Energy Perspectives 2014
Long-term macro and market outlook

Eirik Wærenesk, Chief economist
Energy Perspectives 2014
30-year macro and market outlook – www.statoil.com/energyperspectives

• The global economy
  – Growth close to historic average (3%)
  – Two speeds – non-OECD catching up

• Overall energy market outlook
  – 1.3% annual growth (oil 0.6%, coal: 1.1%)
  – Moderate greening of energy mix

• Global oil and gas markets
  – Oil demand peaks around 2030
  – Gas demand increasing (1.4% per year)

• Strong growth in new renewables (8%)
  – … but CO₂ emissions grow until around 2030…
Long-term forecasts are uncertain
Sustainability, politics and technological progress are drivers of uncertainty

Sources: The Economist, blog.enerdynamics.com, guanming.online, Gettyimages.com, Øyvind Hagen (Statoil), Paris Diplomatie, IEA, Greenenergybricks.com, BBC
There is more than one possible future
Two alternative states of the world have been established

Source: Statoil
A strong trend affecting economics and energy
Economic gravity moves (back) to the east, and so does energy demand

The global centre of population

Shifting energy demand
Share of total energy demand (TPED)

- Rest of world
- OECD North America
- OECD Europe
- OECD Pacific
- India
- China

Source: Reddit, IEA, Statoil (projections)
Growth, efficiency and energy demand
Non-OECD driving growth, energy efficiency to improve by almost 40%

Source: IHS Global Insight and International Energy Agency (history), Statoil (projections)
Growth is a key driver for energy demand... 
... and is different in alternative scenarios
Energy demand and energy mix differ
... depending on growth, efficiency, technology and policies

Source: IEA (history), Statoil (projections)
Alternative scenarios
Energy mix and energy demand: OECD North America

OECD North America energy mix
Share of total energy demand (TPED), %

<table>
<thead>
<tr>
<th>Year</th>
<th>Ref</th>
<th>LC</th>
<th>PP</th>
</tr>
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<tbody>
<tr>
<td>2010</td>
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<tr>
<td>2020</td>
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<td>2040</td>
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OECD North America energy demand per fuel
Bn toe

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<tbody>
<tr>
<td>2010</td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td>3.0</td>
<td></td>
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</tbody>
</table>

Source: IEA (history), Statoil (projections)
Fossil fuels are here to stay
Considerable need for investments, irrespective of scenario

* Excl. Bio-fuels
Source: IEA (history), Statoil (projections)
Global oil supplies in the reference scenario
Non-Opec growing over the medium-term, Opec comeback long term

Non-Opec oil production
Mbd

- Oil sands
- Non-Opec NGL
- Non-Opec conv. Crude
- Non-Opec tight oil
- Other sources*

Opec oil production
Mbd

- Opec NGL/condensate
- Kuwait
- Iraq
- Other Opec
- Iran

* Bio-fuels, GTL, processing gains
Source: IEA (history), Statoil (projections)
Energy related CO₂ emissions vary considerably
… driven by energy intensity, fuel mix and CCS

Source: Statoil, IEA WEO 2013
Energy related CO₂ emissions, cont.
Development in China and other emerging economies is key

OECD Europe CO₂ emissions

Bn tons

China CO₂ emissions

Bn tons

Source: Statoil, IEA WEO 2013
Regional growth in energy demand 2012-2040
CAGR, %

- North America (incl. Mexico): 0.3, 0.3, 2.1
- OECD Europe: 0.2, -0.6, -0.9
- Middle East: 1.8, 2.2
- China: 1.3, 1.7
- India: 3.5, 2.5
- Rest of the world: 1.1, 0.0, 1.3, 2.5, 2.1

World: 1.1, 0.6, 1.4, 1.5, 2.4
There's never been a better time for good ideas

Thank you!
Key messages

• Globalisation and integration continue
• Divergent growth and catch-up
  – OECD 1.9%, non-OECD 4.5%
  – Long-term moderation in China
• Energy intensity improves by 1.5%
• Energy demand (TPED) grows by 1.3%
• Gradual greening of energy mix
  – New renewables grow by 8%
  – Coal and oil grows by 1.1% and 0.6%, respectively
• Special chapters on different scenarios

• Global oil demand peaks around 2030
  – 0.6% average growth 2011-2040
  – Non-Opec production rising medium term, Opec regaining importance long term
  – Unconventional supply gaining importance
• Global gas demand grows 1.4% on average
  – Share of fuel mix up from 21% to about 23%
  – Demand increasing in several regions
  – LNG gaining importance
  – Unconventional gas supply key uncertainty
What if the world develops differently?

Two alternative states of the world have been established

<table>
<thead>
<tr>
<th>Deviating assumptions</th>
<th>Low Carbon scenario</th>
<th>Policy Paralysis scenario</th>
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</thead>
<tbody>
<tr>
<td>Preconditions</td>
<td>Pollution and mounting evidence of global warming</td>
<td>Geopolitical tensions</td>
</tr>
<tr>
<td>GDP growth</td>
<td>Higher, lower, higher</td>
<td>Lower</td>
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<tr>
<td>Wholesale oil, gas and coal prices</td>
<td>Lower</td>
<td>Volatile</td>
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<tr>
<td>Climate policies</td>
<td>Radical at all levels</td>
<td>Limited international cooperation</td>
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<tr>
<td>Efficiency improvement</td>
<td>Faster</td>
<td>Slower</td>
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<td>Penetration of new renewables in the power sector</td>
<td>Faster, and more nuclear</td>
<td>Slower</td>
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<tr>
<td>Removal of fuel subsidies</td>
<td>Quicker</td>
<td>Slower</td>
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<tr>
<td>CO₂ prices</td>
<td>Higher</td>
<td>Lower in Europe, zero everywhere else</td>
</tr>
<tr>
<td>CCS</td>
<td>Takes off</td>
<td>Almost no progress</td>
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<tr>
<td>Other</td>
<td>Faster penetration of electricity, gas and biofuels in the transport sector</td>
<td>Emphasis on energy self-sufficiency favouring coal, in some places gas</td>
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