Energy in 2013: Taking stock

Christof Rühl, Group Chief Economist
Outline

- Introduction
- Energy and the economy
- Fuel by fuel
- Concluding remarks
Reserves and new sources of energy supply

Oil reserves

Gas reserves

Energy production growth 2013

Trillion bbls

Tcm

Annual change, Mtoe

Renewables*
US gas
US oil
World total

1983 1998 2013
1983 1998 2013

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* Includes biofuels

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Energy and the economy

GDP growth

Annual change, %

10% 8% 6% 4% 2% 0% -2% -4%

2003 2005 2007 2009 2011 2013

World | OECD | Non-OECD

Energy and GDP in 2013

Annual change, %

8% 6% 4% 2% 0%

GDP | Energy | GDP | Energy

Non-OECD | OECD

10 year average

Source: includes data from Oxford Economics
Note: GDP growth based on Purchasing Power Parity measure of GDP

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## Energy consumption in 2013

### Growth by region

<table>
<thead>
<tr>
<th>Region</th>
<th>-3%</th>
<th>0%</th>
<th>3%</th>
<th>6%</th>
<th>9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
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<tr>
<td>Middle East</td>
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<tr>
<td>S &amp; C America</td>
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<tr>
<td>Europe &amp; Eurasia</td>
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<tr>
<td>Asia Pacific</td>
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<td>of which China</td>
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<tr>
<td>North America</td>
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<tr>
<td>of which US</td>
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### Growth by fuel

<table>
<thead>
<tr>
<th>Fuel</th>
<th>-3%</th>
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<th>3%</th>
<th>6%</th>
<th>9%</th>
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<tbody>
<tr>
<td>Renewables</td>
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<tr>
<td>Nuclear</td>
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<tr>
<td>Hydro</td>
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<tr>
<td>Gas</td>
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<tr>
<td>Coal</td>
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<td>of which China</td>
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<tr>
<td>Oil</td>
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<tr>
<td>of which US</td>
<td></td>
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</tbody>
</table>

10 year average

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The oil market in 2013

Oil prices and volatility

- Price volatility (RHS)
- Oil price

Volatility*

$/bbl

Production and consumption growth

Annual change, Mb/d

Source: Includes data from Platts
* Three year standard deviation

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Oil consumption by product

Growth by product type in 2013

- Middle distillates
- Gasoline

10 year average

US growth in 2013

- LPG* and naphtha
- Gasoline
- Middle distillates
- Other

10 year average

* Includes ethane

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Oil supply disruptions

Cumulative change since 4Q10, Mb/d

Source: includes data from US Energy Information Administration
Note: Other includes Sudan/S Sudan, Syria & Yemen
Oil supply disruptions and US production growth

Cumulative change since 4Q10, Mb/d

Source: includes data from US Energy Information Administration
Note: Other includes Sudan/S Sudan, Syria & Yemen

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Refining capacity

Capacity growth in 2013

<table>
<thead>
<tr>
<th>Region</th>
<th>Capacity Change (Mb/d)</th>
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</thead>
<tbody>
<tr>
<td>N America</td>
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<td>S &amp; C America</td>
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Crude run changes

Cumulative spare capacity growth

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<th>Year</th>
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<th>OECD</th>
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<td>2012</td>
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<tr>
<td>2013</td>
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</tbody>
</table>

Source: Includes data from ICIS Parpinielli Tecnon and Energy Security Analysis, Inc.

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Refinery utilization and crude differentials

Refinery utilization

- World
- OECD
- Non-OECD

Brent-WTI

$/bbl

2009 2010 2011 2012 2013 2014

Source: Includes data from Energy Security Analysis, Inc. and Platts

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Global natural gas markets

Natural gas prices

<table>
<thead>
<tr>
<th>$/mmBtu</th>
<th>1998</th>
<th>2003</th>
<th>2008</th>
<th>2013</th>
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<tr>
<td>Japanese import</td>
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<tr>
<td>German import</td>
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</tr>
<tr>
<td>UK NBP</td>
<td></td>
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<tr>
<td>US HH</td>
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</tbody>
</table>

Gas consumption growth in 2013

-2% | 1% | 4% | 7%

<table>
<thead>
<tr>
<th>Region</th>
<th>Annual change, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>S &amp; C America</td>
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<tr>
<td>Middle East</td>
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<td></td>
</tr>
<tr>
<td>Europe &amp; Eurasia</td>
<td>10 year average</td>
</tr>
</tbody>
</table>

Source: Includes data from BAFA, Energy Intelligence and ICIS Heren Energy

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US natural gas market

Horizontal drilling rigs

Number of rigs

- 1400
- 1050
- 700
- 350
- 0

Feb-11 Feb-12 Feb-13 Feb-14

Oil

Gas

Consumption growth in 2013

Annual change, Bcm

- 60
- 40
- 20
- 0
- -20
- -40

10 year average 2012 2013

Residential & Commercial

Industrial

Power

Source: Includes data from Baker Hughes and US Energy Information Administration

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The coal market

Coal prices

Growth in China

$/tonne

Annual change, Mtoe

Source: Includes data from IHS McCloskey and Platts

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Hydro, renewables and nuclear

Power generation

Non-fossil share of power (RHS)

Hydro

Nuclear

Renewables

Output changes in 2013

Annual change, TWh

Other

EU

China

US

Nuclear

Hydro

Renewables

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Renewables in power generation

Growth by region

<table>
<thead>
<tr>
<th></th>
<th>Annual change, TWh</th>
<th>Annual change, %</th>
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<tbody>
<tr>
<td>2003</td>
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Renewables share of power

- EU
- US
- World
- China

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Fuel shares and carbon emissions

Shares of global primary energy

Energy and emissions growth in 2013
Annual change, %

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Changes in energy balances

Fossil fuel imbalances

Change in imbalances, 2003-2013

Mtoe

Note: Imbalances defined as production minus consumption

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Trade balances and energy

US

<table>
<thead>
<tr>
<th>Year</th>
<th>Other goods &amp; services</th>
<th>Energy</th>
<th>Net balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>-0.8</td>
<td>0.0</td>
<td>-0.8</td>
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<tr>
<td>2005</td>
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<tr>
<td>2009</td>
<td>0.0</td>
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China

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Russia

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Source: Includes data from CEIC and Thomson Reuters Datastream

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Energy in 2013

• Energy and the economy – a two way relationship
• When things happen – ask the data
• Markets work – if you let them
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