The Outlook for Energy includes Exxon Mobil Corporation's internal estimates and forecasts of energy demand, supply, and trends through 2040 based upon internal data and analyses as well as publicly available information from external sources including the International Energy Agency. Work on the report was conducted throughout 2016. This presentation includes forward looking statements. Actual future conditions and results (including energy demand, energy supply, the relative mix of energy across sources, economic sectors and geographic regions, imports and exports of energy) could differ materially due to changes in economic conditions, 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. This material is not to be used or reproduced without the permission of Exxon Mobil Corporation. All rights reserved.
Global Trends Continue to Evolve

Growth from 2015 Level

Percent

- 100%
- 75%
- 50%
- 25%
- 0%

2015

2040

- 2x GDP
- +25% demand
- +1.8 billion people
- +10% CO₂ emissions
- -45% CO₂ intensity

Global Trends Continue to Evolve

ExxonMobil 2017 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 energy 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
The energy equation

People \times \text{living standards} = \text{energy needs}
Developing Nations Lead Population Growth

Global Population
Billion People

- Non-OECD
- OECD
Purchasing Power and Middle Class Grow

GDP Per Capita
Thousand PPP Dollars

Global Middle Class
Billion People

Source: The Brookings Institution
Non-OECD Leads Economic Growth

World GDP
Trillion 2010$

Growth 2015-2040
Trillion 2010$

- United States: 1.9% AAGR
- China: 4.1% AAGR
- India: Other AP
- Africa: Non-OECD
- Europe: OECD
Energy Fuels Human Development

U.N. Human Development Index
2014 Index

Source: United Nations, ExxonMobil estimates
Demand Growth From Developing Nations

Energy Demand
Quadrillion BTUs

Demand without Efficiency

Energy Savings

Growth 2015-2040
Quadrillion BTUs

Non-OECD

OECD

China

India

Other AP

Africa

Mid East

Americas

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Economics and policies impact the energy mix.
Energy Mix Shifts to Lower-Carbon Fuels

Global Energy Mix

Percent

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil</th>
<th>Gas</th>
<th>Coal</th>
<th>Nuclear</th>
<th>Wind &amp; Solar</th>
<th>Other Renewables</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Energy-Related CO₂ Emissions by Region

Billion Tonnes

<table>
<thead>
<tr>
<th>Region</th>
<th>2010</th>
<th>2025</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-OECD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OECD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Oil remains the world’s primary fuel through 2040.
Transportation and Chemicals Drive Growth

Liquids Demand by Sector

MBDOE

- Transportation
- Industrial
- Res/Comm
- Electricity Generation

Light Duty
Chem
Transportation Demand Driven by Commerce

Sector Demand
MBDOE

- Light Duty
- Heavy Duty
- Aviation
- Marine
- Rail

Years
2000 2020 2040

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Car Penetration Rises

Car Penetration
2014 Cars per Thousand People

Source: demographia.com, ExxonMobil estimates
Personal Mobility Increases

Penetration
Vehicles Per Thousand People

U.S. Car Sales by Class
Percent

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New Car Fuel Economy Improves Rapidly

Average New Car Fuel Economy
Miles per Gallon

World

- 2008: 25
- 2015: 25
- 2040: 50
- Target: 2015, 2040

U.S.

- 2008: 25
- 2015: 25 (Target)
- 2040: 75

E.U.

- 2008: 25
- 2015: 25
- 2040: 75
- Target: 2015, 2040

Japan

- 2008: 25
- 2015: 20
- 2040: 75
- Target: 2015, 2040

China

- 2008: 25
- 2015: 20
- 2040: 50
- Target: 2015, 2040

India

- 2008: 25
- 2015: 21
- 2040: 50
- Target: 2015, 2040
Consumer Preference and Policy Determine Fleet Mix

Fleet by Type
Million Cars

Light Duty Vehicle Demand
MBDOE

Vehicle Miles Traveled
Trillion Miles

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Liquids Supply Highlights Technology Gains

**By Region**
- MBDOE
- Other Non-OPEC
- Russia
- North America
- OPEC

**By Type**
- MBDOE
- OPEC
- Non-OPEC
- Tight Oil
- NGLs
- Deepwater
- Oil Sands
- Biofuels
- Other

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All Scenarios Require Ongoing Development

Natural decline in the absence of further investment

New investment in supply required to offset natural decline and meet growing demand

*Based on IEA sources; excludes biofuels
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

Electricity Demand by Region

Thousand TWh

![Graph showing electricity demand by region from 1980 to 2040. Key regions include United States, Europe, India, Other Asia Pacific, China, and Other.](image)

Electricity Net Delivered by Type

Thousand TWh

![Graph showing electricity net delivered by type from 2000 to 2040. Types include Oil, Coal, Nuclear, Gas, Wind & Solar, and Other Renewables.](image)

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Electricity Sources Shift Regionally

Change in Net Delivered Electricity 2015-2040

Thousand TWh

- Gas
- Wind/Solar
- Nuclear
- Other Renewables
- Coal
- Oil

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Fuel for Electricity Transitions

Net Delivered Electricity 2015-2040
Thousand TWh

- Non-Carbon Fuels
- Gas
- Coal
- Oil

U.S, Europe, China, India, Other AP, Middle East, Africa, Rest of World

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Natural Gas Supply

By Production Type
BCFD

By Delivery Type
BCFD

Unconventional
North America

Conventional

Net Local Production

LNG
Pipeline

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

Global Average Intensity

Index

- **CO₂ / Energy**
- **Energy / GDP**
- **CO₂ / GDP**

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CO₂ Abatement Costs

Abatement Cost = \frac{\text{Capital Costs}}{\text{CO₂ Abated}} - \frac{\text{Operating Costs}}{\text{CO₂ Abated}}

Coal

Gas

Dollars

Tonne

$\text{Capital Costs}$

$\text{Operating Costs}$
Clarifying Options to Reduce CO$_2$ Emissions

Average U.S. CO$_2$ Abatement Costs

2016 - Dollars per tonne

- Improved Gasoline Vehicles
- Gas into Power
- Nuclear
- Hybrid Vehicles
- Carbon Capture and Sequestration
- Wind
- Solar
- Electric Cars

0

-100

100

200

300

500+

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Two Paths to CO₂ Reduction

United States Generation Share

- 2005
- 2015

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

Germany Generation Share

- 2005
- 2015

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

CO₂ Intensity of Generation

- 2005
- 2015

Sources: EIA, UBA

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Technology Contributes to the Fuel Mix

Global Mix of Fuels

- Biomass
- Coal
- Deepwater, Oil Sands, Tight Oil
- Gas
- Other Renewables
- Nuclear
- Hydro
- Unconventional Gas
- Oil

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

2040 By Fuel
Quadrillion BTUs

<table>
<thead>
<tr>
<th>Fuel</th>
<th>2015</th>
<th>Average Growth / Yr. 2015 - 2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>200</td>
<td>0.7%</td>
</tr>
<tr>
<td>Gas</td>
<td>150</td>
<td>1.5%</td>
</tr>
<tr>
<td>Coal</td>
<td>100</td>
<td>-0.1%</td>
</tr>
<tr>
<td>Biomass</td>
<td>50</td>
<td>0.2%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>25</td>
<td>2.6%</td>
</tr>
<tr>
<td>Solar / Wind / Biofuels</td>
<td>10</td>
<td>4.7%</td>
</tr>
<tr>
<td>Hydro / Geo</td>
<td>5</td>
<td>1.4%</td>
</tr>
</tbody>
</table>
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