Part of the Bacton Energy Hub Project

# Regulatory SIG Report

## Relevant Legislation & Regulation

# 1 SIG Participants

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**T**he Regulatory Special Interest Groups also acknowledges assistance received from the following

| Support received | Nature of support |
|---|---|
| **Informal HSE Group including Adam Chisholm / Michelle Workman / June Calder /** | Informal but knowledgeable review and comment on the report |
| **Weston Compliance Limited** | Informal but knowledgeable review and comment on the report.<br><br>The company provides a service of verifying that a client has adhered to all relevant legislation on a specific project. |

# 2 Table of Contents

# 3 Important notice

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# 4 Executive Summary

This report seeks to identify the existing primary legislation, secondary legislation and statutory regulations that might apply to a hydrogen-based development centred on the Bacton gas terminal in Norfolk. It then seeks to identify any regulatory gaps that may need to be addressed to enable such a hydrogen-based development to occur.

Note that there is a separate Supplementary Report which considers Government Funding of Low Carbon Hydrogen Projects.

The approach taken has been to break the hydrogen value chain up into a series of geographical components, and to identify the relevant legislation and regulations that apply. The geographical areas and the related activities considered are as follows :-

## 4.1 Definition of Offshore areas

- Natural Gas extraction and supply (see Section 7)
- Carbon Dioxide Storage (including offshore transportation) (see Section 8)
- Hydrogen Underground Storage (including offshore transportation) (see Section 9)
- Electrical Supply (from offshore wind farms) (see Section 10)

## 4.2 Definition of Onshore areas

- Plant to be constructed at Bacton (see Section 11)
- Plant to be constructed at the Port at Great Yarmouth (see Section 12)
- Pipelines (see Section 13)
- Onshore transportation via road and rail (see Section 14)
- Electrical Supply (via the National Grid) (see Section 15)

The key gaps identified, and the associated recommendations, are set out below.

## 4.3 Recommendations – Offshore

The Regulatory Special Interest Group recommends that :-

- As an overall recommend, the Government address the gaps and uncertainties in the offshore regulatory arrangements to enable offshore hydrogen storage and transport. We have identified the following specific aspects that requires addressing.
- Hydrogen gas injection and storage is not currently covered by any regulatory regime. However, this can be readily remedied. Under Energy Act 2008 section 2(4) as is defined as any combustible substance which is gaseous at a temperature of 15° C and a pressure of 101.325 kPa (1013.25 mb) and which consists wholly or mainly of methane, ethane, propane, or butane (or of a mixture of two or more of those substances). We recommend that the definition of gas be amended to include hydrogen.
- It is not clear to us whether the decommissioning of hydrogen storage facilities and transport infrastructure is within the remit of OPRED – we think it is most likely not as most of OPRED's powers stem from the same acts as NSTA i.e., Petroleum Act 1998 and Energy Act 2008. We

recommend that OPRED powers be extended to include the decommissioning of hydrogen storage facilities and transport infrastructure.

- It is not clear to us whether the requirement for Environmental Impact Assessments (EIAs) for infrastructure relating to hydrogen storage or back-production is currently within OPRED's remit. It is also unclear to us what legislation or regulation should be amended to allow OPRED to manage such EIAs.
- The transportation of hydrogen through offshore pipelines is not currently covered by any legislation or regulation. Our recommendation is that an amendment to the Petroleum Act (Specified Pipelines) Order 2011 is required such that the list of "relevant substances" includes hydrogen.

## 4.4 Recommendations - Onshore

The Regulatory Special Interest Group recommends that :-

- The onshore storage of hydrogen in salt caverns is not currently regulated by any agency. We recommend that the storage of hydrogen in onshore salt caverns be regulated by OFGEM, who already regulate the storage of natural gas in salt caverns
- The construction of onshore manufacture, storage and transportation of hydrogen would currently be regulated through the Town and Country Planning Act. We recommend that the Secretary of State amends the list of Nationally Significant Infrastructure Projects subject to the Planning Act 2008 (Development Consent Order regime) to include hydrogen manufacture, storage and transportation facilities (blue or green) exceeding 100MW.
- A number of health and safety regulations appear not to cover the manufacture and storage of hydrogen (onshore and offshore). We therefore recommend that the HSE review regulation and internal guidance to address the impact of the increased volumes of hydrogen and $CO_2$ that might be processed including the impact on on-site inventory

## 4.5 Other Comments and Recommendations

The Regulatory Special Interest Group has several more general comments and recommendations.

- Fundamental to the proposals to manufacture hydrogen at Bacton is the route to market that involves blending hydrogen with natural gas in the National Grid pipelines that currently transport natural gas to the markets in the southeast of England.

  We understand that this is an approach that is not currently favoured by BEIS in its hydrogen business model.

  We urge BEIS to reconsider this position. Our view is that such blending is essential for two reasons

  - It enables early hydrogen projects to access significant demand – providing a credible business basis for the project.
  - It enables early reductions to the carbon footprint of UK domestic heating (which currently constitutes some 14% of overall UK emissions)

- During this work we came to realise that the word "gas" is defined in many different pieces of legislation. We urge the Government to ensure that hydrogen is broadly included in the definitions of "gas" where relevant to enable the transition to a hydrogen economy.

- Opportunities for government co-funding for current blue hydrogen projects are relatively clear, however the BEH project is too immature to easily qualify for many of the schemes currently open and will have to apply for future funding opportunities as and when they become available.
  Our view is that the UK requires a predictable, long term competitive funding framework that will enable both green and blue hydrogen to be developed at scale and at pace – perhaps similar to the offshore wind framework.

# 5 Glossary

The following abbreviations are used in this document.

| Abbreviation | Explanation |
|---|---|
| **ATR** | Auto-Thermal Reforming (a method for manufacturing "blue" hydrogen with minimal $CO_2$ emissions) |
| **CCS** | Carbon Capture and Storage |
| **CCUS** | Carbon Capture, Utilisation and Storage |
| **CO2** | Carbon dioxide |
| **EEEGR** | East of England Energy Group – a trade body |
| **EIA** | Environmental Impact Assessment |
| **EIS** | Environmental Impact Statement |
| **EU ETS** | European Union Emissions Trading Scheme |
| **GSMR** | Gas Safety (Management) Regulations 1996 |
| **HSE** | UK Health and Safety Executive |
| **MW** | Megawatt – a unit of energy supply |
| **NGG** | National Grid Gas PLC, a company that owns and operates the National Transmission System that distributes gas in the United Kingdom. |
| **NSTA** | UK North Sea Transition Authority – the offshore oil and gas regulator, formerly known as the Oil and Gas Authority (OGA) |
| **OFGEM** | UK Office of Gas and Electricity Markets |
| **OPRED** | UK Offshore Petroleum Regulator for Environment and Decommissioning |
| **PUWER** | Provision and Use of Work Equipment Regulations 1998 |
| **SIG** | Special Interest Group |
| **SMR** | Steam Methane Reforming (a well-established method for manufacturing "grey" hydrogen – it involves significant $CO_2$ emissions) |
| **UK ETS** | UK Emissions Trading Scheme |

# 6 Geographical coverage

The Regulatory SIG focused on a series of aspects of the hydrogen and CCS chain as set out below

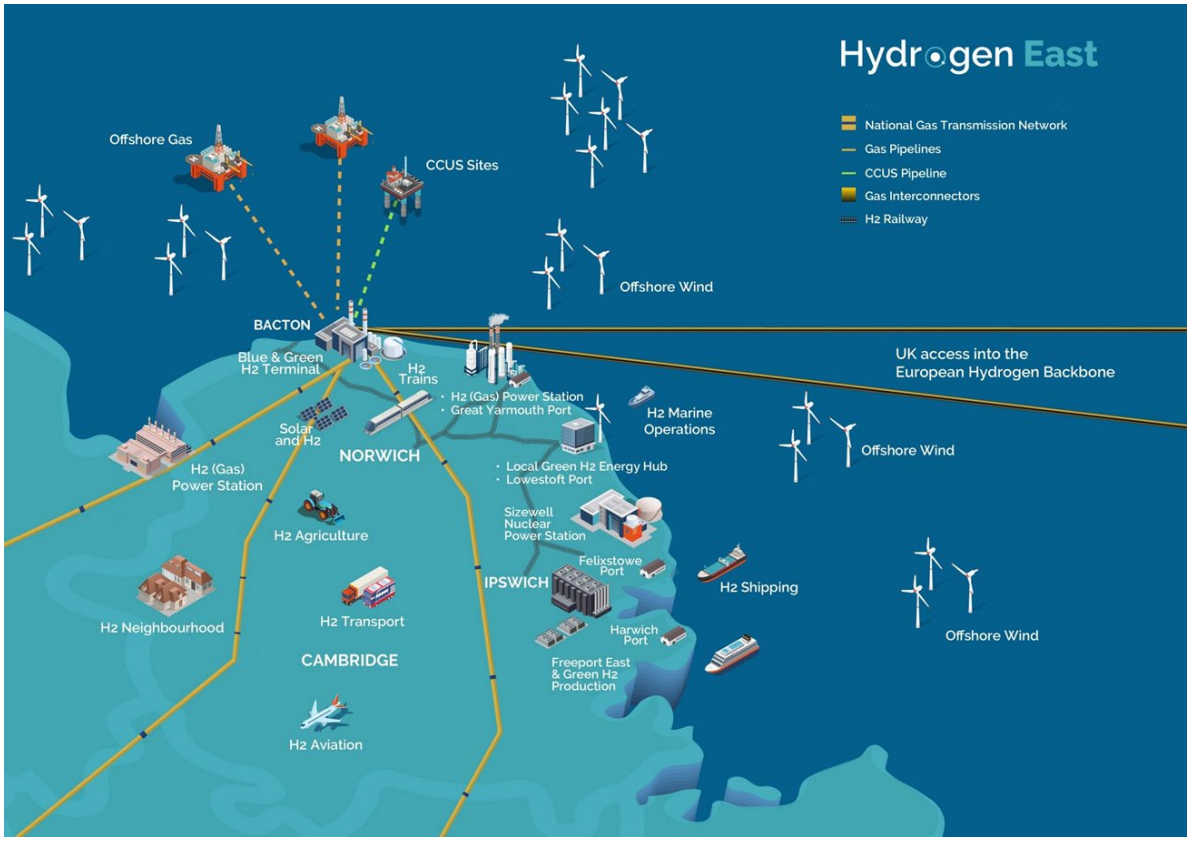


*Figure 1 – Illustration of the various aspects of the Bacton Energy Hub*

Offshore, we identified four distinct areas where we needed to examine the existing legislation, regulation and statutory guidance to determine whether any additions or amendments might be required :-

- Natural Gas extraction and supply
- Carbon Dioxide Transportation and Storage
- Hydrogen Transportation and Storage
- Electrical Supply (from offshore wind farms)

Onshore we identified another four areas where we needed to examine the existing legislation, regulation and statutory guidance to determine whether any additions or amendments might be required :-

- Plant to be constructed at Bacton
- Plant to be constructed at the Port at Great Yarmouth
- Pipelines (for 100% hydrogen, hydrogen blended with natural gas, and for CO2)
- Electrical Supply (via the National Grid)

These offshore and onshore areas are discussed in detail in the subsequent sections of this report

# 7 Offshore Natural Gas

## 7.1 Why consider this

There remains considerable potential to develop discovered but undeveloped high $CO_2$ content gas discoveries in the Southern North Sea, with a potential incremental production of up to 2 Tcf of additional resources. At present circa 50% of these undeveloped discovered reserves are unlicensed.

These resources are undeveloped as they contain high proportions of $CO_2$. They are spread across both the northern and southern pipeline routes into Bacton. Normally, if developed, this gas would require extensive treatment before comingling with other NTS supplies, compromising their economic viability when compared with conventional low-$CO_2$ content gas.

However, this high $CO_2$ content is not an obstacle for use of the "raw" gas for hydrogen production in ATRs thereby providing an alternative development route (i.e., feedstock for hydrogen) for these high $CO_2$ hydrocarbon developments.

## 7.2 Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

Offshore oil and gas is a long-established industry with comprehensive regulatory regime managed by BEIS through the North Sea Transition Authority and OPRED, and the HSE. The key relevant legislation and regulation is set out below :-

- Licencing and consents - Petroleum Act 1998 & Energy Act 2008)
- Environmental – EIA regulations
- HSE - Offshore Installations (Safety Case) Regulations 2015 and others
- Offshore Installations and Wells (Design and Construction, etc) Regulations 1996
- Borehole Sites and Operations Regulations 1995 ("BSOR")
- Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 / Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) (Amendment) Regulations 2007
- Decommissioning - (Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) with NSTA)
- Pipelines – Crown Estate and Crown Estate Scotland lease required for pipelines and for offshore gas storage.
- Pipelines - Petroleum Act 1998
- Pipelines - Pipelines Safety Regulations 1996
- Pipelines - Marine and Coastal Access Act 2009

In addition, the obligation on offshore oil and gas to comply with the UK Emissions Trading Scheme (ETS) is covered by the Greenhouse Gas Emissions Trading Scheme Order 2020 and administered by

the UK ETS Authority and the relevant devolved regulators, which for the purposes of the Bacton Hub project would most likely be the Environment Agency (EA).

## 7.3 Actions required

Existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

# 8 Offshore $CO_2$ Storage

## 8.1 Why consider this

In the development of the Bacton Hub it is likely that significant quantities of "blue" hydrogen will be manufactured. "Blue" hydrogen involves the processing of natural gas to make hydrogen. It generates substantial quantities of $CO_2$ which need to be safely and permanently stored in deep underground reservoirs or aquifers.

## 8.2 Overview of Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

Although this is an emerging industry, and there is currently no $CO_2$ injection in UK waters, the regulatory framework is well established, and is managed by the North Sea Transition Authority, the Crown Estate and the HSE, and is summarised below

- Licencing - Energy Act 2008 and Storage of Carbon Dioxide (Licensing etc.) Regulations 2010 (transposition of European Directive 2009/31/EC)
- A commercial lease with the Crown Estate (or Crown Estate Scotland in Scottish waters) is required for the seabed covering the Carbon Storage licence area
- Environmental - EIA regulations (as per oil and gas)
- Pipelines - Petroleum Act 1998 (same as oil and gas)
- Pipelines - Pipelines Safety Regulations 1996 (as per oil and gas)
- Pipelines - Marine and Coastal Access Act 2009 (as per oil and gas)
- HSE - The Offshore Safety Act 1992 (1992 chapter 15) is an Act of the Parliament of the United Kingdom which extends the application of the Health and Safety at Work etc. Act 1974 to secure the safety, health and welfare of people on offshore installations. The Health and Safety at Work etc. Act 1974 imposes a general duty to operate safely.
- The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015
- The following table provides a summary of the relevant legislation and regulation

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Licencing and Leasing** | | | |
| **$CO_2$ Storage Licence** | Energy Act 2008 - Part 1 - Chapter 3 | Sets out the regime for the regulation of the storage of CO2 | A Carbon Dioxide Storage Licence when granted will require a Licence Operator to be appointed. |
| | Section 18 | Sets out the requirement for a carbon capture and storage licence | |
| | Section 19 | Sets out some of the conditions a licensing applicant may be required to meet to obtain a licence e.g., the provision of financial security. | |
| | Section 20<br><br>Section 20(3) | Provides that a licence can be granted on such terms and conditions as the licensing authority considers appropriate.<br>Sets out a non-exhaustive list of what such conditions might look like. | |
| **Leasing Rights** | | | In addition to applying for a licence, developers must obtain a grant of the appropriate leasing rights from The Crown Estate [or Crown Estate Scotland if within 200 nautical miles from Scottish shores]. |
| **Environmental** | | | |
| **Consent** | Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact | **Consent** under the EIA Regulations will be required as carbon storage activity falls within Schedule 1, para 3, o] the EIA Regulations. | |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | Assessment) Regulations 2020 ("EIA Regulations") | | |
| | Reg 4(1) | For such projects the Secretary of State must 'agree to the grant of consent' by the North Sea Transition Authority (NSTA), and then the NSTA must grant consent, before the project can be commenced | |
| | Reg 4(3) | The Secretary of State can only 'agree to the grant of consent' where a development cost assessment has been carried out | The Environmental Statement needs to be submitted to Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) who act on behalf of the Secretary of State.<br><br>OPRED will advise applicant of relevant authorities likely to have an interest in the project from whom the applicant will need to seek representations as part of the process. Applicant will also need to publish a public notice inviting representations from the public.<br><br>There is no statutory timescale for OPRED to agree to the grant of consent (although EIA Regulations sate the decision must be given within 'a reasonable time' from the receipt of any additional |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | | information it has requested from the applicant and any representations received as part of the process). |
| **Storage Permit** | Storage of Carbon Dioxide (Licensing etc.) Regulations 2010 | | A **Storage Permit** will also be required to authorise the storage of $CO_2$ and the Storage Licence will state the requirements for a Storage Permit<br><br>Once granted the Storage Permit is treated as part of the Storage Licence. |
| | Reg 11 | Imposes a positive duty on NSTA to consider whether to modify or revoke a Storage Permit where, amongst other things, there is 'any scientific finding or technological development [….] which appears to have a bearing on the conduct of operations.' | |
| **Monitoring Plan** | Storage of Carbon Dioxide (Licensing etc.) Regulations 2010 | | A Monitoring Plan requires to be submitted to NTSA for approval alongside the application for a storage permit |
| | Schedule 2 | Sets out the details as to what is required in terms of a monitoring plan | Amongst other things there is a requirement to take account of new scientific knowledge and improvements in best available technology (Schedule 2 5 (c) and (d)). There could be potential challenges around this where the 'best available |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | | technology' is not practically speaking the most appropriate for the site / project. |
| | Reg 7(5) | Once approval granted NTSA may subsequently require the applicant to make 'such modifications [to it as NTSA] considers necessary | In any event the Monitoring Plan must be updated on an ongoing basis to ensure that monitoring is carried out in the most appropriate way and, in any event, at least every 5 years. |
| **Third Party Access to Infrastructure of T&S** | Storage of Carbon Dioxide (Access to Infrastructure) Regulations 2011 | It implements the requirements of the Directive 2009/31/EC relating to third party access to infrastructure for the transport and storage of carbon dioxide on a fair and transparent basis | |
| **Transfer of Responsibility** | Storage of Carbon Dioxide (Termination of Licences) Regulations 2011 | It sets out the minimum period after the closure of the site before licence termination, the conditions that must be met before a licence is terminated and provides that the authority must establish the financial contribution to be made by the operator before the termination of the licence. | Leaks that are determined to caused by "fault on the part of the operator" are excluded from this mechanism, and remain the responsibility of the operator. |
| **Pipelines** | Petroleum Act 1998<br>Marine and Coastal Access Act 2009 | | For any offshore $CO_2$ pipelines associated with the offshore hydrogen facility a licence under the Petroleum Act 1998 will be required, as will a Marine Licence under the |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | | Marine and Coastal Access Act 2009. |
| **Environmental** | | | |
| **Consent** | Offshore Oil and Gas Exploration, Production, Unloading and Storage (Environmental Impact Assessment) Regulations 2020 ("EIA Regulations") | **Consent** under the EIA Regulations may also be required if the project falls within [Schedule 1, para 3 of] the EIA Regulations). | |
| | Reg 4(1) | For such projects the Secretary of State must 'agree to the grant of consent' by the North Sea Transition Authority (NSTA), and then the NSTA must grant consent, before the project can be commenced | |
| | Reg 4(3) | The Secretary of State can only 'agree to the grant of consent' where a development cost assessment has been carried out | The Environmental Statement needs to be submitted to Offshore Petroleum Regulator for Environment and Decommissioning (OPRED) who act on behalf of the Secretary of State.<br><br>OPRED will advise applicant of relevant authorities likely to have an interest in the project from whom the applicant will need to seek representations as part of the process. Applicant will also need to publish |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | | a public notice inviting representations from the public.<br><br>There is no statutory timescale for OPRED to agree to the grant of consent (although EIA Regulations sate the decision must be given within 'a reasonable time' from the receipt of any additional information it has requested from the applicant and any representations received as part of the process). |
| **Health and Safety** | | | |
| **Health, Safety and Environment (HSE)** | Health and Safety at Work etc. Act 1974 | As an emerging process CCS is not specifically addressed by UK Health and Safety legislation but existing legislation e.g., the Health and Safety at Work etc. Act 1974 is used to effectively regulate the safety of the CCS process chain.<br><br>Sections 2 and 3 of the Health and Safety at Work etc. Act 1974 require employers to ensure the health and safety of workers and members of the public, so far as is reasonably practicable. | General duties under the existing legislation means that CCS operators will be required to take a proportionate approach to managing all CCS risks. |
| | Control of Major Accident Hazards Regulations 1999 | Provides that where CO2 capture sites use dangerous substances in quantities above a certain threshold the regulations | |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | will apply to the whole site and in these cases the site operator will be required to submit a safety report to HSE. | |
| | Gas Safety (Management) Regulations 1996 | Only relates to transport of a gas that is primarily methane. | |
| | Construction (Design & Management) Regulations 2015; and | | Applies to any pipeline including a pipeline conveying flammable or explosive materials |
| | Pipelines Safety Regulations 1996 (covering safe design and operation) | | Applies to any pipeline including a pipeline conveying flammable or explosive materials |
| | Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015 | Where the criteria for offshore installation are met, (including EOR) the operator will be required to submit an offshore safety case to HSE. | Applies to both "production" and "non-production" installations |
| **Offshore Installations and Wells (Design and Construction, etc) Regulations 1996** | | | The main aim of these regulations is to ensure that a well is designed, modified, commissioned, constructed, equipped, operated, maintained, suspended and abandoned so that risks from it are as low as is reasonably practicable, and to ensure that the design and construction of a well satisfactorily address its subsequent suspension and abandonment. |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Borehole Sites and Operations Regulations 1995 ("BSOR")** | | | BSOR requires an operator to prepare a health and safety document before starting borehole operations. The health and safety document identifies risks associated with operations and details plans for dealing with and managing these risks. |
| **Offshore Petroleum Production and Pipe-lines (Assessment of Environmental Effects) Regulations 1999 / Offshore Petroleum Production and Pipe-lines (Assessment of Environmental Effects) (Amendment) Regulations 2007** | | | An operator who wishes to carry out certain upstream activities must first undertake an EIA and then summarise and present the conclusions of this in an environmental statement (ES), which must be submitted to the NSTA. This includes the drilling of wells. |
| **Other relevant legislation and regulation** | | | |
| **Decommissioning** | Energy Act 2008 | Applies the provisions of the Petroleum Act 1998 to CCS offshore structures e.g., the requirements in respect of decommissioning. | |
| **Other** | Energy Act 2008 Section 22 | The carrying out of a regulated activity without a licence is a criminal offence punishable by fine and / or imprisonment. It is also an offence to cause or permit | |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | the carrying out of an unlicensed activity. | |
| **Other** | Energy Act 2008 Section 23 | It a criminal offence to breach certain of the terms and conditions in a licence e.g., doing something that requires the licensing authority's consent without first obtaining that consent and failure to keep records. | |
| **Other** | NTSA Guidance - 'Carbon Dioxide Appraisal and Storage Licensing and Permit requirements' | NSTA has issued guidance on the process. | This guidance suggests the process of obtaining a storage licence (including the time taken to obtain consent under the EIA Regulations) is likely to take around 6 months.<br><br>The granting of a storage permit is not subject to any fixed timetable. |
| | The Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 | | Wording is specific to Petroleum Activities – but principles appear to apply equally to CCS activity |
| | The Offshore Chemicals Regulations 2002 | | Applies equally to CCS |
| | The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 | | Relates to oil discharge |
| | Food and Environment Protection Act 1985 | | Excluded for oil and gas activity – but will apply to any and all "dumping on |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | | or beneath the seabed – so applies to $CO_2$ disposal |
| | Marine and Coastal Access Act 2009 | | May be relevant – applies to general marine environment |
| | The Offshore Combustion Installations (Pollution Prevention and Control) Regulations 2013 | | Applies as definition of "offshore combustion installation" includes "a carbon dioxide storage or unloading platform", |
| | The Greenhouse Gas Emissions Trading Scheme Order 2020 establishes the UK ETS | If a store leaks then the store operator is liable to purchase emissions allowances for any CO2 that escapes to surface. | Relevant to a Regulated T&S business as it creates a potential liability. |

## 8.3 Actions required

Existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

# 9 Offshore Hydrogen Storage and back production

## 9.1 Why consider this

In the development of the Bacton Hub it is likely that significant quantities of hydrogen will need to be stored to address seasonal variations in energy demand.

Current natural gas demand in winter is 5-8 times the demand in summer. A future hydrogen system will need to accommodate this variability, most likely by producing excess hydrogen in the summer months and storing the hydrogen for subsequent back-production in the winter months.

This hydrogen will need to be safely injected into depleted natural gas reservoirs (or possibly aquifers) and back produced when required as no appropriate onshore alternatives are available in the region.

## 9.2 Potential Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

There is currently no hydrogen injection in UK waters, and there is no specific licensing regime in place to enable offshore hydrogen pipeline transport and storage.

Our current view of the likely regulatory regime is set out below. Currently there is no specific licensing regime in place for offshore hydrogen storage.

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Licencing and Leasing** | | | |
| **Offshore Hydrogen Storage Licence** | | | Energy Act 2008 s2 and s17 apply to various combustible gases and $CO_2$ respectively, but do not apply to hydrogen (but can be made to do so by the Secretary of State under S2 (4) (e)<br><br>It is likely the regulatory regime will be updated in the near future and likely to be similar to that for $CO_2$ storage. |
| | Planning Act 2008<br>Development Consent Order regime | | The offshore production set up can be an 'associated development' under the Planning Act 2008 Development Consent Order regime.<br><br>Only applies offshore to the |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | | limit of the territorial sea (12 nautical miles / 22 km) |
| **Marine Licence** | Marine and Coastal Access Act 2009 | | Offshore oil and gas production is explicitly excluded from the Marine and Coastal Access Act 2009. Propose recommending that hydrogen storage and back production also be excluded |
| **Pipelines** | Petroleum Act 1998 | A licence under the Petroleum Act 1998 will be required for any offshore hydrogen pipelines. | The Health and Safety at Work etc. Act 1974, Gas Safety (Management) Regulations 1996. Construction (Design & Management) Regulations 2015 and Pipelines Safety Regulations 1996 will apply to onshore pipelines |
| | The Petroleum Act (Specified Pipelines) Order 2011 | Applies to what can be transported through pipelines | Definition of "relevant substances" currently means oil or relative hydrocarbons, natural gas |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | | (including such gas as a liquid) or carbon dioxide. Hydrogen not mentioned. Regulatory SIG recommends amendment to this Order to enable hydrogen transmission. |
| **Storage in Salt Caverns** | OFGEM Guidance on the regulatory regime for gas storage facilities in Great Britain (version 2) | | Hydrocarbon gas storage in onshore salt caverns is also regulated by Ofgem<br>If there were any salt caverns offshore then hydrogen storage would be regulated by NSTA<br><br>Recommend that hydrogen be managed in the same way (by amending the Energy Act) |
| **Other relevant legislation and regulation** | | | |
| | Energy Act 2008 | | Creates a regulatory |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | | | environment for "gas storage" – but "gas" is defined as hydrocarbon gases and does not include hydrogen.<br>However, within the definition of "gas" (Section 2 (4) clause (e) – the Secretary of State is allowed to add gases to the definition of "gas" for injection.<br>This offers a potential route to creating a regulatory framework for hydrogen storage |
| | Environmental - EIA regulations | | Same as oil and gas |
| | Petroleum Act 1998 | Pipelines | See note above relating to The Petroleum Act (Specified Pipelines) Order 2011 |
| | Pipelines Safety Regulations 1996 | Pipelines | Does not currently cover hydrogen unless it exceeds 7bar ( PSR96). |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | Marine and Coastal Access Act 2009 | Pipelines | Does not apply to oil and gas |
| | Health and Safety at Work etc. Act 1974 | | HSE - general duty to operate safely |
| | Dangerous Substances & Explosive Atmospheres Regulations 2002 | | Will apply to hydrogen injection and back production |
| | Prevention of Fire and Explosion, and Emergency Response on Offshore Installations: Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995 (PFEER) | | Will apply to hydrogen injection and back production |
| | The Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015 | | In respect of an installation used for the storage of gas in or under the shore or bed of relevant waters or the recovery of gas so stored;<br>and for the conveyance of things by means of a pipe |

The law firm CMS has produced a useful review of the current status of hydrogen legislation and regulation which is reproduced in Appendix 3.

## 9.3 Actions required

The Regulatory SIG recommends the following actions

- Under The Energy Act 2008 section 2(4) gas is defined as any combustible substance which is gaseous at a temperature of 15° C and a pressure of 101.325 kPa (1013.25 mb) and which consists wholly or mainly of methane, ethane, propane, or butane (or of a mixture of two or more of those substances). The definition of gas should be amended to include hydrogen.

- Also recommend that the onshore storage of hydrogen in salt caverns be regulated by OFGEM who already regulate the storage of natural gas in salt caverns.

- The Petroleum Act 1998 (Specified Pipelines) Order 2011 applies to what can be transported through pipelines. The definition of "relevant substances" means oil or relative hydrocarbons, natural gas (including such gas as a liquid) or carbon dioxide - hydrogen not mentioned. The Regulatory SIG recommends that action be taken to add hydrogen to the list of "relevant substances"

# 10Offshore Electrical connections

## 10.1 Why consider this

In the development of the Bacton Hub it is likely that significant quantities of "green" hydrogen will be manufactured. "Green" hydrogen involves the electrolysis of fresh water to make hydrogen. It requires substantial supplies of electricity to drive this process (order of magnitude 5-10GW)

If this electricity is supplied from offshore wind farms then there is a potential requirement for major electrical connectors to make landfall at Bacton.

## 10.2 Overview of Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

The Crown Estate manages Offshore Wind licencing and has published a useful guide available here

The key legislation is shown below:-

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Offshore Wind Farm** | Electricity Act 1989 (Requirement of Consent for Offshore Wind and Water Driven Generating Stations) (England and Wales) Order 2001 | | Established regulatory regime – no amendments appear necessary |
| | Health and Safety at Work etc. Act 1974 | | HSE - general duty to operate safely |
| | Construction (Design & Management) Regulations 2015 | Applies to all the construction and decommissioning of any structure including site clearance, exploration, Investigation, excavation etc. | Does not require any specific reference to hydrogen. |
| | Provision and Use of Work Equipment Regulations 1998 | | A statutory that regulates the standards of safety for equipment used in work environments.<br><br>Applies automatically to $CO_2$ and hydrogen related equipment |
| | Lifting Operations and Lifting Equipment Regulations 1998 | | A statutory that regulates the standards of safety for the use of lifting equipment.<br><br>Applies automatically to $CO_2$ and hydrogen related equipment |

## 10.3 Actions required

Existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

# 11 Onshore - Plant at Bacton

## 11.1 Why consider this

In the development of the Bacton Energy Hub it is likely that significant process plant will be built at Bacton – whether this is to deliver "blue" hydrogen, process the associated carbon dioxide, or to manufacture "green" hydrogen.

## 11.2 Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

This is already well regulated under established regime that applies equally to blue and green hydrogen and carbon capture plant, including:

- Town and Country Planning Act 1990
- Nationally Significant Infrastructure Project under the Planning Act 2008 - Development Consent Order regime
- Pipelines - Town and Country Planning Act 1990
- Pipelines - Planning Act 2008 - Development Consent Order regime
- HSE - Health and Safety at Work etc. Act 1974 (general duty to operate safely) and the various Relevant Statutory Provisions including for example the Pipelines Safety Regulations 1996 and the Dangerous Substances & Explosive Atmospheres Regulations 2002
- The Management of Health and Safety at Work Regulations 1999

## 11.3 Details of Existing Regulatory Regime

The following table provides a summary of the relevant legislation and regulation

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Licencing and Leasing and Consenting** | | | |
| **Blue Hydrogen Production Facility** | Town and Country Planning Act 1990 | Planning Permission for the blue hydrogen production facility will be required with attendant planning obligations to observe.<br><br>Additionally, approvals under the Building Regulations 2010 may be required. | It may be possible to bring into the Development Consent Order regime under the Planning Act 2008 via a section 35 direction from the Secretary of State if it can be shown the project is of national significance.<br><br>Hydrogen production can also be included as an 'associated development' within a Development Consent Order (e.g., for a wind farm NSIP). |
| | Gas Act 1986 | Transportation of hydrogen is potentially licensable under the Gas Act 1986.<br><br>However, none of the Bacton terminal operators hold a gas transporters licence (exemption under the Gas (Exemptions) Order 2011 (2011/232). | Initial view is that hydrogen would also not require a gas transporters licence for activity at Bacton. |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Onshore Hydrogen Storage Facilities** | Town and Country Planning Act 1990 | Planning Permission for any onshore hydrogen storage facilities will be required with attendant planning obligations to observe.<br><br>Additionally, approvals under the Building Regulations 2010 may be required. | The Development Consent Order regime will apply where this will involve starting to use or carrying out operations to create underground hydrogen storage, and the capacity will be 43mln m3 or flow rate of 4.5mln m3 per day.<br><br>Additionally, the Development Consent Order regime will be applicable where underground gas storage facilities are being altered and the effect is to increase capacity / flow rate by those same figures. |
| | The Gas Act 1995 | Makes the Gas and Electricity Markets Authority responsible for regulating the gas and electricity industries, which it does through OFGEM which is responsible for regulating gas storage onshore | Applies as the definition of gas is "…….any substance in a gaseous state which consists wholly or mainly of- (i) methane, ethane, propane, butane, hydrogen……" |
| **Pipelines** | Town and Country Planning Act 1990<br>Planning Act 2008 – Development Consent Order regime | Planning permission will also be required for the natural gas import and hydrogen export pipes for the production facility if the pipes are less than 16.093 kilometres otherwise the Development Consent Order regime is mandatory. | |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Decommissioning** | | | The Planning Permission (when granted) and any Environment Permit are likely to contain decommissioning and / or restoration obligations. |
| **Environmental** | | | |
| **Environmental Permit** | Environmental Permitting (England and Wales) Regulations 2016 | A hydrogen production facility is a Part A (1) installation for the purposes of the Environmental Permitting (England and Wales) Regulations 2016 and is therefore a regulated facility for which an Environmental Permit is required. | The permit will authorise the operation of the facility by a named operator who must be the person who has, or will have, control over its operation. |
| **Health and Safety** | | | |
| **Health, Safety and Environment (HSE)** | Health and Safety at Work etc. Act 1974 | The Health and Safety at Work etc. Act 1974 is applicable. | |

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| | Planning (Hazardous Substances) Regulations 2015 | The presence of 2 tonnes or more of hydrogen on, or over land requires a Hazardous Substances Consent (Part 2, Schedule 1 of the Planning (Hazardous Substances) Regulations 2015). Even if the controlled quantity is not reached, Hazardous Substances Consent may be required if other hazardous substances are present (known as the "addition rule"). | |
| | Control of Major Accident Hazards Regulations 2015 | | Bacton is already a COMAH site – the addition of Hydrogen and Carbon dioxide does not change this |
| | Construction (Design & Management) Regulations 2015 | Applies to all the construction and decommissioning of any structure including site clearance, exploration, Investigation, excavation etc. | Does not require any specific reference to hydrogen. |
| | Environmental Permitting (England and Wales) Regulations 2010 in E&W and The Environmental Authorisations (Scotland) Regulations 2018. | Applies to any use of radioactive substances | |

## 11.4 Actions required

Existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

# 12 Onshore – Port at Great Yarmouth or nearby

## 12.1 Why consider this

In the development of the Bacton Hub it is possible that significant quantities of hydrogen will be exported – possibly in the form of compressed hydrogen (at extremely high pressures), possibly in the form of liquified hydrogen (at extremely low temperatures) or possibly in the form of ammonia or some other solid – through the port of Great Yarmouth.

The import of $CO_2$ from emitters elsewhere in the UK and in Europe is also a possibility. This has the potential to increase volumes and reduce the unit cost of any Bacton $CO_2$ T&S service.

## 12.2 Overview of Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

This is already well regulated under established regime that applies equally to blue and green hydrogen and carbon capture plant:

- Pipelines – Town and Country Planning Act 1990
- Nationally Significant Infrastructure Project under the Planning Act 2008 (Development Consent Order regulations)
- Pipelines – Planning Act 2008 – Development Consent Order regime
- HSE – Health and Safety at Work etc. Act 1974 (general duty to operate safely)
- HSE – Pipelines Safety Regulations 1996
- HSE – Dangerous Substances & Explosive Atmospheres Regulations 2002

This is broadly the same as for Onshore - Plant at Bacton – see section 11 Onshore - Plant at Bacton

## 12.3 Details of Existing Regulatory Regime

Guidance on the HSE website confirms that port activity is regulated by existing regulatory agencies as follows

### 12.3.1 Health and Safety Executive

HSE is responsible for regulating work activities carried out by shore-based workers e.g. stevedores both on port premises and on-board ship.

### 12.3.2 Maritime and Coastguard Agency (MCA)

MCA is responsible for shipboard activities carried out by ships' crew, marine/maritime safety and ship/navigational safety.

### 12.3.3 Marine Accident Investigation Branch (MAIB)

The MAIB investigates all types of marine accidents to or on-board UK ships worldwide and other ships in UK territorial waters.

### 12.3.4 Local authority Environmental Health Inspectors

They are generally responsible for work activities in warehouses, shops, catering facilities and offices not on dock premises; leisure activities on or adjacent to inland navigations; and complaints regarding nuisance

### 12.3.5 Environment Agency

They are responsible for railways on dock premises.

### 12.3.6 Office of the Rail Regulator (ORR)

They are responsible for railways on dock premises.

## 12.4 Actions required

Existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

# 13 Onshore – Long Distance Pipelines

## 13.1 Why consider this

In the development of the Bacton Hub it is likely that significant hydrogen will be distributed to markets in the southeast of England by pipeline – potentially through National Grid Feeders or through regional gas distribution company pipelines.

## 13.2 Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

This is already well regulated under established regime that applies equally to blue and green hydrogen and carbon capture plant:

- Pipelines – Town and Country Planning Act 1990
- Nationally Significant Infrastructure Project under the Planning Act 2008 (Development Consent Order)
- Pipelines – Planning Act 2008 – Development Consent Order regime
- HSE – Health and Safety at Work etc. Act 1974 (general duty to operate safely)
- HSE – Pipelines Safety Regulations 1996
- HSE – Dangerous Substances & Explosive Atmospheres Regulations 2002
- Gas Safety (Management) Regulations 1996

## 13.3 Overview of Existing Regulatory Regime

The following table provides a summary of the relevant legislation and regulation.

Same as for Onshore - Plant at Bacton – see section 11.3 Details of Existing Regulatory Regime.

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Licencing and Leasing and Consenting** | | | |
| **Onshore hydrogen pipelines** | Town and Country Planning Act 1990<br>Section 21<br>Planning Act 2008 - Development Consent Order regime | Planning Permission for pipeline(s) up to 16.093 kilometres will be required with the Development Consent Order regime under the Planning Act 2008 being applicable over that threshold | The Construction (Design & Management) Regulations 2015 and the Control of Major Accident Hazard Regulations 2015<br>will also need to be considered. |
| | Gas Act 1986 | Covers authorization of public gas suppliers, public gas supply code including gas quality standards, safety regulations, use of pipe-lines belonging to public gas suppliers including acquisition of rights to use pipe-lines, construction of pipe-lines, increasing capacity of pipe-lines.<br><br>OFGEM is the designated regulator. | Definition of "gas" explicitly includes hydrogen |
| **Market Regulation** | | | |
| | Utilities Act 2000 | | May apply to a future market for hydrogen |
| **Environmental** | | | |
| | Environmental Impact Assessment Regulations | | |
| | Conservation of Habitats and Species Regulations 2017 | | |
| **Health and Safety** | | | |

| | | | |
|---|---|---|---|
| **Health, Safety and Environment (HSE)** | Health and Safety at Work etc. Act 1974<br>Pipelines Safety Regulations 1996 | The Health and Safety at Work etc. Act 1974 and the Pipelines Safety Regulations 1996 will apply if the pipeline(s) are determined to be 'Major Accident Hazard Pipelines', which is highly likely.<br><br>Additionally, the Pipelines Safety Regulations 1996 require an operator to ensure that a pipeline which has ceased to be used is left in a safe condition. | This means that, amongst other requirements, they will be subject to a tight notification regime, have an obligation to prepare a major accident prevention document and have adequate emergency plans in place. |
| | Gas Safety Management Regulations 1996. | The flow of gas (to which hydrogen is specifically captured) through the network engages the Gas Safety Management Regulations 1996. | |
| | Pipelines Safety Regulations 1996 concerned with pipeline integrity | | |
| | HSE – Control of Major Accident Hazards (COMAH) 1999 | | |
| | The Planning (Hazardous Substances) Regulations 2015 (for storage) | | |

## 13.4 Actions required

Existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

The blending of hydrogen into the natural gas in the Nation al Transmission system is the subject of considerable technical work at present. Extensive regulation already in place for blending but will require:

- Amendments to GS(M)R are required to permit hydrogen blending. At present these regulations limit hydrogen content of gas in the NTS to below 0.1%% (Molar)
- The National Grid 'Future Grid' project is critical to build the evidence based and demonstrate higher blending levels (20%) into NTS. Implementation of NTS blending planned for 2026 within NGG roadmap

Other matters that will need to be resolved include:

- Framework for information on payment, connections fees/charges, balancing fees for injection and offtake of hydrogen (including for safety and balancing purposes)
- Measurement and metering of input and offtake of blended hydrogen.
- Bacton is currently considered as part of the UK Project Union (a potential development of a Hydrogen Backbone project), but likely not in the initial phase.

# 14Onshore – Hydrogen transport (Road / Rail / Ship)

## 14.1 Why consider this

In the development of the Bacton Hub it is likely that significant hydrogen will be distributed by road and rail.

## 14.2 Overview of Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

The road and rail distribution of hydrogen is already well regulated under an established regime that applies equally to blue and green hydrogen,

- Hydrogen stored under pressure >5 bar is classified as a dangerous good (flammable or explosive gas) under RID and ADR (as defined below).
- European Regulations concerning the International Carriage of Dangerous Goods by Rail ("RID") and the European Agreement concerning the International Carriage of Dangerous Goods by Road ("ADR").
- The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 ("TPE") implements ADR and RID in the UK.
- The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Amendment) (EU Exit) Regulations 2020 maintained the TPE regulations following EU Exit.
- Department for Transport as regulator.
- The Health and Safety Executive and the Driver and Vehicle Standards Agency are responsible for the enforcement of the safe carriage of dangerous goods by road and the Office of Rail and Road are responsible for transportation by rail.
- Extensive regulation already in place, including Pressure Equipment (Safety) Regulations 2016

## 14.3 Transport of hydrogen by ship

The transportation of hydrogen by ship is not currently practiced widely. An experimental pilot liquified hydrogen ship has transported hydrogen from Australia to Japan under the "hydrogen energy supply chain" project funded by the government of Japan, the Australian federal government and Victoria state government.

As part of this and several competing projects independent ship classification societies are developing standards for cargo containment

Technically the transport of hydrogen as a liquid is extremely challenging as it has to be maintained below -253degrees Celsius temperature to compress the hydrogen to 1/800 of its original gas-state volume. Cooling hydrogen to this temperature requires considerable energy input.

The Regulatory SIG notes that BEIS is currently (Q4 2022) conducting a consultation entitled "Proposals for hydrogen transport and storage business models". This consultation closes 22 November 2022 and is intended to inform business models that may be available from 2025.

Given the immaturity of this space the Regulatory SIG has no recommendations relating to ship transport of hydrogen.

## 14.4 Details of Existing Regulatory Regime

The following table provides a summary of the main relevant legislation and regulation

.

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Transportation of Hydrogen by Road and Rail** | | | |
| | European Regulations concerning the International Carriage of Dangerous Goods by Rail ("RID") | Covers the rules and regulations of dangerous substances (including hydrogen) by rail. | |
| | European Agreement concerning the International Carriage of Dangerous Goods by Road ("ADR") | Covers the rules and regulations of dangerous substances (including hydrogen) by road. | |
| | Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 ("TPE") | Implements ADR and RID into UK legislative regime. | |
| | Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Amendment) (EU Exit) Regulations 2020 | Maintains ADR and RID as part of UK legislation following Brexit. | |
| **Gas Safety Management** | Gas Safety (Management) Regulations 1996 | Transporters of hydrogen will need to have a safety case approved by the HSE to ensure adequate safety controls and emergency plans are in place. | |

| | | | |
|---|---|---|---|
| **Health, Safety and Environment (HSE)** | Health and Safety at Work etc. Act 1974 | | Mainly relating to road and rail termina ls where significant volumes of hydrogen may be stored. |
| **Vehicle Certification Agency (VCA) Dangerous Goods Office** | | Responsible for the certification of dangerous goods packaging within UK. | |

Resource: Carriage of dangerous goods – health and safety in the workplace (hse.gov.uk)

## 14.5 Actions required

The rail and road transport industry is regulated by the Office of Rail and Road.

The existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

# 15 Onshore - Electrical Supply

## 15.1 Why consider this

In the development of the Bacton Hub it is likely that significant quantities of "green" hydrogen will be manufactured. "Green" hydrogen involves the electrolysis of fresh water to make hydrogen. It requires substantial supplies of electricity to drive this process (order of magnitude 5-10GW).

If this electricity is supplied via the National Grid then the grid will require reinforcement to enable the electricity to be delivered to Bacton.

## 15.2 Overview of Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

Large offshore wind farms and other power generators already exist, and the regulatory framework is well established, managed by the North Sea Transition Authority and the HSE, summarised below

- Long distance power transmission - Town and Country Planning Act 1990
- Long distance power transmission - Planning Act 2008 - Development Consent Order regime
- HSE - Health and Safety at Work etc. Act 1974 (general duty to operate safely)
- Underground cables are generally consented via planning permission under the Town and Country Planning Act 1990 if standalone. They may also be consented as "associated development" if associated with a project proceeding down the Development Consent Order route under the Planning Act 2008. Overhead lines generally need to be consented via a Development Consent Order under the Planning Act 2008 if they meet the specification in s16 of the Planning Act 2008 (generally this is if the line is 132kv voltage or above and/or 2km long or more).

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Onshore – Electrical Supply** | | | |
| **Underground Cables** | Town and Country Planning Act 1990 | | Planning permission under the TCPA 1990 for a standalone application |
| **Underground Cables** | Planning Act 2008 | | Can be consented as an 'associated development' if part of a bigger project proceeding down the Development Consent Order route under the PA 2008 |
| **Overhead Lines** | Planning Act 2008 | | Overhead lines generally need to be consented via a Development Consent Order under the PA 2008 if they meet the specification in s16 of the Planning Act 2008 (generally this is if the line is 132kv voltage or above and/or 2km long or more). |

## 15.3 Actions required

Existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

# 16Onshore - Water Supply

## 16.1 Why consider this

In the development of the Bacton Hub it is likely that significant quantities of "green" hydrogen will be manufactured. "Green" hydrogen involves the electrolysis of fresh water to make hydrogen. It requires substantial supplies of water to drive this process (order of magnitude 30-50 tonnes per hour).

Similarly, "blue" hydrogen is a major consumer of water.

There is already a significant challenge to supply water in East Anglia, so we anticipate a significant effort being required to supply water to any development at Bacton.

## 16.2 Overview of Existing Regulatory Regime

**Please note – the following information reflects the collective knowledge and understanding of the Regulatory SIG members. It is not comprehensive, and anyone using this document for any purpose should undertake their own due diligence to ensure that all relevant legislation, regulation and guidance has been identified.**

Large industrial water demands already exist, and the regulatory framework is well established and summarised below.

The infrastructure for onshore fresh water is managed and operated by water statutory undertakers, regulated by Ofwat, the Drinking Water Inspectorate and the Environment Agency.

Onshore private water resources are primarily small scale and agricultural in focus, requiring planning permission and impounding and abstraction licences.

Large industrial plant requiring fresh water, such as nuclear power plants, are usually sited by the sea with integral desalination plants in order to ensure the fresh water supply.

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Water supply via a Water Undertaker** | | | |
| **Regulation of the water and sewerage industry** | Water Industry Act 1991 | | Governs overall regulation of the water and sewerage industry |
| **Regulation of the water and sewerage industry** | Water and Sewerage Undertakers (Exit from Non-household Retail Market) Regulations 2016 | | Non-household customers ordinarily connect to the water supply via a retailer |
| **Regulation of the water and sewerage industry** | Water Act 2014 | | Water supply licences |

A water undertaker may refuse a non-household connection to its water supply under s55 of the Water Industry Act 1991 if it would incur unreasonable expenditure that would put at risk its ability to meet its existing or probable future obligations.

The feasibility of taking water from the existing water network is highly dependent on the availability of water resources.

The water undertaker can recover costs associated with a new connection, necessary to ensure the continued ability to meet its water supply obligations.

In the event the water undertaker refuses a non-household connection to its water supply an alternative water source would need to be considered e.g., private supply from a reservoir.

The construction of a reservoir will usually involve the 'winning and working' of minerals which may require the advertisement of the application for planning permission and make the application a county matter. The licencing required relates to both the impounding of water in a reservoir, and the abstraction of the water once impounded.

Statutory water undertakers have duties in respect of water resource management to ensure that they can supply water to premises within its area, through the use of water resources management plans. These plans will be key documents to consider for any planning application, along with consultation of affected water undertakers, to ensure that any new reservoir will not harm the undertaker's statutory duty to supply water.

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Private supply of water from a reservoir** | | | |
| **Private supply of water from a reservoir** | Town and Country Planning Act 1990 | | Relating to planning permission for construction / use of a reservoir |
| **Private supply of water from a reservoir** | Planning Act 2008 | | In situations where the construction / use of a reservoir would be an 'associated development' in respect of a nationally significant project |
| **Private supply of water from a reservoir** | TCPA (Environmental Impact Assessment) Regulations 2017<br><br>Conservation of Habitats and Species Regulations 2017 | | Relating to the environmental impacts of the project |
| **Private supply of water from a reservoir** | Water Resources Act 1991;<br><br>Water Act 2003;<br><br>Abstraction and Impounding Regulations 2006 | | Relating to impounding and abstraction licences |
| **Private supply of water from a reservoir** | Water Supply (Water Quality) Regulations 2016 | | Only applicable only if the water supply will be used for drinking, food production, etc) |

A further option for consideration would be to source the water supply via desalination.

Desalination is subject to obtaining the relevant planning consents. Operational permits relate to the environmental impact of discharging the extracted salt back into the marine environment, increasing salination. There is currently no desalination filter approved for drinking water quality; it would be simpler to wholly separate any desalinated supply from any drinking water supply to plant.

| Matter Item | Statutory Provision / Regulation | Specific Provisions | Comments |
|---|---|---|---|
| **Supply of water via desalination** | | | |
| **Desalination** | Town and Country Planning Act 1990<br><br>Planning Act 2008 | | Dealing with planning permission for construction / use of a desalination plant. |
| **Desalination** | TCPA (Environmental Impact Assessment) Regulations 2017<br><br>Conservation of Habitats and Species Regulations 2017 | | Relating to the environmental impacts of the project |
| **Desalination** | Environmental Permitting (England and Wales) Regulations 2016 | | Relating to operating environmental permits |
| **Desalination** | Water Supply (Water Quality) Regulations 2016 | | Only applicable only if the water supply will be used for drinking, food production, etc) |

## 16.3 Actions required

Existing regulatory regime appears satisfactory. No further review or action by Regulatory SIG required.

# 17 Other Issues

Several overarching issues have been identified that fall into the regulatory domain and need to be addressed

## 17.1 Hydrogen quantities

The quantities of hydrogen to be processed at Bacton are significant.

The current largest hydrogen production plant in UK produces ~50,000 tonnes hydrogen per annum (1,650,000 MWh / 190MW.)

Any likely Bacton "blue" hydrogen plants are potentially twice this size, and there could be multiple such plants on the site.

Although existing hydrogen production plants are regulated, it is appropriate to ask the regulator to consider whether the increased inventories and flow rates of hydrogen constitute material changes that might require the regulation to be reviewed.

## 17.2 Carbon Dioxide quantities

The quantities of carbon dioxide that will be produced from the "blue" hydrogen process at Bacton is significant.

The likely Bacton "blue" hydrogen plants are potentially 350MW size and will produce 450,000-1.5 million tonnes of $CO_2$ per annum. This equates to 750,000–1 million tonnes per annum or 2000-2750 tonnes per day with onsite inventories likely 100-115 tonnes per hour.

Although existing carbon dioxide plants are regulated, it is appropriate to ask the regulator to consider whether the increased inventories and flow rates of carbon dioxide constitute material changes that might require the regulation to be reviewed.

| OTHER POINTS FOR CONSIDERATION |
| --- |
| **As well as the highlighted rules and regulations depending on the circumstances a myriad of other permits and consents may be required:**<br><br>**For example:**<br>• **Waste exemptions and waste permits under the Environmental Permitting (England and Wales) Regulations 2016;**<br>• **Greenhouse Gas Emissions Permit under the Greenhouse Gas Emissions Trading Scheme Regulations 2012, as amended by the Greenhouse Gas Emissions Trading Scheme (Amendment) (No.3) Regulations 2019:**<br>• **Other construction / development related permits; and**<br>• **Various wildlife and conservation related licences may be required.** |

## 17.3 International movement of $CO_2$

It is possible that as part of the Bacton Energy Hub project CO2 may be imported from elsewhere in the UK or from other countries. We have therefore briefly considered the international agreements that might influence such activity.

### 17.3.1 The London Protocol

#### 17.3.1.1 Overview

The "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972", known as the "London Convention" was one of the first global conventions to protect the marine environment from human activities. It has been in force since 1975. Its purpose is to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. Currently, 87 States are Parties to this Convention.

In 1996, the "London Protocol" was agreed to modernise the Convention and, eventually, replace it. Under the Protocol all dumping is prohibited, except for possibly acceptable wastes on the so-called "reserve list". The London Protocol entered into force on 24 March 2006 and there are currently 53 Parties to the Protocol.

#### 17.3.1.2 2006 Amendment - $CO_2$ added to Protocol

Annex 1 of the London Protocol was amended in 2006 to add $CO_2$ streams from $CO_2$ capture processes for storage to the list of wastes or other matter that may be considered for dumping (paragraph 1.8 of Annex 1).

New paragraph 4 of Annex 1 provides that $CO_2$ streams may only be considered for dumping if:

1. disposal is into a sub-seabed geological formation; and
2. they consist overwhelmingly of $CO_2$. They may contain incidental associated substances derived from the source material and the capture and sequestration processes used; and
3. no wastes or other matter are added for the purpose of disposing of those wastes or other matter.

The amendments to Annex 1 entered into force on 10 February 2007.

As the amendments were made to an annex to the London Protocol, their entry into force was governed by Article 22 (Amendment of the Annexes). Under paragraph 4 of Article 22, amendments to the Annexes automatically enter into force for all contracting parties that have not objected to the amendment 100 days after the date of adoption at a meeting of contracting parties (or immediately on notification to the International Maritime Organization (IMO) of a contracting party's acceptance of the amendment prior to that time).

#### 17.3.1.3 2009 Amendment - $CO_2$ Allowed to across international boundaries

Article 6 of the London Protocol (Export of wastes or other matter) provides that "Contracting Parties shall not allow the export of wastes or other matter to other countries for dumping or incineration at sea". This was interpreted as preventing the shipment of $CO_2$ between countries.

The 2009 amendment adds a new paragraph to Article 6:

2. Notwithstanding paragraph 1, the export of carbon dioxide streams for disposal in accordance with Annex 1 may occur, provided that an agreement or arrangement has been entered into by the countries concerned. Such an agreement or arrangement shall include:

2.1 confirmation and allocation of permitting responsibilities between the exporting and receiving countries, consistent with the provisions of this Protocol and other applicable international law; and

2.2 in the case of export to non-contracting parties, provisions at a minimum equivalent to those contained in this Protocol, including those relating to the issuance of permits and permit conditions for complying with the provisions of Annex 2, to ensure that the agreement or arrangement does not derogate from the obligations of contracting parties under this Protocol to protect and preserve the marine environment. A Contracting Party entering into such an agreement or arrangement shall notify it to the Organization.

#### 17.3.1.4 2019 legal manoeuvres

As of 2019, only 6 of the 53 parties to the London Protocol had ratified the amendment. Ratification by two thirds of the parties is required for it to be implemented.

A 2013 agreement between the parties to the London Protocol adopted a new guidance document entitled "Guidance on the Implementation of Article 6.2 on the Export of $CO_2$ Streams for Disposal in Sub-seabed Geological Formations for the purpose of sequestration". Practically this guidance permits the international shipping of $CO_2$ but requires a legally binding agreement between the governments of the $CO_2$ exporting and importing countries. It requires the same standards to be met even if a country is not a signatory to the London Protocol. However this guidance was seen as not fully addressing the legal barriers

The Vienna Convention on the Law of the Treaties (VCLT) Article 25 provides that a treaty or part of a treaty can be applied provisionally pending its entry into force if (a) the treaty itself so provides; or (b) the negotiating States have in some other manner so agreed.

In 2019 the parties to the London Protocol agreed a text which allows two governments to agree the export of $CO_2$ from one country to another

**The final text of the Resolution LP.5(14) on the Provisional Application of the 2009 Amendment to Article 6 of the London Protocol was subsequently published in the LC41/LP14 meeting report in 2020 [18]. It has the following operative clauses.**

**DECIDES to allow for the provisional application of the 2009 amendment pending its entry into force by those contracting Parties which have deposited a declaration on provisional application of the 2009 amendment;**
**INVITES Contracting Parties to deposit with the Depositary a declaration on provisional application of the 2009 amendment of the London Protocol pending its entry into force**
**FURTHER RECALLS the obligation to notify the Depositary of agreements or arrangements mentioned in article6, paragraph 2 of the London Protocol (as amended by resolution LP.3(4));**
**AFFIRMS that the export of carbon dioxide under the provisional application of article 6 of the London Protocol (as amended by resolution LP.3(4)), and in compliance with the requirements of paragraph 2 of the article (as amended by resolution LP.3(4)) will not be in breach of article 6 as in force at the time of the export; and**
**URGES Contracting Parties to consider accepting the amendment to article 6 of the London Protocol adopted through resolution LP.3(4).**

#### 17.3.1.5 Conclusions

The provisional application of the 2009 amendment to Article 6 of the London Protocol allows countries to agree to export and receive $CO_2$ for offshore geological storage. This removed the last significant international legal barrier to CCS and means that $CO_2$ can be transported across international borders to offshore storage. Because of the previous work by London Protocol Parties on the requirements for permitting and responsibilities, the environmental protection from the original 2006 amendment and subsequent guidelines is maintained for transboundary CCS

activities. This is an enabling event in the truest form for CCS, and consequently also towards the immense $CO_2$ mitigation which is needed to achieve the Paris Agreement goals.

### 17.3.2 The EU ETS and CCS Directives

#### 17.3.2.1 Introduction

A combination of the requirements of the EU Emissions Trading Scheme Directive and the EU Carbon Capture and Storage Directives currently creates a blockage to the international movement of $CO_2$ from the EU to a non-EU country such as the UK.

The two separate Directives are interlinked and the effect is

- The ETS Directive accepts CO2 storage as entitling an emitter to avoid the obligation to purchase EU Emissions Allowances (EUA's) if the CO2 is stored in a store regulated by the CCS Directive.
- The CCS Directive only applies to stores within the EU. If a UK store is to store CO2 originating in the EU then agreement is required by the EU Commission and the UK government over the acceptability of such an arrangement
- As a consequence if a UK store is used EUA's must continue to be purchased

#### 17.3.2.2 EU Emissions Trading Scheme Directive

Directive 2009/31/EC of the European Parliament and of the Council of 13 October 2003 established a system for greenhouse gas emission allowance trading within the European Union.

Article 12 of this Directive relates to the transfer, surrender and cancellation of allowances

Paragraph 3a states that "An obligation to surrender allowances shall not arise in respect of emissions verified as captured and transported for permanent storage to a facility for which a permit is in force in accordance with Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide"

Directive 2009/31/EC is widely known as the "CCS Directive"

#### 17.3.2.3 EU CCS Directive

Directive 2009/31/EC of the European Parliament and of the Council dated 23 April 2009 establishes a framework for the long-term geological storage of $CO_2$.

Relevant extracts of are as follows :-

- Article 2 paragraph 1 - "This Directive should apply to the geological storage of CO2 within the territory of the Member States, in their exclusive economic zones and on their continental shelves."
- Article 2 paragraph 3 - "The storage of CO2 in storage complexes extending beyond the territorial scope of this Directive and the storage of CO2 in the water column should not be permitted."

#### 17.3.2.4 Recommendation and proposed actions

The current position creates a significant obstacle to the international shipping of $CO_2$ from an EU country to the UK and vice versa.

Proposed actions are as follows

- Seek to persuade the UK and the EU to accept one another's CO2 store regulations.
- For the EU - this should be straightforward as the UK adopted the original CCS Directive and implemented it in UK legislation and has retained this legislation unaltered post-Brexit. However it may require a change to the EU CCS Directive – a process that can take years
- For the UK - legislation also needs to be changed – the Energy Security Bill now laid before parliament may enable the Secretary of State to make this change as secondary regulation (to be confirmed)

- Encourage ISO to develop a storage standard which can be adopted by legislature globally. This process will likely be slow but is potentially most beneficial as the standard will be consistent globally.

# 18 Useful references

In the course of preparing the document the Regulatory SIG identified the following public domain information sources that may be helpful

| Resource | Web address |
|---|---|
| **Offshore Energy UK (formerly Oil and Gas UK)**<br>**Environmental legislation guidance** | https://oilandgasukenvironmentallegislation.co.uk/activity-index.htm |
| **HyLAW**<br>**23 partners, co-ordinated by Hydrogen Europe, that seeks the removal of legal barriers to the deployment of fuel cells and hydrogen applications** | https://www.hylaw.eu/ |
| **UK HSE - Hydrogen safety** | https://www.hsl.gov.uk/hydrogen-safety |
| **UK HSE – COMAH guidance** | https://www.hse.gov.uk/comah |
| **OFGEM – guide to industry codes and standards** | https://www.ofgem.gov.uk/energy-policy-and-regulation/industry-codes-and-standards |
| **National Grid – Hydrogen testing and FutureGrid project** | https://www.nationalgrid.com/uk/stories/journey-to-net-zero-stories/hydrogen-testing-heating-fuel-futuregrid |
| **National Grid – long term electricity grid strategy (onshore and offshore)** | https://www.nationalgrideso.com/document/262676/download |

# Appendix 1 – English Planning Approach

Adapted from https://www.morton-fraser.com/insights/scottish-and-english-planning-regimes

## Submission and processing

Other than for nationally significant infrastructure projects ("NSIPs"), a planning application for a development in England is made to the local planning authority. All planning applications are processed in the same manner.

- National developments - are the top tier and are set out in the National Planning Framework 2.
- Major developments - include developments such as housing proposals over 50 units, supermarkets over 5,000 square metres and wind farms over 20MW.
- Local developments – single unit houses, shop front alterations and change of use of properties.

## Pre-application consultation

As yet there is no legal duty on applicants to undertake pre-application consultation in England, but one will be introduced if and when the relevant part of the Localism Act 2011 comes into force.

## Extending life of a planning permission

There is no mechanism to apply to an English planning authority to extend the lifetime of a planning permission. However, there is a streamlined renewal process for planning permissions granted on or before 1 October 2010.

## Appeal

All planning appeals for English property are to the Secretary of State, irrespective of the size of the development.

The Judicial Review Time Limit for England is 6 weeks.

## Major infrastructure projects

There are a number of different statutory consents that are required for a major infrastructure project in England – not just planning permission. For example, a project may also need compulsory purchase powers for land assembly or road orders to stop up roads. All necessary consents for NSIPs can now be obtained by means of applying for a Development Consent Order - replacing the need to apply for a myriad of statutory consents.

## Discharge of planning obligations

Planning obligations in England can be discharged by voluntary agreement between an applicant and planning authority at any time. However, a formal application to discharge or vary an obligation can only be made, to the planning authority, after five years from entering into it. There are also appeal rights to the Secretary of State against any refusal or failure to determine such application.

## Community Infrastructure Levy

Local Planning Authorities in England now have the legal right to charge a Community Infrastructure Levy ("CIL") on all new developments. The CIL is calculated on a price per square foot basis for each new development.

Each local authority in England can choose whether to charge the CIL, whether it will apply to all developments or only to certain types of development and the amount of the CIL.

To date, only a limited number of local authorities have chosen to impose the levy, but this number is set to rise - as in April 2014 the CIL replaced Section 106 agreements as the only mechanism by which infrastructure projects (including open space, education and highways improvements) in England can be delivered.

# Appendix 2 – Nationally Significant Infrastructure Projects

On 1 April 2012, under the Localism Act 2011, the Planning Inspectorate became the government agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).

NSIPs are major infrastructure projects such as new harbours, roads, power generating stations (including offshore wind farms) and electricity transmission lines, which require a type of consent known as 'development consent' under procedures governed by the Planning Act 2008 (PA2008). Development consent, where granted, is made in the form of a Development Consent Order.

## Planning Act 2008

Nationally Significant Infrastructure projects are set out here - https://www.legislation.gov.uk/ukpga/2008/29/section/14

The list can be added to if the development is in the area of energy / transport / water / waste water / waste in England and Wales. Currently

- All electricity transmission lines over 132Kv are included
- Onshore underground storage is included
- Modifications to gas reception facilities is included
- Gas and other pipelines are included

## Actions required

The regulatory SIG recommends that the Secretary of State amends the list of Nationally significant infrastructure projects to include hydrogen generation facilities (blue or green) above a certain materiality threshold - say 100MW.

# Appendix 3 – Review of Hydrogen Legislation and Regulation

The following overview of the current position of hydrogen legislation and regulation has been published online. The full text is available here

The following extract addresses the legislative and regulatory aspects

## Regulation of hydrogen

### 18.1.1 Legislation overall

There is very little legislation that specifically relates to hydrogen. Instead, hydrogen projects must navigate the existing legislative landscape that applies to gasses more generally. Hydrogen is captured under the definition of "gas" in the Gas Act 1986 (the "Gas Act") and is therefore regulated as part of the gas network.

The UK gas market is regulated by the Gas and Electricity Markets authority, operating through the Office of Gas and Electricity Markets ("Ofgem"). Anyone engaging in gas supply, gas shipping or gas transportation, or who participates in the operation of gas interconnectors, or provides smart metering in respect of gas must have a licence to do so under the Gas Act. The licences include measures relating to the safe operation of the gas network and provisions relating to price controls. An entity wishing to transport hydrogen (or carry out another activity regulated by the Gas Act) through gas pipelines may therefore require a licence and as part of this must demonstrate a credible plan to commence licensed activities and permit a risk assessment to be carried out by Ofgem as part of the process for obtaining the licence.

Further, a gas licensee must also comply with various industry codes, such as:

- The Uniform Network Code – sets out the common rules governing the gas transportation arrangements between licenced gas transporters and shippers, as required under their licence. Every licensed gas transporter must have its own network code, incorporating the Uniform Network Code, and governing the terms on which it will transport gas. It includes a Transportation Principal Document, which sets out the gas transportation arrangements between gas shippers and transporters and an Offtake Arrangements Document which sets out arrangements between different transporters.
- Independent Gas Transporter Uniform Network Code – sets out the common rules applying to independent gas transporters. It aims to harmonise the network code arrangements of Independent Gas Transporters, who operate extensions to the gas network such as those serving new housing developments.
- Supply Point Administration Agreement – this is a multi-party agreement to which all gas transporters and suppliers are required to comply with. It facilitates supply point administration, being the change of gas supplier.
- Retail Energy Code – this enables end consumers to switch energy suppliers.

### 18.1.2 Injection into the gas grid – blending hydrogen into the existing gas networks

Pursuant to the Gas Safety (Management) Regulations 1996, the concentration of hydrogen that can be injected onto the UK gas network is 0.1%. As mentioned above, this is being tested to increase

the hydrogen blend to up to 20%. If successful, the regulations will need to be amended to allow for this higher blend.

### 18.1.3 Real estate and consenting

Major hydrogen projects are likely to be nationally significant infrastructure projects which require a development consent order under the Planning Act 2008. For smaller projects (or pipelines) such consents may be instead regulated through the Town and Country Planning Act 1990.

In addition to ensuring the relevant consents are obtained, land rights need to be secured the same as for other infrastructure. As such access rights would be needed from production and storage facilities to ensure they are fit for the purpose of large-scale industrial transportation which may be through private contracts or under the compulsory acquisition powers that may be available. In the case of re-purposing existing infrastructure, variations to existing rights are likely to be needed to reflect the necessary technological upgrades and/or regulatory issues.

In relation to storage of hydrogen, an Environmental Impact Assessment may be required if hydrogen is to be stored on site or if there are pipelines carrying hydrogen pursuant to the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.

### 18.1.4 Health and safety laws

Hydrogen, like other gasses is heavily regulated from a health and safety perspective. The Health and Safety Executive ("**HSE**") requires compliance with the following regulations:

- Gas Safety (Management) Regulations 1996 – concerns the flow of gas through the network. All gas transporters must prepare and submit a safety case to HSE. This identifies the hazards and risks, explains how they are controlled, and describes the system in place to ensure that controls are applied. The gas transporter will be audited to ensure compliance with their safety case
- Pipelines Safety Regulations 1996 – concerns pipeline integrity. These regulations set out requirements in respect of pipeline design, construction, installation, operation, maintenance and decommissioning. For example, pipelines should be equipped with emergency shut down valves and its design should take account of the need for maintenance access.
- Storage of Hydrogen is regulated by The Planning (Hazardous Substances) Regulations 2015 and/or the Control of Major Accident Hazards Regulations 2015 ("COMAH"), depending on the quantities involved. COMAH sets a high bar of requiring operators to take all measures necessary to prevent a major accident and limit consequences for human health and the environment. The operator must have in place various strategies, including safety plans, emergency plans and a Major Accident Prevention Policy.
- Under the Hazardous Substances Regulations, consent is required to store two or more tonnes of hydrogen, and a further consent is required where storing five of more tonnes of hydrogen.
- The Dangerous Substances and Explosive Atmosphere Regulations 2002 sets out requirements for the use of equipment and protective systems in potentially hazardous environments, including those where hydrogen is produced or stored.

### 18.1.5 Transport of hydrogen by road

The European Agreement concerning the International Carriage of Dangerous Goods by Road (**"ADR"**) regulates the transport of hydrogen, which is classified as a dangerous good under Annex 5 of the ADR. Hydrogen transport is excluded through ten tunnels in the UK, based on its ADR classification.

Drivers transporting hydrogen must be appropriately trained, and vehicles must meet specifications required for hazardous cargoes.

The Pressure Equipment (Safety) Regulations apply to the design and manufacture of tanks used to transport hydrogen.

## Regulatory bodies

There is no specific regulatory body which is responsible for the regulation of hydrogen projects. Instead, a number of regulators would have responsibilities depending on the activity in question.

| Regulatory Body | Role |
|---|---|
| **Local Authority / Town and Country Planning Authority** | Regulates the use of land<br>Undertakes Environmental Impact Assessment<br>Usually has the role of the hazardous substance authority in relation to storage |
| **Health & Safety Executive** | Assesses local authority decisions and signs off driver training |
| **UK Vehicle Certification Agency** | Approves hydrogen transport vehicles |
| **Oil and Gas Authority (Now the North Sea Transition Authority)** | Regulates new pipelines and decommissioning |
| **Ofgem** | • Regulates the gas network |
| **Offshore Petroleum Regulator for Environment and Decommissioning (OPRED)** | • Regulates offshore environmental and decommissioning matters |