EU ENERGY AND CLIMATE CHANGE POLICY

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DEFINITIONS & CAUTIONARY NOTE

Cautionary Note

Reserves: Our use of the term “reserves” in this presentation means SEC proved oil and gas reserves. Resources: Our use of the term “resources” in this presentation includes quantities of oil and gas not yet classified as SEC proved oil and gas reserves. Resources are consistent with the Society of Petroleum Engineers 2P and 2C definitions.

Organic: Our use of the term Organic includes SEC proved oil and gas reserves excluding changes resulting from acquisitions, divestments and year-average pricing impact. Resources plays: our use of the term ‘resources plays’ refers to tight, shale and coal bed methane oil and gas acreage.

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The New Lens Scenarios are part of an ongoing process used in Shell for 40 years to challenge executives’ perspectives on the future business environment. We base them on plausible assumptions and quantification, and they are designed to stretch management to consider even events that may be only remotely possible. Scenarios, therefore, are not intended to be predictions of likely future events or outcomes and investors should not rely on them when making an investment decision with regard to Royal Dutch Shell plc securities.

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OUTLINE

- EU Framework for Climate and Energy to 2030
- Global context
- EU energy pathways
- Decarbonisation pathways and the role of CCS
- Policy needs
- What is Shell doing for a lower carbon future?
Aims to make the European Union's economy and energy system more competitive, secure and sustainable

- Reducing greenhouse gas emissions by 40% below 1990 level by 2030
  - Sectors covered by the EU-ETS need to reduce by 43% compared to 2005.
  - Sectors outside the EU-ETS need reduce by 30% below the 2005 level.
  - Ensuring a cost-effective track towards cutting emissions by 80% by 2050.
  - Enables EU to engage actively in the negotiations on a new international climate agreement that should take effect in 2020.
This effort would be shared equitably between the Member States.

- Increasing the share of renewable energy to at least 27%
  - Non-binding for individual member states

- Increasing energy efficiency by 30%

- Reform of the EU Emissions Trading System
  - Establishment of a market stability reserve at the beginning of the next ETS trading period in 2021, addressing the surplus of emission allowances that has built up in recent years and improve the system's resilience to major shocks by automatically adjusting the supply of allowances to be auctioned.
THE GLOBAL CONTEXT – THE COMPETITION FOR ENERGY

USA & Canada - Total Primary Energy - By Source

Oceans

China - Total Primary Energy - By Source

Oceans

EU - Total Primary Energy - By Source

Oceans

Asia (excl China) - Total Primary Energy - By Source

Oceans

Source: Shell FSB-Energy
What energy choices will be driven by policy and what by global drivers?

By 2020 around 20% Renewables and by 2030 between 25-35% True efficiency gains difficult to assess

Source: Shell FSB-Energy
A strong uptake of Renewables can only be accommodated by strong uptake of electrification of sectors.
A scenario of higher commodity prices and CO₂ pricing will increase efficiency and substitution – and reduce imports by more than half by 2050

Source: Shell FSB-Energy

These regional outlooks are based on many assumptions and interpretations of possible future choices from today's perspective. Many uncertainties remain and many alternatives are possible. It should be seen as a starting point for discussion and Shell by no means advocates any of these outlook as a preferred or inevitable one.
The CO₂ reduction targets of 20% by 2020, 40% by 2030 and 80% by 2050 fall somewhat short, unless land use and industry can make up the difference.

EU - CO₂ Emissions from energy

By 2020 between 5-10% reduction from energy, by 2030 between 20-30% and by 2050 between 55-60%
OVERSHOOT, DAMAGE ... REPAIR?

Exploratory scenarios

plausible but sustainable?

Normative scenario

Sustainability, but implausible

Source: Shell FSB-Energy
CONTRIBUTIONS TO GREENHOUSE GAS REDUCTION

Nuclear 8% (8%)
Power generation efficiency and fuel switching 3% (1%)
Renewables 21% (12%)
End-user fuel switching 12% (12%)
CCS 14% (17%)
End user fuel and electricity efficiency 42% (39%)

Source: IEA Energy Technology Perspectives, 2012
CCS expected to be cost competitive

CCS EUROPEAN STATE OF PLAY

- Large-scale demonstration projects proposed, some operating
- Demonstration funds (EERP and NER300) available

But progress largely stalled due to:
- ETS ineffective as CCS driver
- Lack of Member State support
- Lack of public support for onshore storage
DEVELOP CO₂ INFRASTRUCTURE & CLUSTERS

- Compression Facilities
- Emitters
- Major CO₂ point source
- Potential pipeline
- Potential shipping route
- Planned pipeline
- Existing pipeline
- Potential EU pipeline network

- Aquifer Storage
- Oil field
- Gas field
- Cond field

Source: SCCS
### Policy Needs

**CCS** will require a robust CO\(_2\) price, a level playing field with alternative low carbon technologies, and short term demonstration support to drive down costs.

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<td>Development</td>
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<td><strong>Capital Grants</strong> <em>(Support Build)</em></td>
<td><strong>Robust CO(_2) Price</strong>*</td>
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<td><strong>OPEX Support</strong> <em>(Ensure Plant Operates)</em></td>
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<td><strong>Non-Financial Measures</strong> <em>(Enabling Regulations, Liability Agreements, ETC)</em></td>
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WHAT IS SHELL DOING FOR A LOW CARBON FUTURE?

GAS INNOVATION: LNG FOR TRANSPORT

ENERGY EFFICIENCY: REFINERIES

BIOFUELS: RAIZEN JV

CARBON CAPTURE + STORAGE: OIL SANDS
The world’s most advanced test centre for CO₂ capture

Technology demonstration and verification, including Shell Cansolv

Critical step in scaling up CCS
Planned first full-scale CCS project on a gas-fired power station
DEVELOPING PETERHEAD WITH CONFIDENCE

ENABLING LEGISLATION
CCS Directive Transposed
Storage Licence granted
Electricity Market Reform (EMR)
Contracts for Difference (CfD)

CLEAR LIABILITY AGREEMENT
Government accepts the long term liability at handover

EARLY ADOPTER BENEFITS
Peterhead Powerplant operates as baseload
Negotiated CfD

DEMO FINANCIAL SUPPORT
UK CCS Competition offers ‘up-front’ capital grant
Partial FEED funding
Additional R&D support underpinning project
CONCLUDING REMARKS

To build a competitive, secure and sustainable energy system is complex and costly, requiring new forms of co-operation between Governments, Industry, Academia and Society.

We need all forms of energy to meet future demand and the oil and gas industry will continue to fulfil a crucial role in this over the coming decades while new industries grow.

To achieve the CO₂ targets there is a growing need to decarbonise fossil fuels and CCS will play a critical role.