MARRAM ENERGY STORAGE AND DECARBONISATION HUB PROJECT

REQUEST FOR A SECTION 35 DIRECTION UNDER THE PLANNING ACT 2008

1 Introduction

1.1 In this document, EnergyPathways PLC (**EPP**) requests the Secretary of State to give a direction under s.35(1) of the Planning Act 2008 (the **Act**) for parts of the Marram Energy Storage and Decarbonisation Hub Project (**MESH** or the **Project** or **the developmen**t) to be treated as development for which development consent (as defined in the Act) is required.

1.2 The Project comprises a number of different elements, as described in Section 3 below. This request relates to the whole, or specified components, of certain of those elements as further described in Section 4 below. EPP requests that any s.35(1) direction given in response to this request should be given in respect of those elements or components.

1.3 As explained in section 4.2 below, a development consent order (**DCO**), for one element of the Project may be required in any event. If a direction under s.35(1) is given as requested here, EPP will be able to make an application (or applications) for a DCO in respect of all those parts of the Project for which authorisation is not required under the Petroleum Act 1998 or the Energy Act 2008 – together comprising a major part of the Project.

1.4 The individual elements of the Project could be developed, and their development authorised, separately. However, as explained further below, they are mutually complementary, and it would be advantageous both in commercial and policy terms for them to be developed, and their development to be authorised, in as integrated a manner as possible. A s.35(1) direction would enable such integrated authorisation and would greatly facilitate the process of making the necessary financial, commercial and engineering arrangements to ensure that all the elements of the Project is completed on time and at the most efficient cost.

1.5 The remainder of this document is organised as follows:

(a) Section 2 explains the objectives of the Project.

(b) Section 3 outlines the different elements comprised in the Project. These are: (1) an offshore flexible power generation and compressed air Long Duration Energy Storage (**LDES**) facility; (2) an offshore gas extraction and storage facility (or substitute natural gas infrastructure: see below); (3) a methane pyrolysis hydrogen production facility (onshore); (4) a clean ammonia and graphite production facility (onshore); (5) an offshore hydrogen storage facility; and (6) pipelines and cables that will link the elements of the Project to each other, to adjacent offshore wind farms, and to the National Electricity Transmission System (**NETS**) and National Transmission System for gas (**NTS**).

(c) As further explained below, the development of element 2 as originally conceived (**original element 2**) would be contingent on two forms of authorisation that lie outside the potential scope of a DCO. In particular, in addition to the grant of a gas storage licence under the Energy Act 2008, it would require the grant of production licence under the Petroleum Act 1998 in relation to planned low-cost clean hydrogen production. Since the Secretary of State's currently stated policy is that new licences under the Petroleum Act 1998 should not be issued, EPP accepts that it may become impossible for it to realise original element 2. However, whilst the absence of original element 2 will reduce some synergies and benefits between the elements of MESH, natural gas storage and indigenous gas feedstock for clean hydrogen production are not essential to the functioning of the other elements and, as further explained below, in so far as original element 2 would contribute low-cost and secure fuel supply input into element 1 and low-cost feedstock for clean hydrogen and ammonia production for element 3, EPP does envisage that alternative sources of natural gas can be obtained for each of these purposes, and conveying it to elements 1 and 3 through **substitute element 2** infrastructure (which is not envisaged to include extraction or storage infrastructure). In discussing the natural gas aspects of MESH below, EPP has marked in each case whether what is said relates to original element 2, substitute element 2 infrastructure, or both. The details relating to original element 2 are provided for background information only. In the interests of simplicity, EPP is not requesting that and component of original element 2 be included in the scope of the s.35(1) direction at this time, but it reserves the right to request a variation to such a direction if policy in relation to the Petroleum Act 1998 develops in a way that appears favourable to the realisation of original element 2 and the decarbonisation and energy security benefits that would be derived.

(d) Sections 2 and 3 together give a sense of both the scale of the Project and its potential contribution to ensuring that the UK achieves the government's goal of becoming a “clean energy superpower”.

(e) Section 4 provides more detail about the infrastructure involved in each element of the Project and the authorisations required for them. It explains which elements of the Project are the subject of this request and how the other elements either fall within s.14 of the Act (and therefore require development consent under s.31 in any event) or require authorisations that cannot be incorporated within a development consent order.

(f) Section 5 sets out policy considerations that EPP considers relevant to the Project.

(g) Section 6 explains what, in EPP's view, are the reasons why the Secretary of State should give a s.35(1) direction in this case.

2 The Project's objectives

2.1 EPP's overall aim is to deliver affordable, low-carbon energy to Britain’s homes and businesses. With MESH, EPP will develop a large-scale integrated energy storage and decarbonisation project that will harness value from Britain’s wasted wind with Long Duration Energy Storage (LDES), enhance Britain’s energy security with increased low-carbon flexible power capacity and gas storage. It will also help to decarbonise British industry by producing low-carbon hydrogen. EPP has established a consortium of strategic development and technology partners – including Siemens Energy, Hazer Group-KBR, Wood plc, and Costain Group plc – for the MESH project, with the goal of achieving the following seven objectives.

2.2 Maximising the benefit from the UK’s fleet of wind assets by storing electricity which would otherwise be wasted due to grid constraints or market limitations

2.2.1 The MESH facilities will enable the UK’s growing fleet of wind assets to generate more power (rather than having their output curtailed when it is not matched by demand or generation is restricted by system constraints) by storing oversupply, curtailed or low value wind power produced from adjacent offshore wind farms or from the grid.

2.2.2 As well as providing an LDES solution with a multi-day supply, MESH will enable this stored wind power, (i) to be flexibly dispatched to meet demand when renewable supply is low and when the grid is not congested; (ii) to be dispatched to provide a cost competitive low-carbon flexible power generation solution, and (iii) to be used in the growing electricity markets of capacity, balancing and ancillary services to ensure a resilient grid.

2.3 Increasing the UK's Long Duration Energy Storage and flexible low-carbon electricity generation capacity

2.3.1 EPP will construct 4 compressed air storage caverns in unique geological salt formations located offshore in the UK East Irish Sea. These will store renewable power sourced from regional wind projects and the grid initially at a targeted rate of 200 MW over multi-day periods. This stored power is capable of being released, providing flexible power capacity that can generate 350 MW of dispatchable low-carbon electricity at short notice with multi-day supply. The capital cost to develop this power storage capacity is estimated to be approximately one tenth of the cost for battery energy storage systems (BESS).

2.3.2 The MESH compressed air LDES and flexible power capacity offers much needed standby capacity to back up renewable energy as the UK's energy system moves to a renewables-dominated grid, significantly enhancing the resilience and reliability of the UK's overall power supply. The MESH LDES and flexible power system can be expanded to multi-GW scale given there is potential to construct up to 100 salt caverns in the area.

2.4 Enhancing the security of the UK's supplies of natural gas energy (original element 2)

2.4.1 EPP proposes to develop the Marram gas field in such a way that it will operate as a combined gas extraction and storage project from day 1, before becoming essentially a storage project once the indigenous gas is sufficiently depleted. MESH gas storage will potentially more than double the UK's gas storage capacity which will help strengthen the UK's energy security, energy independence and flexibility of energy supply. The UK has a mere fraction of the gas storage capacity of other major European economies, with Germany, the Netherlands, Italy and France having ten times that of the UK.

2.4.2 MESH's estimated gas storage capacity of 17 TWh will be equivalent in size to Centrica's existing Rough gas storage facility, which accounts for over half of the UK's current gas storage capacity. Centrica has cautioned that the Rough facility will be shut down soon which will leave the UK with only 6 days of stored gas supply. The MESH gas storage facility will be a low-cost development estimated at around £200 million. The cost of Centrica's proposed redevelopment of Rough for example is estimated at £2 billion. MESH gas storage will be integrated with other elements of the MESH energy system creating synergies to enhance its ability to generate cost effective flexible low-carbon power capacity for the UK.

2.4.3 In this way, MESH will fully decarbonise a volume of gas at least equivalent to the volume of indigenous gas produced from the Marram gas field by using MESH's methane pyrolysis plant to produce clean hydrogen and synthetic graphite with no Scope 3 emissions. (This paragraph 2.4.3 applies to both original element 2 and substitute element 2.)

2.5 First-of-a-kind commercial deployment of proven technologies that will position Britain as a clean energy leader

Using leading-edge clean energy technologies in collaboration with Siemens Energy and Hazer Group Ltd-KBR, EPP will develop an integrated energy solution that provides the UK with large scale LDES and low to zero-carbon flexible power to support a renewables-dominated grid. The principal technologies involved are:

(a) *Compressed air energy storage (**CAES**)* is a proven LDES technology that has been deployed in other countries but its potential in the UK, where there is considerable scope for it to augment the output and value of intermittent renewable generation, particularly offshore wind, remains under-exploited. CAES shares many of the attributes of pumped hydro storage and hydrogen energy storage but can be deployed much more cost effectively and with greater energy efficiency. Coupled with small volumes of gas or hydrogen the Siemens-EPP Hybrid Compressed Air Energy Storage system (H-CAES) efficiently generates flexible low to zero carbon power making it a cost-effective form of decarbonised power generation. EPP will use Siemens Energy technologies in compressed air and heat storage systems, and hybrid power plants operated with hydrogen and gas & steam turbines.

(b) *Siemens Energy AI integrated energy management SMART-grid systems* will be used to optimise the MESH integrated energy operations so it can meet system-wide UK energy market demand, whilst providing cost-competitive and energy efficient supply to minimise consumer funded energy subsidies.

(c) *Methane pyrolysis technology* is an under-exploited but proven decarbonisation technology which can generate clean or low-carbon hydrogen cost-competitively at scale, offering full Scope 3 GHG emissions mitigation without reliance on a Carbon Capture Utilisation & Storage (**CCUS**) network. EPP has exclusive rights to use Hazer-KBR licensed methane pyrolysis and clean ammonia technology in the UK.

2.6 **Enabling DESNZ to get better value for money in future Hydrogen Allocation Rounds (HARs)**

2.6.1 The energy requirements of methane pyrolysis are much lower than those of equivalent electrolytic or methane reformation production of hydrogen. In addition, methane pyrolysis also offers a substantial emissions benefit over steam methane reformation and at the same time, enables substantial scope-3 reductions for energy producers. This means that any HAR in which a methane pyrolysis project is awarded a contract will be able to support more projects, or a larger amount of capacity of hydrogen production, for the same amount of HAR subsidy. We estimate the cost of production of methane pyrolysis hydrogen could be as little as a quarter of the cost of electrolytic green hydrogen systems.

2.6.2 MESH's initial planned hydrogen production capacity will be 90 MW hydrogen output. There would be significant scope to expand MESH's hydrogen production, or to deploy the technology it would use elsewhere, so as to provide an avenue for decarbonising the UK's undeveloped gas resources.

2.7 **Helping the UK become a leader in industrial decarbonisation by establishing domestic production of clean hydrogen, clean ammonia and clean graphite**

2.7.1 EPP's preferred methane pyrolysis technology and clean hydrogen production will have two sustainable end products, clean ammonia and clean synthetic graphite. The conditions at MESH for converting hydrogen into clean ammonia are ideal, benefiting from the North West's nitrogen rich gas resources, coupled with the abundant wind generated electricity in the region. (The previous sentence would apply if <u>original element 2</u> forms part of MESH; it would only apply with <u>substitute element 2</u> if alternative sources of natural gas rich in nitrogen is used or an alternative nitrogen source is used). Graphite has been identified by the UK government as a critical mineral for advanced manufacturing e.g. as a raw material required in the manufacture of batteries.

2.7.2 The nation’s supply of graphite and ammonia is currently almost entirely met by high emission “dirty” imported products. The competitiveness of UK-produced clean ammonia will be enhanced by the introduction of a UK Carbon Border Adjustment Mechanism that makes imported "grey" ammonia more expensive, and US tariffs on graphite produced in China (which dominates the global market) may help create an export market for UK-produced synthetic graphite.

2.8 Decarbonising the UK’s future energy system by providing large scale hydrogen storage

2.8.1 EPP proposes to create hydrogen storage caverns in geological salt formations in the UK’s East Irish Sea with a targeted working capacity of up to 2.8 TWh. MESH’s hydrogen storage facility will potentially be UK’s largest and will future proof the MESH integrated system as a major energy storage and decarbonisation hub.

2.8.2 MESH hydrogen storage will be connected to MESH’s clean hydrogen production facilities, MESH’s low-cost low-carbon flexible power capacity, and MESH gas storage. It will also be connected to nearby emerging hydrogen markets such as HyNet via the UK’s planned hydrogen grid “Project Union” which will be routed close to by near Heysham.

3 Infrastructure

3.1 The objectives outlined above will be achieved by developing several distinct, but linked and complementary facilities. The East Irish Sea is a particularly good place to develop these together in a co-ordinated sequence.

3.2 The principal facilities are outlined in the schematic diagram (Figure 1), map (Figure 2) and table (Figure 3) below and described in more detail in the paragraphs following them. The diagram and map include original element 2. If it were replaced with substitute element 2, there would be no underground gas storage and extraction infrastructure platform offshore. The connecting natural gas offshore pipeline sections to element 1 would still be required.

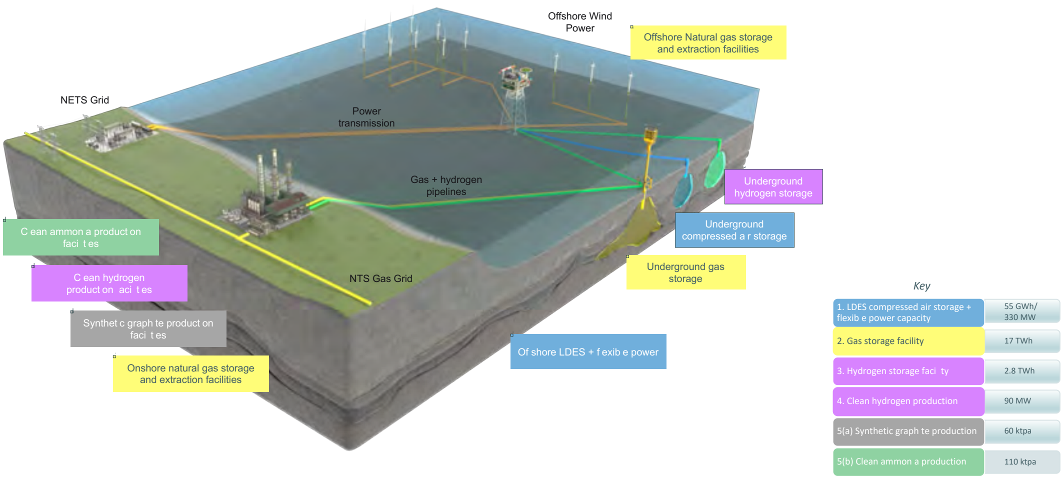

Figure 1: Schematic diagram of integrated MESH project and its elements

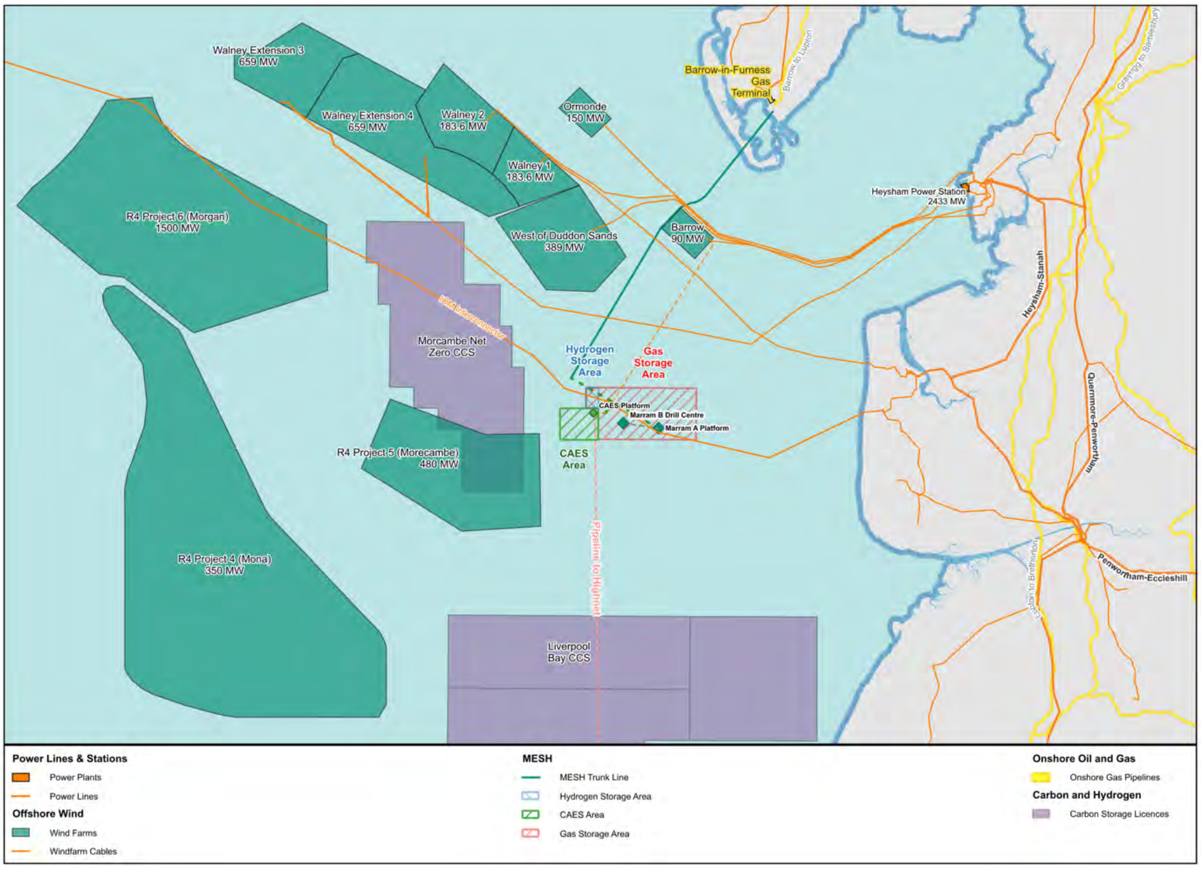

Figure 2: Map showing location of MESH project

	Element	Elements proposed to benefit from development consent (via Section 14 or 35)	Elements requiring authorisation under Petroleum Act 1998 / Energy Act 2008	Links to other MESH elements	Products / Services
1	Compressed air LDES and flexible power capacity facilities	• 4 Offshore Subsea-Subterranean Salt Caverns • Hybrid Compressed Air Storage system (H-CAES) offshore platform - New Normally Unmanned Installation (NUI) housing centralised wellhead system, compression and turbine systems for storage • Flexible power generation capacity • AI integrated energy management systems and onshore integrated control room ***Note:*** *See section 4.2 below regarding the possible treatment of some or all of element 1 as an NSIP / associated development within the meaning of the Act, or as development for which development consent is required pursuant to a s.35 direction.*	• All out of scope of the 1998 and 2008 Acts	• Power supplied to element 2 • Power supplied to element 5 • Power supplied to element 3	• Wholesale electricity (merchant trading and supply via power purchase agreements) • Electricity storage • Balancing Mechanism • Capacity Market • Frequency Stabilisation services • Inertia services • Other ancillary services
2 (original)	Natural gas storage and extraction facilities	• Onshore gas terminal consisting of field gas compression, water dew-pointing and trace carbon dioxide removal, nitrogen rejection, product gas compression, metering, control and shutdown systems, and safety and utility systems ***Note:*** *Not an NSIP within s.14; would need to be made a subject of the s.35 direction.*	• Offshore 4 extended reach wells for injection and withdrawal • Offshore new Normally Unmanned Installation (NUI) powered from renewable energy to house gas storage wellheads	• Methane supplied to element 1 • Methane supplied to element 3 • Power supplied from element 1	• Methane feedstock for clean hydrogen and clean graphite production • Natural gas storage services • High purity nitrogen for ammonia production
2 (substitute)	Gas supply infrastructure for elements 1 and 3	• Onshore gas terminal consisting of field gas compression, water dew-pointing and trace carbon dioxide removal, (possibly) nitrogen rejection, product gas compression, metering, control and shutdown systems, and safety and utility systems ***Note:*** *Not an NSIP within s.14; would need to be made a subject of the s.35 direction (unless treated as development "associated" with element 1 within the meaning of s.120 of the Act).*	Offshore pipelines	• Methane supplied to element 1 • Methane supplied to element 3	• Methane feedstock for clean hydrogen and clean graphite production • High purity nitrogen for ammonia production
3	Methane pyrolysis hydrogen production and graphite production facilities	• 20,000 tpa hydrogen pyrolysis plant located adjacent to the MESH onshore gas terminal • Graphite production, storage, metering, packaging, distribution and export facilities connecting to Barrow port ***Note:*** *Not NSIPs within s.14; would need to be made a subject of the s.35 direction.*	• All out of scope of the 1998 and 2008 Acts	• Methane feedstock supplied from element 2 • Hydrogen supplied to element 5 • Power supplied	• Clean hydrogen feedstock for clean power generation • Clean hydrogen feedstock for ammonia synthesis

	Element	Elements proposed to benefit from development consent (via Section 14 or 35)	Elements requiring authorisation under Petroleum Act 1998 / Energy Act 2008	Links to other MESH elements	Products / Services
				from element 1	• Clean graphite production
4	Clean ammonia production facilities	• Haber-Bosch ammonia synthesis facility • Ammonia distribution and export facilities connecting to Barrow port • Ammonia production, tank storage, metering, distribution and export facilities connecting to Barrow port, rail and road networks ***Note:*** *Not NSIPs within s.14; would need to be made a subject of the s.35 direction.*	• All out of scope of the 1998 and 2008 Acts 2008	• Nitrogen supplied from element 2 • Hydrogen feedstock supplied from element 3 • Heat supplied to element 3 • Power supplied from element 1	• Ammonia • Heat source for methane pyrolysis plant
5	Hydrogen storage facilities	• Onshore hydrogen compression facilities at landfall • Onshore connection to HyNet, and Project Union ***Note:*** *Not NSIPs within s.14; would need to be made a subject of the s.35 direction.*	• 20 injection and withdrawal offshore wells • 20 offshore salt storage caverns • 5 subsea manifolds	• Power supplied from element 1 • Hydrogen supplied from element 3	• Hydrogen Storage Services connected to HyNet, Project Union and MESH hydrogen production
6	Network infrastructure connecting different elements of the MESH project to each other and to other networks	• Electricity imports and exports cables from offshore regional wind farms, national power grid and transmission interconnectors • Onshore easements from end of trunkline to gas terminal and gas grid connection • Onshore connection to the National Gas NTS gas grid • Onshore National Grid power connection • Connection to MESH methane pyrolysis hydrogen production facility ***Note:*** *Infrastructure within the first bullet above may be "associated development" with item 1 above or other NSIPs (e.g. offshore wind farms). Infrastructure in the other bullets may fall within "permitted development" or similar rights of statutory undertakers but otherwise would need to be made a subject of the s.35 direction.*	• Repurposed end of life existing offshore gas trunkline (Calder Pipeline) • New offshore spur line to/from repurposed Calder gas trunkline to MESH gas storage platform location • Gas offshore interconnector pipeline connecting the H-CAES offshore facility to the new offshore spur line • Connection to new H-CAES offshore Normally Unmanned Installation (NUI) for housing brine leaching and pumping operations • Dedicated offshore hydrogen spur line to Marram spur line for blended natural gas and hydrogen transportation • New offshore to onshore hydrogen pipeline, either to Project Union, Hynet or both • New offshore hydrogen pipeline connecting MESH hydrogen storage to the H-CAES offshore facility	• Gas links from element 2 to elements 1 and 3 • Hydrogen links from element 5 to elements 1 and 2 • Possible power link from element 1 to elements 2	• Facilitate provision of products and services provided by elements 1-5 by providing connections between them

Figure 3: Table showing MESH elements

3.3 **Long Duration Energy Storage / Flexible power generation facility**

3.3.1 The MESH LDES and flexible power generation facilities will have a storage capacity input rate of 200 MW for a 7-day duration and 350 MW of flexible low-carbon power output with 7 days of supply.

3.3.2 The facilities will comprise 4 storage caverns, a small Normally Unmanned Installation (**NUI**) for cavern construction and an offshore H-CAES platform for compression storage and flexible power generation (Figures 4a, 4b), along with subsea grid transmission cabling (trenched and buried) and interconnecting subsea pipelines to MESH gas storage and hydrogen storage.

3.3.3 Salt caverns will be constructed using the NUI mono pile pumping and leaching facilities for solution mining to be powered by renewable and hydrogen energy. When completed the NUI will house four dry wellheads and trees, one for each cavern. The energy storage salt caverns will be 300-600m below the seabed and expected to be 100m in diameter and 200m deep. Three caverns will be used for compressed air storage and a fourth will be used for heat storage using brine as a storage medium.

3.3.4 The H-CAES platform facilities will involve installation of a larger bridge linked platform containing air compression, heat exchangers and air expansion equipment. It will consist of a multi-legged steel jacket with a piled foundation. Initially, compression and generation capacities of 200 MW each will be installed, consisting of four 25 percent compression trains and two 50 percent generation trains.

3.3.5 The H-CAES platform will source intermittent wind power from the local wind farms via a direct connection to the grid via transmission lines and interconnectors. When the H-CAES system discharges flexible electricity, compressed pressurised air and stored heat will be taken from the caverns to cause an expander to rotate, driving a generator and producing electricity. The expander will be a gas turbine gas generator which means that gas, or a mixture of gas and hydrogen, or in the future, pure hydrogen will be combusted to enhance clean power flexible output. H-CAES flexible power will be exported via the same transmission and interconnector lines (Figure 5).

Figure 4(a): H-CAES offshore platform

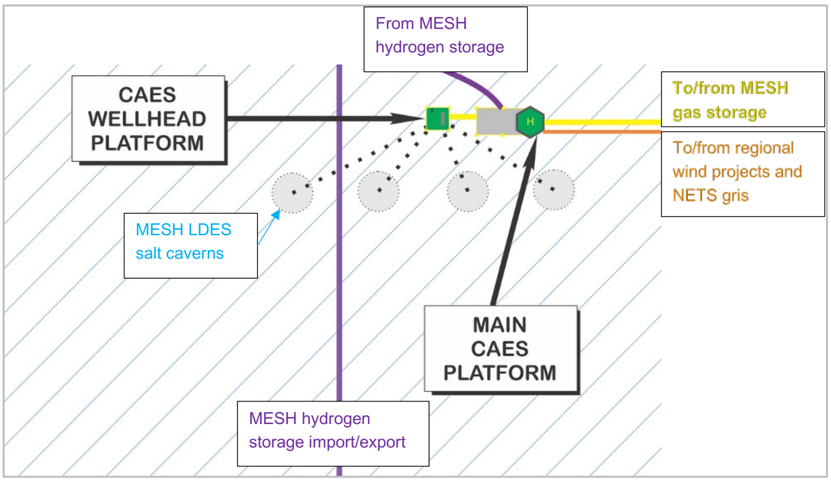

Figure 4b: layout of offshore LDES H-CAES facilities

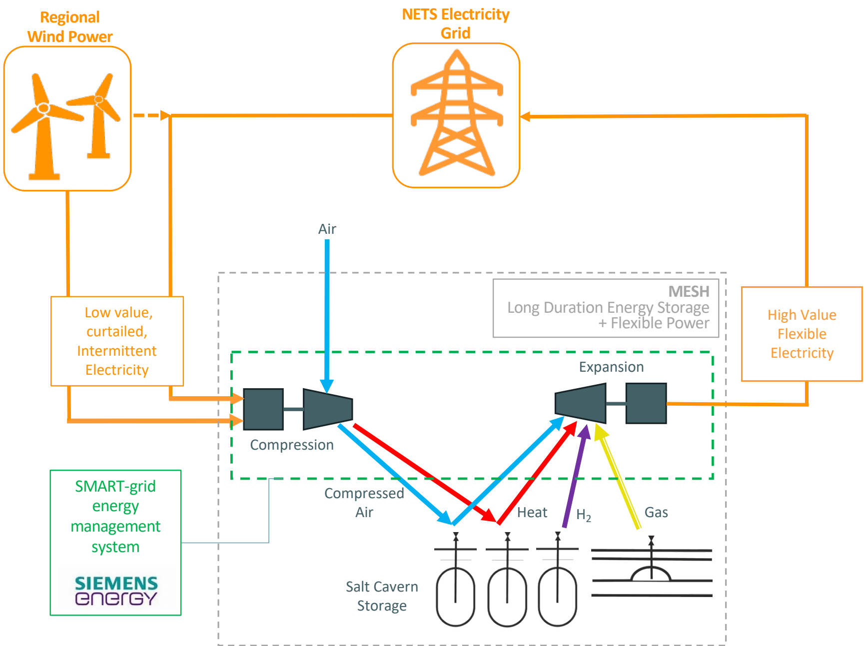

Figure 5: MESH LDES and flexible power system engineering diagram

3.4 Natural gas storage and extraction facility (<u>original element 2</u>)

3.4.1 The MESH natural gas storage and extraction project will have a storage capacity of 17 TWh (600 million therms) with injection and withdrawal rates of 2 GW (1.7 million therms per day). The facility will have equivalent storage capacity to Centrica's existing and retiring gas storage facility, Rough.

3.4.2 The facility will comprise a small NUI located offshore at the Marram gas field, Marram 'A' (Figure 6a). Marram 'A' will run entirely on renewable energy, generated from solar panels, small wind turbines and supported by battery storage, all of which will be located on the platform. Marram 'A' will support 4 dual purpose withdrawal and injection wells into the Marram gas field. The wells will penetrate the Marram gas field clastic high permeability, high porosity reservoirs which are ideal for gas storage operations.

3.4.3 Gas will be transported to and from Marram 'A' via a new 8km trenched and buried spur flowline, where it will be connected to the existing, and to be repurposed Calder 24" subsea trunkline that connects to an onshore gas processing terminal at Barrow-in-Furness which in turn, will be connected to the UK gas grid (Figure 6b). The facility design selectively repurposes certain existing infrastructure to establish an ultra-low emission operational asset, with minimal impact to the marine environment thereby avoiding the use of existing, late life, unreliable, high carbon emitting gas infrastructure. The layout of the new equipment at the onshore terminal is shown in Figure 4. The design life of the facilities is at least 25 years.

3.4.4 The MESH gas terminal will be co-located with MESH's decarbonisation and hydrogen production facilities. Gas storage operations will begin once indigenous Marram gas has been sufficiently depleted from the Marram reservoir. Marram indigenous gas will be used as feedstock for MESH clean hydrogen production, a fully decarbonised Scope 3 emissions mitigation solution.

Figure 6a: Marram A NUI gas storage facility

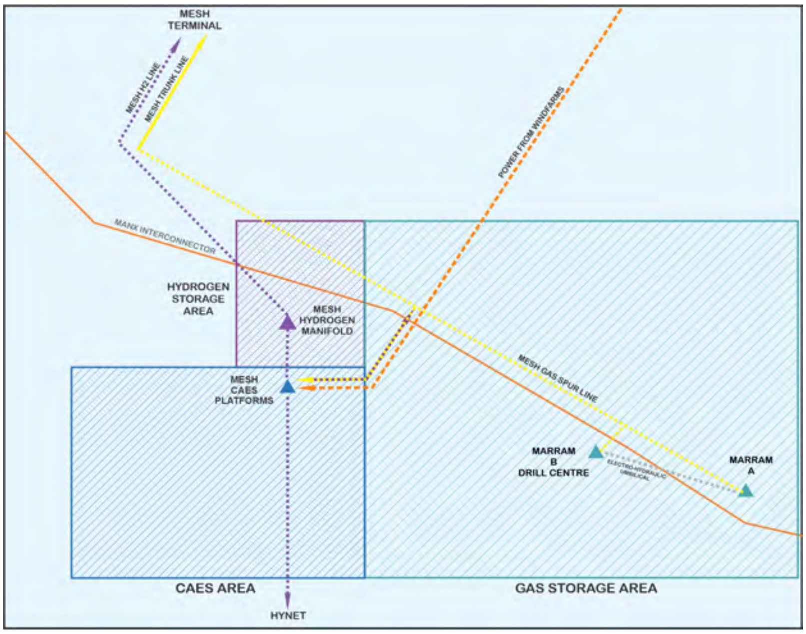

Figure 6b: Offshore layout of gas storage facilities

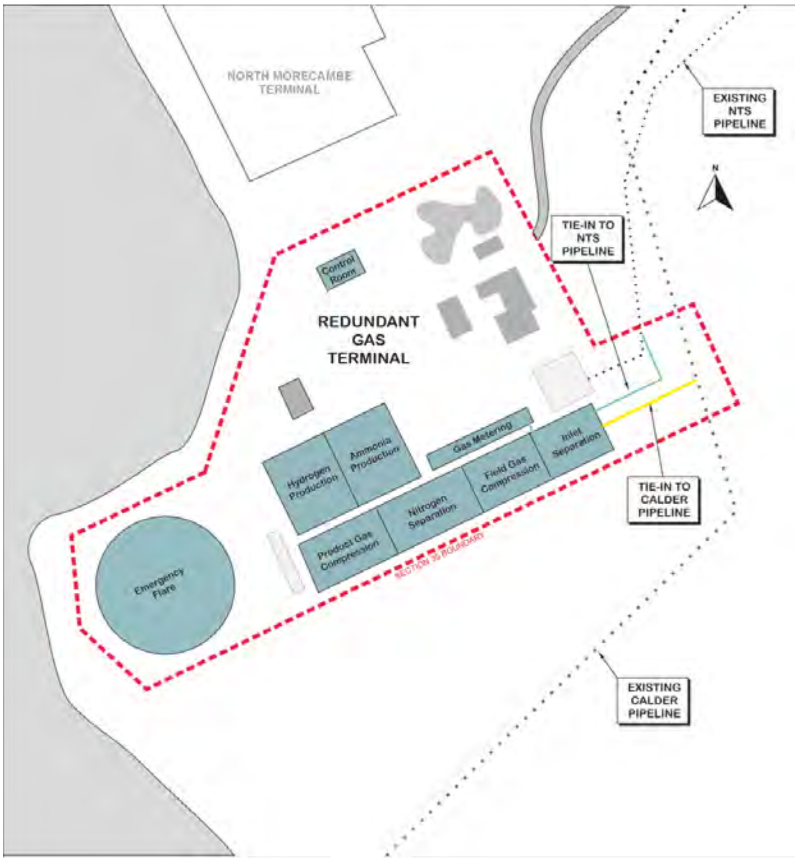

Figure 7: Onshore gas terminal layout

3.5 **Methane pyrolysis hydrogen production facility**

3.5.1 The MESH hydrogen production facility will be fully decarbonised with a capacity of 20,000 tonnes per annum (**tpa**), or 90 MW of hydrogen. The MESH clean hydrogen production facility will be co-located with the MESH onshore gas facilities at Barrow-in-Furness (see Figure 7). The facility will use global leading-edge proven Hazer-KBR methane pyrolysis and ammonia production technology which EnergyPathways has exclusive rights to use in the UK. The facility will “bolt on” to the MESH gas terminal in Barrow-in-Furness and use MESH gas feedstock or gas sourced from the UK grid. Gas consumption will be at a rate of 12 million cubic feet per day (mmscfd). The facility will be a full decarbonisation solution with little to no Scope 3 emissions. This facility will mitigate Scope 3 emissions at a rate of 140,000 tpa. Low-carbon hydrogen produced will be lower cost in comparison to "blue" hydrogen and as little as a quarter of the cost of "green" hydrogen. It will be close to equivalent cost of high GHG emission Steam Methane Reforming (**SMR**) “grey” hydrogen.

3.5.2 The Hazer-KBR technology equipment that will be installed, will include a proven fluidised bed reactor re-purposed from refining and metallurgical industries which will enable scalable synthetic graphite production at a rate of 60,000 tpa.

3.6 **Clean ammonia production facility**

3.6.1 The MESH clean ammonia production facility is a fully decarbonised facility with a production capacity of 110,000 tpa. This facility will be co-located with the MESH onshore gas and clean hydrogen production facilities at Barrow-in-Furness. The facility will use global, leading-edge Hazer-KBR ammonia synthesis production technology. MESH will use produced hydrogen as feedstock at a consumption rate of 20,000 tpa. This facility is also a full decarbonisation solution with no Scope 3 emissions, as it uses decarbonised hydrogen production and renewable power.

3.6.2 Facility operations will benefit from the abundant, high purity (99%) nitrogen that is produced by the MESH gas processing plant from its nitrogen rejection unit (**NRU**); the gas fields in the East Irish Sea are nitrogen rich. The exothermic nature of the Haber-Bosch ammonia synthesis process enables its waste heat to be harnessed and re-used to reduce the energy consumption for the methane pyrolysis process. MESH clean ammonia will be cost competitive relative to grey “dirty” ammonia imports as well as "green" (or "blue") ammonia. Production will be tank stored and distributed to domestic and international markets via the port in Barrow, further mitigating emissions related to transportation.

3.7 Hydrogen Storage

3.7.1 The MESH hydrogen storage will have a hydrogen storage capacity of 2.8 TWh and 640 MW hydrogen output. The facility comprises the construction offshore, of 20 salt caverns, subsea pipelines, facilities and onshore, compression and market/grid connections.

3.7.2 For salt cavern construction for hydrogen and compressed air storage, a small NUI mono pile ‘wellhead’ type platform with a minimal topside will be installed. The NUI will be used to house pumping and leaching facilities for solution mining, a process of pumping in sea water and dissolving out the salt to form the 20 caverns. The planned layout of the 20 caverns is shown in Figure 5. A produced brine concentrate solution will be offloaded by tanker and sold into markets. Diluted environmentally neutral brine will be dispersed overboard.

3.7.3 Hydrogen storage salt caverns will be 300-600m below the sea floor and will be 200m deep and 100m diameter. The salt caverns will average 650,000 m^3 in volume but each can contain 53 million m^3 of hydrogen due to the high pressure which can be maintained within the salt caverns at depth below the surface.

3.7.4 The cavern well locations will be connected by pipeline to a central subsea manifold (Figures 8, 9). An offshore import/export pipeline will be installed connecting the subsea hydrogen manifold to the nearby hydrogen markets and hydrogen production of the North-West including HyNet via the Project Union hydrogen pipeline network. Hydrogen compression for storage operations will be located at the landfall of this pipeline.

3.7.5 A separate short hydrogen spur line will link back to the H-CAES storage NUI to further decarbonise H-CAES flexible power generation. A separate spur line will connect to the Marram A spur line to enable hydrogen blending into the UK gas grid. (The last sentence relates to original element 2 only.)

Figure 8: hydrogen storage subsea manifold and hydrogen wellheads

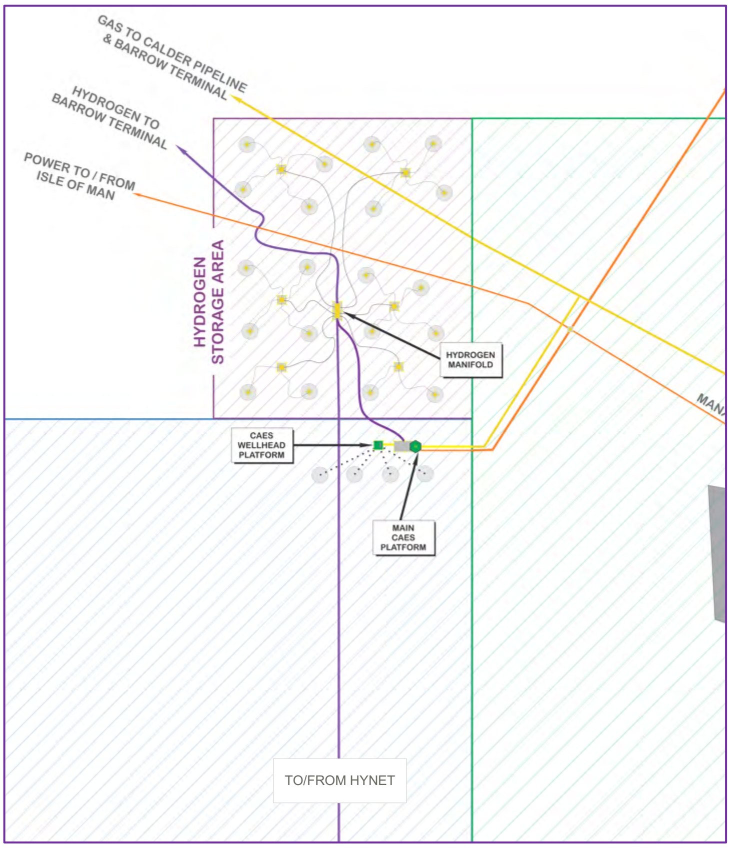

Figure 9: Salt cavern hydrogen storage area, hydrogen manifold and hydrogen pipeline to Hynet

4 Development in respect of which a s.35(1) direction may be (and is) requested

4.1 Relevant categories of infrastructure comprised in the Project

4.1.1 For the purposes of any s.35(1) direction relating to the Project, the facilities outlined in section 2 may conveniently be divided into three broad categories of infrastructure:

(a) infrastructure that falls within s.14 of the Act (Nationally Significant Infrastructure Projects (**NSIP)**);

(b) infrastructure that will require authorisation under other legislation in any event, and/or for which a DCO is not an appropriate means of authorisation (**excluded infrastructure**);

(c) **eligible infrastructure** – that is, infrastructure:

(i) which is not NSIP infrastructure or excluded infrastructure; and

(ii) which, if no DCO is granted in respect of it, would require authorisation under other legislation, but which would not require such authorisation if a s.35(1) direction were made, and a DCO granted, in respect of it.

4.1.2 EPP requests that any s.35(1) direction that the Secretary of State is minded to give in respect of the Project should cover all the infrastructure relating to the Project that the Secretary of State considers is eligible infrastructure as defined above (excluding any components of original element 2).

4.1.3 The remaining paragraphs of this section set out EPP's views on which parts of the overall Project fall into each of the categories identified for s.35(1) direction purposes in the previous paragraph, but in summary, adopting the numbering of the main elements of the MESH project used in the table above, EPP considers that:

(a) all of elements 3 and 4 (hydrogen / ammonia / graphite production) amount to eligible infrastructure as defined above (i.e. within the scope of s.35(1)):

(b) those parts of substitute element 2 and element 5 (natural gas supply infrastructure, hydrogen storage) which are not governed by the Petroleum Act 1998 or Energy Act 2008) are eligible infrastructure;

(c) some of elements 1 and 6 (flexible generation and compressed air storage, connecting infrastructure) will or may be eligible infrastructure.

4.2 NSIP?

4.2.1 EPP considers that the Project may contain one item of NSIP infrastructure as defined above: the offshore generating station that will form part of the dispatchable generation and energy storage facility. As a generating station with a capacity of more than 100 MW located within the seaward limits of the territorial sea adjacent to England, it falls within s.14(1)(a) of the Act (see s.14(2) and s.15(1), (3) and (4)) and will require a DCO in any event.

4.2.2 However, to the extent that a generating station comprises an "exempt electricity storage facility", the dispatchable generation and energy storage facility falls outside the scope of s.14(1)(a) of the Act (see s. 14(2) and s.15(1), (3C), (3D) and (6)), and any capacity provided by an exempt electricity storage facility would then be disregarded when determining its capacity for the purposes of s.15(3). Whilst it is intended that the bulk of the facility's generating capacity will be provided by the release of stored compressed air, it would also be technically capable of generating 200 MW of electricity fuelled by natural gas or hydrogen.

4.2.3 In EPP's view, it is arguable that the core generating plant (turbines etc) either an NSIP within the scope of s.14(1)(a) and s.15(1) / (3), or that it is not. It may also be arguable whether, in the former case, the other parts of element 1 of the Project fall to be treated as "associated development". However, subject to the Secretary of State's views, EPP does not consider that it is necessary to reach a definitive answer on either of these points for the purposes of making a s.35(1) direction.

4.2.4 At this stage, therefore, EPP invites the Secretary of State to direct under s.35(1) that any part of element 1 that are not themselves an NSIP or development associated with an NSIP within the meaning of s.120(2)(a) of the Act should be treated as development for which development consent is required.

4.2.5 No other element of the Project is expected to be NSIP infrastructure:

(a) none of the electricity transmission lines comprised in the Project will fall within the scope of s.16 of the Act, since they will either be offshore (and therefore not wholly within England / Wales), or be underground, or (if not underground) be less than 2 km in length;

(b) it is not currently expected that any onshore pipelines comprised in the Project would fulfil the criteria set out in s.20 or s.21 of the Act;

(c) the Project will involve the underground storage of natural gas (original element 2 only), hydrogen, compressed air and thermal energy as brine but this will take place offshore and therefore not within England or Wales, so it does not involve infrastructure within s.17 of the Act;

(d) the Project is not expected to comprise any of the other categories of NSIP infrastructure listed in s.14(1) of the Act.

4.3 **Excluded infrastructure**

4.3.1 As regards the indigenous gas extraction to produce zero emission clean hydrogen part of the Project: it is not lawful to extract petroleum from the UK Continental Shelf without a licence under the Petroleum Act 1998. Such development is outside the scope of the Act. If it were capable of being the subject of a s.35(1) direction, any resulting DCO would serve no practical purpose, because all development of petroleum assets is regulated under the 1998 Act. (This paragraph 4.3.1 relates to original element 2 only.)

4.3.2 The Project would involve several sub-sea pipelines (including for gas and hydrogen). However, any pipeline in the territorial sea requires an authorisation under Part 3 of the Petroleum Act 1998. The Act makes no provision for a DCO to provide equivalent authorisation.

4.3.3 As regards the sub-sea storage elements of the Project:

(a) the storage of natural gas or hydrogen offshore (specifically in the territorial sea or Gas Importation and Storage Zone), and the conversion of natural features for the purpose of storing them, require a licence under Part 1 of the Energy Act 2008 (**2008 Act**: see s.2 of that Act and article 3 of the Petroleum Act 1998 (Specified Pipelines) (Amendment) and Importation and Storage of Combustible Gas (Designation of Substance etc.) Order 2023 (S.I. 2023/971): if such development were capable of being the subject of a s.35(1) direction, any resulting DCO would serve no purpose;

(b) it is clear from s.141 of the Act that in any event a DCO cannot authorise underground storage of natural gas and hydrogen otherwise than in England or Wales (i.e. onshore);

(c) however, in EPP's view, the legislation referred to in sub-paragraph (a) above does not cover the storage of compressed air and thermal energy in brine, or the conversion of natural features to store it, and s.141 of the Act does not prevent a DCO from authorising such activity.

4.4 **Eligible infrastructure**

4.4.1 EPP outlines below what it believes are the categories of eligible infrastructure to be developed as part of the Project. All of these would, in each case, require at least one form of authorisation other than a DCO, but for which a DCO can provide a substitute (e.g. planning permission under the Town and Country Planning Act 1990, or a marine licence).

(a) *Methane pyrolysis facility:* 90 MW methane pyrolysis hydrogen production facility of 20,000 tpa, a 60,000 tpa fluidised bed reactor system for synthetic graphite production, connecting transmission line for nearby grid power supply, waste heat recycling systems for energy efficiency and pipe connections to the UK's gas grid and MESH onshore gas storage and extraction facilities.

(b) *Clean ammonia production facility:* 110,000 tpa clean Haber-Bosch ammonia synthesis plant, feedstock pipeline links to MESH hydrogen and high purity nitrogen production, waste heat recycling systems for energy efficiency, ammonia tank storage and distribution systems with connection to Barrow port for clean ammonia product export.

(c) *Natural gas and hydrogen network infrastructure*: Onshore natural gas and hydrogen processing facilities comprising electrical compression systems for storage operations that are compatible for natural gas, hydrogen or blended gas, a nitrogen separation and high purity nitrogen production system and connection to Project Union.

(d) *Offshore long duration energy storage and flexible power facility:* To the extent that they are not treated as an NSIP or as development associated with an NSIP within the meaning of the Act, an offshore unmanned platform containing 200 MW air compression, heat exchange and air expansion equipment for the MESH long duration energy storage and 350 MW flexible generation facility; four (4) offshore subsea subterranean salt caverns for compressed air storage and thermal energy storage using concentrated brine; a small unmanned offshore mono-pile platform to house dry wellheads for the salt caverns; and offshore and onshore control rooms for an Artificial Intelligence (AI) integrated energy management system.

(e) *Supporting network infrastructure*: To the extent that they are not treated as associated development within the meaning of the Act, or are capable of being developed by statutory undertakers relying on "permitted development" or similar rights, electrical transmission lines to connect the MESH long duration energy storage and flexible power generation facility to connection points and substations for the UK electricity grid (NETS), regional offshore wind projects and the nearby Manx interconnector; and onshore gas pipelines and related network infrastructure connecting different elements of the MESH project with each other and with public gas networks.

4.5 Location of eligible infrastructure

4.5.1 EPP notes that:

(a) to determine whether the Secretary of State has power to make a s.35(1) direction, only broad indications as to its location are required;

(b) to provide certainty as to the scope of the direction, it is nevertheless desirable to give as clear an idea of its location as is practicable;

(c) the location of infrastructure is not necessarily the only way of identifying that infrastructure forms part of the Project;

(d) EPP's thinking in relation to some elements of the Project is at a very early stage, and fully detailed plans have yet to be prepared for many elements of the Project.

4.5.2 Accordingly, the maps below provide as much detail as EPP is currently able to give about the locations of each element of the Project (Figures 10 and 11).

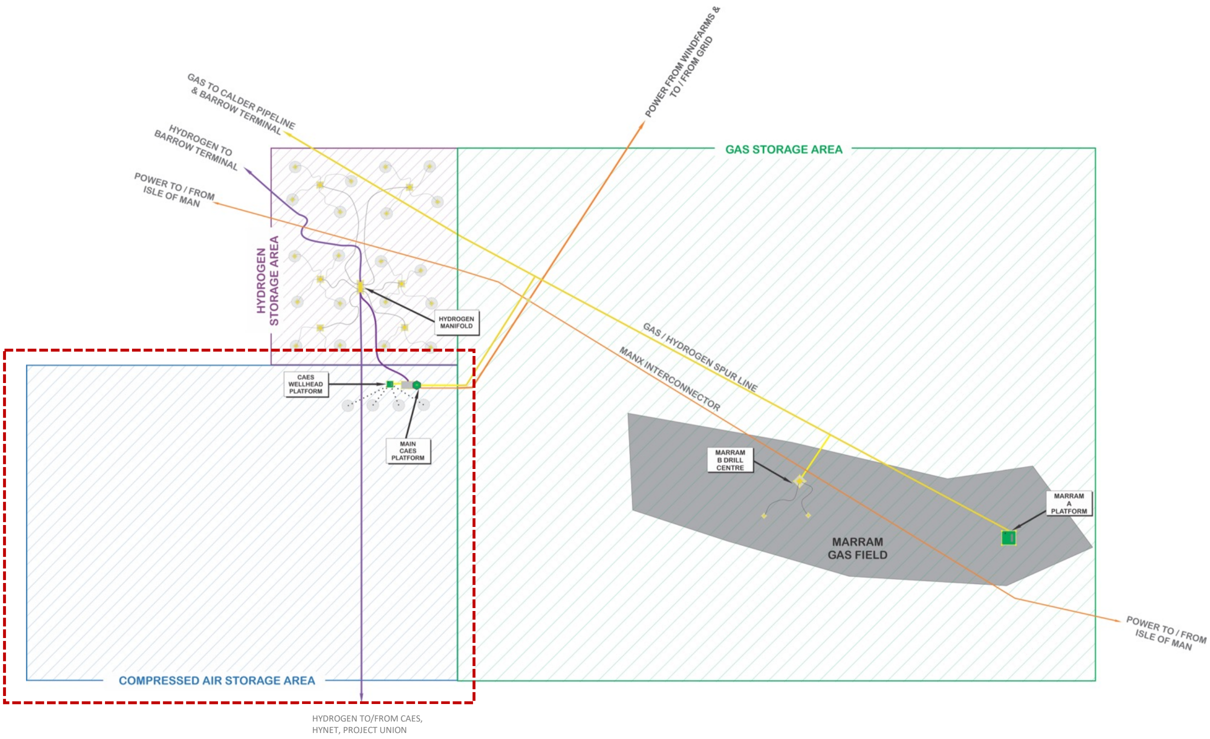

Figure 10: Offshore: elements of MESH project to be located in the East Irish Sea and proposed to benefit from development consent via S14 and S35 (references to gas storage relate to original element 2 only)

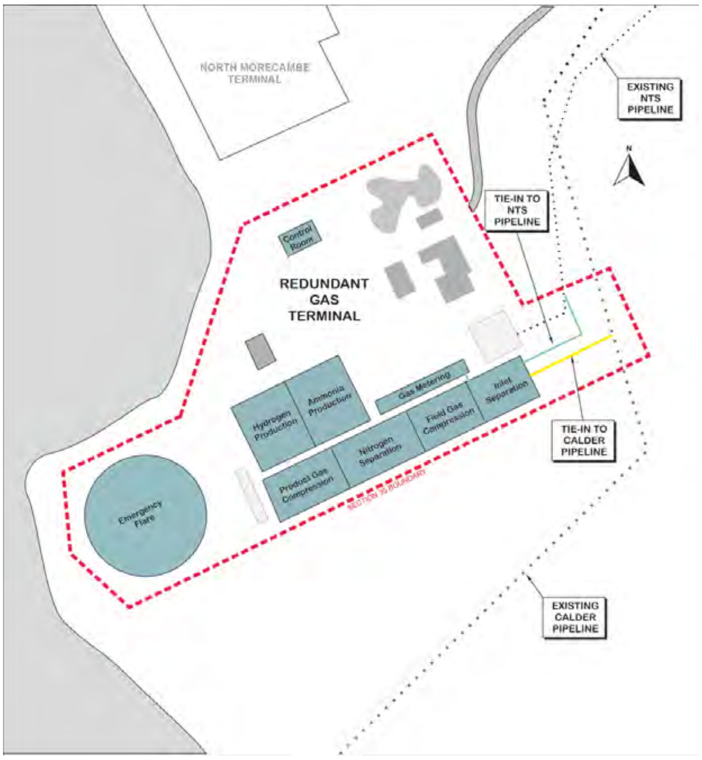

Figure 11: Onshore Elements of MESH to be located at Barrow-in-Furness and proposed to benefit from a development consent via S14 or S35

4.6 Relevant Development

In this request for a s.35(1) direction, the term **Relevant Development** refers to development that is to be carried out in respect of eligible infrastructure that is described in section 4.4 above and is located as described in section 4.5 above

5 Relevant policy considerations

5.1 Net zero

5.1.1 As a signatory to the 1992 UN Framework Convention on Climate Change, the UK is committed to achieving "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" (UNFCCC, Article 2). This objective is expressed more precisely in Article 2(1)(a) of the 2015 Paris Agreement as "holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognising that this would significantly reduce the risks and impacts of climate change". These objectives are reflected in the duties imposed on the Secretary of State by sections 1 and 4(1) the Climate Change Act 2008 to "ensure that the net UK carbon account for the year 2050 is at least 100% lower than the 1990 baseline"; to set five-yearly carbon budgets for the UK; and to ensure that they are met.

5.1.2 The UK's current Nationally Determined Contribution (**NDC**) under the Paris Agreement is a target of reducing emissions by 68% on 1990 levels by 2030. In its latest progress report to Parliament (June 2025), the Committee on Climate Change (**CCC**) observed: "61% of the required reduction in emissions to hit the 2030 NDC is covered by either credible plans or has some associated risks, mostly in the electricity supply and surface transport sectors. For the remaining 39%, there are either significant risks, or insufficient or unquantified plans". In

January 2025, the government published as a command paper a new NDC for 2035 (first announced in November 2024): "to reduce all greenhouse gas emissions by at least 81% by 2035, compared to 1990 levels (excluding international aviation and shipping emissions)".

5.1.3 Further urgent action is required to reduce the UK's greenhouse gas emissions.

5.1.4 Government and CCC thinking envisages low-carbon hydrogen playing a significant role in reducing UK greenhouse gas emissions, and a continuing UK demand for natural gas (particularly as a feedstock for hydrogen production via thermal reforming with CCUS). For example, in its publication on the Seventh Carbon Budget (2037-42), in the context of a notional "Balanced Pathway for Fuel Supply", the CCC states:

The role for the hydrogen supply sector is to enable decarbonisation in the wider economy and energy system, displacing use of unabated fossil fuels. Hydrogen will also need to be transported and stored, to allow supply to match with demand…Overall, in the Balanced Pathway hydrogen demand increases to nearly 60 TWh in 2040…with supply primarily a mix of electrolysis (54%) and fossil methane reformation with CCS (44%), with the remainder from bio-hydrogen.

5.1.5 By 2050, under the same pathway, the CCC envisage that the dominant use of natural gas (accounting for 85% of primary energy use of natural gas, which would be running at roughly a quarter of current UK annual natural gas demand), would be as a hydrogen feedstock.

5.1.6 In the same context, the CCC notes:

Storage: *there will be an important role in the future energy system for long-term storage of both natural gas and hydrogen. These will help provide low-carbon sources of generation for balancing the electricity system and managing low-wind periods, through use in gas CCS and hydrogen power stations (see Section 7.5). The Balanced Pathway has 3 TWh of hydrogen storage in 2040, primarily provided by salt caverns. This storage capacity could increase three-fold by 2050, depending on the balance of hydrogen-powered electricity in low-carbon dispatchable electricity generation.*

5.1.7 The CCC also notes the connection between hydrogen and flexibility of electricity supply:

The Balanced Pathway includes 15 GW of dispatchable low-carbon electricity generation capacity by 2040 (Figure 5.1h). This includes gas CCS and hydrogen-fired turbines. There is flexibility in the balance of these options. They are complemented by 26 GW of battery and other short- to medium-duration energy storage, which helps with operation of the system and balancing of daily variations in demand.

5.2 The government's Plan for Change

5.2.1 One of the government's key missions in its Plan for Change, is to Make Britain a Clean Energy Superpower. The Plan states:

The economic case, the national security case and the environmental case all now point in the same direction: a clean energy mission which protects the country from exposure to unstable international markets and gives security and stability to both family and national finances.

We will achieve this through delivering clean power by 2030 and accelerating to net zero. Our mission will bring energy security, protect billpayers, create good jobs, and help to protect future generations from the cost of climate breakdown.

By building a diverse low carbon energy system, we will make the most of our abundant natural resources to keep bills down for good and protect consumers from future price shocks.

5.2.2 The ability to store energy generated from renewable sources such as wind and solar for long periods is critical to the "energy security", "national security" and "economic" cases referred to in the above paragraphs from the Plan. As noted in the government's October 2024 response to consultation on Long Duration Energy Storage (**LDES**):

Long duration electricity storage (LDES) is a key enabler to a secure, cost-effective and low carbon energy system. LDES can help to decarbonise the system by storing excess renewable generation over six hours or longer, replacing flexibility from fossil-fuelled generation and helping to alleviate constraints on the grid. LDES assets can reduce costs to consumers through lowering their energy bills, and by avoiding the need for electricity grid reinforcement and peak generation plant build. System modelling (published alongside the consultation) estimates savings for the energy system, and ultimately the energy consumer, could be £24 billion by 2050 from 20 GW of LDES.

5.3 "Building the North Sea's Energy Future" and Supplementary Guidance on EIAs

5.3.1 In April 2025, the government published a consultation entitled "Building the North Sea's Energy Future". Amongst other things, the consultation sought "to gather evidence and stakeholder views" on definitions that could be used to give effect to its commitment not to "issue new licences to explore new fields", and how to "ensure that our regulatory regime can support activity where it is needed to deliver the government's broader strategic priorities".

5.3.2 EPP responded to this consultation in some detail. (What follows in the rest of this section 5.3 is relevant only to original element 2.) After highlighting what we believe are some misconceptions underlying the analysis and policy set out in the consultation, we suggested that it would be consistent with what ought to be the fundamental drivers of the government's policy on Petroleum Act 1998 licences (and the emphasis on exploration in the way that that policy had been framed prior to the Consultation) if it were to allow new licences to be issued in respect of known gas resources in respect of which certain criteria are satisfied. Ideally, these criteria would be set out in legislation, presumably by amending the OGA's power to issue licences under the 1998 Act so that it only applied where the criteria are satisfied. We suggested that the criteria could include some or all of the following:

(a) the underlying hydrocarbon asset being a gas asset able to go "straight to production" (i.e. it has already been the subject of sufficient exploration and appraisal work);

(b) the gas extracted or withdrawn from it being used for domestic purposes;

(c) its operational "scope 1 and 2" emissions never exceed a specified (very low) threshold (and see now further below on "scope 3" emissions);

(d) its operation directly facilitating the decarbonisation of electricity supply to an upstream oil and gas platform and/or contributing to the more efficient utilisation of offshore renewable electricity generation or transmission infrastructure;

(e) it is facilitating, the operation or development of a low carbon hydrogen or CCUS project.

5.3.3 The gas extraction and storage element of the Project would be contingent, as noted above, on the issue of a production licence under the 1998 Act and a storage licence under the Energy Act 2008. EPP recognises that it is for government to decide whether, and, if so, on what terms, further 1998 Act licences are issued, and for the NSTA to determine whether such licences should be issued to EPP or anybody else. However, although the gas extraction and storage element of the Project is a fundamental part of its original conception, it is entirely possible that even if it proves impossible to pursue that element, other elements, and in particular, dispatchable generation and energy storage, can still be pursued.

5.3.4 A government response to the consultation is awaited, but in June 2025, DESNZ published its supplementary guidance further to the Supreme Court's *Finch* judgment, "Environmental Impact Assessment (EIA) – Assessing effects of downstream scope 3 emissions on climate". The supplementary guidance states:

In terms of mitigation hierarchy, suitable mitigation measures available to a developer to avoid, prevent or reduce any likely significant adverse effects on the environment from scope 3 emissions are expected to be limited. A developer may not have direct control over mitigation measures for avoiding, preventing or reducing scope 3 emissions, unlike the situation for scope 1 and scope 2 emissions. Typically, under EIA mitigation hierarchy, offsetting would only be considered if other mitigation measures to avoid, prevent or reduce likely significant adverse effects on the environment are not suitable.

OPRED is not recommending or discounting any specific mitigation measures, but any such proposals must not be speculative.

5.3.5 Without prejudice to any application that EPP may in future be able to make for a licence under the 1998 Act, or for any consent or approval under such a licence, we note that our discussions with the providers of the technology that we propose to use to produce hydrogen from methane in the pyrolysis facility open up the possibility that, over time, a volume of natural gas equivalent to the indigenous gas that could be extracted from the Marram field could be converted into low-carbon hydrogen by the methane pyrolysis plant, thereby achieving a result precisely equivalent to the avoidance, prevention or reduction of emissions that the supplementary guidance paragraphs quoted above regard with some scepticism.

5.4 Clean Power 2030

5.4.1 In December 2024, the government published its Clean Power 2030 Action Plan, having received advice from NESO which was published in November 2024. In relation to LDES, NESO's advice noted the following points.

[LDES…is…] particularly important for longer term flexibility and additional operability needs (such as during extended periods of wind drought or to spread demand between weekend and weekdays).

The pipeline for options ready to deploy by 2030 is limited and our analysis sees capacity potentially increase from 3 GW in 2023 to 5-8 GW, with…capacity growing from 28 GWh to 50-99 GWh by 2030. This would require completion of Great Britain's first pumped hydro stations in more than 40 years.

New and innovative LDES, liquid air, compressed air and longer-duration batteries (10+ hours) projects have successfully operated at a small scale. Work has started on new projects and feedback from stakeholders was that the lower range is within what they can *build for 2030…It was noted that decision making on funding mechanisms would need to speed up to accelerate delivery.*

5.4.2 Since the Action Plan was published, Ofgem has been taking forward the cap and floor funding round. EPP notes that versions of compressed air energy storage have operated at commercial scale in Germany and the US for more than 30 years, and that it is both functionally comparable with pumped hydro technology and cheaper to build.

5.4.3 The Action Plan itself focuses on the importance of both Hydrogen to Power and hydrogen storage. It makes the following points.

Hydrogen to Power can play a key role in our electricity system at a range of scales and is the primary low carbon technology capable of providing low carbon inter-seasonal storage, whilst providing a decarbonisation pathway for unabated gas. Our analysis indicates H2P is economic at lower load factors (below 30%), enabling it to be cost effective in a clean power system where flexible load factors are expected to fall as renewable generation increases.

There is a critical dependence on access to enabling grid-scale hydrogen infrastructure, such as new build transport and storage facilities, which typically have long lead-in times. Ensuring the deployment of hydrogen transport and storage infrastructure, alongside supporting H2P plants, will be critical in enabling delivery of H2P to deploy whilst also providing the infrastructure to support industrial decarbonisation through hydrogen.

Hydrogen storage will play a vital role in the hydrogen economy and the wider energy system. Storage is key for managing within day network balancing and providing security of supply to hydrogen off takers. Large-scale deployment of H2P will require access to geological hydrogen storage via hydrogen pipelines, to enable delivery of H2P plants. Developers face barriers to investment including high costs, long lead-times, and uncertainty around how quickly demand for transport and storage will increase.

5.4.4 This highlights the advantages of combining, as the Project does, hydrogen production, hydrogen storage, and the potential to use hydrogen as a fuel for dispatchable generation. Moreover, given the Project's clean ammonia and dispatchable generation and energy storage facilities, its methane pyrolysis facility should not have any difficulty securing offtake for its output (which has been a concern for many potential hydrogen projects).

5.5 National Policy Statements for Energy Infrastructure

5.5.1 The revised version of National Policy Statement EN-1 which was published in draft in May 2025 (which is not substantially different in terms of what it says about hydrogen from the currently designated version of EN-1) builds on the messages above, as set out below.

Low carbon hydrogen is essential to achieve the government's Clean Energy Superpower and Growth Missions and will be a crucial part of our future energy system. The Impact Assessment for CB6 shows an illustrative range for low carbon hydrogen of 85-125TWh in 2035 and 250-460TWh in 2050.

…we will significantly reduce emissions from domestic oil and gas fuel supplies, whilst scaling-up the production of low carbon alternatives such as hydrogen and biofuels. Gas price spikes seen in recent years underline the need to move away from hydrocarbons as quickly as possible, but we will manage the transition in a way that protects jobs and investment, uses existing infrastructure, maintains security of supply, and minimises environmental impacts.

Where low carbon alternatives can replace unabated natural gas, we will still need new gas infrastructure. Given the changing nature of the energy landscape, we cannot be certain on the precise role of natural gas, or gas infrastructure, in the future.

Natural gas infrastructure might also be repurposed in the future for use by other gases required to deliver a net zero economy, such as low carbon hydrogen or for transportation of carbon dioxide to storage. Therefore, there is an ongoing need for retaining and developing the infrastructure for importing, storing and transporting gas.

There is an urgent need for all types of low carbon hydrogen infrastructure to allow hydrogen to play its role in the transition to net zero.

As set out in the UK Hydrogen Strategy, the government is committed to developing low carbon hydrogen, which will be critical for meeting the UK's legally binding commitment to achieve net zero by 2050, with the potential to help decarbonise vital UK industry sectors and provide flexible deployment across heat, power and transport…This demand for hydrogen will need the infrastructure that supports it, including pipelines and storage.

To support the urgent need for low carbon hydrogen infrastructure, hydrogen distribution, pipelines and storage, are considered to be CNP Infrastructure.

5.5.2 EN-1 also states that where an application is made, pursuant to a s.35(1) direction, for a DCO for hydrogen infrastructure not covered by sections 15-21 of the Act, the Secretary of State should give substantial weight to the need established at paragraphs 3.4.12 to 3.4.23 of EN-1.

5.6 Modern Industrial Strategy

5.6.1 In June 2025, the government published its Modern Industrial Strategy. This focuses on eight growth-driving sectors, one of which is Advanced Manufacturing. One of the frontier industries picked out in this sector is the manufacture of batteries and accumulators.

We have chosen to focus on these sectors because they are the best positioned to drive inclusive, sustainable, and resilient growth, thanks to their potential to create well-paid jobs across the UK, seize the opportunities of the net zero transition, and build superstar firms so the UK can project global influence and deter our adversaries.

We have ambitious 10-year plans to make the UK the best place to start and scale in these sectors, with homegrown champions to create a national renewal that benefits the whole country. We are delivering these plans through partnership between government, industry, and workers, underpinned by productive private investment, targeted government investment, and an activist agenda to make it easier and quicker to do business.

The increasingly blurred boundaries between sectors in the modern economy mean that faster growth in our frontier industries will have significant spillover benefits for other sectors…by making our growth-driving sectors more competitive, we will create prosperity not just for the people who work in them, but for families across the UK.

To achieve this will take all our agility, vision, and industrial policy levers: we must create the conditions for private investment in high-risk, high-reward technologies and drive innovation pull-through…We must do more to help businesses navigate an uncertain and changing world...

5.6.2 As noted above, the Project's methane pyrolysis plant will produce graphite as well as hydrogen. Having an indigenous (if synthetic) supply of this critical mineral, which is not currently produced in the UK, would benefit the Advanced Manufacturing sector. Giving a s.35(1) direction for the Project would enable the Project to move forward in exactly the way described by the Modern Industrial Strategy paragraphs quoted above.

5.7 Drawing the threads together

5.7.1 In one sense, the fundamental thrust of UK government energy infrastructure policy has changed relatively little since the Planning Act 2008 and the Climate Change Act 2008 received Royal Assent. The re-setting of the 2050 target to a 100% (rather than just 80%) reduction from 1990 levels and other circumstances have added a greater sense of urgency and ambition, but the primary drivers remain the decarbonisation of energy supply and the wider economy to which it is central, while maintaining security of supply and affordability.

5.7.2 As the extracts from the various policy documents quoted above, and the description of the various elements of the Project in the previous sections show, the Project sits at the intersection of a number of strands of UK climate and energy policy. Given its proposed scale, it will make a meaningful contribution to meeting several of the infrastructure and material supply needs that policy highlights. Moreover, it will do so in a co-ordinated way, with each element complementing the others, and adjacent projects such as offshore wind farms. Rather than imposing additional demand on existing infrastructure, as much new generation capacity, it will bring multiple system-level benefits.

5.7.3 Although the underlying objectives of energy and climate policy may not have altered much since 2008, obviously a great deal has changed in the energy sector. The policies in the documents referred to in this section reflect those changes. Some technologies that featured large in the policy thinking of the Department of Energy and Climate Change 15 or 16 years ago (like "clean coal") are nowhere to be found in current documents; others, that did not rate a mention as national significant energy infrastructure then (e.g. solar, batteries, hydrogen), are now regarded as central to Clean Power 2030 and achieving Net Zero. Over shorter time-spans, the inherent uncertainty of planning for future energy infrastructure can be seen in the multiple scenarios laid out in successive annual iterations of NESO's Future Energy Scenarios (**FES**), and how e.g. the quantities of certain types of infrastructure associated with a given scenario sometimes change markedly from one FES iteration to another.

5.7.4 Against this background of inherent uncertainty and constant change, which policy statements and business models can mitigate only up to a point, the inherent flexibility and structural resilience of the Project stand out. These include its potential to draw on multiple sources of renewable electricity generation (given the proliferation of offshore wind farms, existing and planned, in the area); its ability to flex between different energy storage vectors (compressed air and hydrogen); and the scope for at least two built-in offtake routes for its hydrogen. At a time when more than one decarbonisation mega-project focused on a single technology or market strategy has been cancelled, in some cases with its promoters alleging insufficient government support, the Project offers a substantial move towards a Clean Power / Net Zero future, based on business cases that are grounded in commercial reality, and is put forward by a promoter that does not ask for, or expect, any special treatment.

6 Reasons for granting a s.35(1) direction in this case

6.1 Statutory conditions for giving a s.35(1) direction

6.1.1 There are three positive conditions and one negative condition that must be met if a s.35(1) direction is to be given in response to EPP's request.

6.1.2 *Positive conditions:* Under s.35(2), the Secretary of State may give a s.35(1) direction only if:

(a) *the development is or forms part of—*

(i) *a project (or proposed project) in the field of energy, transport, water, waste water or waste, or*

(ii) *a business or commercial project (or proposed project) of a prescribed description,*

(b) *the development will (when completed) be wholly in one or more of the areas specified in subsection (3) [England / the English territorial sea / Renewable Energy Zone], and*

(c) *the Secretary of State thinks the project (or proposed project) is of national significance, either by itself or when considered with—*

(i) *in a case within paragraph (a)(i), one or more other projects (or proposed projects) in the same field;*

(ii) *in a case within paragraph (a)(ii), one or more other business or commercial projects (or proposed projects) of a description prescribed under paragraph (a)(ii).*

6.1.3 In addition, where development falls within s.35(2)(a)(ii) rather than s.35(2)(a)(i) (see above), a further condition must be met (see further s.35ZA(2) and paragraph [5.2.X] below).

6.1.4 *Negative condition*: Under s.35ZA, if a qualifying request (within the meaning of s.35ZA(11)) is made for a s.35(1) direction in a case within s.35(2)(a)(i), the power to give a s.35(1) direction is exercisable only if no application for a consent or authorisation mentioned in s.33(1) or (2) has been made in relation to development to which a qualifying request relates.

6.2 **Positive conditions**

The first positive condition (s.35(2)(a))

6.2.1 Of the elements of the Project that are Relevant Development, it is clear that (at least):

(a) the dispatchable energy storage facility; and

(b) to the extent that they are Relevant Development, the electricity network infrastructure and the gas network infrastructure,

(c) are all development that is or forms part of a project or proposed project (i.e. the Project) in the field of energy. As such they fall within s.32(2)(a)(i).

6.2.2 The methane pyrolysis facility and the clean ammonia production facility will produce hydrogen and ammonia, which are both capable of being used as fuels or otherwise in energy supply chains, but which also have chemical feedstock and other applications. Indeed, in the context of the Project itself, some of the output of the methane pyrolysis facility will be an input into the clean ammonia production facility. In addition, the methane pyrolysis plant will produce graphite, which has multiple applications, some of them relating to energy supply chains (for example, as a component of certain types of battery).

6.2.3 In EPP's view, the methane pyrolysis facility and clean ammonia production facility:

(a) comprise development that is or forms part of a project in the field of energy – either taking the Project as a whole (most of whose individual elements are in that field, and whose collective focus may also be seen as being in that field), or emphasising the potential energy applications of the hydrogen and ammonia that they will produce; or

(b) to the extent that they may not wholly comprise development that is or forms part of a project in the field of energy, they could be seen as being "associated development" within the meaning of s.115(2) of the Act – associated with development comprising a project or projects in the field of energy in a way that meets the criteria laid down in the published guidance on associated development under the Act; or

(c) alternatively, if the analysis in sub-paragraph (a) or (b) above is incorrect, they may be seen as projects in their own right that fall within s.35(2)(a)(ii) as business / commercial projects of a "prescribed description". The prescribed description for these purposes is given in the Infrastructure Planning (Business or Commercial Projects) Regulations 2013, reg. 2 of which states that the description is:

…a project (or proposed project) which—

(a) consists wholly or mainly of either or both of the following—

(i) the construction of buildings or facilities for use for the purposes of one or more of the matters in the Schedule to these Regulations;

(ii) the winning and working of minerals in, on or under land; and

(b) does not include—

(i) the winning or working of peat, coal, oil or gas, or

(ii) the construction of one or more dwellings.

6.2.4 The Relevant Development relating to the methane pyrolysis facility and clean ammonia production facility will not involve the construction of any dwellings. Although partly fed by gas extracted from the natural gas extraction and storage facility, they do not themselves include the winning or working of gas. However, they will consist wholly or mainly of the construction of buildings or facilities for use for the purposes of industrial processes (see paragraph 3 of the Schedule to the Regulations). On that basis, this Relevant Development would fall within s.35(2)(a)(ii) rather than s.35(2)(a)(i).

6.2.5 Accordingly, the first positive condition is met in respect of the Relevant Development, on the basis that the Relevant Development forms part of a project or proposed project that falls either wholly within the field of energy (s.35(2)(a)(i), with or without some associated development), or partly within s.35(2)(a)(i) and partly within s.35(2)(a)(ii).

The second positive condition (s.35(2)(b))

6.2.6 All the Relevant Development:

(a) will take place wholly within England or waters adjacent to England up to the seaward limits of the territorial sea; or

(b) to the extent that it takes place outside those limits, it will comprise development wholly within the field of energy, and take place in the Renewable Energy Zone (it may be the case that all the Relevant Developments falls within (a) above, but if any of it does not, it will be electricity network infrastructure linking elements of the Project to offshore wind farms that are outside UK territorial waters.

6.2.7 Accordingly, the second positive condition is met in respect of the Relevant Development.

The third positive condition (s.35(2)(c))

6.2.8 Section 4 above shows that the Project as a whole, and its several elements, will contribute directly to meeting a number of strategically critical national needs identified in current government energy, climate and planning policy documents. In particular:

(a) Its integrated large-scale integrated LDES system will be able to harness value from Britain's mounting wasted wind. Britain's investment in wind generation is being increasingly curtailed and constrained.

(b) It will enhance Britain's energy security by increasing Britain's low-carbon flexible power capacity and (<u>original element 2</u> only) gas storage capacity ensuring it has a reliable supply of energy to back up wind power.

(c) It will decarbonise British industry using new clean hydrogen production technology to produce synthetic graphite and clean ammonia, critical energy transition commodities that the UK almost entirely imports

6.2.9 Section 3.6 above indicates that each element of the Project will contribute to meeting those needs on a substantial scale – one that is comparable with, for example, that represented by the quantitative thresholds for NSIPs that are set out in sections 15 and 16 of the Act as regards infrastructure of the kinds within s.14(1)(a) or (b).

6.2.10 Accordingly, the Project (and its several elements) are of national significance, and the third positive condition is met in respect of the Relevant Development.

The fourth positive condition (s.35ZA(2))

6.2.11 The fourth positive condition is only applicable to the extent that any of the Relevant Development falls within s.35(2)(a)(ii) rather than s.35(2)(a)(i). Section 35ZA(2) provides that in such a case, the power to give a direction under s.35(1) is only exercisable where the person making the request in response to which the direction is to be given is one or more of:

(a) a person who proposes to carry out any of the development to which the request relates;

(b) a person who has applied, or proposes to apply, for a consent or authorisation mentioned in section 33(1) or (2) in relation to any of that development;

(c) a person who, if a direction under section 35(1) is given in relation to that development, proposes to apply for an order granting development consent for any of that development.

6.2.12 EPP falls within sub-paragraphs (a) and (b) of s.35ZA(2). Accordingly, the fourth positive condition, if it is applicable to the Relevant Development, is met in respect of it.

6.3 Negative condition

6.3.1 As noted above, much, if not all, of the Project falls within s.35(2)(a)(i). This means that the negative condition in s.35ZA(1) applies in respect of the Relevant Development.

6.3.2 No application has been made for any of the forms of consent or authorisation mentioned in s.33(1) or (2) of the Act, either in respect of the Relevant Development, or any other development that is expected to be comprised in the Project.

6.3.3 The negative condition is therefore met in respect of the Relevant Development.

6.4 Conclusion

6.4.1 It follows from the above that all the statutory pre-conditions for giving a s.35(1) direction (both positive and negative) are met in respect of the Relevant Development.

6.4.2 EPP therefore requests the Secretary of State to give a s.35(1) direction for the Relevant Development to be treated as development for which development consent is required.