The Outlook for Energy: A View to 2040

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Global Trends Continue to Evolve

Growth from 2014 Level

Percent

2014 2040

GDP

Demand

Population

Carbon Emissions

ExxonMobil 2016 Outlook for Energy
Key Energy Outlook Themes

**Energy** is fundamental to **standards of living**.

**Developing nations lead** gains in GDP and living standards.

**Economics** and **policies** impact the fuel mix.

**Oil** remains the world’s primary fuel through 2040.

**Natural gas** grows more than any other energy source.

**Technology** has the highest potential and greatest uncertainty.
Energy is fundamental to standards of living.
Energy Fuels Human Development

U.N. Human Development Index
2013 Index

Energy Use per Capita (Thousand BTU/person/day)

Source: United Nations, ExxonMobil estimates
The energy equation

People × living standards = energy needs
The energy equation

U.S. daily usage

7 gallons/day

or

27,000 cell phone batteries
The energy equation

U.S. daily usage: 7 gallons/day

World daily usage: 1.7 gallons/day
The energy equation

7 billion people \times 1.7 \text{ gallons per person} = 12 \text{ billion gallons per day}
Developing nations lead in GDP growth and living standard improvements.
Global GDP Shifts Toward Developing Nations

2014

- OECD*
- Key Growth
- Rest of World
- India
- China

$72 Trillion (2010$)

*Mexico and Turkey included in Key Growth countries
Global GDP Shifts Toward Developing Nations

2014:
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$72 Trillion (2010$)

2040:
- 2.0% per year
- 3.4%
- 3.5%
- 5.5%
- 5.0%
- ~$150 Trillion (2010$)

*Mexico and Turkey included in Key Growth countries
Middle Class and Urbanization Increase

Global Middle Class
Billion People

Urbanization
Percent

Source: The Brookings Institution
*Mexico and Turkey included in Key Growth countries

Source: United Nations

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Demand Growth From Developing Nations

Energy Demand
Quadrillion BTUs

*Mexico and Turkey included in Key Growth countries
Economics and policies impact the fuel mix.
“Children cannot study in the dark. Girls and women cannot learn or be productive when they spend hours a day collecting firewood. Businesses and economies cannot grow without power.”

Secretary-General Ban Ki-moon
United Nations Foundation
We believe the risks of climate change are serious and warrant thoughtful action.

Rex Tillerson, CEO
Exxon Mobil Corporation
CO₂ Policy Assumptions Vary by Region

2040 CO₂ “Proxy” Cost

- < 10 $/ton
- ~ 20 $/ton
- ~ 35 $/ton
- ~ 80 $/ton

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Energy Mix Shifts to Lower-Carbon Fuels

Global Energy Mix

Energy-Related CO₂ Emissions by Region

*Mexico and Turkey included in Key Growth countries
Oil remains the world’s primary fuel through 2040.
Transportation and Chemicals Drive Growth
Transportation Demand

Sector Demand
MBDOE

Rail
Marine
Aviation
Heavy Duty
Commercial
Light Duty

2000 2020 2040
Global Vehicle Fleet

By Type
Million Cars

- Elec/Plug-in/Fuel Cell
- Hybrid
- Natural Gas & LPG
- Diesel
- Gasoline

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Liquids Production

By Region
MBDOE

- OPEC
- Russia
- North America
- Other Non-OPEC

By Type
MBDOE

- Conventional Crude and Condensate
- NGLs
- Tight Oil
- Deepwater
- Oil Sands
- Other
Natural gas grows more than any other energy source.
Gas Demand Grows in All Sectors

Gas Demand by Sector

BCFD

- Electricity Generation
- Industrial
- Res/Comm
- Transportation

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Electricity Demand Continues to Surge

By Sector
Thousand TWh

- Transportation
- Res/Comm
- Industrial

Electricity Demand by Region
Thousand TWh

- China
- United States
- Europe OECD
- India

Key Growth

2014

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Fuel for Electricity Transitions

Electricity Delivered by Type

Thousand TWh

- Other Renewables
- Wind & Solar
- Nuclear
- Gas
- Coal
- Oil
- OECD

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Technology has the highest potential and greatest uncertainty.
Technology Helps Us Do More With Less

Global Average Energy Intensity
Thousand BTUs per dollar GDP (2010$)

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Technology Contributes to the Fuel Mix

Global Mix of Fuels

Source: Smil, Energy Transitions (1800-1960)
Global Demand

2040 By Fuel
Quadrillion BTUs

Oil: 0.7% growth 2014 - 2040
Gas: 1.6% growth 2014 - 2040
Coal: -0.2% growth 2014 - 2040
Biomass: 0.3% growth 2014 - 2040
Nuclear: 2.9% growth 2014 - 2040
Solar / Wind / Biofuels: 4.8% growth 2014 - 2040
Hydro / Geo: 1.3% growth 2014 - 2040

Average Growth / Yr. 2014 - 2040: 0.9%
For more information, visit exxonmobil.com/energyoutlook or download the ExxonMobil app