International Energy Outlook 2017

for
Eighth IEA-IEF-OPEC Symposium on Energy Outlooks
February 14, 2018 | Riyadh, Saudi Arabia

U.S. Energy Information Administration
IEO2017 Highlights (Reference case)

• World energy consumption increases from 575 quadrillion Btu in 2015 to 736 quadrillion Btu in 2040, a 28% increase
  – More than 60% of the increase in energy consumption comes from non-OECD Asia
  – Even though demand in the residential and transportation sectors grows more rapidly, the industrial sector still accounts for over 50% of delivered energy consumption in 2040

• Renewable energy is the world’s fastest-growing energy source, increasing an average 2.8%/year between 2015 and 2040

• Fossil fuels remain dominant, supplying 77% of the world’s energy consumption in 2040
  – Natural gas is the fastest growing fossil fuel with consumption increasing an average 1.4%/year between 2015 and 2040, and its use in electricity generation rises an average of 2.8%/year
  – The use of petroleum and other liquid fuels in the transportation sector continues to increase through 2040, but their share decreases from 95% to 88% as the use of alternative fuels increases
World energy consumption rises 28% between 2015 and 2040 in the Reference case with most of the increase occurring in non-OECD countries

World energy consumption
quadrillion Btu

Past trend
Outlook

Non-OECD
OECD

Source: EIA, International Energy Outlook 2017
Asia accounts for most of the increase in energy use in non-OECD regions in the Reference case.

Non-OECD energy consumption by region (quadrillion Btu)

Source: EIA, International Energy Outlook 2017
The industrial sector continues to account for the largest share of energy consumption through 2040 in the Reference case.

**World energy consumption by end-use sector**
quadrillion Btu

Source: EIA, International Energy Outlook 2017
Energy consumption increases over the projection for all fuels other than coal in the Reference case with renewables being the fastest-growing energy source.

World energy consumption by energy source
quadrillion Btu

Source: EIA, International Energy Outlook 2017
Motor gasoline and diesel continue to dominate the transportation fuel mix, but jet fuel, natural gas, and electricity grow fastest in the Reference case.

Transportation sector delivered energy consumption by source (quadrillion Btu)

Past trend vs. Outlook

- Diesel (including biodiesel)
- Other liquids
- Motor gasoline and E85
- Natural gas
- Jet fuel

Source: EIA, International Energy Outlook 2017
In the Reference case, renewables and natural gas provide much of the growth in electricity generation with their combined share of the total rising to 57% in 2040.

**World electricity generation by fuel**

trillion kilowatthours

*Source: EIA, International Energy Outlook 2017*
Wind and solar dominate growth in renewables and represent two-thirds of related capacity additions by 2040

*World net electricity generation from renewable power*

trillion kilowatthours

Source: EIA, *International Energy Outlook 2017*
Liquid fuel supplies increase from 2015 to 2040 with most of the growth occurring in OPEC crude oil and lease condensate.

**World petroleum and other liquids production**

<table>
<thead>
<tr>
<th>Past trend</th>
<th>Outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>47</td>
</tr>
<tr>
<td>2005</td>
<td>34</td>
</tr>
<tr>
<td>2010</td>
<td>16</td>
</tr>
<tr>
<td>2015</td>
<td>21</td>
</tr>
</tbody>
</table>

**Non-OPEC crude and lease condensate**

- **Past trend**: 47
- **Outlook**: 48

**OPEC crude and lease condensate**

- **Past trend**: 34
- **Outlook**: 44

**Other liquids**

- **Past trend**: 16
- **Outlook**: 21

*Source: EIA, International Energy Outlook 2017*
Middle East, the United States, and China account for more than 60% of the world increase in natural gas production.

Increase in natural gas production, 2015-40
trillion cubic feet

Middle East
United States
China
Russia
Australia and New Zealand
Africa
Other non-OECD Asia
Canada
Non-OECD Americas

Source: EIA, International Energy Outlook 2017
IEO2017 Highlights (Reference case)

• World energy consumption increases from 575 quadrillion Btu in 2015 to 736 quadrillion Btu in 2040, a 28% increase
  – More than 60% of the increase in energy consumption comes from non-OECD Asia
  – Even though demand in the residential and transportation sectors grows more rapidly, the industrial sector still accounts for over 50% of delivered energy consumption in 2040

• Renewable energy is the world’s fastest-growing energy source, increasing an average 2.8%/year between 2015 and 2040

• Fossil fuels remain dominant, supplying 77% of the world’s energy consumption in 2040
  – Natural gas is the fastest growing fossil fuel with consumption increasing an average 1.4%/year between 2015 and 2040, and its use in electricity generation rises an average of 2.8%/year
  – The use of petroleum and other liquid fuels in the transportation sector continues to increase through 2040, but their share decreases from 95% to 88% as the use of alternative fuels increases