BP Statistical Review of World Energy
July 2016
2015: A year of plenty
Richard de Caux, head of refining analysis
Key features of 2015
Growth in GDP and energy

GDP and primary energy growth

Annual change, %

Primary energy growth by region

Annual change, %

-4% -2% 0% 2% 4% 6%

Energy intensity GDP Energy


-1% 0% 1% 2% 3% 4% 5% 6%

10-year average 2015

World OECD China Other
Oil and refining
Oil market in 2015

Annual change, Mb/d

Demand

Global growth

Exporters

Importers

Supply

10-year average

2014

2015

10-year average

2014

OPEC

Non-OPEC
Oil market in 2015

Annual change, Mb/d

Demand

Exporters

Importers

Global growth

Supply


OPEC

Non-OPEC
Oil inventories and price

OECD commercial inventories

Past episodes of large oil price falls

Cumulative change in real prices from initial year

Note: Oil prices have been converted into 2015 dollars to show changes in prices adjusted for inflation

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Refinery throughput and margins

Refinery throughput

Annual change, Mb/d

-0.5 0.0 0.5 1.0 1.5 2.0

Other OECD China World

10-year average

2011 2012 2013 2014 2015

Global refining margins*

$/bbl


* Average of regional margins, as defined in the Statistical Review

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Natural gas
### Natural gas demand and supply

#### Regional demand growth

<table>
<thead>
<tr>
<th>Region</th>
<th>Annual change, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>-8%</td>
</tr>
<tr>
<td>Middle East</td>
<td>-4%</td>
</tr>
<tr>
<td>Africa</td>
<td>0%</td>
</tr>
<tr>
<td>S. &amp; C. America</td>
<td>4%</td>
</tr>
<tr>
<td>North America</td>
<td>8%</td>
</tr>
<tr>
<td>Asia Pacific</td>
<td>-8%</td>
</tr>
<tr>
<td>Europe &amp; Eurasia</td>
<td>-4%</td>
</tr>
<tr>
<td>of which EU</td>
<td>0%</td>
</tr>
</tbody>
</table>

#### Regional supply growth

<table>
<thead>
<tr>
<th>Region</th>
<th>Annual change, %</th>
</tr>
</thead>
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<td>-4%</td>
</tr>
<tr>
<td>of which EU</td>
<td>0%</td>
</tr>
</tbody>
</table>

10-year average
US electricity sector

Electricity generation by fuel

<table>
<thead>
<tr>
<th>Year</th>
<th>Coal (GWh)</th>
<th>Gas (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>1500</td>
<td>500</td>
</tr>
<tr>
<td>1995</td>
<td>2000</td>
<td>1500</td>
</tr>
<tr>
<td>2005</td>
<td>2000</td>
<td>1000</td>
</tr>
<tr>
<td>2015</td>
<td>1500</td>
<td>500</td>
</tr>
</tbody>
</table>

Electricity generation cost by fuel

<table>
<thead>
<tr>
<th>Year</th>
<th>Gas ($/MWh)</th>
<th>Coal ($/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>2000</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>2005</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>2010</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>2015</td>
<td>70</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: includes data from EIA, Pira, Platts

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Natural gas prices

European prices

$/mmBtu

*Dutch spot, Oil-linked index, Russian export proxy*
Coal
Global coal market

Global coal demand growth

Annual change, %


Rest of world
China
World

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Non-fossil fuels
Renewables growth

Wind and solar growth
Annual change, TWh

Shares of solar growth

Wind and solar growth

Shares of solar growth

Other
China
Japan
US
EU

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Carbon emissions
Factors driving slower growth of carbon emissions

Contributions to slowdown in 2015 growth vs trend

Note: these charts show, for each factor or geographic entity, the difference between its contribution to the growth of emissions in 2015 and its average contribution to emissions growth over the past decade.
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July 2016
Global energy demand

Consumption by region

<table>
<thead>
<tr>
<th>Billion toe</th>
<th>1965</th>
<th>2000</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>0</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Other Asia</td>
<td>3</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>China</td>
<td>6</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>OECD</td>
<td>9</td>
<td>12</td>
<td>18</td>
</tr>
</tbody>
</table>

Consumption growth by region

10 year average, % per annum

<table>
<thead>
<tr>
<th>Region</th>
<th>1975</th>
<th>1995</th>
<th>2015</th>
<th>2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Asia</td>
<td>4%</td>
<td>6%</td>
<td>8%</td>
<td>10%</td>
</tr>
<tr>
<td>China</td>
<td>12%</td>
<td>10%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>OECD</td>
<td>6%</td>
<td>4%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>World</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Fuel mix

Shares of primary energy

- Oil
- Coal
- Gas
- Hydro
- Nuclear
- Renewables*

Annual demand growth by fuel

- Renew.*
- Hydro
- Nuclear
- Coal
- Gas
- Oil

*Includes biofuels

2016 Energy Outlook

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Speed of transition

Shares of global primary energy

Years from reaching 1% share

- Oil (1877)
- Gas (1899)
- Nuclear (1974)
- Hydro (1922)
- Renewables (2008)
- (projected)

Note: - For sources of data pre-1965 see "Economic development and the demand for energy" by Ruehl et al, Energy Policy, 2012
Oil demand and supply

Demand

- 2014: 
- OECD decline
- Non-OECD growth

Supply

- 2014:
- Non-OPEC growth
- OPEC growth

2035 level

Countries:
- China
- Mid East
- Other Asia
- India
- Other
- Brazil
- US
Oil demand

Liquids fuel demand by sector

- Transport
- Industry
- Other
- Power

Vehicle fleet

- Non-OECD
- OECD

2016 Energy Outlook
Tight oil supply forecasts

10-year supply increments

Changes in US tight oil forecasts

Mb/d

S & C America
Europe & Eurasia
Asia Pacific
North America

Forecast year:
- 2013
- 2014
- 2015
- 2016

2016 Energy Outlook
Changing outlook for carbon emissions
Carbon emissions

2016 Energy Outlook
Outlook for carbon emissions

Billion tonnes CO₂

- Base case
- IEA 450

1975 1995 2015 2035
Outlook for carbon emissions

Billion tonnes CO₂

- Base case
- Faster transition
- IEA 450

1975 1995 2015 2035

2016 Energy Outlook
Impact of faster transition case

Consumption by fuel

- Oil
- Coal
- Gas
- Hydro & Nuclear
- Renewables*

Annual demand growth by fuel

- Mtoe per annum

2014-35
- Renew.*
- Hydro
- Nuclear
- Coal
- Gas
- Oil
- Total

*Includes biofuels

1994-2014 Base case Faster transition

2016 Energy Outlook
Conclusions

- Global demand for energy continues to rise
  - to power increased levels of activity as the world economy continues to grow

- Fuel mix changes significantly
  - coal losing, renewables gaining, and oil and gas combined holding steady

- Growth rate of carbon emissions slows sharply
  - but further policy changes are needed