



UKCS Cross-Sector Energy Integration

Better Regulation Executive, Regulators' Pioneer Fund

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Business, Energy
& Industrial Strategy

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UKCS Cross-Sector Energy Integration

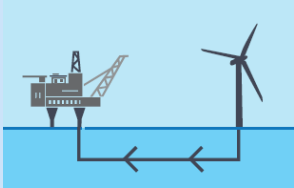
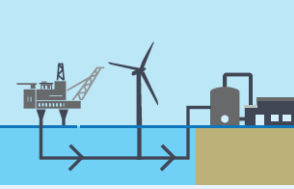
Aims & Objectives



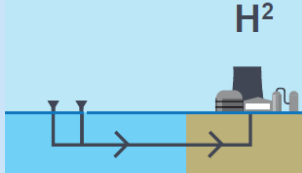
- Estimate the economic potential of energy integration across **five main applications (next slide)**
- The project will **generate a further shared understanding** (industry and government) of energy integration opportunities, recommending ways to fully unlock these.
- **Assess different industry sectors' capabilities** and the approaches of different government entities overseeing offshore energy developments.
- The project will **prioritise and pursue integration 'quick wins'** where these may exist. e.g. by accelerating or unlocking cross-sector initiatives or projects in play, and considering potential pilots and demonstrators.
- **Recommend longer-term actions**, such as removal of potential regulatory barriers and introduction of enablers to realise the full value from UKCS energy integration.

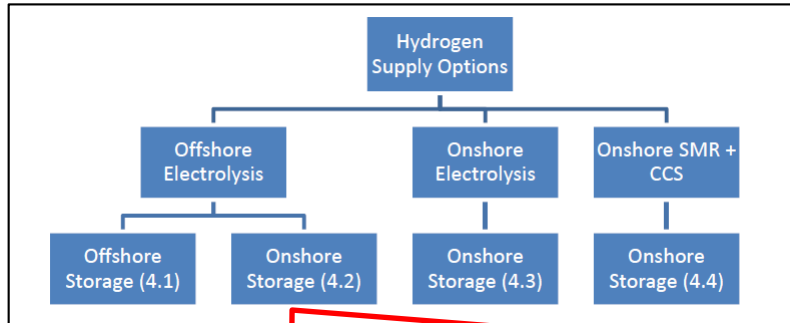
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Topics 1-2

Concept	Schematic	Potential Application(s)
<p><u>Platform Electrification</u> Connect platforms to power source (e.g. offshore windfarm) to reduce costs and emissions.</p>		<ul style="list-style-type: none">• Connect gas compression platforms to nearby windfarms• Use floating offshore wind to create ring main
<p><u>Gas-to-Wire</u> Generate power from gas and transmit to shore via windfarm infrastructure; can balance out intermittence.</p>		<ul style="list-style-type: none">• Switch gas fields over to offshore power generation or access stranded volumes

Topic 3

Concept	Schematic	Potential Application(s)
<p><u>Power-to-Gas</u> Use offshore windfarm power to produce hydrogen by water electrolysis. Use offshore platforms and pipelines to produce/store hydrogen.</p>	 <p style="text-align: center;">H^2</p>	<ul style="list-style-type: none"> • Use redundant platforms to generate hydrogen (using wind power) • Use pipeline infrastructure for storage and transport

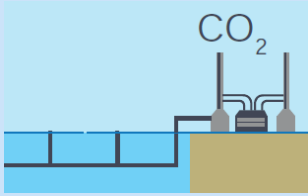



LR study considers re-use concepts relating to:

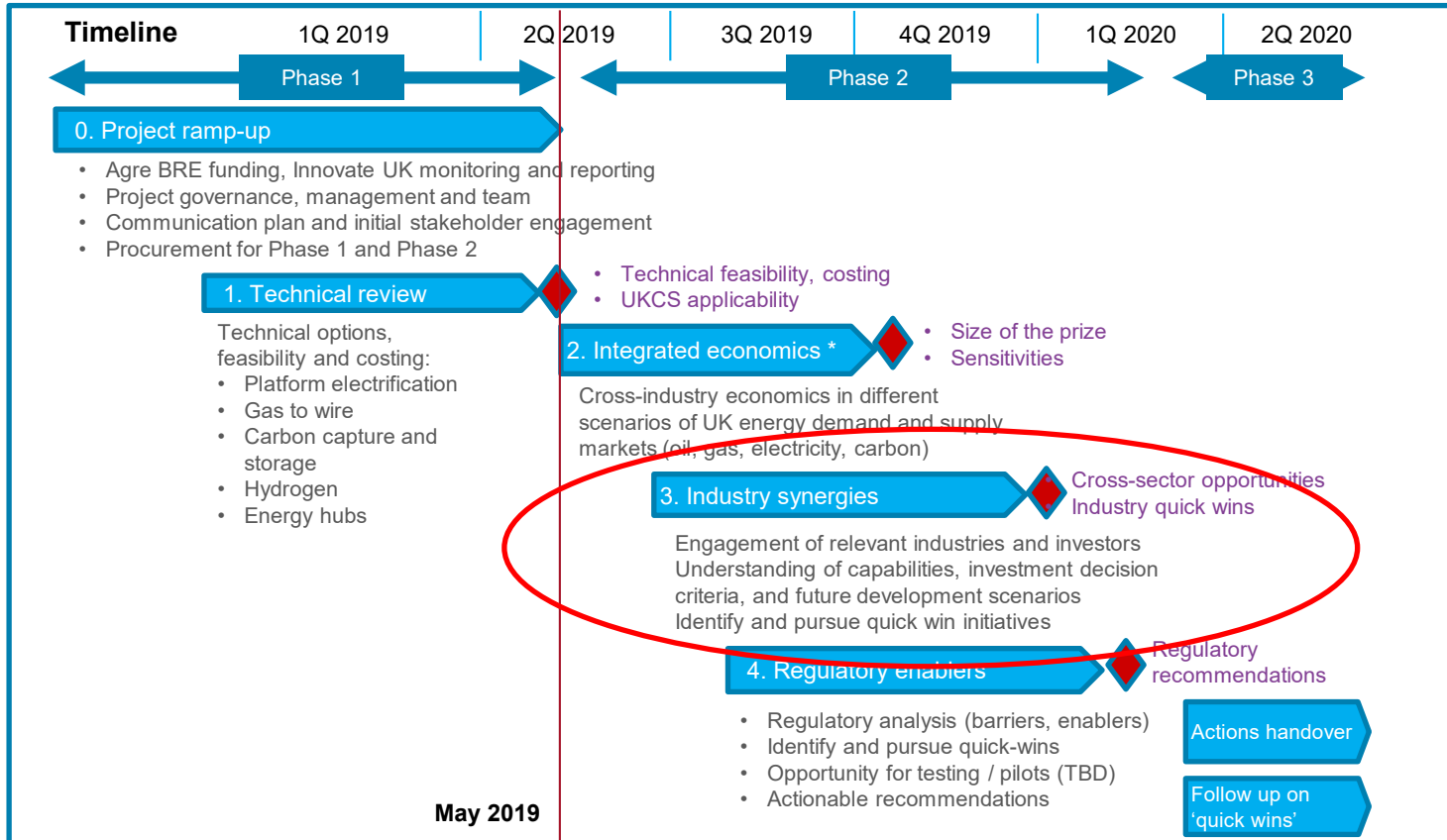
- 'Green': offshore platforms as windpower H_2 electrolyser stations, offshore pipelines for H_2 transport/storage, offshore fields for H_2 storage
- 'Blue': pipelines for H_2 transport/storage (from onshore SMR generation), offshore fields for H_2 and CO_2 storage (or H_2 in onshore salt caverns)

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Topics 4-5

Concept	Schematic	Potential Application(s)
<p><u>CO₂ transport and storage</u> Re-use of oil & gas infrastructure and spent fields</p>	 A schematic diagram showing an offshore oil and gas platform on the right. A pipeline extends from the platform to the left, crossing the water surface. Above the platform, the text 'CO2' is written, with a small upward arrow indicating the source of the gas. The platform has several structures and chimneys.	<ul style="list-style-type: none">• Use redundant infrastructure and fields to transport and store CO₂
<p><u>North Sea Wind Power Hub</u> New, artificial 'energy islands' for v. large scale hydrogen production from wind.</p>	 A schematic diagram showing three wind turbines on an artificial island in the sea. The island is a small, rectangular landmass. The turbines are positioned in a row. The sea is represented by a blue area at the bottom.	<ul style="list-style-type: none">• Integrate UK offshore power and hydrogen infrastructure with neighbouring countries

Cross-Sector Energy Integration Project Plan



UKCS Cross-Sector Energy Integration

Early Findings - all topics



- **Platform Electrification:** UKCS accounts for c.5% of national power demand but c.10% of emissions. Offshore demand declining but electrification can act as enabler for further integration opportunities. SNS has windfarms and gas platforms in close proximity whilst CNS is close to interconnectors. Also FOW potential e.g. WoS.
- **Gas to Wire:** can be used to develop stranded or late-life UKCS gas reserves. Must either be competitive with other generators or operate in a “niche” e.g. peak shaver. SNS has windfarms and gas platforms in close proximity.
- **Hydrogen:** potential for ‘green’ generation (via wind power) on re-purposed offshore platforms and for storage in offshore reservoirs. Likely to require long-term purpose-built facilities (pipelines, platforms, wells) but could commence via existing infrastructure re-use. Key issues: metallurgy and well P&A. Offshore project underway in Netherlands.
- **CCS:** significant storage potential in offshore reservoirs. Likely to require long-term purpose-built facilities but could commence via existing infrastructure re-use. Key issues: metallurgy and well P&A. SNS, EIS and CNS projects under consideration. Can be used in conjunction with hydrogen generated from natural gas.
- **Energy Hubs:** workflow builds on the above technical concepts. Integration could prolong use (re-purposing or otherwise) of current infrastructure. “Quick wins”: SNS & EIS, “Big wins”: CNS, WoS.

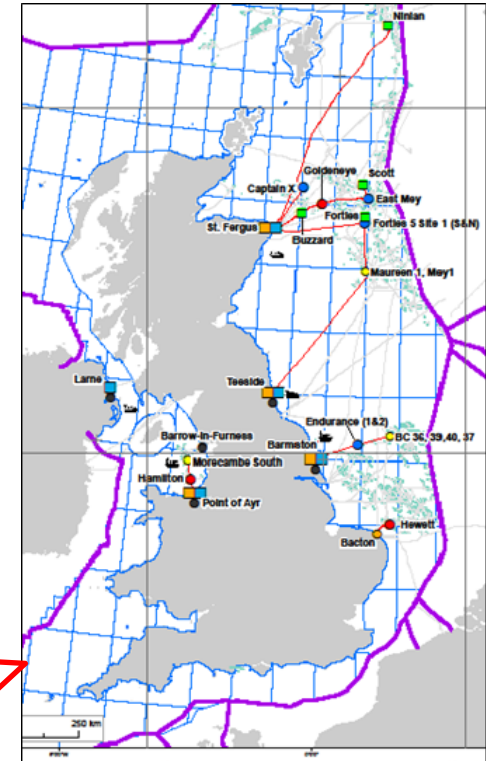
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Early Findings – Hydrogen

- **Platform Re-Use:**
 - Consider re-use options inc. gravity-base structures - NNS, FOW opportunities
 - Replace topsides – 20,000 te accommodates 200 MWe electrolysers
- **Pipeline Re-Use:**
 - Metallurgy & service history is key - consider embrittlement issues
 - Dry gas pipelines - low pressure swing volume (10 to 20 barg) holds 30 GWh
- **Reservoir Re-Use, H₂:**
 - Up to 150 tcf storage offshore – also onshore aquifers
 - Wells – appear less suitable for re-use, new required

LR study considers re-use concepts relating to:

- Transition: offshore infrastructure re-use could be a short-term enabler or a long-term solution
- CCS: considerable offshore capacity (2.6 GT)



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Next Steps



- Complete technical work, April/May (Phase 1)
- Award tender for integrated economics, June (Phase 2)
- Engage regulatory stakeholders, June onwards (Phase 2)
- Engage industry stakeholders, June onwards (Phase 2)
 - via trade associations (e.g. EEEGR, Renewable UK)
 - one-to-one discussions
 - workshop sessions