



**Pale Blue Dot.**



# **Energy transition Threat or opportunity?**

*SPE YP 1<sup>st</sup> May 2019*

Sam Gomersall

# Energy transition

---



# Energy transition

---



# Energy transition

---



# Energy transition



Copywrite of the material belongs to Pale Blue Dot Energy Ltd and any use of elements of the material must be credited to them. Use of the material for commercial purposes is not allowed

**Pale Blue Dot.**



# Nations Unies

## Conférence sur les Changements Climatiques 2015

COP21/CMP11

### Paris France



The aim is to keep the increase in global average temperature to well below 2C  
and to 1.5C if possible

# Paris Compliant?

---

Career

Investment

Industry

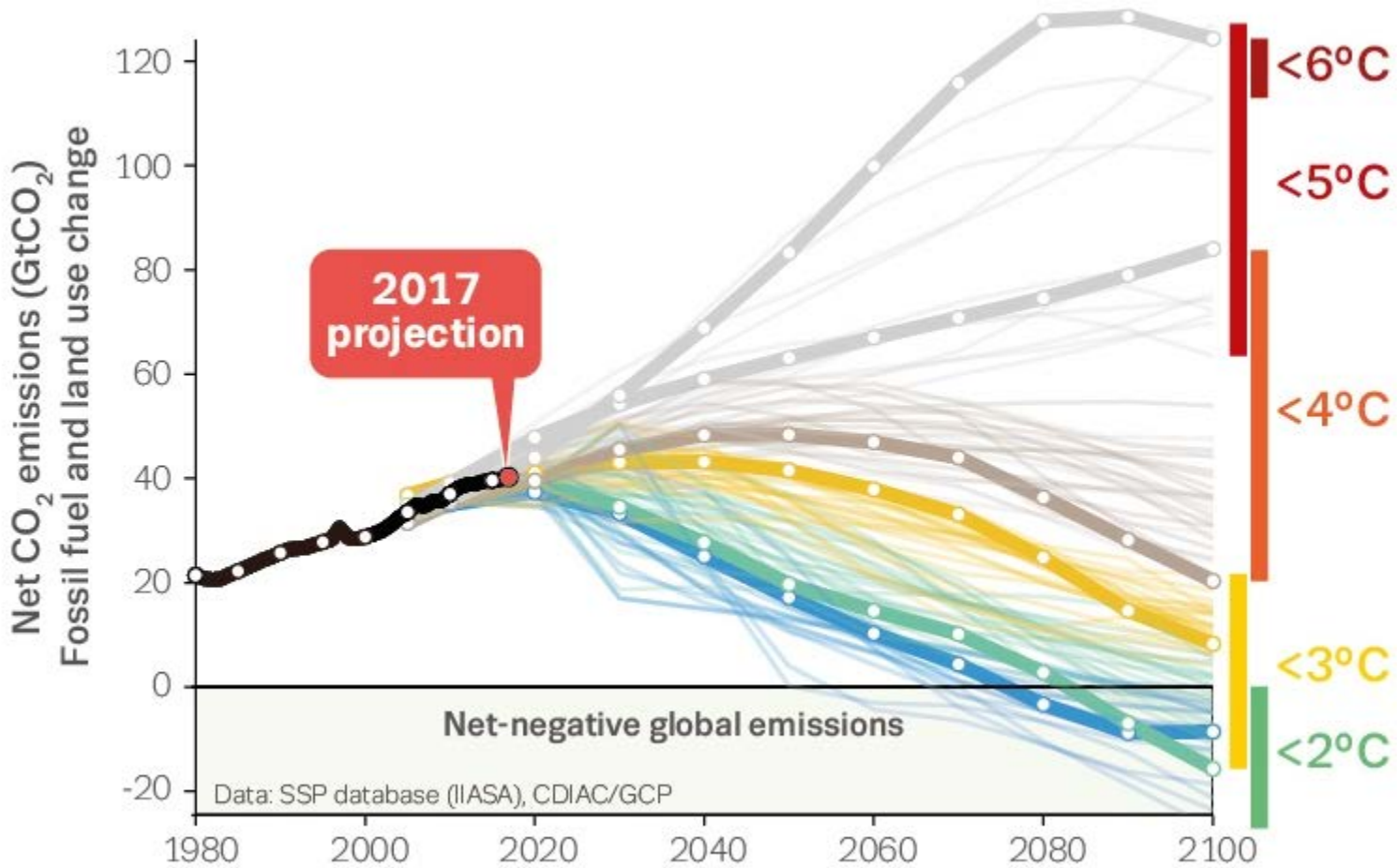
Economy

Way of Life

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



# 80% of reserves must stay in the ground





Support The  
Guardian

Subscribe Find a job Sign in Search ▾

UK edition ▾

News

Opinion

Sport

Culture

The  
Guardian

World ▶ Europe US Americas Asia Australia Middle East Africa Inequality Cities Global development

New Zealand

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

---



GDF SUEZ

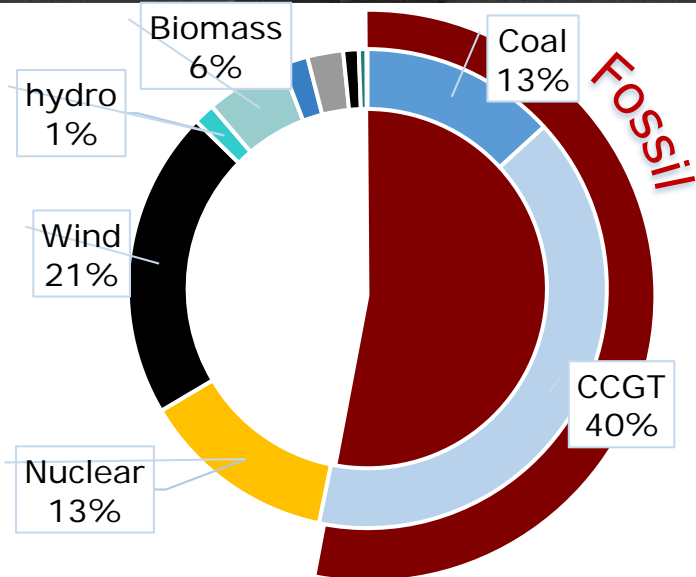
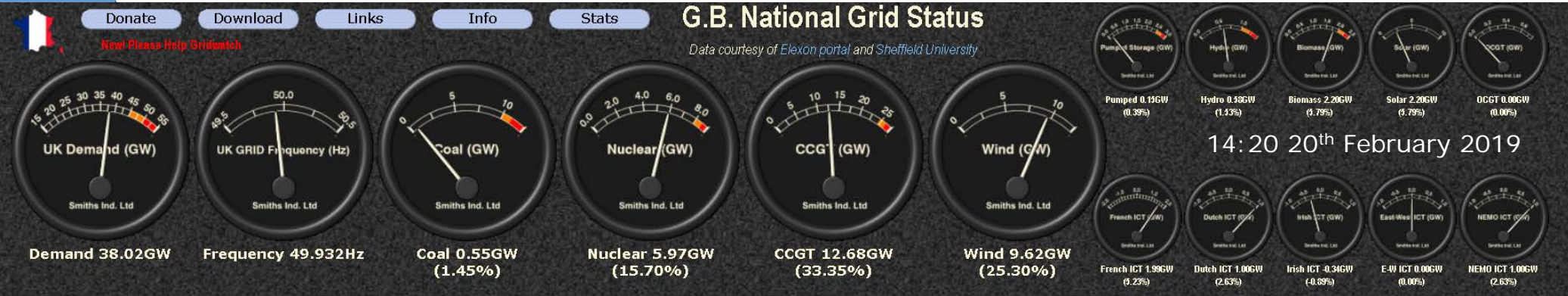


**DONG**  
energy

**Ørsted**

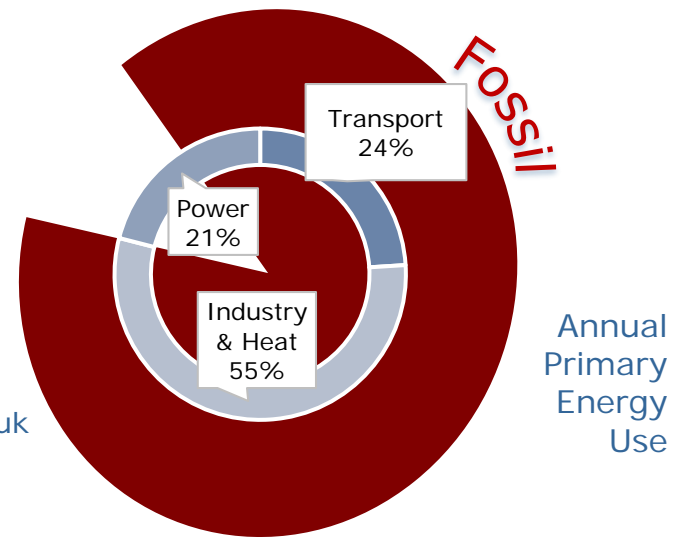


# UK power & UK energy

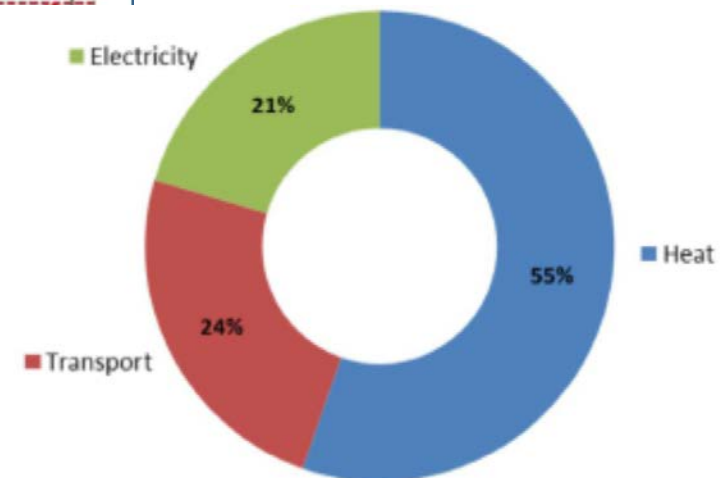
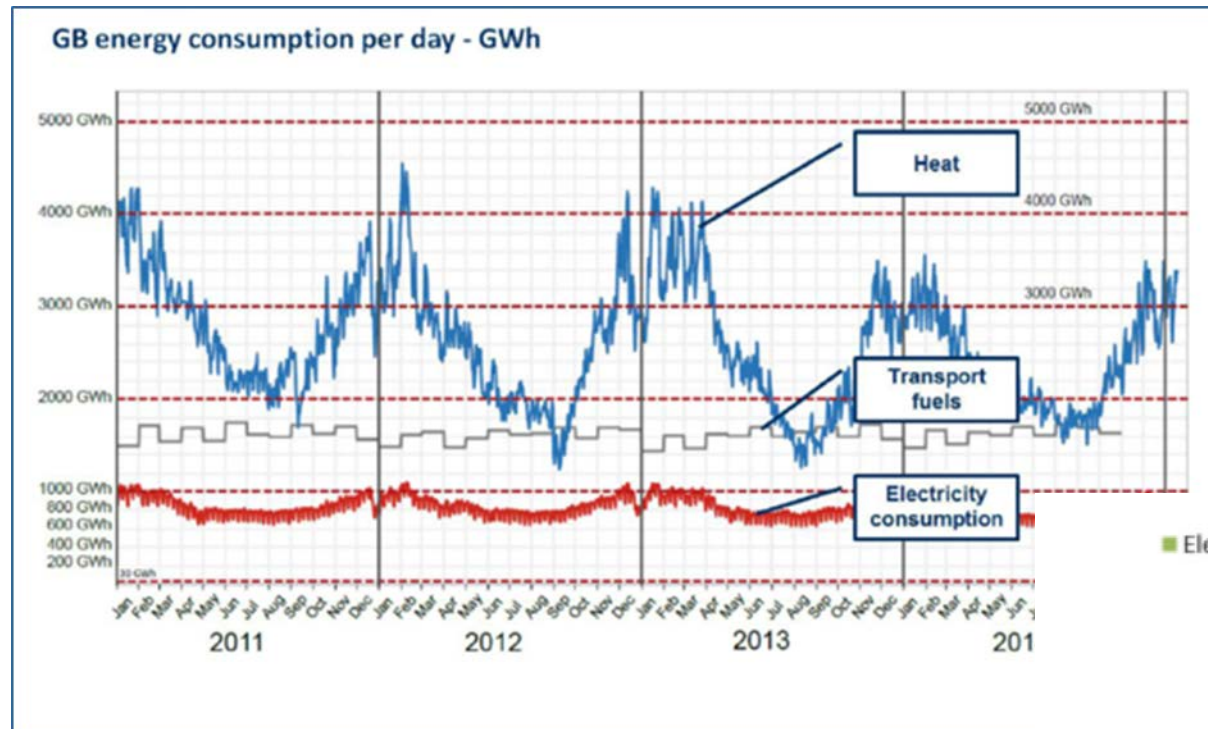


Snapshot  
of UK  
power  
generation

[www.gridwatch.templar.co.uk](http://www.gridwatch.templar.co.uk)



# UK energy by demand type (Sheffield University)





# Hydrogen





# The 7 roles of hydrogen (Hydrogen Council)



Enable the renewable energy system → Decarbonize end uses

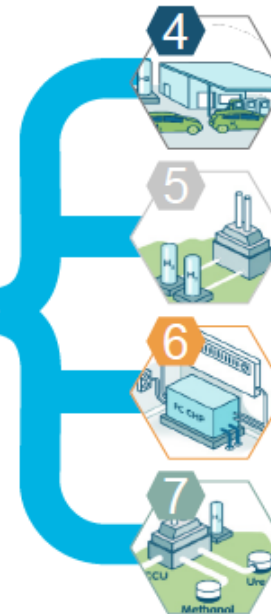
Enable large-scale renewables integration and power generation



Distribute energy across sectors and regions



Act as a **buffer** to increase system resilience



Help decarbonize transportation



Help decarbonize industrial energy use



Help decarbonize building heat and power



Serve as renewable feedstock

# 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



**SGN**  
Your gas. Our network.



Leeds  
City  
Gate

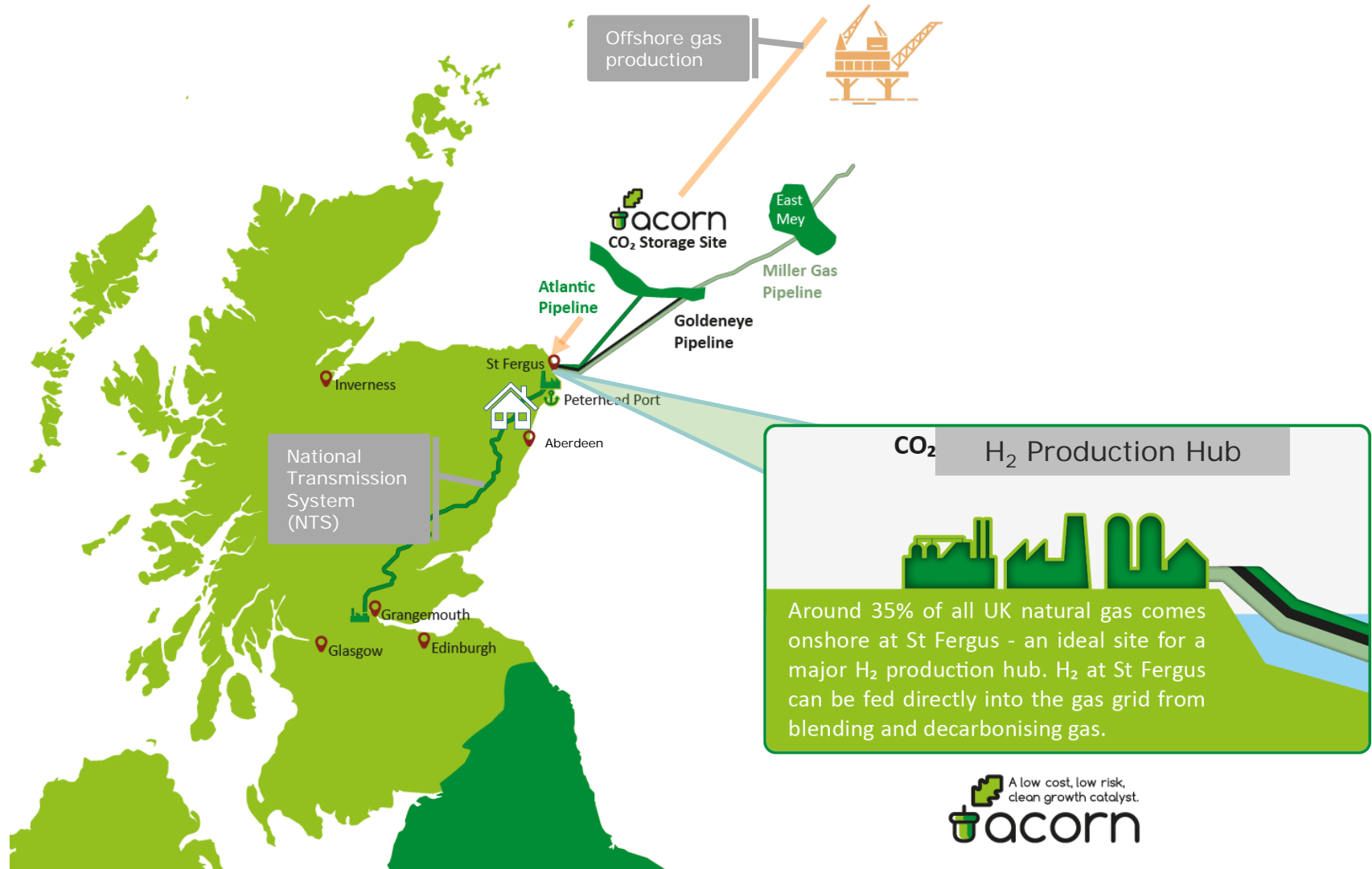


**Cadent**  
Your Gas Network

# Hydrogen pipes



# Acorn Hydrogen





# Acorn: St Fergus location



**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



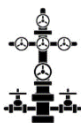
**St Fergus Gas Terminal Industrial Site:** the coastal gas processing terminal at St Fergus is an existing industrial site, which is suited to the construction of large scale hydrogen production facilities



**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 CO<sub>2</sub>



**CO<sub>2</sub> Transport by Existing Infrastructure:** There are three large redundant offshore gas transmission pipelines that can be redeployed for offshore CO<sub>2</sub> transport

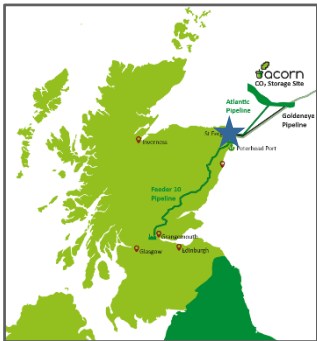


**CO<sub>2</sub> Storage Capacity Offshore:** Scotland has internationally strategic CO<sub>2</sub> storage resources in the offshore region which are well characterised, close to St Fergus and connected by existing pipelines.

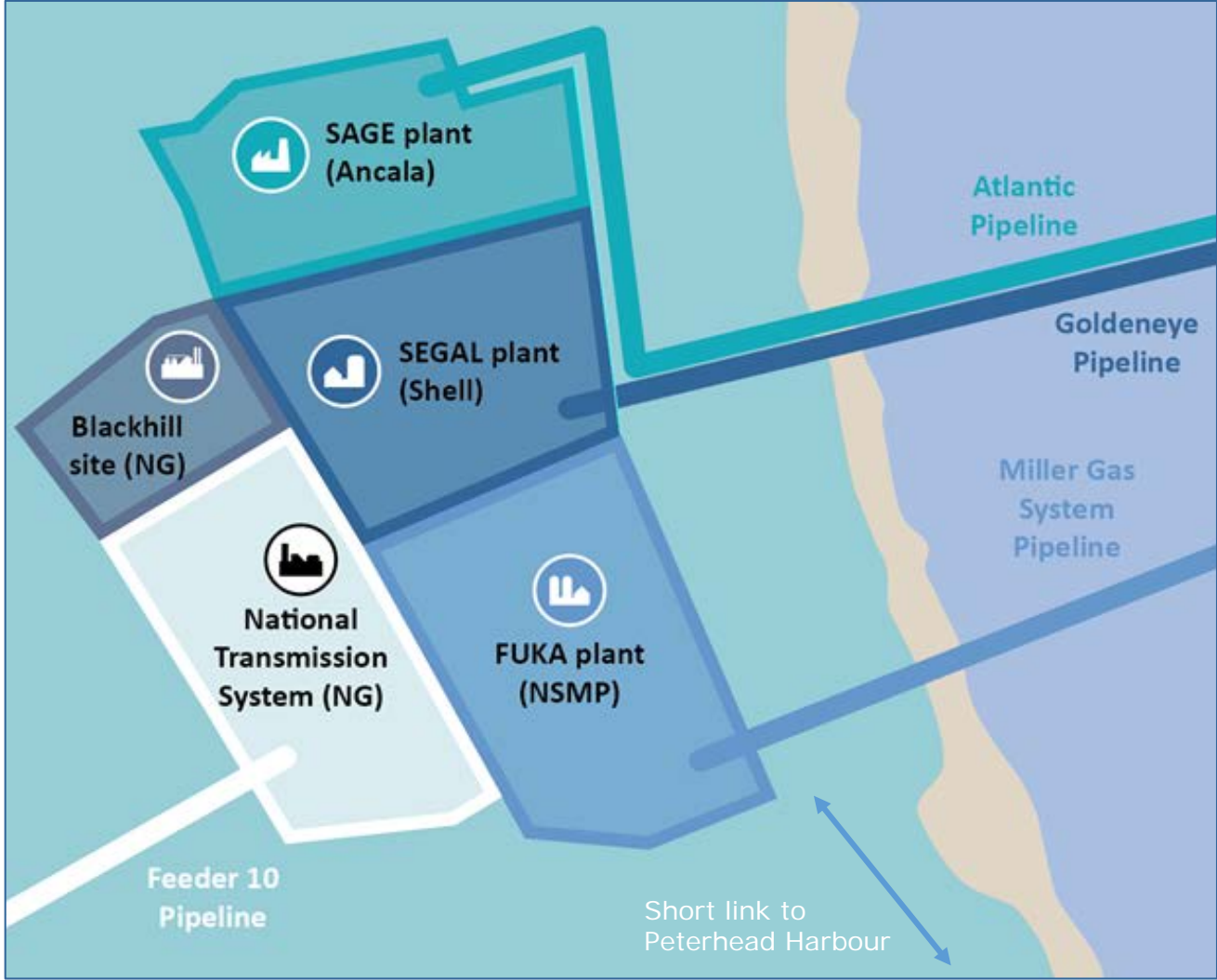
# Acorn: St Fergus Gas Terminal



# Acorn: St Fergus Gas Terminal

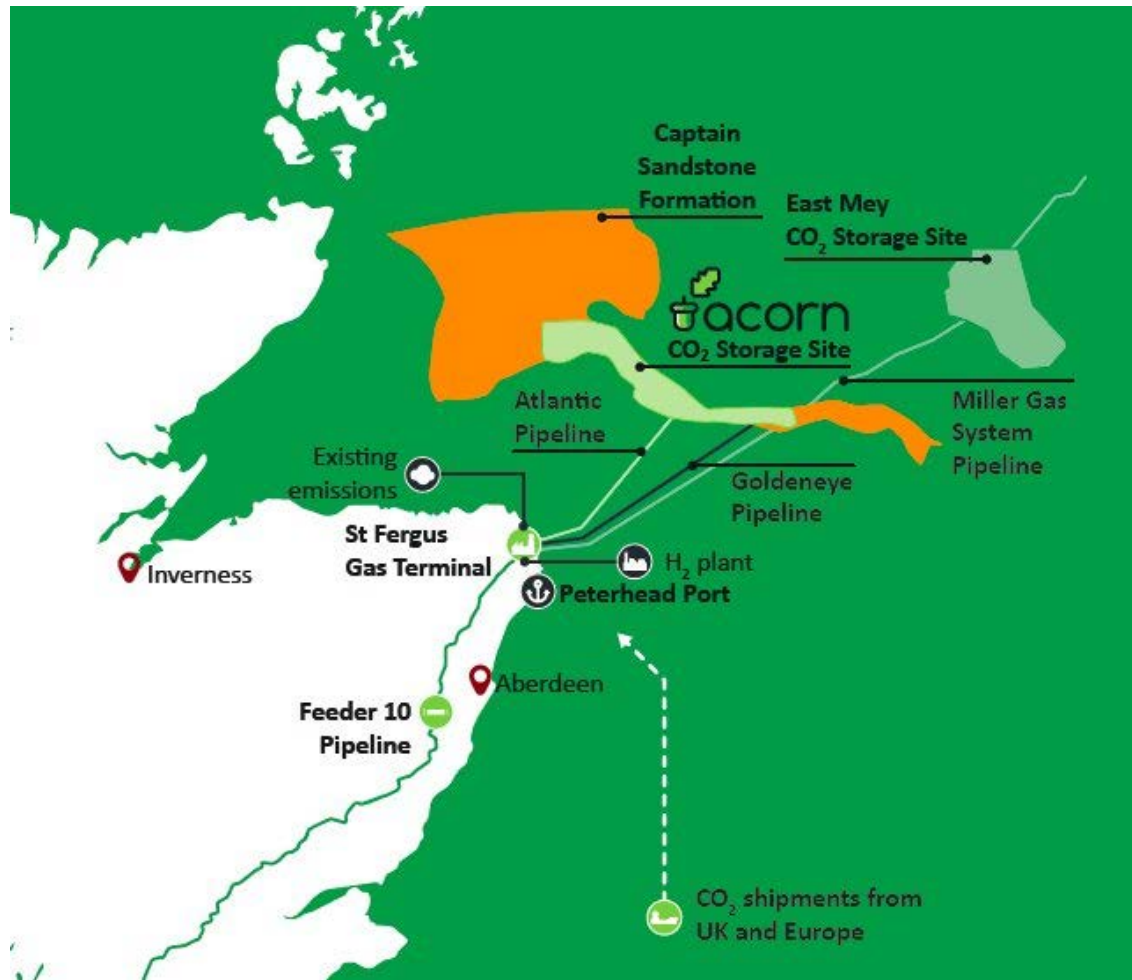


# Acorn: St Fergus Gas Terminal





# Acorn CCS

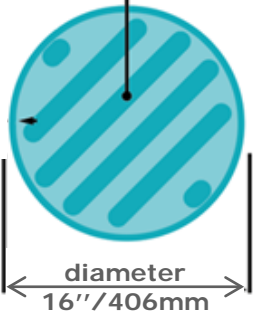


# Acorn CCS



## Atlantic Pipeline

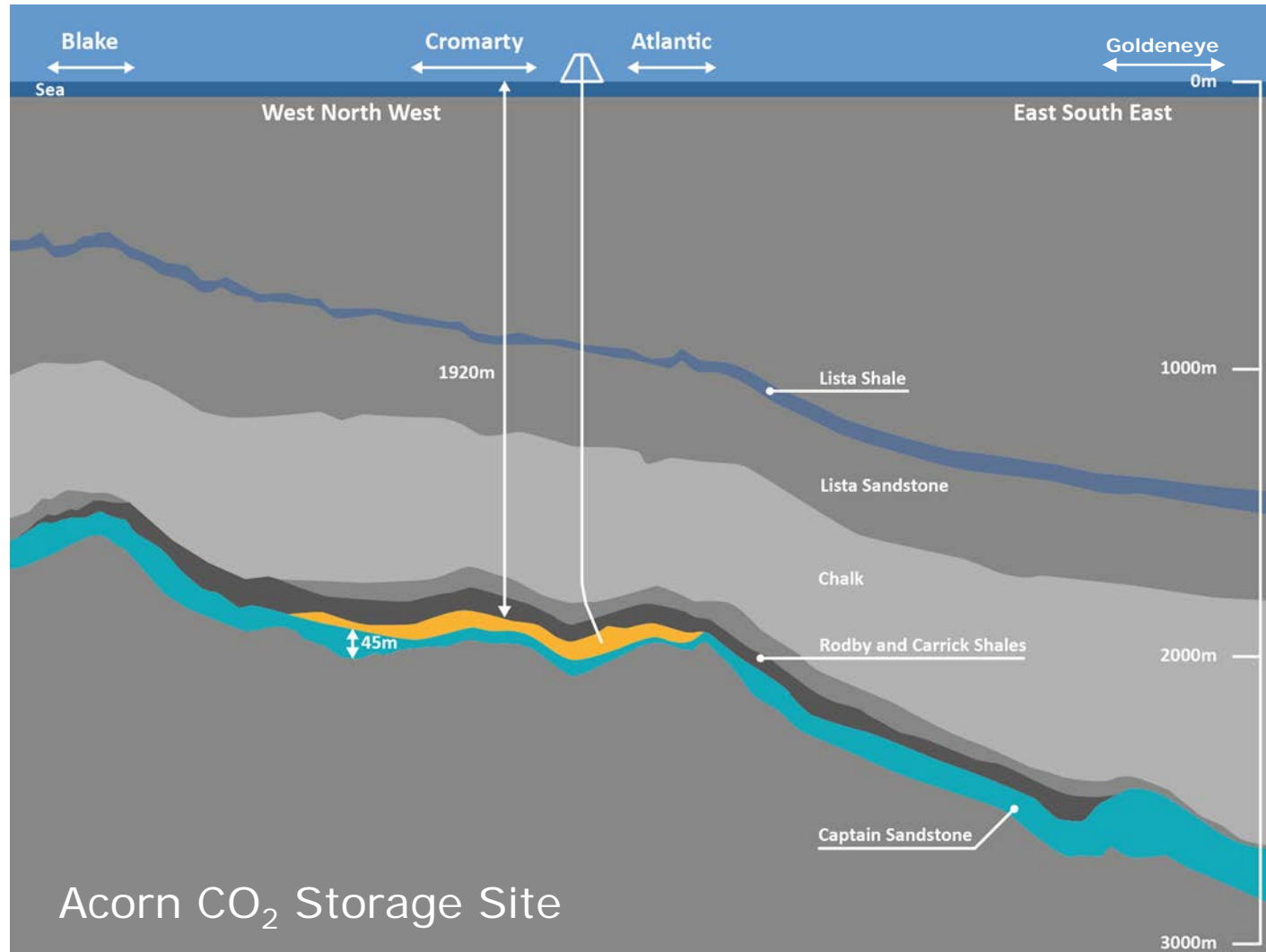
Throughput: 5 million tonnes CO<sub>2</sub> per year



Pressure: 170barg

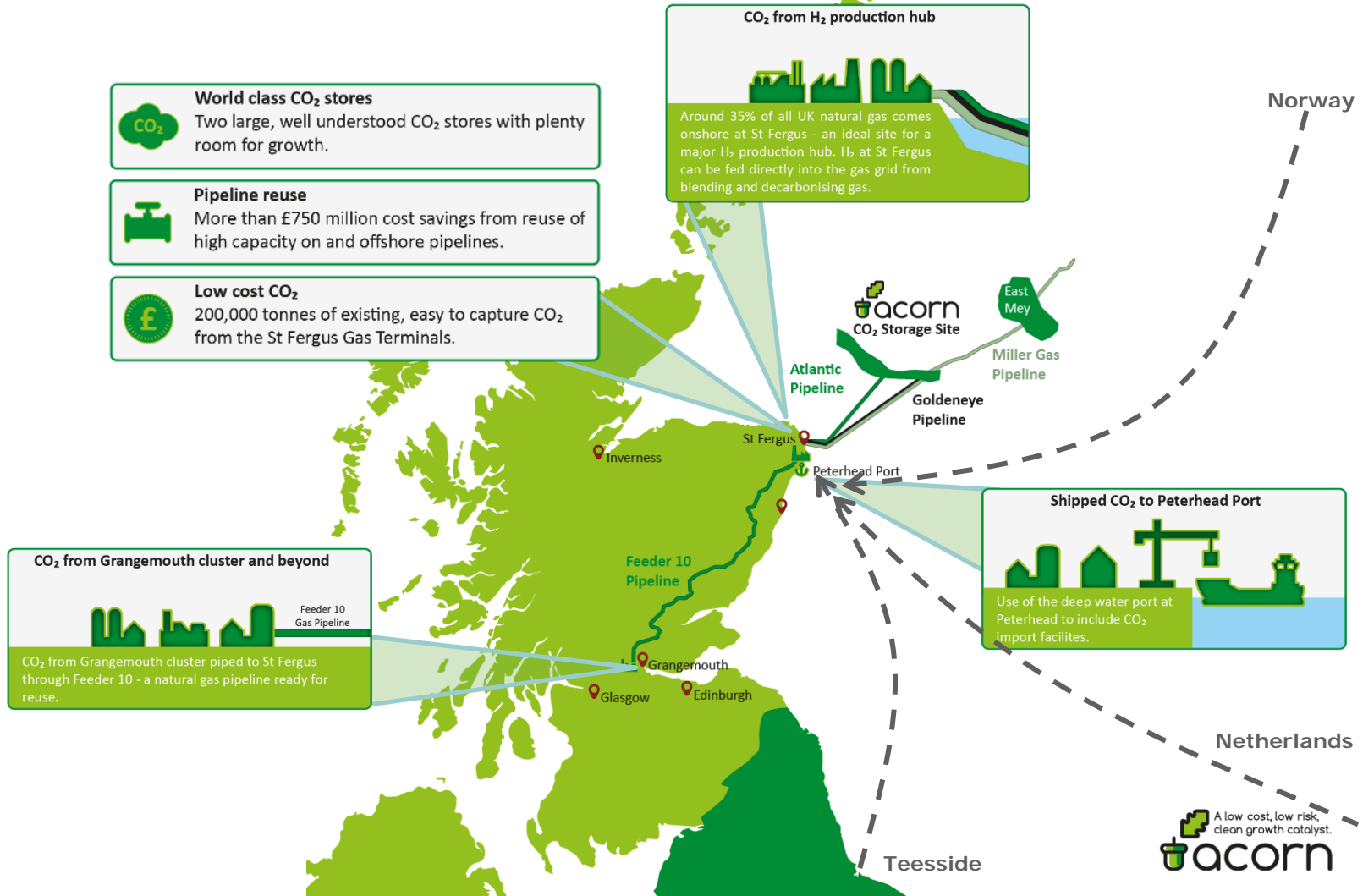
Design life: 20 years

Operated for: 4 years

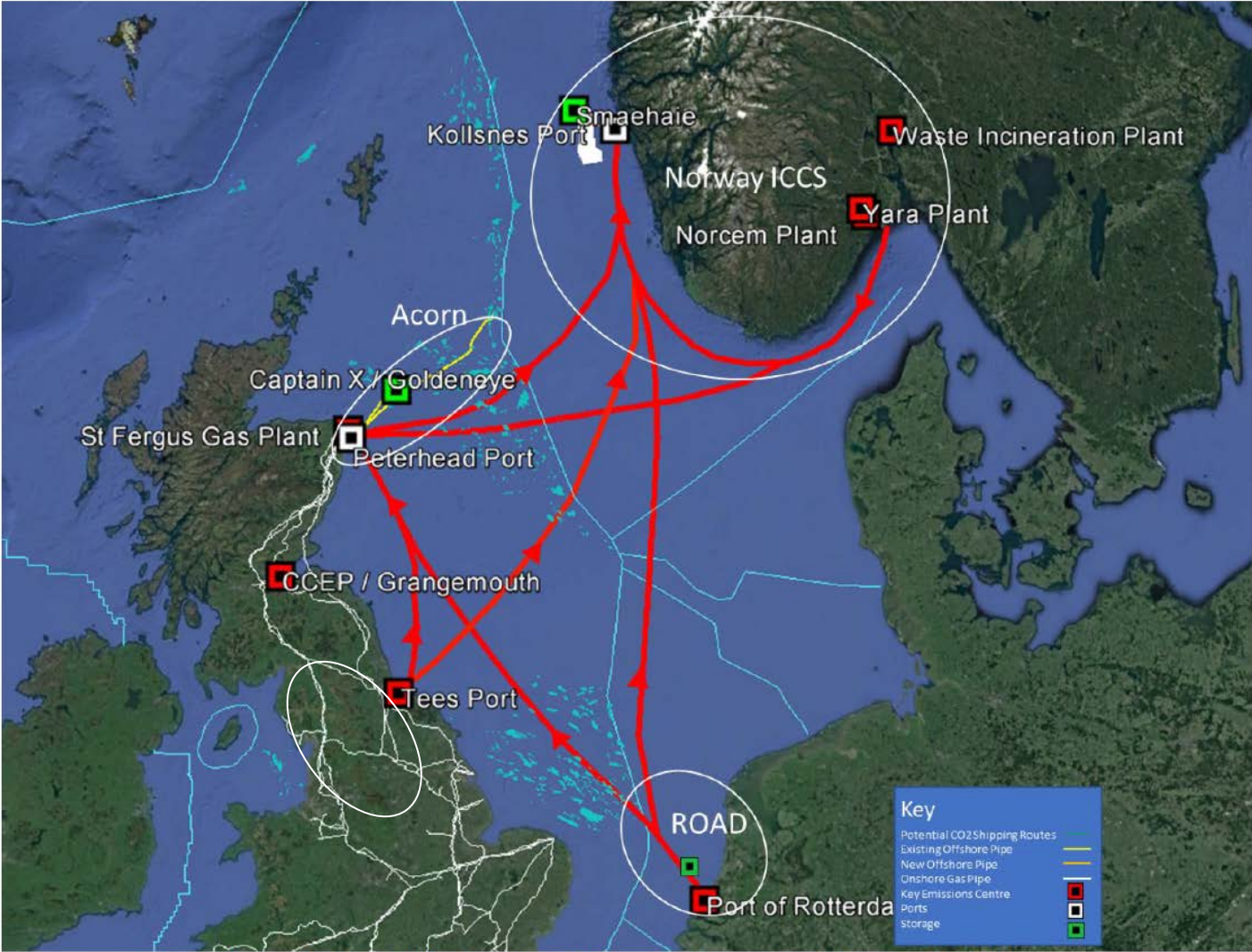


Acorn CO<sub>2</sub> Storage Site

# Acorn: CCS



# Acorn CCS





# Acorn Project Status



Oil & Gas  
Authority

First OGA  
CO<sub>2</sub> Storage Licence



First CCS project to be  
awarded PCI funding



Pale Blue Dot.

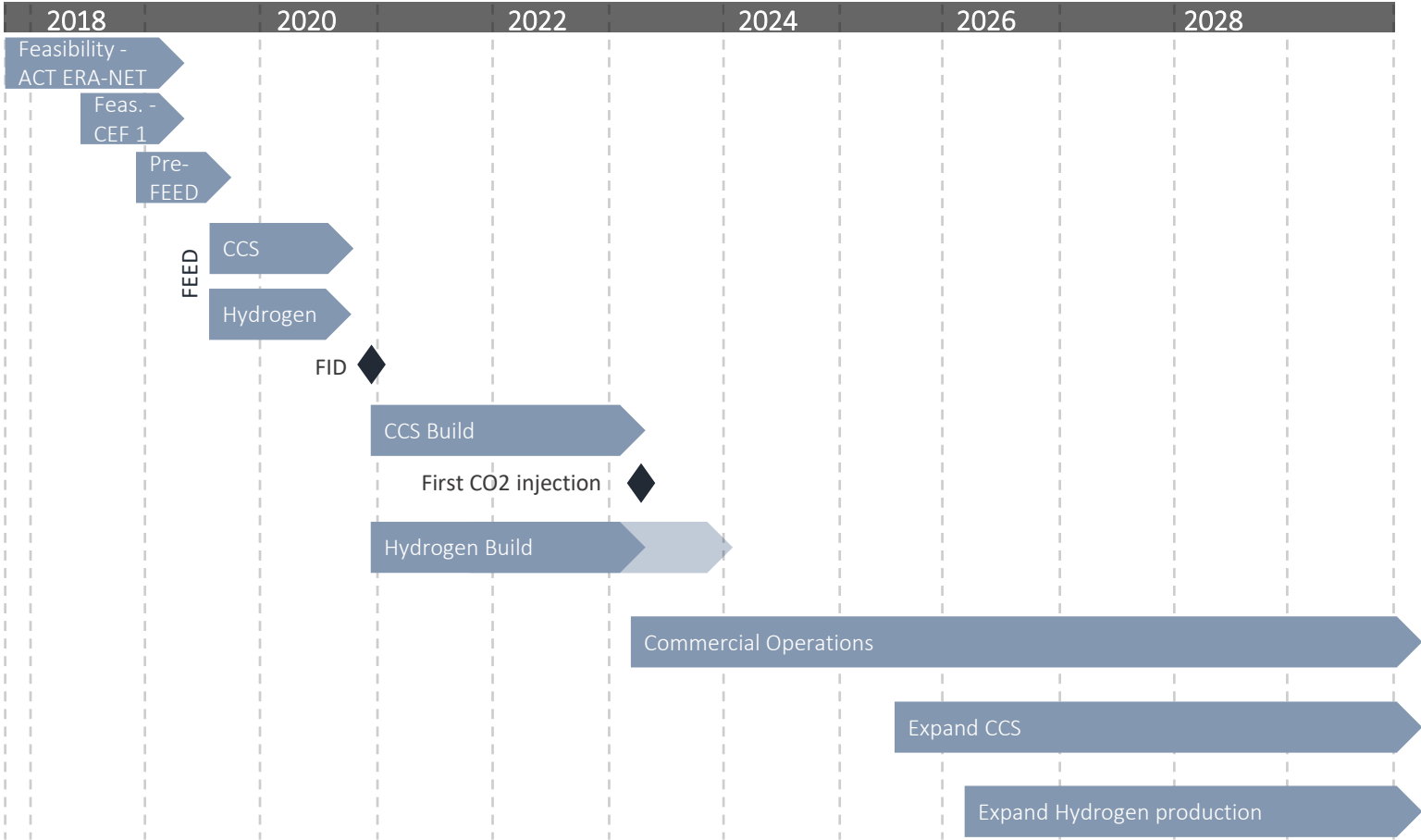


Department for  
Business, Energy  
& Industrial Strategy



The Scottish  
Government  
Riaghaltas na h-Alba

# Acorn Project Plan

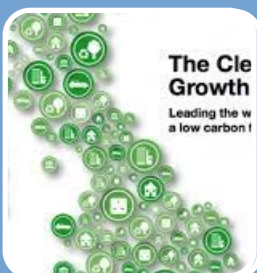


# Acorn Summary



## 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

# 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
- Its time for you to take action

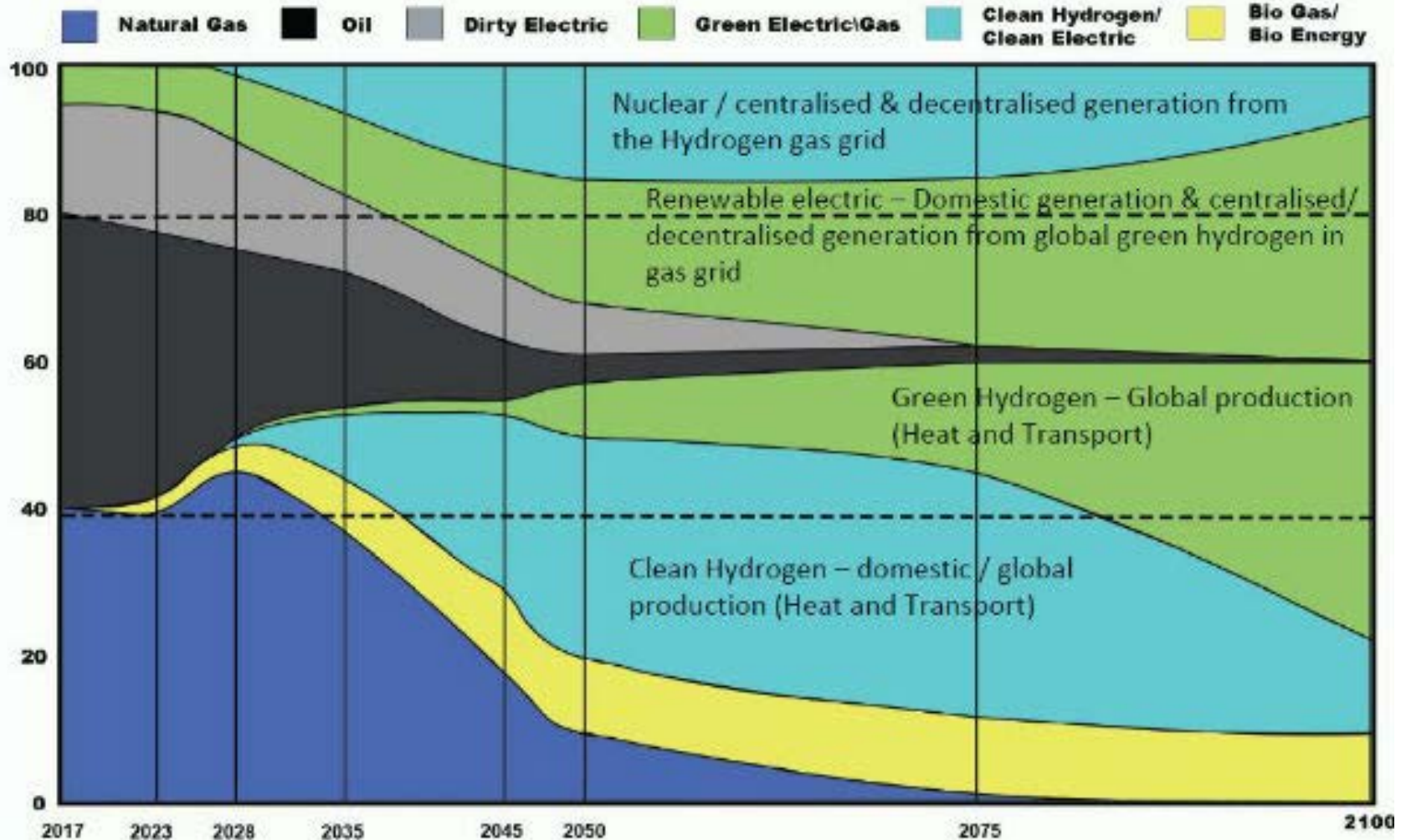


# Energy transition

---

**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



Sadler's Graph; The onset of the UK/Global hydrogen economy (illustrative purposes only)