Spencer Dale, group chief economist

Energy in 2017: two steps forward, one step back
Growth in GDP and energy productivity

OECD
Non-OECD

2017
2006-16

Annual change, %

GDP
Primary energy
Energy productivity
Shares of primary energy consumption

Primary energy fuel mix

Consumption growth by fuel

Note: Oil includes biofuels
Oil demand growth

Growth by importers and exporters

Growth by product

10-year average

-0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 Mb/d

2015

2016

2017

Importers

Exporters

Total growth

-0.5 0.0 0.5 1.0 1.5 2.0 2.5 3.0 Mb/d

2015

2016

2017

Gasoline

Jet/Kero

Fuel oil

Other products

Total growth

Gasoil/Diesel

Fuel oil

Other products

Total growth
Production cuts versus tight oil increases

Change in supply relative to October 2016

Net US tight oil and NGLs

Vienna group

Oct-16
Apr-17
Jul-17
Oct-17
Apr-18
Jan-18
Apr-18
Jan-17
Oct-16
Natural Gas
Natural gas consumption and production

<table>
<thead>
<tr>
<th>Country</th>
<th>Consumption (bcm)</th>
<th>Production (bcm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>175</td>
<td>-25</td>
</tr>
<tr>
<td>Russia</td>
<td>150</td>
<td>25</td>
</tr>
<tr>
<td>Iran</td>
<td>125</td>
<td>50</td>
</tr>
<tr>
<td>Turkey</td>
<td>100</td>
<td>75</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>75</td>
<td>100</td>
</tr>
<tr>
<td>Australia</td>
<td>50</td>
<td>125</td>
</tr>
<tr>
<td>Rest of world</td>
<td>-25</td>
<td>150</td>
</tr>
</tbody>
</table>

10-year average

- China: 175 bcm
- Russia: 150 bcm
- Iran: 125 bcm
- Turkey: 100 bcm
- Saudi Arabia: 75 bcm
- Australia: 50 bcm
- Rest of world: -25 bcm
China LNG imports and receiving capacity

Impact of Chinese gas surge

Impact of Chinese gas surge

Impact of Chinese gas surge

China wholesale LNG prices

Average northern China

Thousand RMB/tonne

Million tonnes

Million tonnes

Million tonnes

Million tonnes

Million tonnes
US LNG exporters' costs and Asian spot prices

- Operating costs = 1.15 * Henry Hub + $2/mmBtu (transport)
- Full costs also include liquefaction fee ($3/mmBtu)
Gas price correlation and volatility

- **HH** (Henry Hub, US)
- **NBP** (National Balancing Point, UK)
- **JKM** (Japan Korea Marker)

Gas price volatility

- **HH (US)**
- **NBP (Europe)**
- **JKM (Asia)**
Coal
Global coal consumption and production

Regional contributions

Annual change, %

Production growth and consumption growth and production


Annual change, %

RoW China US India

Regional contributions

-4% -2% 0% 2% 4% 6% 8%
Power
Growth in power generation

By fuel

By region
Growth in solar capacity and generation

Capacity

Growth in solar capacity and generation

Generation
Fuel shares in power generation
Carbon emissions
Growth in carbon emissions 2017 vs 2013-16

GDP and carbon emissions

Energy intensity of GDP
Carbon intensity of energy

Note: change in the carbon intensity of GDP is the sum of energy intensity of GDP and carbon intensity of energy.
Spencer Dale, group chief economist

Energy in 2017: two steps forward, one step back
Oil supply growth

2017

2016

Non-OPEC

OPEC

US

Others

Total supply

Annual change, Mbd
Vienna Group production cut

- Actual cut (April 2018)
- Target reduction

Vienna Group (LHS)

Mb/d

Mb/d

-3.0
-2.5
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0

Venezuela

Rest OPEC-12

Saudi Arabia

Non-OPEC

Production cuts
US tight oil and oil prices

WTI
Tight oil (RHS)
LNG glut?

Source: PIRA, IHS, WoodMacKenzie, BP

Additional demand/supply from 2014 (million tonnes)
Chinese coal prices

Target band
Area of increasing concern
Red lines

Source: includes data from IHS Markit

Chinese Qinhuangdao spot price

Jan-16
May-16
Sep-16
Jan-17
May-17
Sep-17
Jan-18
May-18

Chinese coal prices

RMB/tonne

Jan-16
May-16
Sep-16
Jan-17
May-17
Sep-17
Jan-18
May-18

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