



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?

THE 2030 POLICY FRAMEWORK FOR CLIMATE AND ENERGY

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%

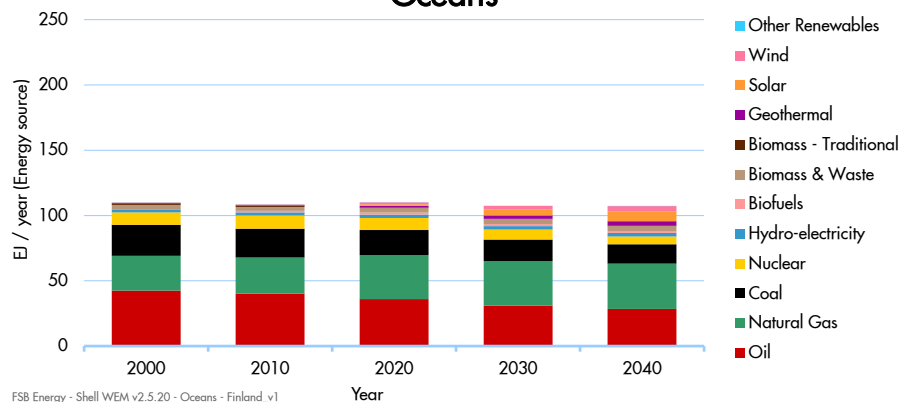
■ Reform of the EU Emissions Trading System

- 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.

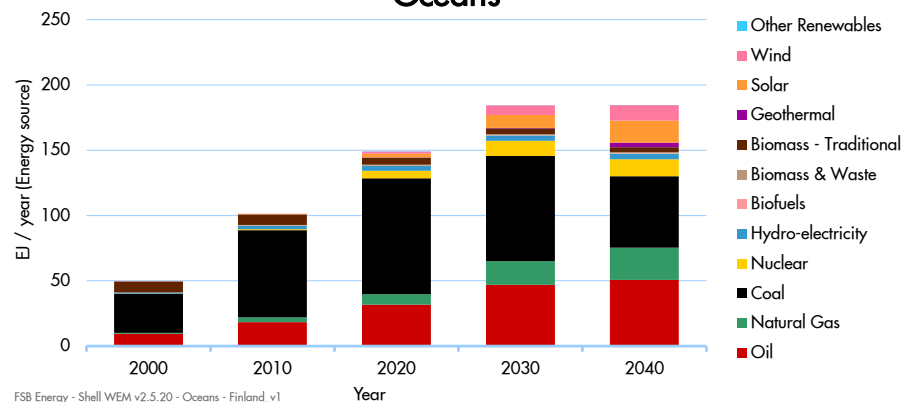
THE GLOBAL CONTEXT – THE COMPETITION FOR ENERGY



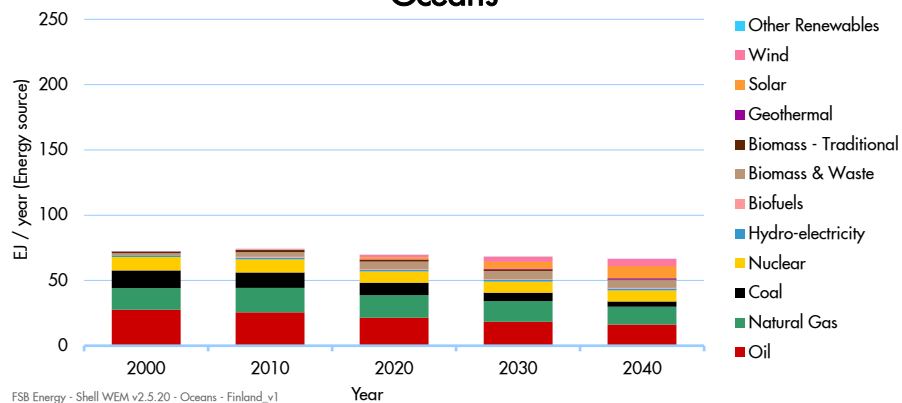
USA & Canada - Total Primary Energy - By Source
Oceans



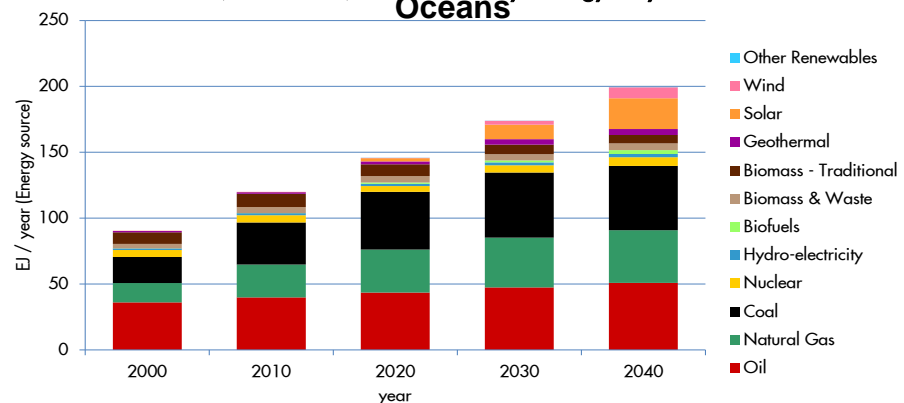
China - Total Primary Energy - By Source
Oceans



EU - Total Primary Energy - By Source
Oceans

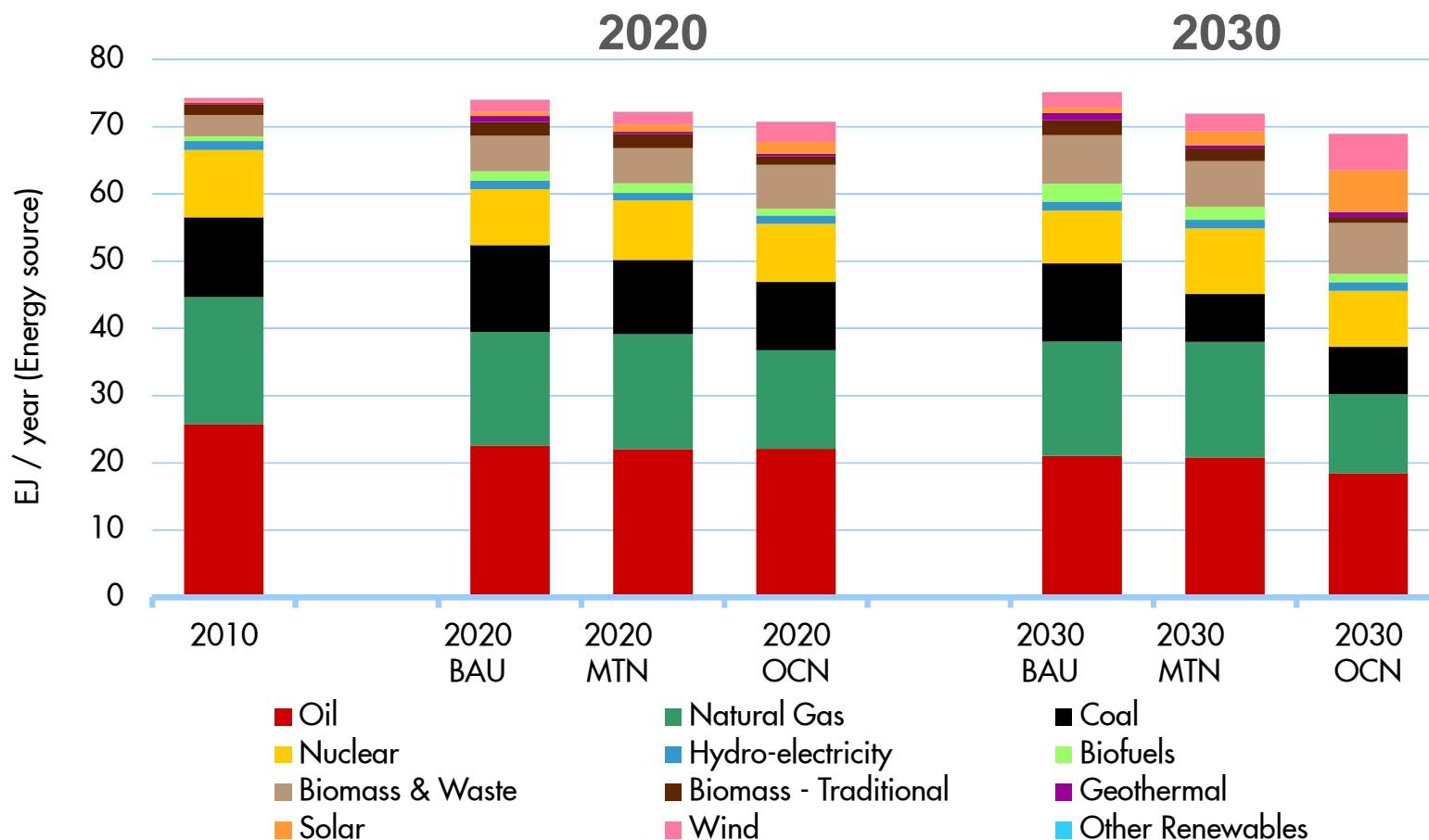


Asia (excl China) - Total Primary Energy - By Source
Oceans



Source: Shell FSB-Energy

What energy choices will be driven by policy and what by global drivers?

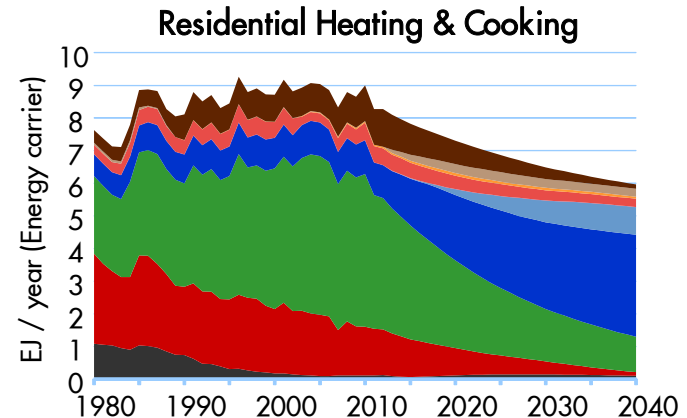
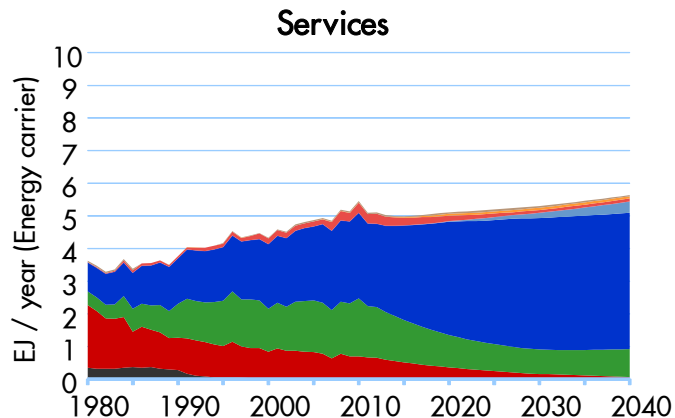
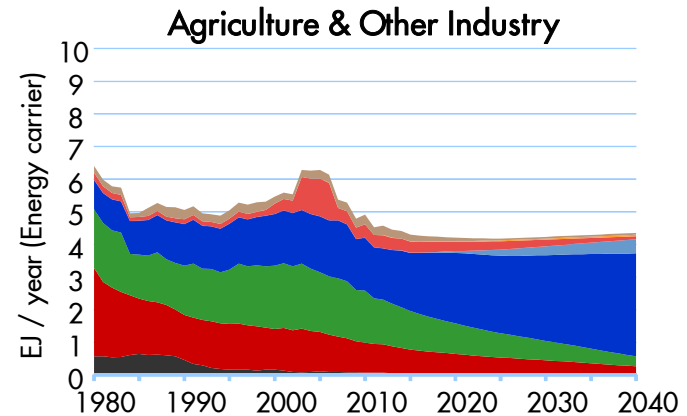
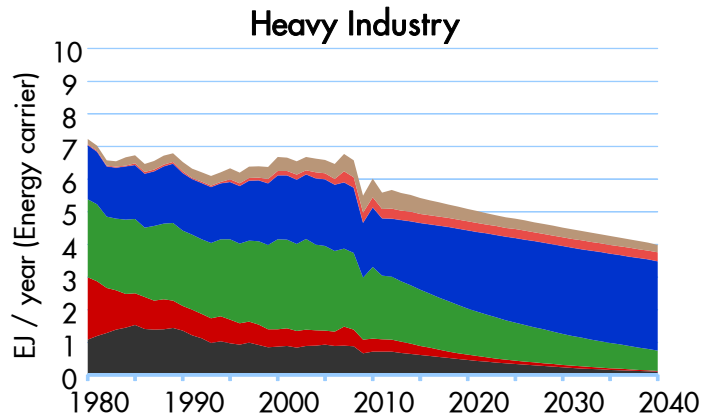


By 2020 around 20% Renewables and by 2030 between 25-35%
True efficiency gains difficult to assess

Source: Shell FSB-Energy

EU-15 TOTAL FINAL CONSUMPTION HOW FAST CAN SECTORS CHANGE?

A strong uptake of Renewables can only be accommodated by strong uptake of electrification of sectors



■ Solid Hydrocarbon Fuels

■ Liquid Hydrocarbon Fuels

■ Gaseous Hydrocarbon Fuels

■ Electricity

■ Hydrogen

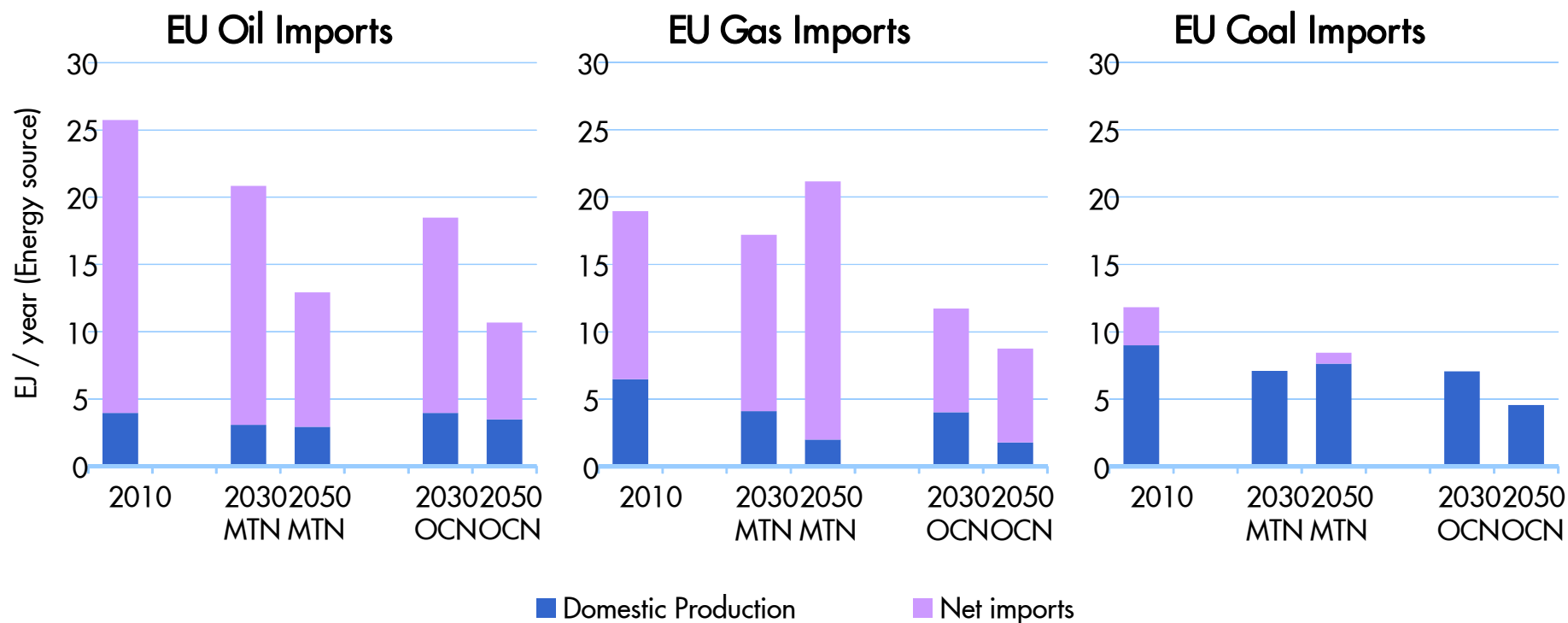
■ Heat

■ Biomass - Commercial

■ Biomass - Traditional

Source: Shell FSB-Energy

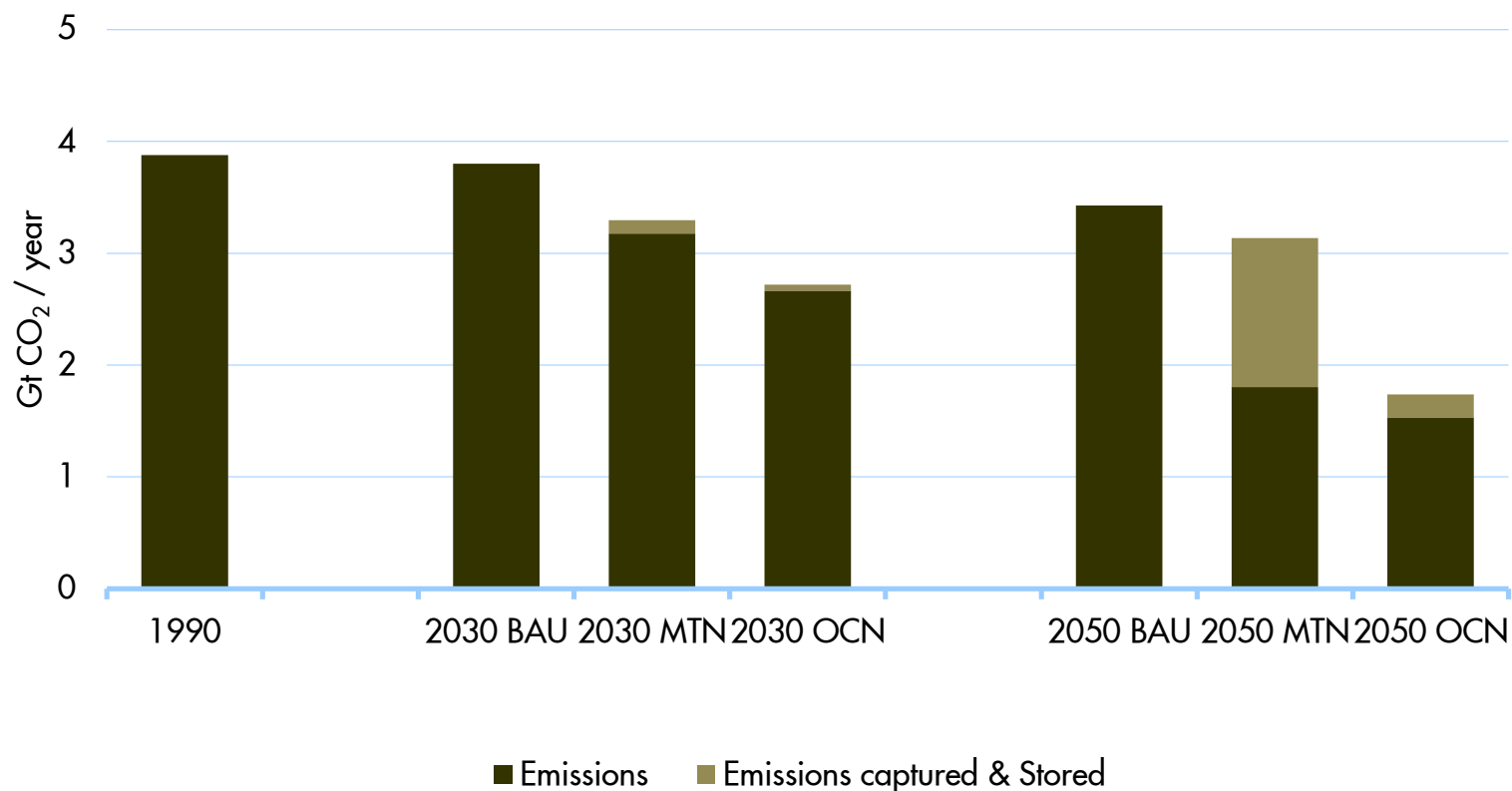
A scenario of higher commodity prices and CO₂ pricing will increase efficiency and substitution – and reduce imports by more than half by 2050



Source: Shell FSB-Energy

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

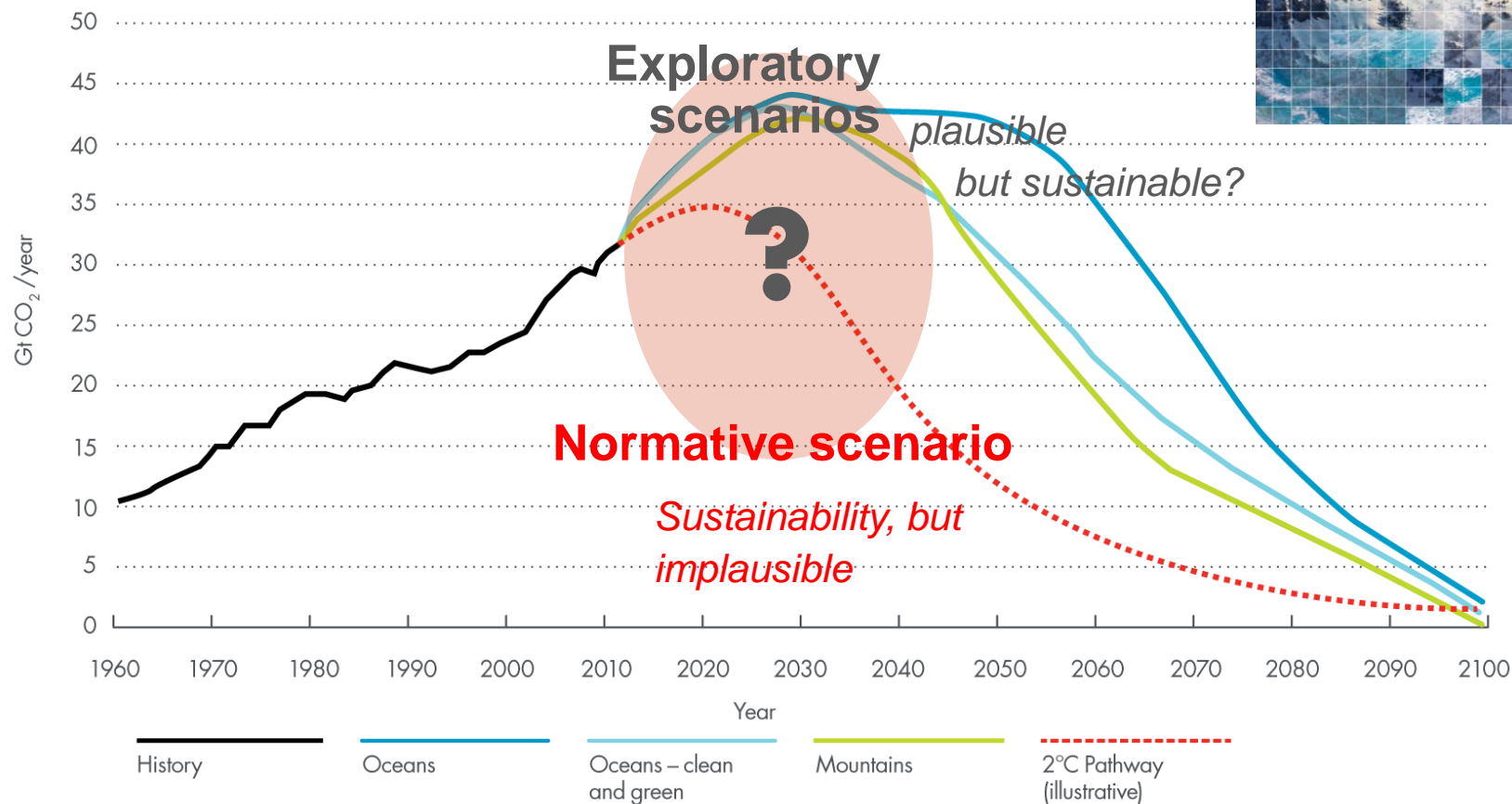


By 2020 between 5-10% reduction from energy, by 2030 between 20-30% and by 2050 between 55-60%

Source: Shell FSB-Energy

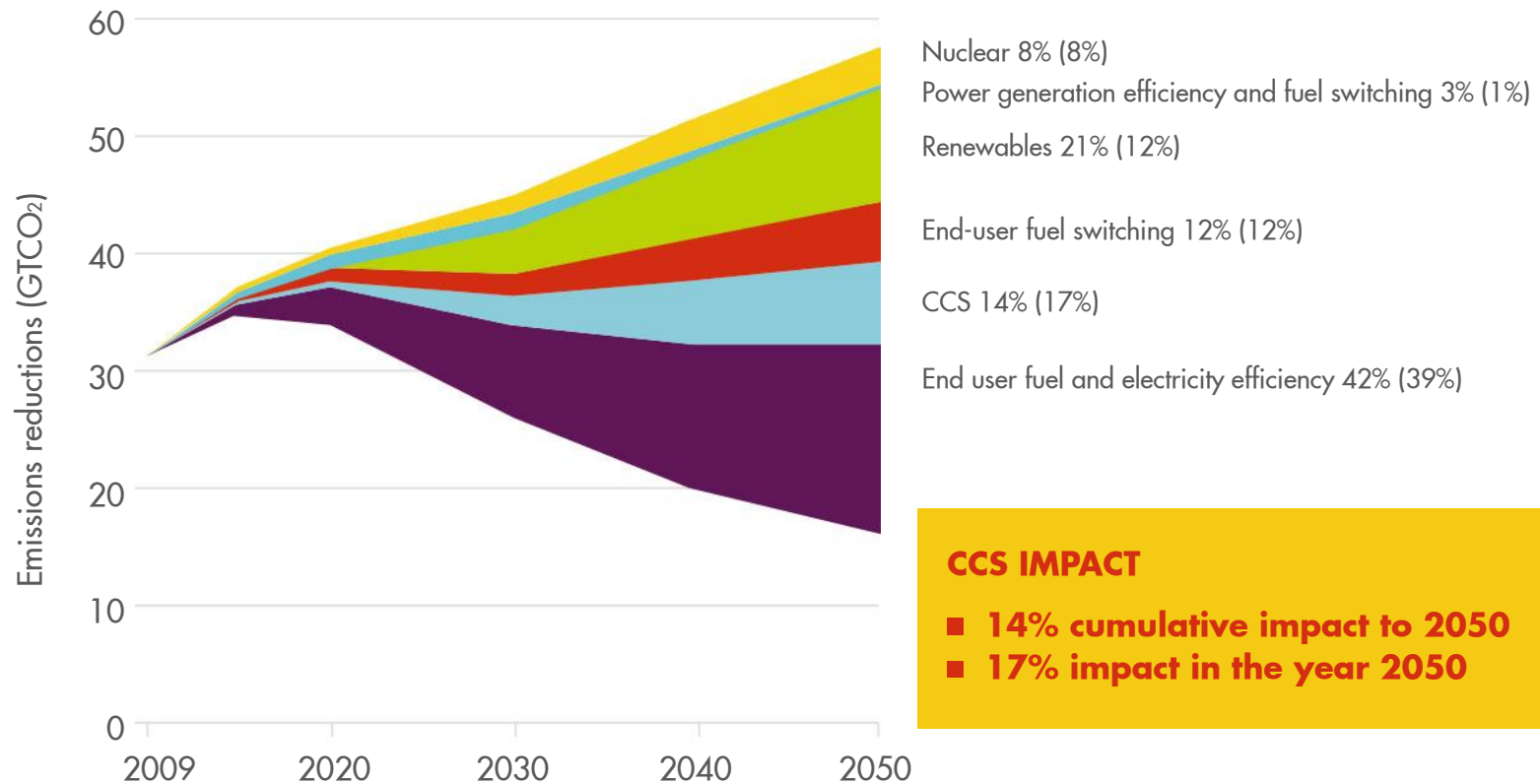
GLOBAL CONTEXT – ENERGY-RELATED CO₂ EMISSIONS

OVERSHOOT, DAMAGE ... REPAIR?



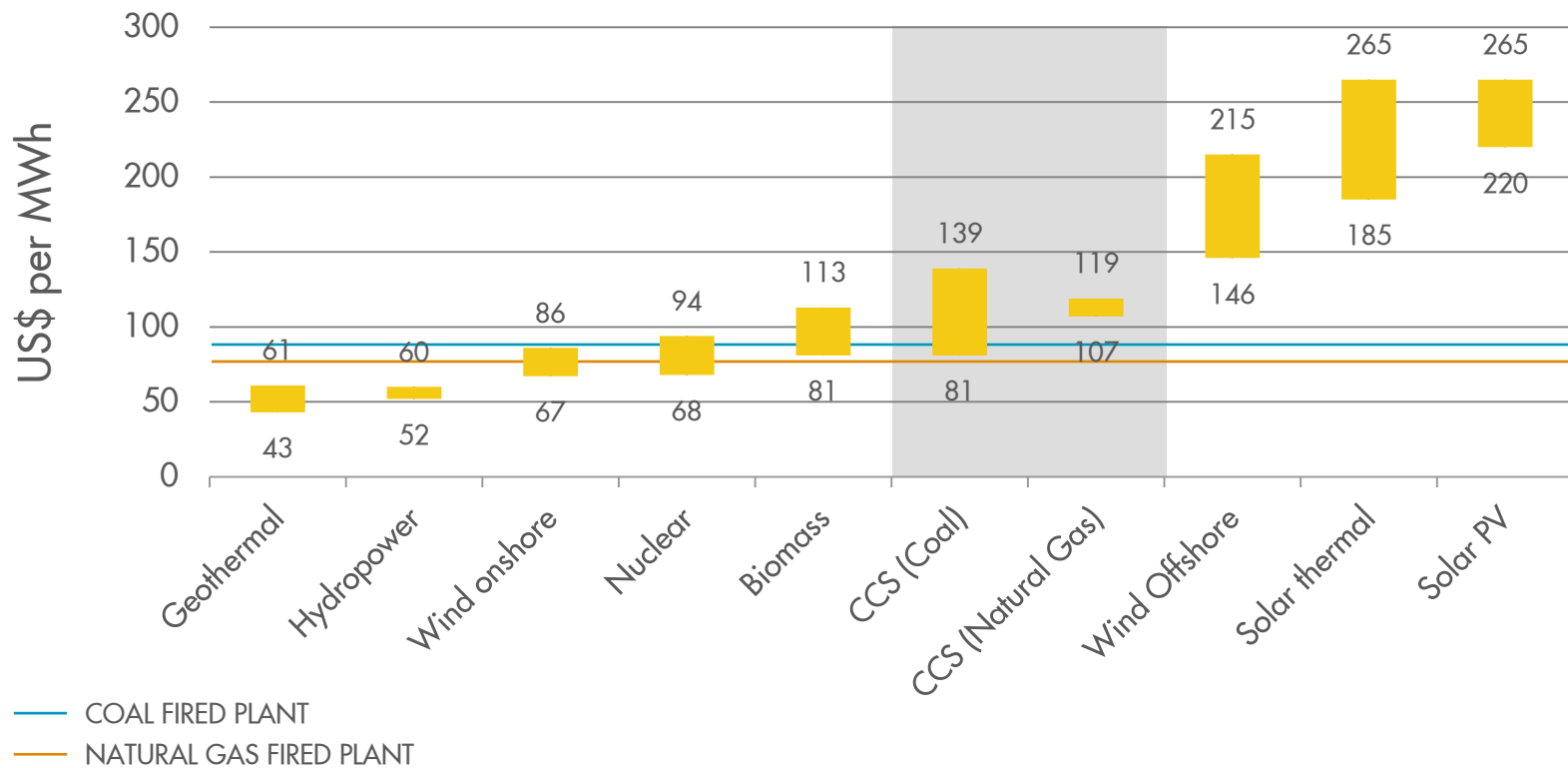
Source: Shell FSB-Energy

CONTRIBUTIONS TO GREENHOUSE GAS REDUCTION



Source: IEA Energy Technology Perspectives, 2012

CCS EXPECTED TO BE COST COMPETITIVE



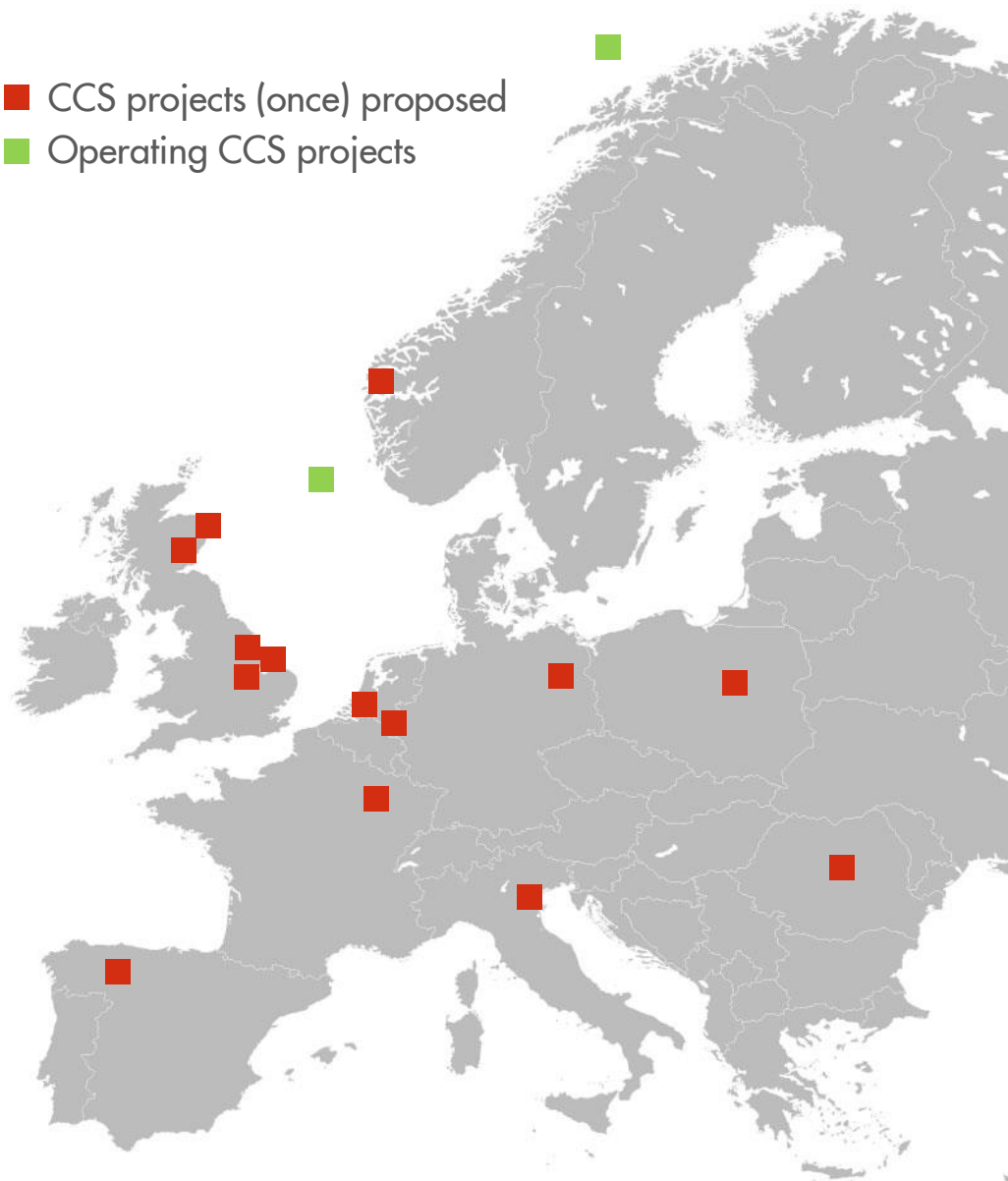
*Levelised cost of electricity of low-carbon technologies and conventional power generation – as presented in 'The costs of CCS and other low-carbon technologies' Global CCS Institute.

CCS EUROPEAN STATE OF PLAY

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

But progress largely stalled due to:

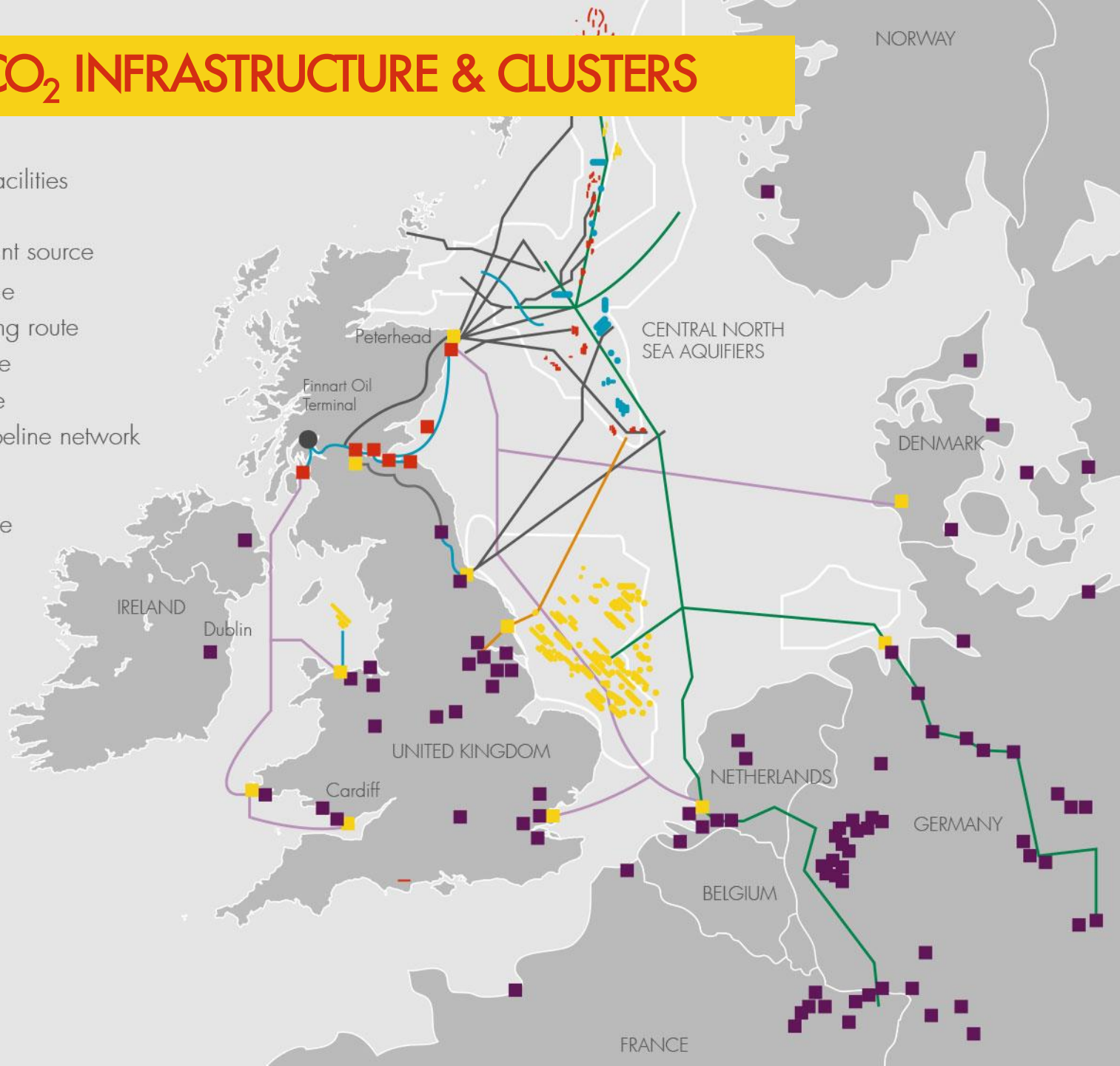
- ETS ineffective as CCS driver
- Lack of Member State support
- Lack of public support for onshore storage



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

ATLANTIC OCEAN



POLICY NEEDS



CCS will require a robust CO₂ price, a level playing field with alternative low carbon technologies, and short term demonstration support to drive down costs.

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



CO₂ TECHNOLOGY CENTRE MONGSTAD (TCM) NORWAY

The world's most advanced test centre for CO₂ capture

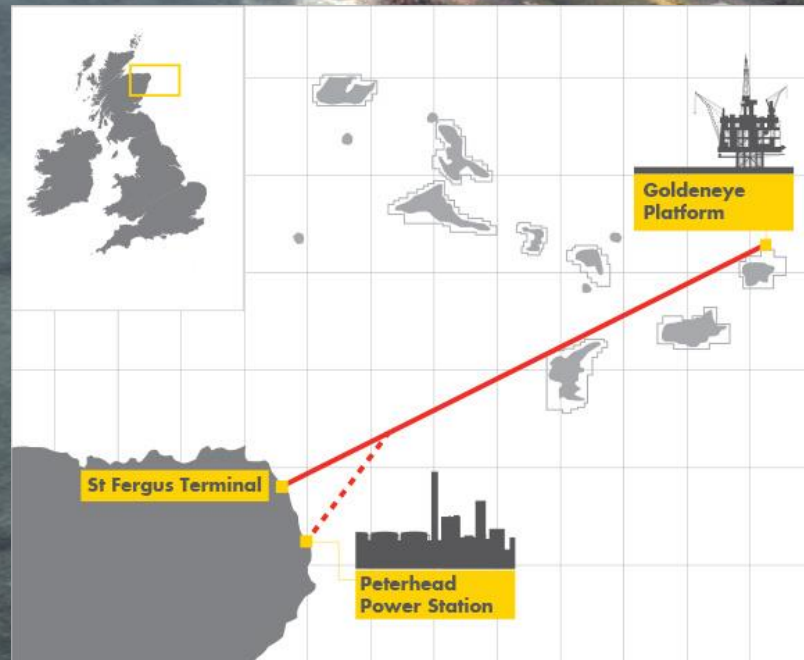
Technology demonstration and verification, including Shell Cansolv

Critical step in scaling up CCS



PETERHEAD CCS FOR GAS POWER PROJECT

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



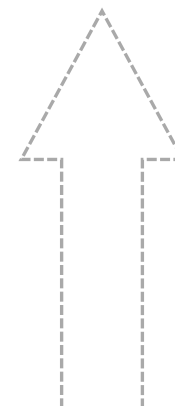
EARLY ADOPTER BENEFITS

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



Q&A



END

