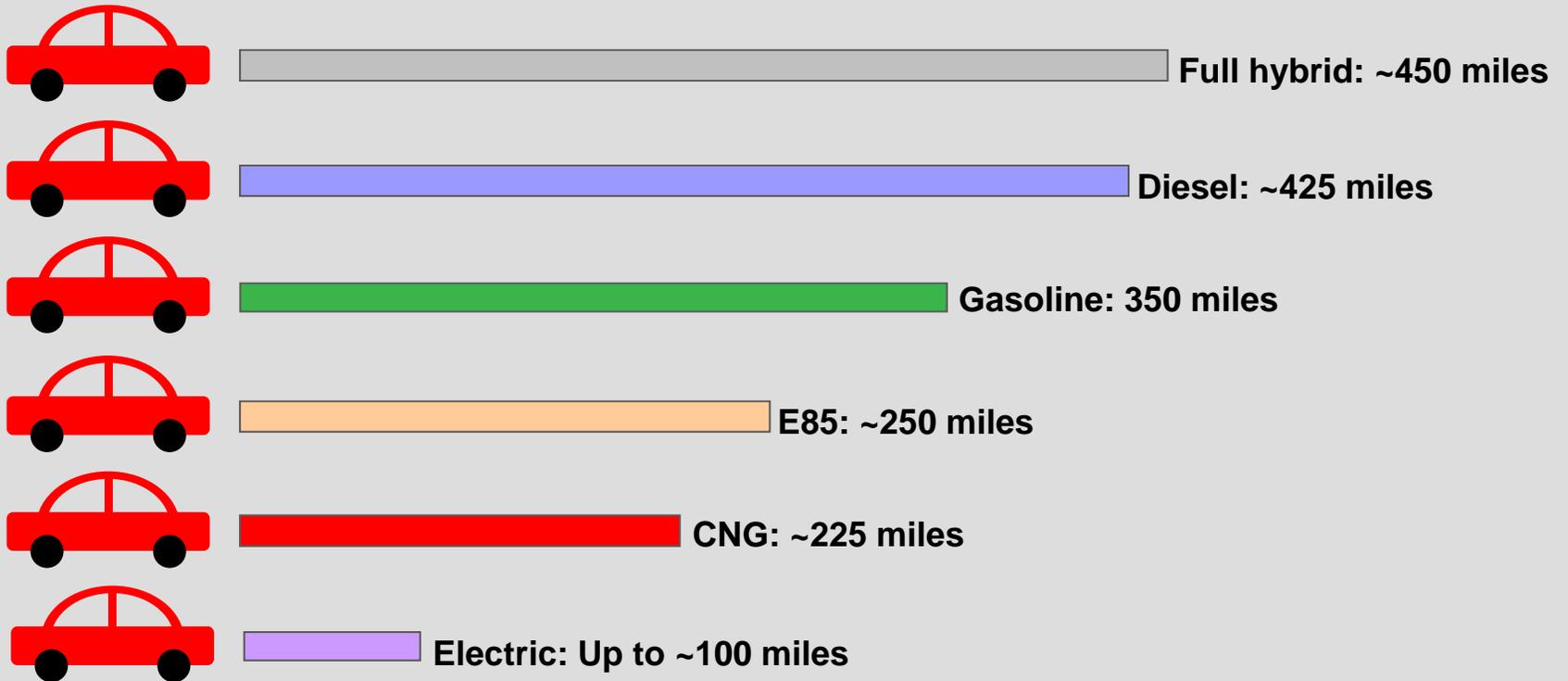


Source: U.S. Energy Information Administration

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Driving Ranges Differ

Gasoline, diesel, and hybrid vehicles travel more miles per fill-up, resulting in fewer stops for fueling and enhanced consumer convenience

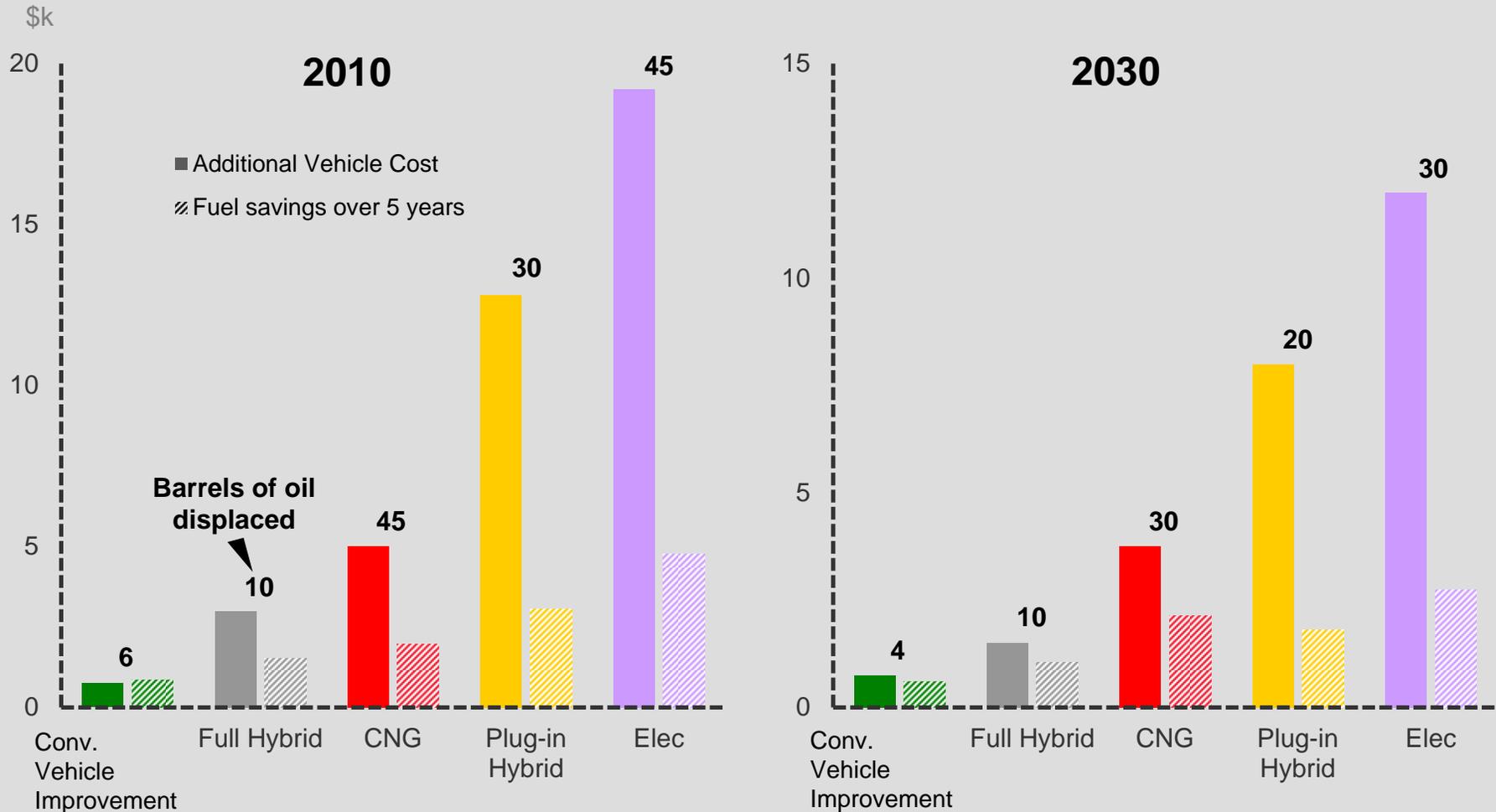


Source: ExxonMobil analysis

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Personal Transportation Choices

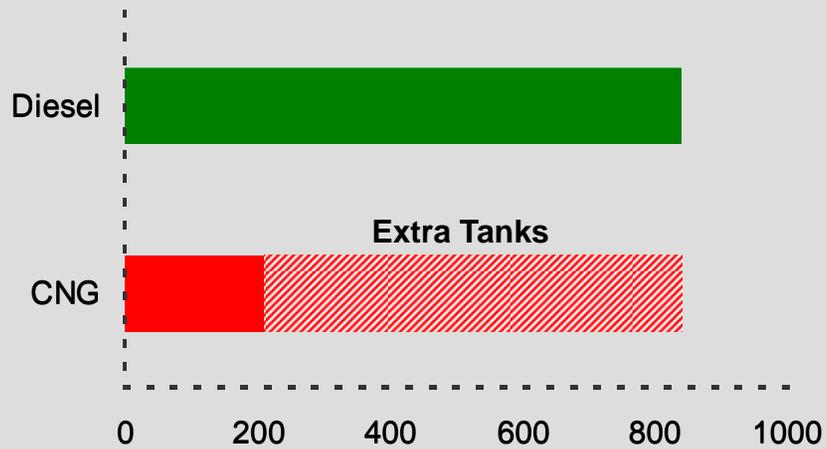
Cost & Savings of Oil Displacement



Costs Impact U.S. Heavy Duty Choices

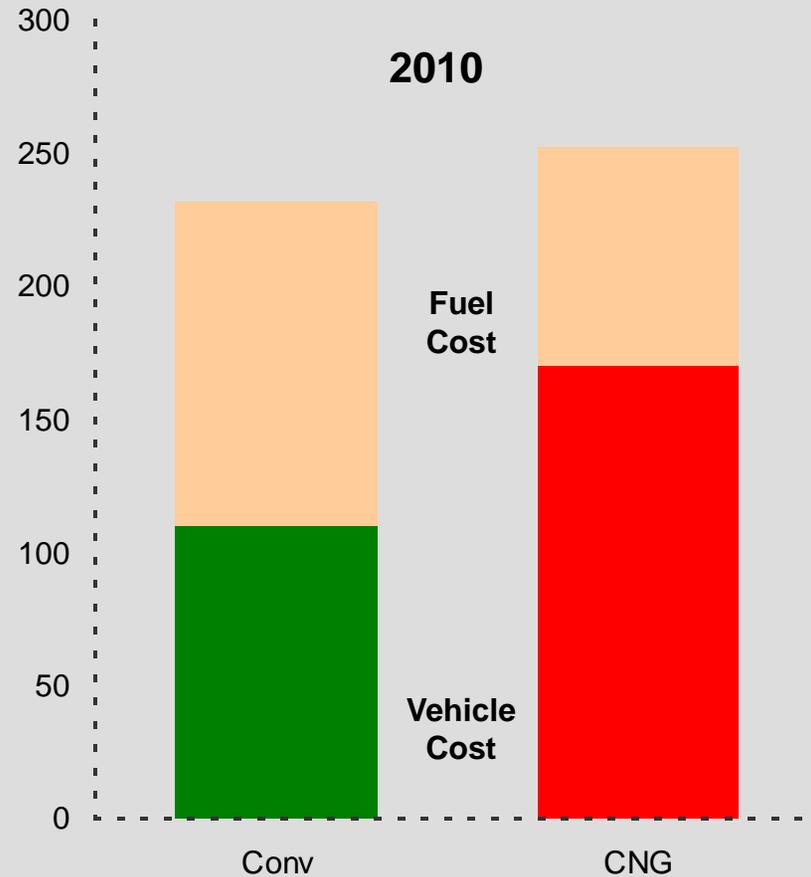
Distance per Fill Up

Miles



5-Year Cost of Ownership

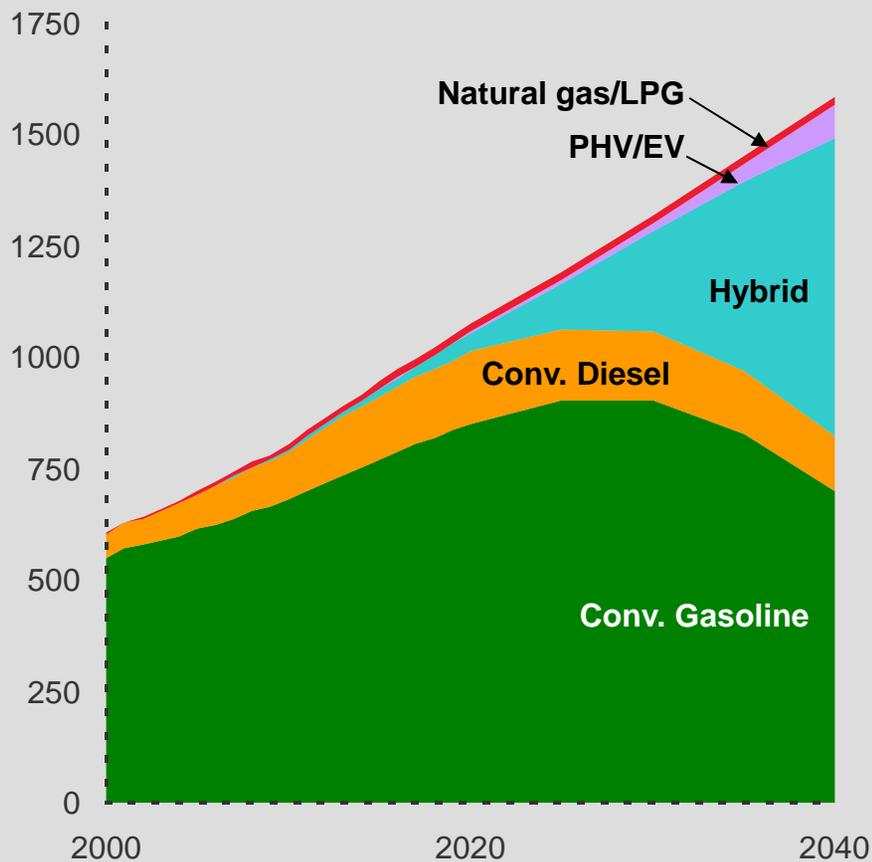
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Impact of Global Fleet Shift on Efficiency

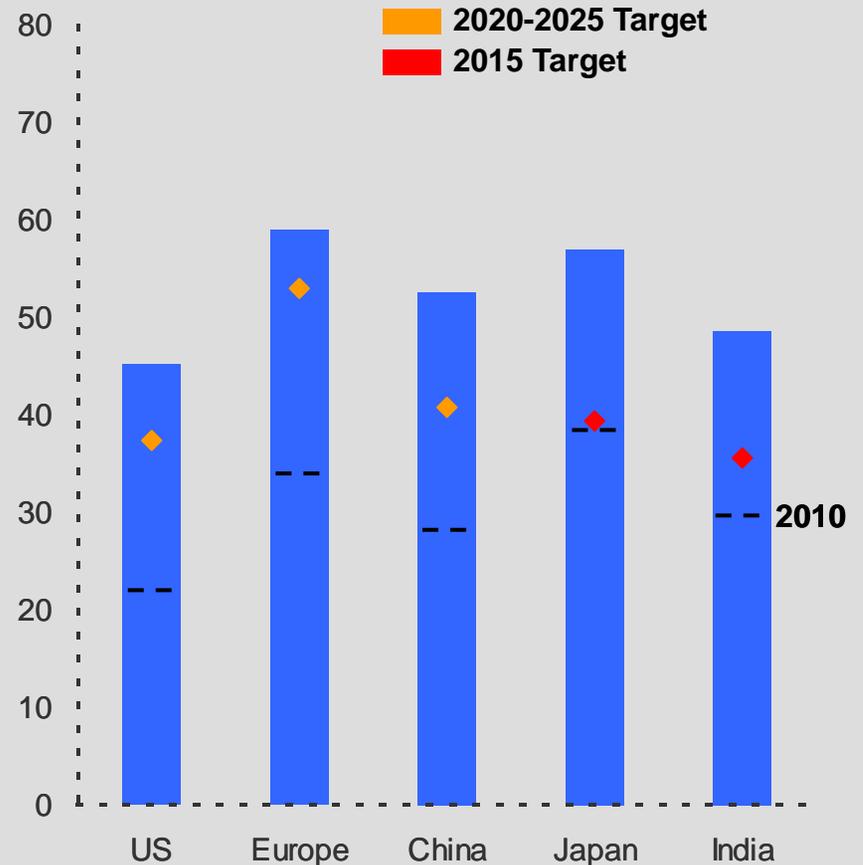
Light Duty Vehicle Fleet by Type

Million Vehicles



Avg New Car Fuel Efficiency in 2040

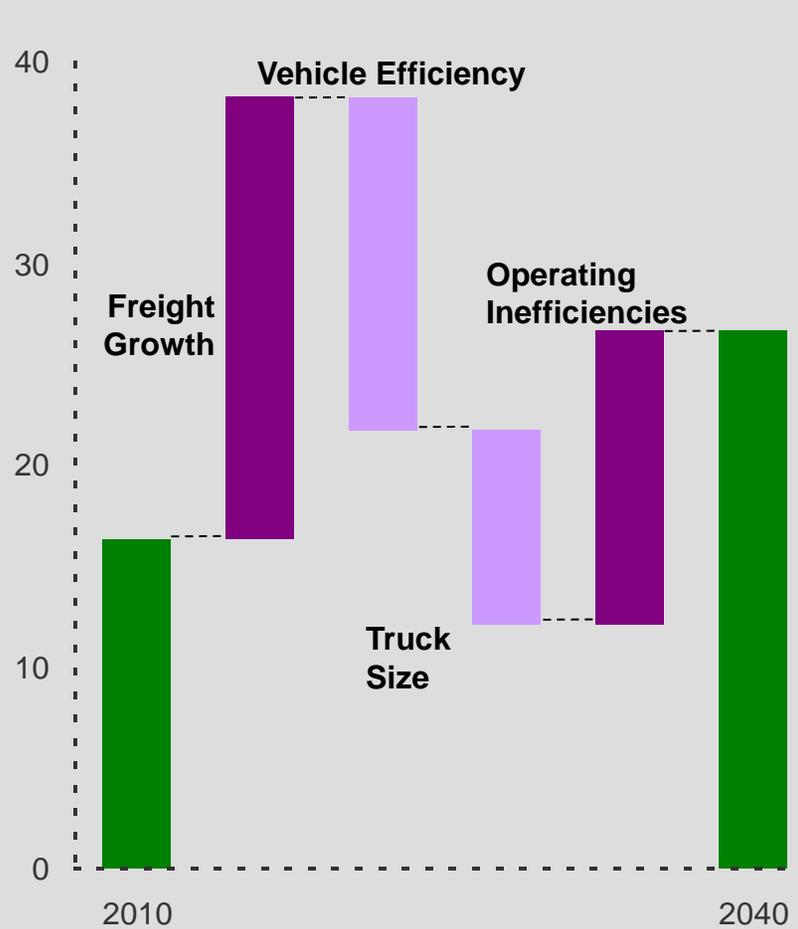
On-Road MPG



Efficiency Tempers Demand Growth

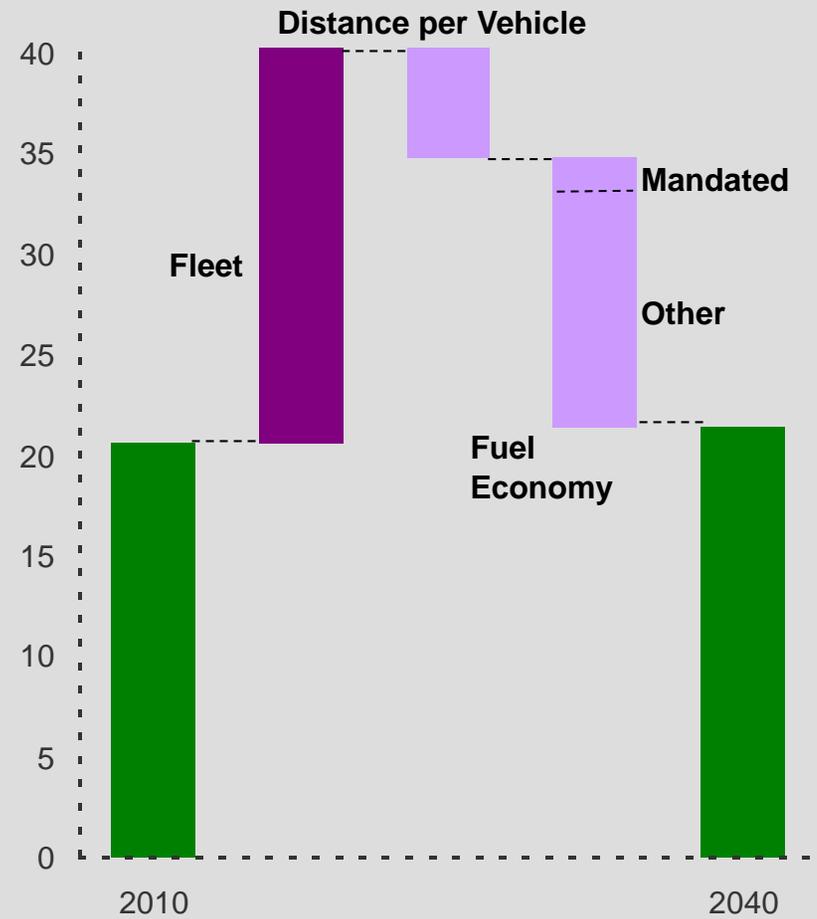
Heavy Duty Demand Changes

MBDOE



Personal Vehicle Demand Changes

MBDOE



Takeaways

- **Transportation is vital to economic growth**
- **Liquid fuels are favored because of their energy density**
- **Abundant sources of liquid fuels are available**
- **“Unconventional” oil resources will play an increasing role in providing liquid fuels for transportation**
- **Alternative fuel sources – ethanol, biodiesel expected to grow**
- **Diversity of supply enhances energy security**
- **Cost will be a factor in consumer choices for fuel and vehicle types**
- **Efficiency is the “virtual” alternative fuel**

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