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IV. Transportation and storage

1. Introduction

In most jurisdictions, legislation specific to the transportation and storage of hydrogen or the operation of hydrogen networks has not been developed. Instead, the relevant legislation relating to the regulation of gas is expected to govern the transmission, distribution and storage of hydrogen.

While that may not always be the case (see the case study below in relation to proposals for gas and hydrogen regulation in Germany, for example), current hydrogen developments are operating within the context of existing gas regulations. In the United Kingdom, for example, the Gas Act 1986 gives Ofgem a duty to regulate and protect the interests of consumers with regard to persons or entities engaged in, or connected with, "the shipping, transportation or supply of gas conveyed through pipes".[60] Any entity engaging in gas supply, gas shipping or gas transportation, or which participates in the operation of gas interconnectors or provides smart metering in respect of gas, must have obtained a licence to do so under the Gas Act. The licences include measures relating to the safe operation of the gas network and to price controls, and licensed entities must demonstrate a credible plan to commence licensed activities and permit a risk assessment to be carried out by the regulator.

Additionally, across most EU states, the International Carriage of Dangerous Goods by Road (ADR) will have been implemented which will regulate how hydrogen, and other dangerous gases, are to be transported between countries. Under Annex 5 of the ADR, hydrogen is classified as a dangerous good, and any vehicles carrying hydrogen must be of a certain specification and drivers appropriately trained.

Case study: should methane and hydrogen be regulated separately?

In February 2021, the German government passed a draft amendment to the Energy Act with the aim of gradually building up a 'pure' hydrogen infrastructure in Germany (ie, pipelines that carry only hydrogen and not other gases), but regulating it separately from the existing gas (methane) pipeline network.[61] This would mean that existing planning rules for the gas grid and how it is financed by way of grid fees would not automatically apply to pipelines carrying hydrogen. Currently, networks transporting only hydrogen are not regulated under German law as they do not fall under the heading of 'energy' in the Energy Industry Act. The amendment would widen the definition of 'energy' (at s 3 no 14 of the Act) to include hydrogen, so that it would become a third, independent, designated source of energy, after electricity and gas. However, this would not apply to the blending of hydrogen into the methane gas network, so the existing legal framework would continue to apply.

The bill will allow operators of hydrogen networks to choose whether they want to be subject to the new regulation, and any benefits and restrictions that come with it. This way, the legislation will aim to facilitate the development of hydrogen networks without hindering those networks carrying hydrogen and natural gas blends. However, because network operators are required to grant access and connection to their hydrogen networks based on the principle of negotiated network access, if hydrogen networks are to be regulated separately the industry standard contracts for regulated network access to the natural gas network, which have been in continuous development since 2006, would be up for review. Similarly, the conditions of network access, and the tariffs that would apply, are not adequately addressed by the proposed amendments. It is not clear, for example, to what extent the existing Ordinance on the Incentive Regulation of Energy Supply Networks, which governs the conditions and tariffs for network access (noting that these must be reasonable, non-discriminatory and transparent), could be reopened.

Thus far, the proposed separation in regulation of the methane and hydrogen networks has met with strong opposition from the

industry and market participants. Amongst the reasons cited are that developing and testing new regulation piecemeal will slow down rather than accelerate the development of hydrogen networks and will prevent the coordinated development of gas and hydrogen infrastructures as more hydrogen is added to the gas networks.

2. Health and safety issues

As it is primarily regulated as an explosive gas, hydrogen, like other gases, will likely also be heavily regulated from a health and safety perspective. Often, the regulator will not only restrict the storage of large quantities of gases such as hydrogen but will also, as part of gas quality standards, mandate parameters as to the amount of hydrogen that can be included on the methane gas networks, the pressure at which any gas is transported and further restrictions to ensure that the gas is handled in a safe manner. Such restrictions may be driven by health and safety requirements but may also be a result of market practice that reflects national and regional characteristics, regularised by way of industry codes that apply to the gas market in the particular jurisdiction. The industry codes work as multilateral agreements between stakeholders that define the technical and commercial terms within which they must operate. These are then given legal footing by way of the licence conditions with which a gas licensee would be required to comply.

These are some examples of the regulations with which the United Kingdom's HSE requires compliance:

- **Gas Safety (Management) Regulations 1996:** These concern 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.
- **Pipeline Safety Regulations (1996):** These are about pipeline integrity – requirements in respect of pipeline design, construction, installation, operation, maintenance and decommissioning. For example, pipelines should be equipped with emergency shut-down valves and their design should take account of the need for maintenance access.
- **Planning (Hazardous Substances) Regulations 2015 and/or Control of Major Accident Hazards Regulations 2015 (COMAH):** These regulate storage of hydrogen, depending on the quantities involved. COMAH sets a high bar, requiring operators to take all measures necessary to prevent a major accident and limit consequences for human health and the environment. The

"One lesson from the 'new' technologies developed over the last few decades, including renewables, has been that familiarity with the authorities and stakeholders responsible for granting property and consenting rights is a key consideration."

operator must have in place various strategies, including safety and emergency plans and a major accident prevention policy.

- **Hazardous Substances Regulations:** Consent is required for storage of two or more, and further consent for five or more, tonnes of hydrogen.
- **Dangerous Substances and Explosive Atmosphere Regulations 2002:** These set out requirements for the use of equipment and protective systems in potentially hazardous environments, including those where hydrogen is produced or stored.
- **Pressure Equipment (Safety) Regulations:** These regulations apply to the design and manufacture of tanks that will be used for the transportation of hydrogen.

In addition to legislation, there are a number of industry codes that contain requirements for gas licensees:

- **The Uniform Network Code:** This sets out common rules governing the gas transportation arrangements between licensed 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 (TPD), 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:** This sets out the common rules applying to 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 with which all gas transporters and suppliers are required to comply. It facilitates supply point – change of gas supplier – administration.
- **Retail Energy Code:** This enables end consumers to switch energy suppliers.

This is an extract from the chapter 'Transportation and storage' by Dalia Majumder-Russell from the Special Report 'Hydrogen Projects Legal and Regulatory Challenges and Opportunities'*, published by Globe Law and Business.*