

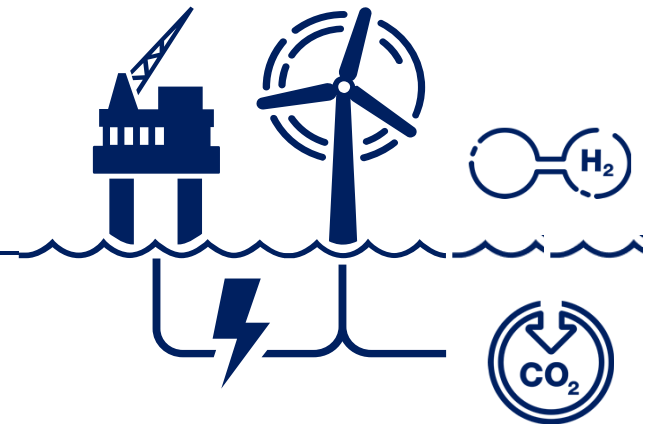


North Sea
Transition
Authority



Offshore Energy Integration

The UKCS 'net zero' transition



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21st June 2023

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We regulate and influence the oil, gas and carbon storage industries. We help drive North Sea energy transition, realising the significant potential of the UK Continental Shelf as a critical energy and carbon abatement resource.

We hold industry to account on **halving upstream emissions by 2030**.

ENERGY SECURITY



Helping meet UK energy demand

Oil and gas licensing and stewardship

EMISSIONS REDUCTION



Regulating for emissions reductions

Driving electrification and ensuring zero routine flaring

ACCELERATING THE TRANSITION



Carbon storage licensing and stewardship

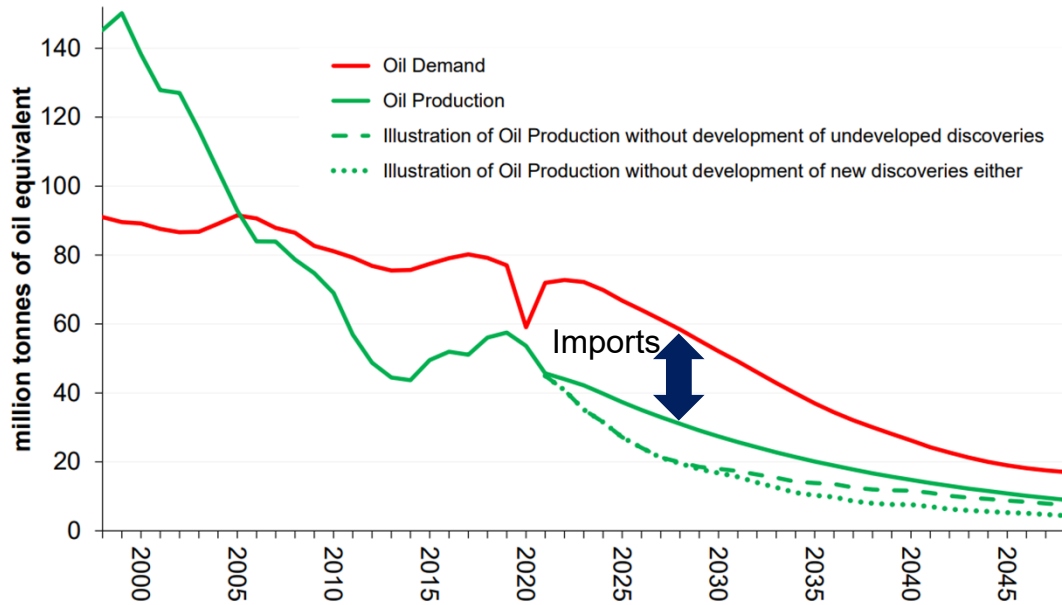
Promoting energy integration
Providing open data access

We aim to be an **integrating force** in the UKCS, helping realise its **full economic potential**.
We champion the **supply chain** and **job creation** across the UK.

UK O&G supply and demand

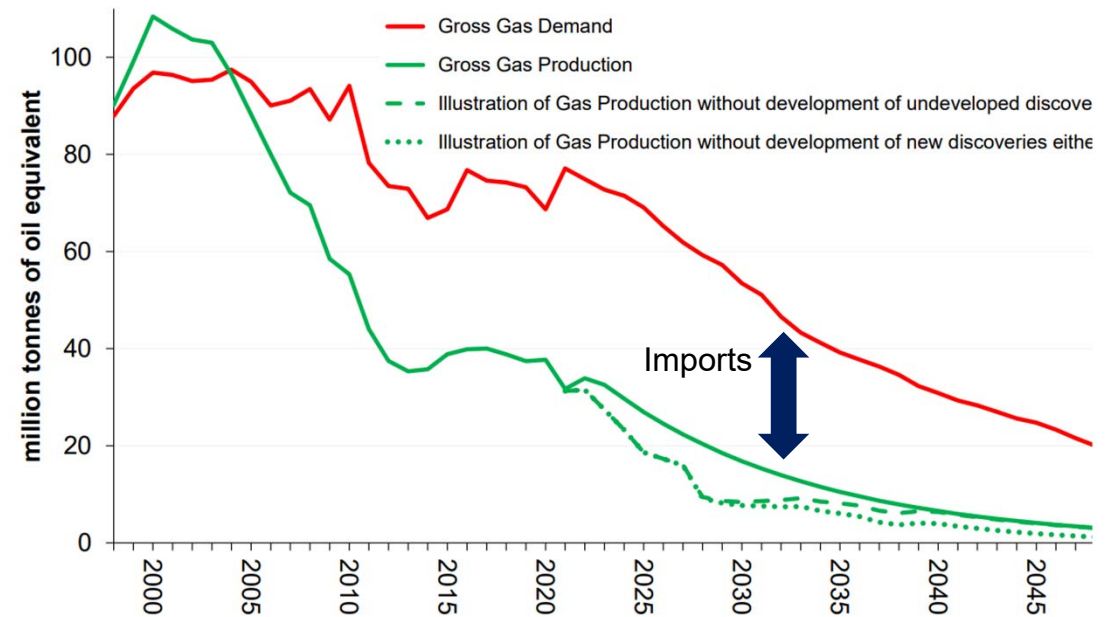
Oil

CCC Balanced Net Zero Pathway Demand and OGA Production Projections



Gas

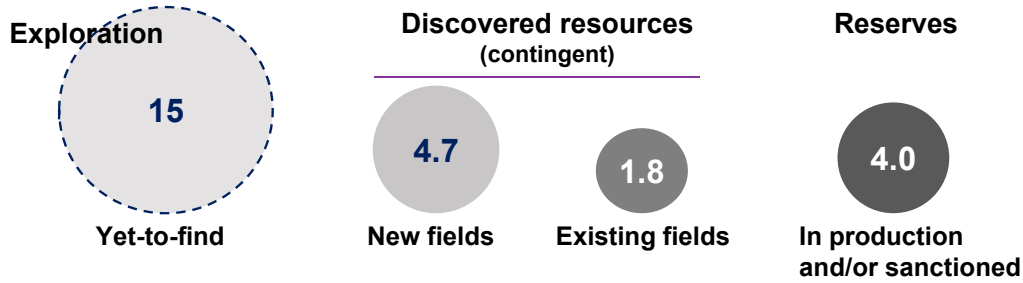
CCC Balanced Net Zero Pathway Demand and OGA Production Projections



UK domestic O&G production has a significant lower carbon footprint compared with imports

Hydrocarbon opportunities

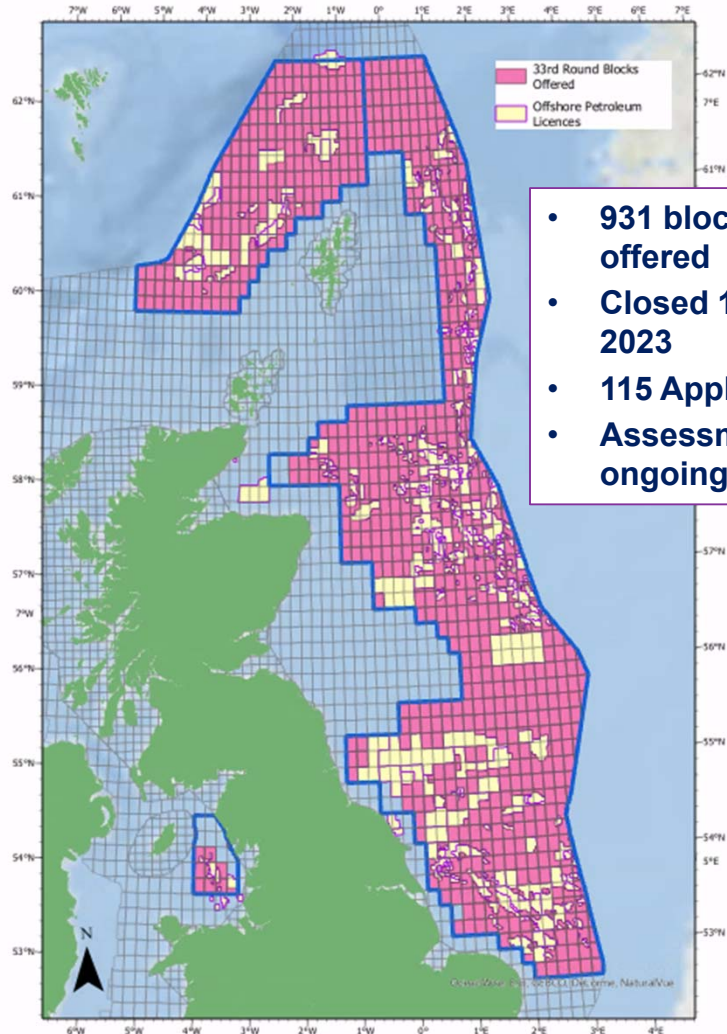
Resource & Reserves (P50, bnboe)



Field development projects

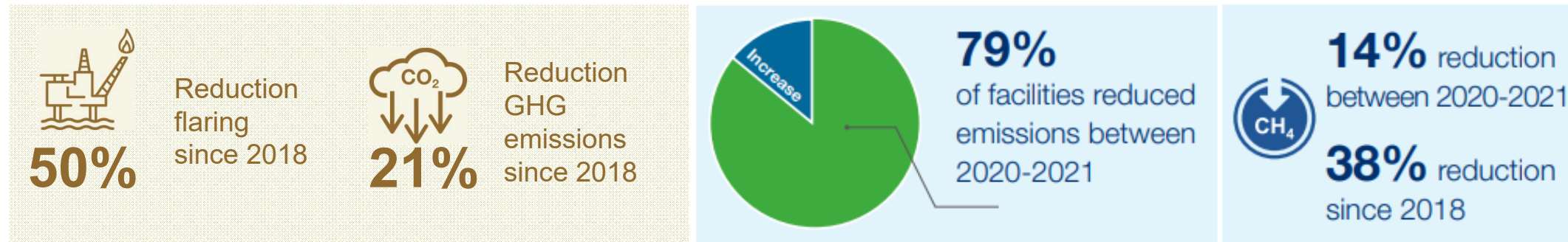


33rd Offshore Petroleum Round



- 931 blocks/parts offered
- Closed 12th January 2023
- 115 Applications
- Assessment ongoing

Emissions Reduction - Early successes



NSTA benchmarking, monitoring and reporting

- Online dashboards
- Emissions Monitoring Report
- Active engagement with industry

Sanctions

- NSTA held operators to account, including £215,000 in fines in December 2022.



Emission Reduction Plans (ERAPs)

Circa 90% of offshore asset plans submitted (several have gone second iterations)
Onshore terminals still lagging



70% of ERAPs identified opportunities to continue optimising existing Operations

Power Generation: reduce unit ops, fuelling [10]
Gas Compression: reduce unit ops/ restore availability/ control mapping [6]
Liquid Pump: Oil/ PWRI/ SWLP reduce unit ops, [6]
F&V: VRU reinstatement, lower purge rates [4]



25% are planning Projects or studying modifying Power Generation

Up-grade existing unit efficiency [3]
Right size units [2]
Recovered energy generation [4]



30% are planning Projects or studying modifying Gas Compression

Right size units: rewheels/ revamp [12]
Change to motor-driven [1]
Train reinstatement [1]



25% are planning Projects or studying modifying users of Electrical power

- Right size pump units/ VFDs [12]



50% are planning Projects or studying modifying Flare & Vent systems

- New Flare Gas Recovery facilities [15]
- Routing existing vents into flare systems [4]
- New Flare tips [2]

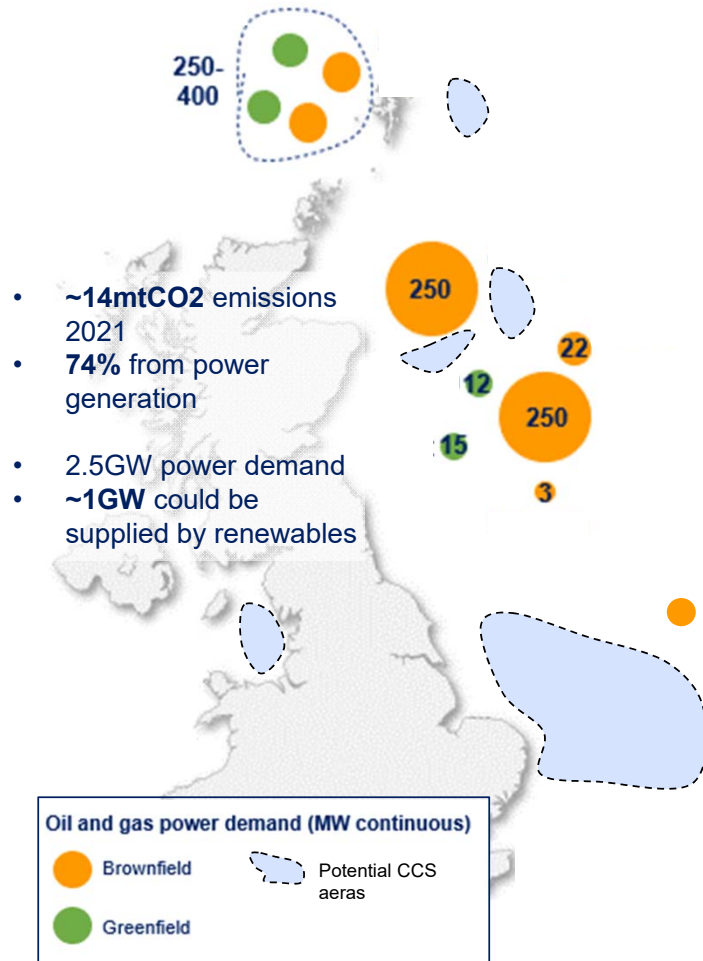


50% are participating in or evaluating Infrastructure Projects

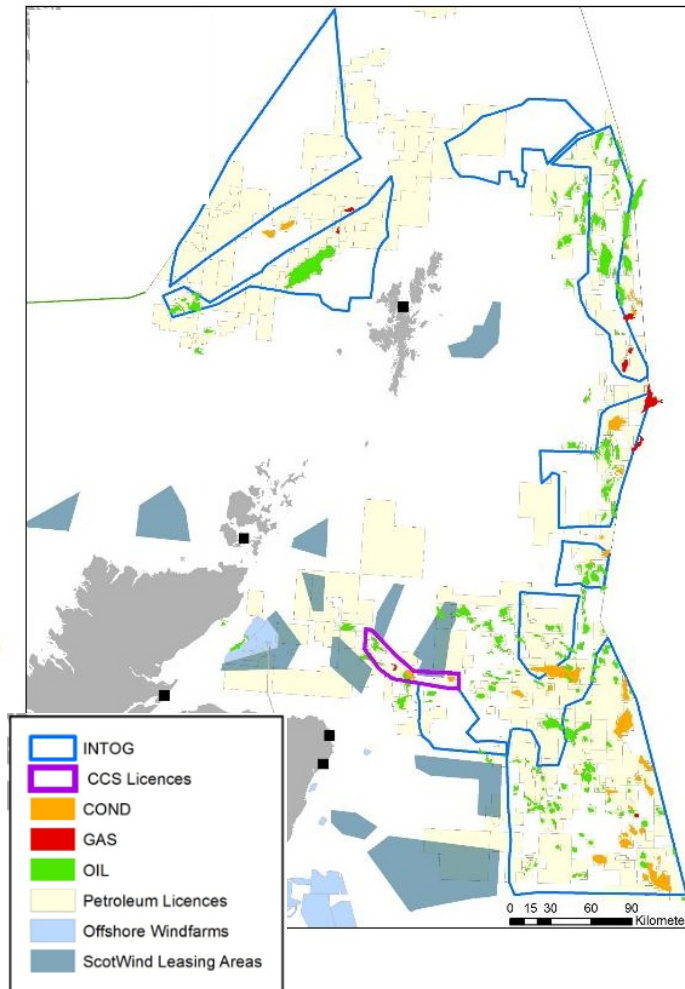
- Hub Electrification: CNS, OMF, WoS, [10]
- WTG, NZTC WINTOG program Ph2 [7]
- Power sharing/ import [2]
- CCS: [3]
- Adding gas export: [1]

Windpower synergies – INTOG

Electrification opportunity (MW)



CES' INTOG Lease Round



INTOG results (March 2023)

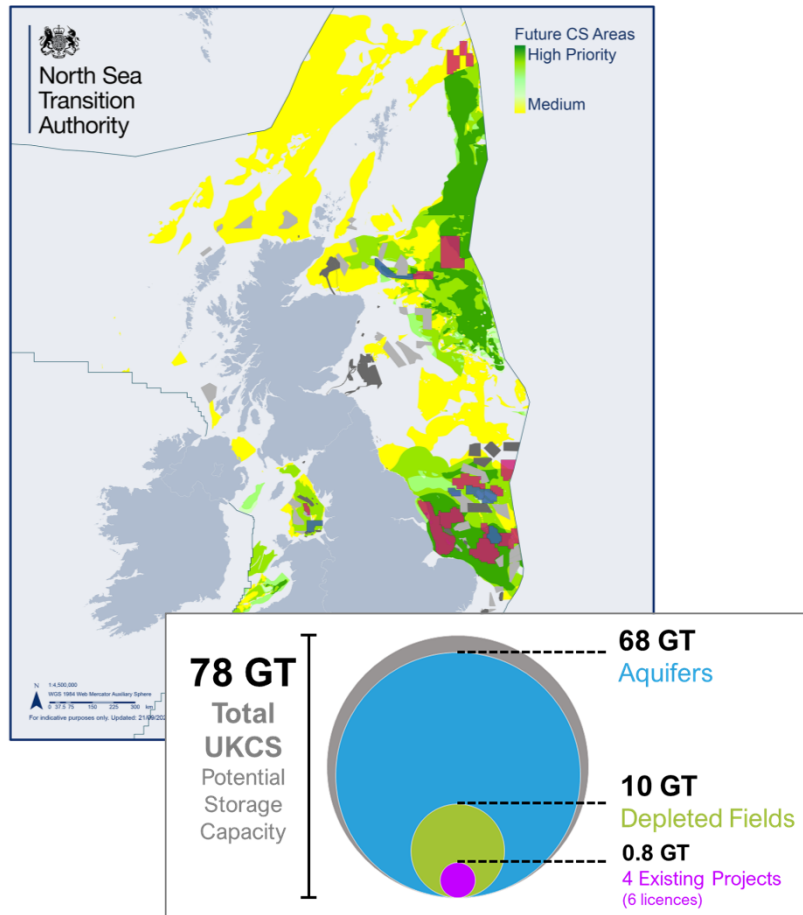
- Innovation and Targeted Oil & Gas decarbonisation (INTOG)
- Scottish Government, Marine Scotland, Crown Estate Scotland
- March: 13 exclusivity awards offered
- 5.4GW capacity

Next steps:

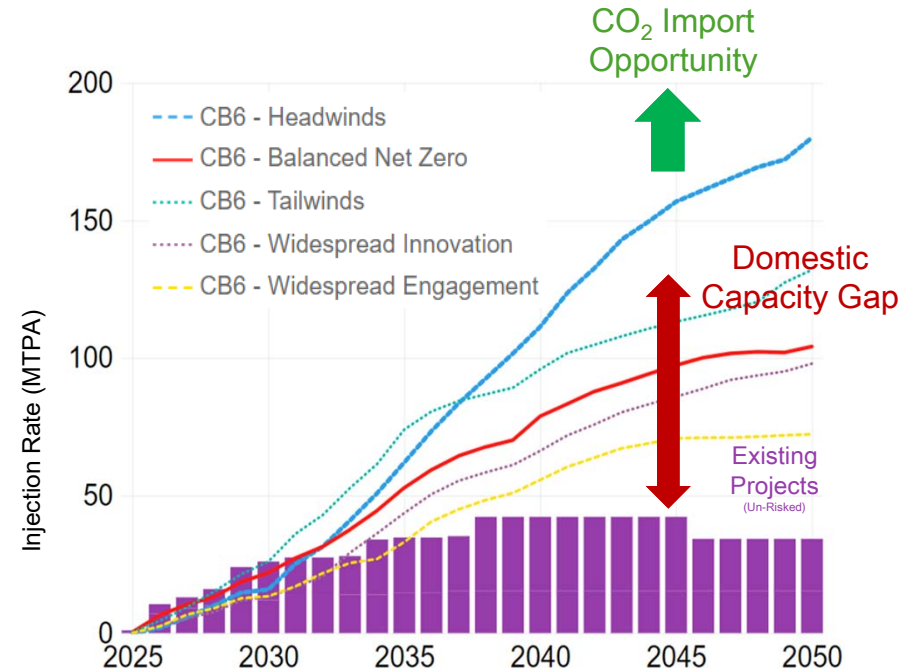
- Signing of Exclusivity Agreements (CES)
- Developers / Operators negotiating power contracts

Carbon capture and storage

UKCS carbon storage potential



CCS development outlook



UK 2030 Targets

- By 2030, deliver 4 CCUS clusters with
- **20-30 MtCO₂/year 'Capacity'**
- (including 6 MtCO₂/year of industrial emissions capture)
- **50 MtCO₂/year by 2035**
- **Many more projects required post 2030**

1st Carbon Storage Round

20 Licences Offered for Award
Covering **~12,000 km²**
Awards in **all areas** made available for application

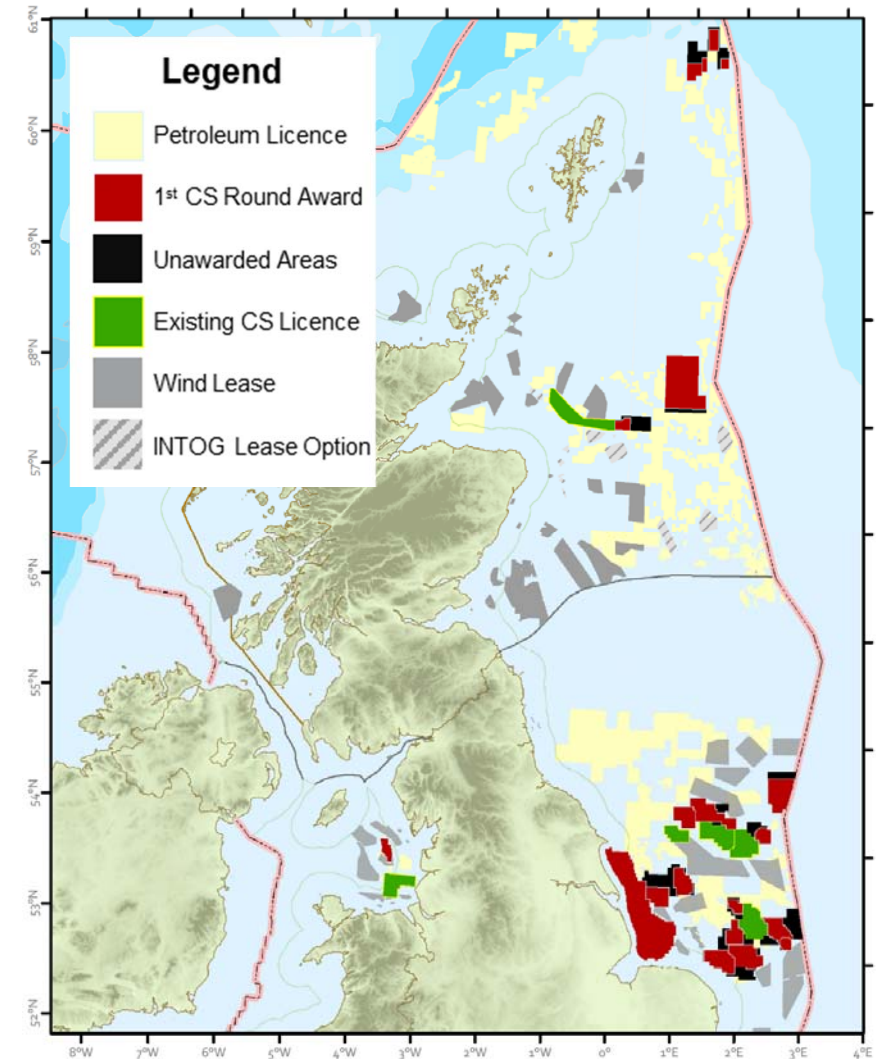
Diversified Portfolio (Aquifers & Depleted Fields).
Some projects potentially injecting before 2030.

Key Success Metrics

If all offers accepted,

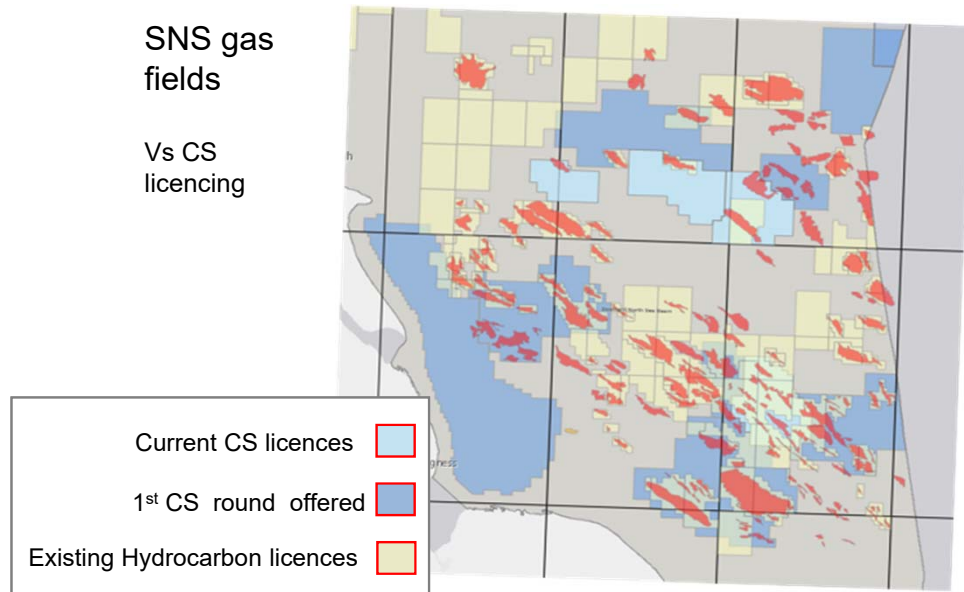
- **5 Firm Wells/Tests (9 Contingent)**
- **4 Firm Seismic Shoots (5 Contingent)**
- Additional reprocessing and studies commitments

Expectation that licensees will work collaboratively with each other, and with marine users from other sectors.



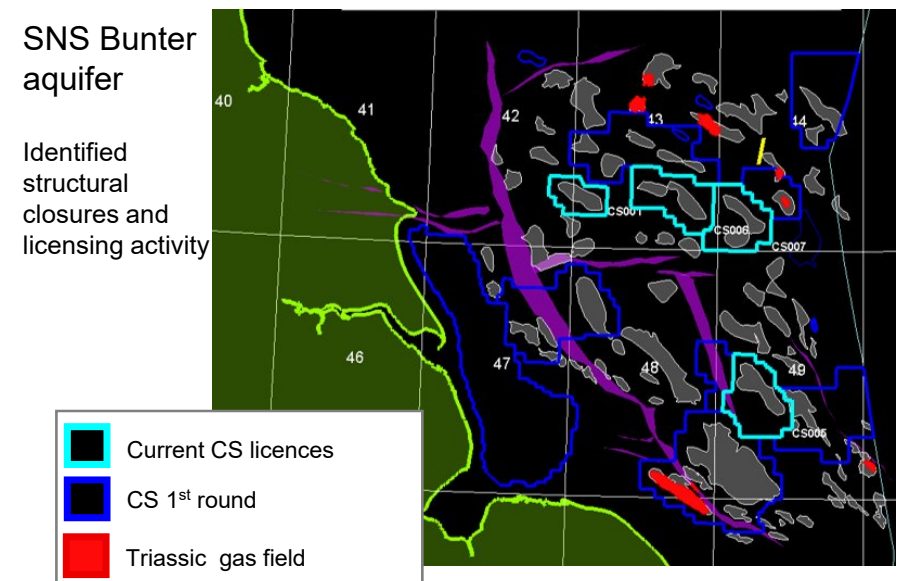
Carbon Storage – Site Characterisation

Depleted oil and gas fields



- Stores well-understood with legacy hydrocarbon data
- Overburden less well-characterised
- All legacy wells, potential for non-sealing faults/ fractures, gas CO₂ low flow
- Characterisation goals:
 - Integration of storage site, complex and overburden
 - Reservoir behaviour and impact of CO₂ injection on rock properties

Saline aquifers

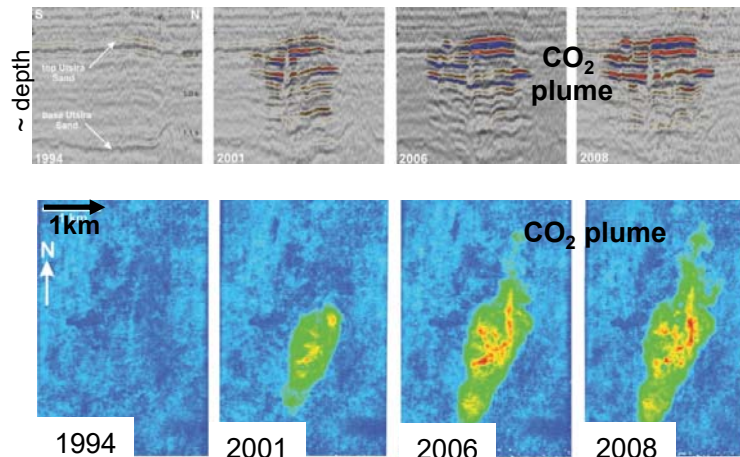


- Less well-characterised in many cases
- Poorer/less legacy data available (seismic and wells)
- Legacy E&A wells, particularly older ones
- Potential for unrecognised flow paths from store
- Characterisation goals
 - Integration of storage site, complex and overburden
 - Pressure behaviour of store and impact of CO₂ injection on aquifer/fairway pressures, brine migration/production

Carbon Storage – Monitoring

Seismic technologies

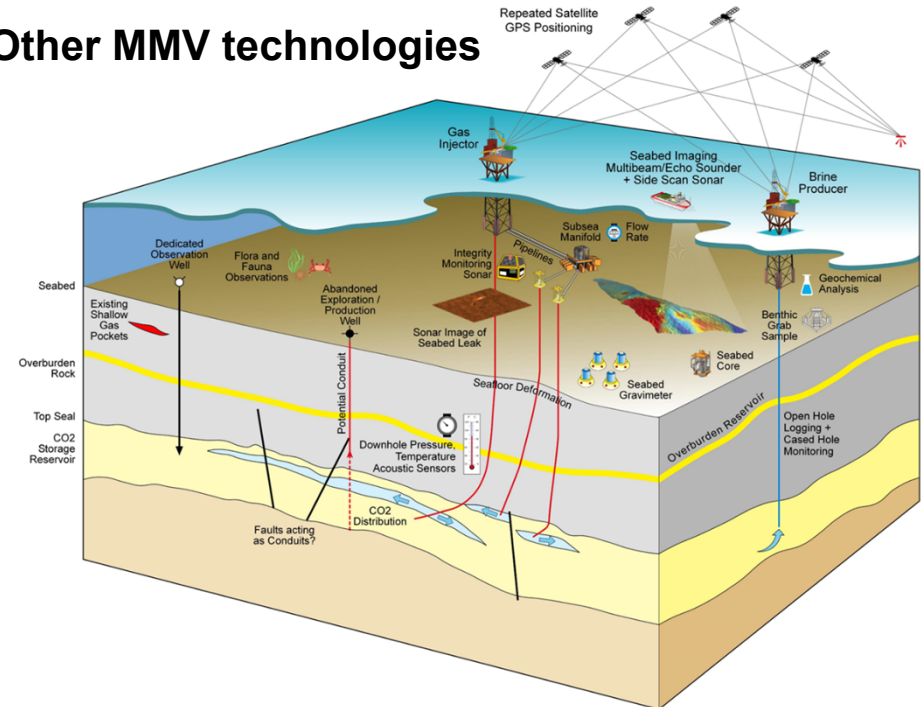
4D seismic (Sleipner, Norway)



Pre CO₂ injection: weak seismic response
 Post injection surveys: CO₂ plume distribution

- 4D will have critical role
- Aquifers plume migration
 - vertical distribution
 - lateral containment
- Depleted O&G fields
 - CO₂ plume resolution (more difficult)
 - Competency of seal
 - Monitoring overburden
- Long offset for deep reservoir & UHR for near seabed

Other MMV technologies

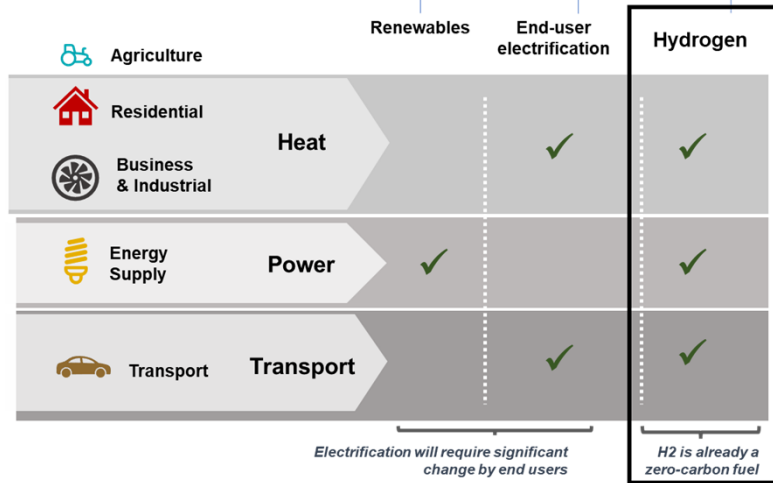


- Ocean Bottom acquisition
- Vertical seismic profiles
- Fibre DAS, downhole and seabed
- Seabed deformation
- Geochemical, seabed and water column sampling
- Autonomous (OBN, AUVs) for acquisition, sampling and data communication
- Aim: improve monitoring data, reduce activity cost, footprint, and potential co-location issues

Hydrogen Hubs



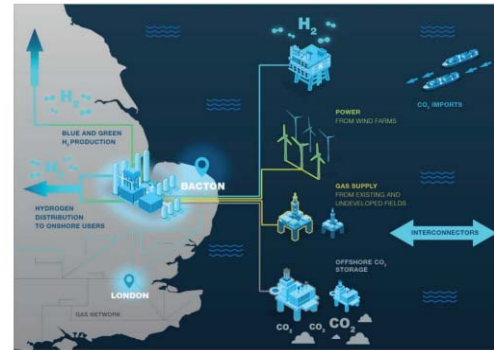
UK decarbonisation avenues



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- Hydrogen is a low carbon fuel which is storable and dispatchable
- UK government target is 10GW of Hydrogen capacity by 2030 (5GW to be electrolytic)
- UKCS access allows cost-competitive H2 production (both Blue and Green) transportation and storage solutions

Bacton (East England)

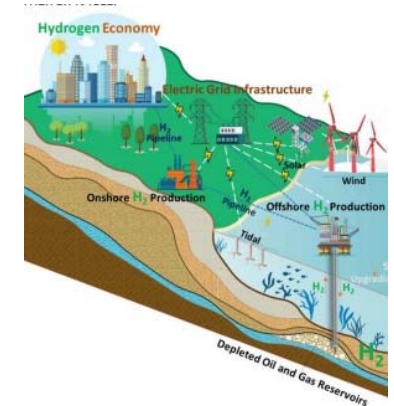
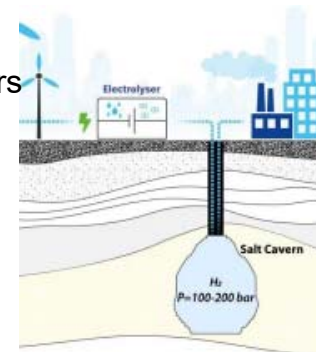


Flotta (Orkney)



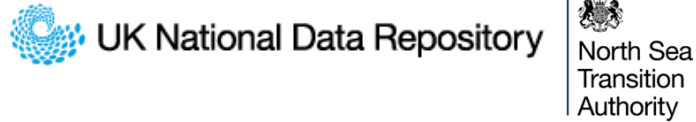
Storage

Critical for H2 market
Surface, salt caverns and/or offshore reservoirs

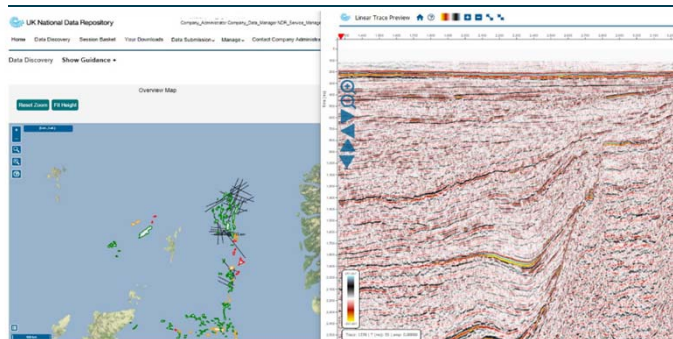


Access to data

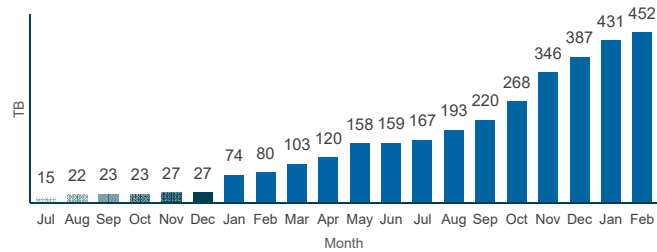
Quality industry data – readily available



A wealth of industry data (Seismic, well, etc) to support investment in hydrocarbons, windfarms and CCS development

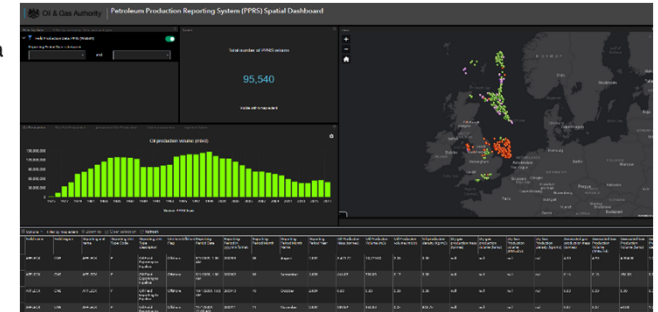


All online data (TB)



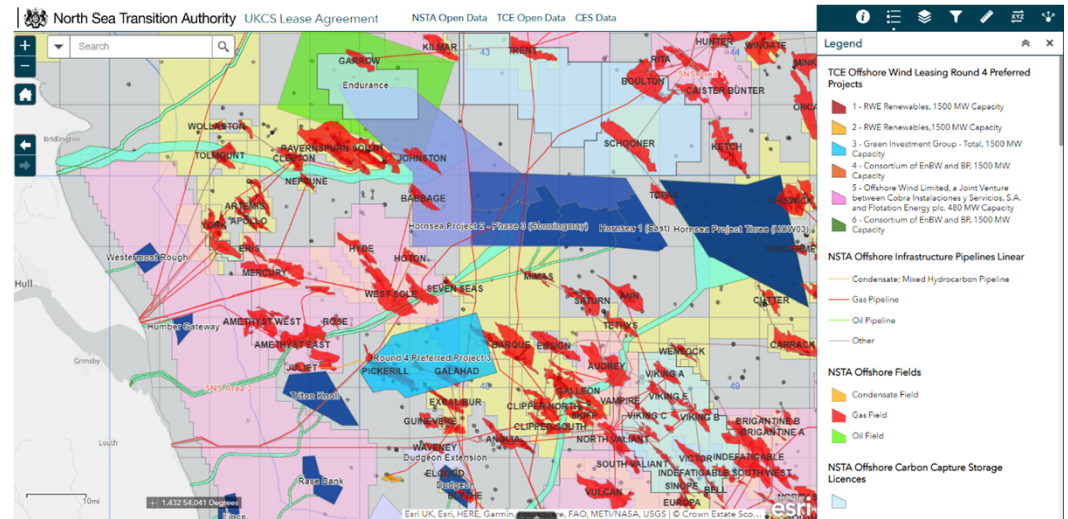
Geospatial applications

- Oil and gas
- Windpower
- CCS
- Other UKCS users

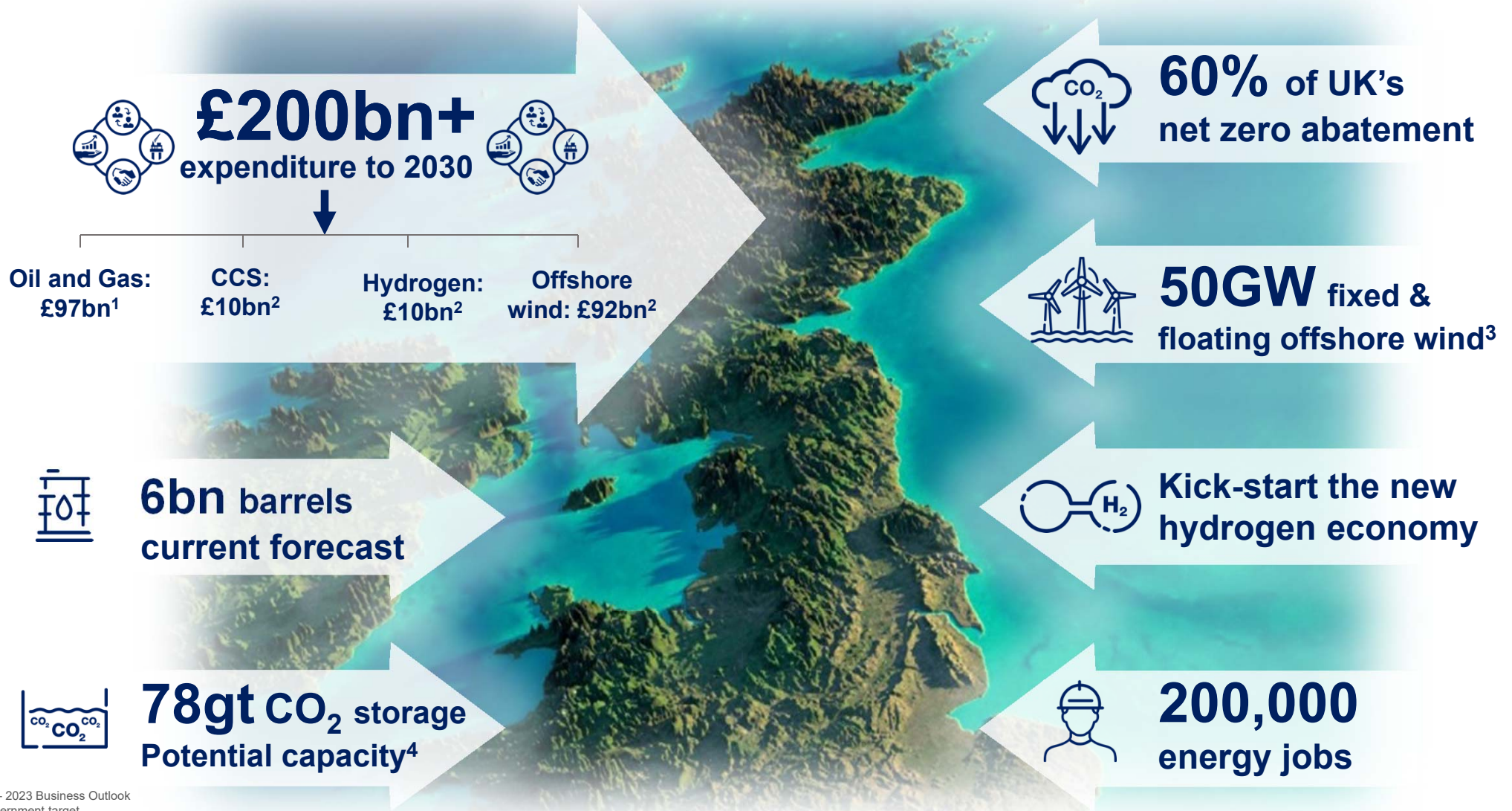


Energy lease app

Nov 2020



UKCS – Value of Energy Integration



Sources:
1 NSTA
2 OEUK – 2023 Business Outlook
3 UK Government target
4 ETI, BGS, et al. UK Storage Appraisal Project (2011)