Energy transition
Threat or opportunity?

*SPE YP 1st May 2019*

Sam Gomersall
Energy transition
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The aim is to keep the increase in global average temperature to well below 2°C and to 1.5°C if possible.
Paris Compliant?

That is consistent with and contributes to meeting all the terms of the 2015 Paris Climate Change Agreement.

Career
Investment
Industry
Economy
Way of Life

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80% of reserves must stay in the ground

Net CO₂ emissions (GtCO₂)

Fossil fuel and land use change

Net-negative global emissions

Data: SSP database (IASA), CDIAC/GCP

2017 projection

<6°C

<5°C

<4°C

<3°C

<2°C

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New Zealand bans all new offshore oil exploration as part of 'carbon-neutral future'
France to ban all oil and gas production from 2040

New law follows French Government announcement that sale of all petrol and diesel vehicles will become illegal in same year

France is to ban all drilling for oil and natural gas by 2040 after its Parliament approved part of President Emmanuel Macron’s plans to cut the use of fossil fuels.

It will become illegal to produce or look for oil and gas in the country and its overseas territories. Existing drilling permits will expire in 2040 and, from today, no new ones will be granted.
Danish government to no longer oil the wheels of fossil fuel extraction

State decision means no more exploration permits will be issued
Mark Carney warns of climate change threat to financial system

Bank of England governor says firms must acknowledge risks to avoid ‘catastrophic impact’

- The “catastrophic impact” climate change could have for the financial system unless firms do more to disclose their vulnerabilities.

- Need to provide more information about the risks they might face from climate change.

- The finance industry could be forced into making rapid adjustments if they did not gradually expose where their climate change risks might lie, which he said could trigger steep losses.
Energy transition
UK power & UK energy

www.gridwatch.templar.co.uk

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UK energy by demand type (Sheffield University)
Hydrogen
The 7 roles of hydrogen (Hydrogen Council)

1. Enable large-scale renewables integration and power generation
2. Distribute energy across sectors and regions
3. Act as a buffer to increase system resilience
4. Help decarbonize transportation
5. Help decarbonize industrial energy use
6. Help decarbonize building heat and power
7. Serve as renewable feedstock

Enable the renewable energy system → Decarbonize end uses
The hydrogen opportunity

- Manufacture hydrogen from natural gas
- Use the hydrogen for heating and transport
  - Blend H2 into the HP gas network, as a substitute for gas
  - Deliver H2 via the LP gas network, switching from gas
- CO2 piped offshore for sequestration (CCS)
- Scotland, Leeds and Mersey all progressing projects

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Hydrogen pipes
Acorn Hydrogen

Around 35% of all UK natural gas comes onshore at St Fergus - an ideal site for a major H₂ production hub. H₂ at St Fergus can be fed directly into the gas grid from blending and decarbonising gas.
Natural Gas Supply: natural gas supply is key to bulk hydrogen production. St Fergus is the gas processing terminal for about 35% of the UK’s gas and is forecast to continue to be so out to 2040 and beyond.

St Fergus Gas Terminal Industrial Site: the coastal gas processing terminal at St Fergus is an existing industrial site, which is suited to the construction of large scale hydrogen production facilities.

Hydrogen Export by Blending: Blending hydrogen into the national gas transmission systems from one ‘SMR’ at St Fergus will decarbonise 1.4% of the UK’s gas and abate 500,000T/y of CO₂.

CO₂ Transport by Existing Infrastructure: There are three large redundant offshore gas transmission pipelines that can be redeployed for offshore CO₂ transport.

CO₂ Storage Capacity Offshore: Scotland has internationally strategic CO₂ storage resources in the offshore region which are well characterised, close to St Fergus and connected by existing pipelines.
Acorn: St Fergus Gas Terminal
Acorn CCS

Atlantic Pipeline

Throughput: 5 million tonnes CO₂ per year

Diameter: 16”/406mm

Pressure: 170barg

Design life: 20 years

Operated for: 4 years

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Acorn: CCS

- **World class CO₂ stores**
  - Two large, well understood CO₂ stores with plenty room for growth.

- **Pipeline reuse**
  - More than £750 million cost savings from reuse of high capacity on and offshore pipelines.

- **Low cost CO₂**
  - 200,000 tonnes of existing, easy to capture CO₂ from the St Fergus Gas Terminals.

- **CO₂ from Grangemouth cluster and beyond**
  - CO₂ from Grangemouth cluster piped to St Fergus through Feeder 10 - a natural gas pipeline ready for reuse.

- **CO₂ from H₂ production hub**
  - Around 35% of all UK natural gas comes onshore at St Fergus - an ideal site for a major H₂ production hub. H₂ at St Fergus can be fed directly into the gas grid from blending and decarbonising gas.

- **Shipped CO₂ to Peterhead Port**
  - Use of the deep water port at Peterhead to include CO₂ export facilities.

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Acorn Project Status

First OGA CO₂ Storage Licence

First CCS project to be awarded PCI funding

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Acorn Summary

Acorn opportunity
- The first PCI funded project
- Storage licence in place
- Re-use of O&G infrastructure

Acorn Hydrogen enables;
- Hydrogen blending into the NTS
- Local hydrogen applications
- Early learning for other regions

Acorn CCS enables;
- Initiation of CCS in the UK
- Decarbonisation of multiple regions
- A CCS project by 2023

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Summary

- CCS & Hydrogen stands on the shoulders of Petroleum Technology best practice
- CCS & Hydrogen will influence our ability to meet UK obligations under the Paris Agreement
- It is one of many low carbon career pathways fully compliant with Paris Agreement on climate change
- The Energy Transition is a massive opportunity
- It's time for you to take action

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Energy transition

You are the first generation who grew up knowing about climate change ........ and the last generation who can do something about it
Sadler’s Graph; The onset of the UK/Global hydrogen economy (illustrative purposes only)

- Nuclear / centralised & decentralised generation from the Hydrogen gas grid
- Renewable electric – Domestic generation & centralised/decentralised generation from global green hydrogen in gas grid
- Green Hydrogen – Global production (Heat and Transport)
- Clean Hydrogen – domestic / global production (Heat and Transport)

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