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Hydrogen Regulation in Europe

The EU's 'Hydrogen and Decarbonised Gas Market' – Best Practice or Missed Opportunity?

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2.1 INTRODUCTION

The EU's path towards net-zero carbon was triggered with the launch of the European Green Deal,[1] a comprehensive policy roadmap adopted in 2019 to transform the Union's economy[2] and align it with the goals of the Paris Agreement of 2015.[3] Major importance is attached to hydrogen (H2) in the ongoing energy transition and for the realisation of the EU's ambitious and legally binding net-zero target.

Consequently, one of the two strategic pillars aimed at reaching the targets in the Green Deal's roadmap focuses on H2.[4] This roadmap spans twenty action points, including the design of the enabling market rules for the deployment of H2, based on a review of the EU's existing gas legislation.

Hydrogen can be used as a direct energy carrier, it can support storage and transport, it can function as an alternative fuel for e-mobility and it can be used as a feedstock – that is, an input for oil refining/petrochemicals, ammonia and steel production.[5] Today, renewable and low-carbon H2 gases are not yet cost competitive compared to fossil-based H2 gas. By 2050, the European Commission (EC) estimates that gaseous fuels, largely H2 and biogases, will make up a fifth of final energy consumption, and by 2030 Europe is expected to have a 'pure' H2 market in place.[6]

Building on the promise to make the EU's climate, energy, transport and taxation policies fit for reducing net greenhouse gas (GHG) emissions by at least 55 per cent by the Green Deal's intermediate target date of 2030, in July 2021 the EC adopted its first series of more targeted

The views expressed in this chapter are personal and do not represent the position or and/views of any organisation.

[1] COM(2019) 640 final, issued on 11 December 2019, European Green Deal.

[2] By reducing GHG emissions to 55 per cent compared to 1990 levels by 2030 and to net zero by 2050, aiming to decouple economic growth from GHG emissions; Ibid., p. 2.

[3] United Nations, Paris Agreement (2015).

[4] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions: A Hydrogen Strategy for a Climate-Neutral Europe, Brussels, 8 July 2020, COM(2020) 301 final (EU Hydrogen Strategy).

[5] Martin Lambert, *Clean Hydrogen Roadmap: Is Greater Realism Leading to More Credible Paths Forward?*, OIES, September 2023, pp. 2–3 and 8.

[6] Euractiv, *EU's Future Hydrogen Grid Takes Shape after Parliament Vote*, 9 February 2023.

proposals (the 'Fit for 55' initiative). This promotes, inter alia, demand for and production of renewable and low-carbon gases, including H2.[7]

2.1.1 The Gas Package

In December 2021, the EC released its 'Hydrogen and Gas Market Decarbonisation Package' (Gas Package).[8] This package, also sometimes referred to as the 'Fourth Gas Package', includes a proposal for a gas directive (GD) and a regulation (Regulation) establishing common internal market rules for renewable and natural gases and for H2, to foster decarbonisation, create the conditions for a more cost-effective transition and reach the EU's goal of climate neutrality by 2050. It is a recast of the 'Third Gas Package' and extends its scope to cover H2 networks.

Both the GD and the Regulation contain provisions (set out in separate chapters) applicable to natural gas systems and to dedicated H2 networks. More specifically, the GD includes provisions on the unbundling of H2 network operators and their certification. It also addresses topics that are common to both natural gas and H2, including: (i) consumer protection; (ii) third-party access (TPA) to infrastructure and integrated network planning; (iii) rules for transmission, storage and distribution system operators; and (iv) rules on independent regulatory authorities.

Read in conjunction with the GD, the Regulation lays down rules on the organisation of the decarbonised gas and H2 markets, on H2 blends for natural gas systems and cross-border coordination on H2 quality. It also elaborates principles and rules concerning: (i) tariffs for network access and discounts; (ii) the separation of regulated asset bases (RAB), TPA services, principles of capacity-allocation mechanisms and congestion-management procedure; and (iii) the duties of regulatory authorities and regional cooperation between them.

With this Gas Package and the ambition to adopt a comprehensive system of regulation for H2 and decarbonised gases, the EU aimed at the time to be one of the world's jurisdictions, along with the United States, to lead on H2 policy development.[9] Belgium, probably one of the most developed H2 markets, adopted specific H2 transport legislation in July 2023.[10] Some countries (such as Australia) have amended their existing regulations to include H2, while other countries (China, Republic of Korea) are developing H2-specific technical guidelines.[11]

The launch of the Gas Package in 2021 was subsequently overtaken in March 2022 by the 'RepowerEU' Plan, which was triggered as a response to the global energy crisis. This initiative called for an acceleration of the roll-out of renewable energy to complete the energy transition and replace the use of fossil fuels, contributing to the further reduction of dependence on energy supply from Russia. This means, inter alia, building more renewable energy generation capacity

[7] European Commission, 'Hydrogen and Decarbonised Gas Market Package' <https://energy.ec.europa.eu/topics/markets-and-consumers/market-legislation/hydrogen-and-decarbonised-gas-market-package_en> accessed 15 February 2024.

[8] Ibid. Extensive public consultations took place prior to the initial publication of the EC's Gas Package in December 2021: European Commission, 'Public Consultation Launched on Hydrogen and Decarbonising the EU Gas Market' <https://commission.europa.eu/news/public-consultation-launched-hydrogen-and-decarbonising-eu-gas-market-2021-03-26_en> accessed 15 February 2024.

[9] International Energy Agency (IEA) 'Hydrogen' <https://iea.org/energy-system/low-emission-fuels/hydrogen> accessed 15 February 2024.

[10] Belgian Act on the transport of hydrogen <https://economie.fgov.be/en/themes/energy/sources-and-carriers-energy/hydrogen/regulation-hydrogen-transport> accessed 15 February 2024.

[11] OECD, 'Risk-Based Regulatory Design for the Safe Use of Hydrogen', p. 9 <www.oecd.org/governance/risk-based-regulatory-design-for-the-safe-use-of-hydrogen-46d2da5e-en.htm> accessed 30 May 2024; The Hydrogen Regulatory Landscape (2023) <www.oecd.org/gov/risk-based-regulatory-design-for-the-safe-use-of-hydrogen-46d2da5e-en.htm> accessed 30 May 2024.

and faster, as well as ensuring the enhanced integration of renewable energy sources into final energy uses.[12]

Nevertheless, a major pillar of the RepowerEU plan is the 'Hydrogen Accelerator', which sets out an ambitious strategy to double the previous EU renewable H2 target to ten million tonnes of annual domestic production, plus an additional ten million tonnes of annual H2 imports. Meeting these targets requires the EU to significantly upscale its manufacturing capacities, speed up development and retrofit infrastructure to allow for future H2 readiness.

There is increasing scepticism that these targets are realistic.[13] This uncertainty impacts on the transportation, distribution and storage of domestically produced H2 and imported H2 from countries with adequate renewable energy resources.

This chapter will first describe certain concepts in the Gas Package, which – as we explain – have proved controversial in the ongoing EU legislative process. We question whether these concepts are 'fit for purpose' in the H2 market context given two main differences between the regulatory framework applied to natural gas versus H2.

2.1.2 *Natural Gas and H2: The Main Differences and Challenges in Regulation*

A first key difference between the implementation of the current natural gas regulatory framework (as enacted through the gas packages of 1998, 2003 and 2009) and the provisions in the new Gas Package is that the former rules were intended to regulate an existing, profitable and mature natural gas market with well-developed infrastructure. By contrast, there is currently no real H2 market, let alone any well-developed infrastructure, and the high costs of H2 production together with a lack of means for transporting renewable H2 have become a challenge for the development of this market.[14]

A second key difference between natural gas (methane) and H2 is that, while the former must be transported from point of production (an onshore or offshore gas field) to the point of use, the latter can be produced near input sources and then transported to the point of use. H2 is also more difficult and more expensive to transport over long distances compared to natural gas; thus, a European-wide H2 pipeline network or 'H2 backbone' may not necessarily materialise. This seems to have partially made its way into EU policy given the references to EU 'H2 hubs' and 'H2 valleys'.[15] With current technologies, transport often doubles the price of H2 for the end user. It is more logical to start with H2 clusters around Europe's key port areas and experiment with different transport modes and carriers between them and production centres in third countries.

In view of these differences, this chapter analyses the key instruments to be deployed in the proposed regulatory exercise. We first focus (in Section 2.2.2) on the 'regulatory holiday' concept in the H2 market context, and whether, as developed in the Gas Package, this approach facilitates the inception of an H2 market.

[12] Communication on REPowerEU: Joint European Action for More Affordable, Secure and Sustainable Energy, COM (2022) 108 final, 8 March 2022, with Annexes.

[13] International Energy Agency (IEA), *Global Hydrogen Review*, 2023 <https://iea.org/reports/global-hydrogen-review-2023/executive-summary> accessed 15 February 2024.

[14] Camilla Palladino, 'Lex in Depth: The Staggering Cost of a Green Hydrogen Economy', *Financial Times*, 28 May 2023; European Parliamentary Research Service, Briefing towards Climate Neutrality, *EU Rules for Renewable Hydrogen. Delegated Regulations on a Methodology for Renewable Fuels of Non-biological Origin*, 2023, p. 4.

[15] European Commission, Directorate-General for Research and Innovation, *REPowering the EU with Hydrogen Valleys*, Publications Office of the European Union, 2023.

Next, we turn to a detailed critique of three of the principal regulatory building blocks of the new Gas Package: unbundling (Section 2.3), tariff regulation (Section 2.4) and TPA (Section 2.5).

In conclusion, we question in Section 2.6 whether the ambitious timelines and targets envisaged by the new Gas Package, the mirroring of some parts of the existing framework for natural gas regulation in a dedicated H2 network and in renewable and low-carbon H2 used for injection into the natural gas systems, as well as the EC's approach to a nascent EU H2 market, are realistic and appropriate to pursue its decarbonisation goals.

2.2 OVERVIEW AND HISTORY OF THE HYDROGEN AND DECARBONISED GAS MARKET PACKAGE

2.2.1 *Scope and Definitions*

In its 2021 Impact Assessment accompanying the Gas Package, the EC anticipated: (i) an H2-based infrastructure, which will complement and partly replace the current natural gas infrastructure and (ii) a methane-based infrastructure, which will evolve from the current natural gas-based system to one which uses primarily biomethane and synthetic methane.[16]

These two separate infrastructures are to be subject to similar but not identical regulatory principles. It is, therefore, immediately evident that certain definitions and regulatory concepts are central to understanding how these different sets of infrastructure will be developed and regulated.

The expansion in the new Gas Package to include other types of gas besides natural gas and liquefied natural gas (LNG) is already an improvement given the increasing lack of clarity around the scope and applicability of the Third Package to H2 or blended H2 – it is no longer reflecting market developments.

In this regard, the EC confirmed that 'the Third Gas Package applies to all gases that can be safely injected into the gas network, which include hydrogen blended safely into the natural gas system' but the Third Gas Package 'does not apply to dedicated hydrogen infrastructure'.[17]

Pure Hydrogen What Is It?

Hydrogen is lighter than air, and can be transported, stored and transformed into other carriers. Based on the energy source and the means used for its production,[18] as well as its greenhouse emissions, H2 is often categorised based on a colour code. Figure 2.1 matches the coloured H2 types (mainly green, grey and blue H2) with terms from the EU legislation to the extent possible.

Even if the EC proved reluctant to embrace this colour code, it could not totally avoid the controversy of whether H2 could really prove to be 'the silver bullet' for decarbonisation. The EU Hydrogen Strategy refers to different H2 categories, such as 'electricity-based H2' (which encompasses all categories of H2 produced with electricity irrespective of its source) and 'low-carbon H2' (which includes blue H2 and electricity-based H2 with reduced greenhouse gas

[16] Brussels, 15 December 2021, SWD(2021) 455 final.

[17] European Commission Staff Working Document, Evaluation Report, SWD(2021) 457 final, 15 December 2021, p. 41.

[18] It is produced essentially through two means: (i) by splitting water into H2 and oxygen molecules with the support of extensive energy input. This split can be performed in various ways, including with electricity (a process called electrolysis). After splitting, H2 can be stored or transformed into methane, similarly to natural gas; and (ii) by steam-methane reforming, which separates H2 from carbon in methane. See US Energy Information Administration, *Hydrogen Explained. Production of Hydrogen* <www.eia.gov/energyexplained/hydrogen/#:~:text=Elemental%20hydrogen%20is%20an%20energy,source%20of%20energy%20or%20fuel> accessed 15 February 2024.

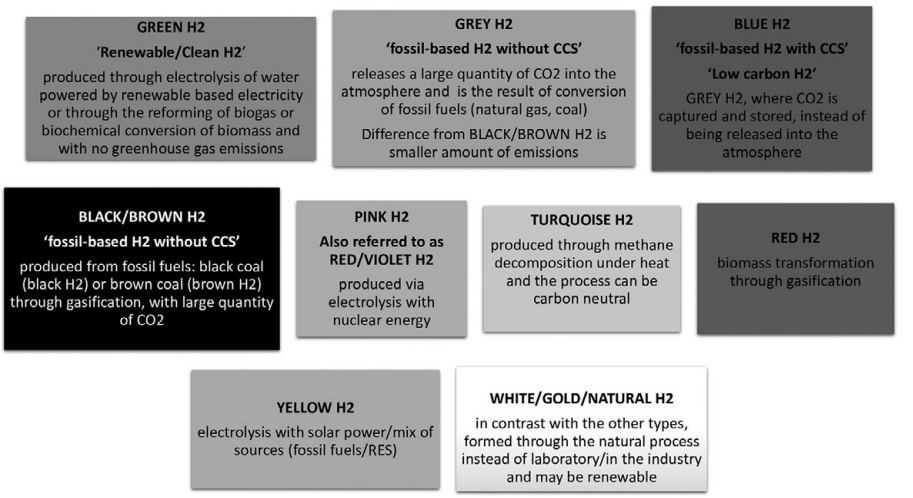

FIGURE 2.1 The coloured H2 types[19]

emissions).[20] This categorisation reflects the EC's 'stepwise' approach at the heart of the document.

Hence, the EC acknowledged that

> "*renewable hydrogen is the most compatible option with the EU's climate neutrality and zero pollution goal in the long term and the most coherent with an integrated energy system. In the short and medium term, however, other forms of low-carbon hydrogen are needed, primarily to rapidly reduce emissions from existing hydrogen production and support the parallel and future uptake of renewable hydrogen.*"[21]

In any event, and for a nascent market to take off, clear definitions for the types of gases that are to be regulated must be applied consistently throughout the Gas Package. In addition, given Europe's H2 import dependency, a comprehensive terminology for different types of gases for inclusion in an EU-wide certification system will be necessary.[22]

The Necessity for Clearer and More Comprehensive Definitions and Concepts

The preamble of the GD[23] makes a distinction between 'low-carbon H2' and 'renewable H2' produced mainly from wind and solar energy, but the latter concept is not defined in the

[19] *Sources*: authors based on corroboration of different sources: (1) European Parliamentary Research Service, *EU Rules for Renewable Hydrogen: Delegated Regulations on a Methodology for Renewable Fuels of Non-biological Origin*, p. 3 <www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)747085>; (2) World Nuclear Association, *Hydrogen Production and Uses* <https://world-nuclear.org/information-library/energy-and-the-environment/hydrogen-production-and-uses> 1 May 2024; (3) US Energy Information Administration, *Hydrogen Explained. Production of Hydrogen*, section 2, pp. 3–4 <www.eia.gov/energyexplained/hydrogen/#:~:text=Elemental%20hydrogen%20is%20an%20energy,source%20of%20energy%20or%20fuel>; (4) *EU Hydrogen Strategy*, <https://energy.ec.europa.eu/topics/energy-systems-integration/hydrogen_en>; (5) 'Is Hydrogen Colourless or Colourful?' Ramboll <https://ramboll.com/net-zero-explorers/hydrogen-colours-explained>, all accessed 15 February 2024.

[20] EU Hydrogen Strategy, section 2.

[21] Ibid.

[22] CEER response to the European Commission's Public Consultation on the Hydrogen and Gas Market Decarbonisation Package, Ref: C21-GWG-171-03, 22 June 2021, p. 2 <www.ceer.eu/wp-content/uploads/2024/04/CEER-Response-to-the-EC-public-consultation-on-the-Hydrogen-and-Gas-Market-Decarbonisation-Package.pdf> accessed 15 February 2024.

[23] Recital 13 GD.

GD – which only states that 'renewable H2' produced using biomass energy is captured under the term 'biogas'.[24]

'Low-carbon H2' is defined in the GD as H2 derived from 'non-renewable' sources producing at least 70 per cent less greenhouse gas emissions than fossil natural gas across its full lifecycle.[25] To ensure compliance with this threshold, the GD includes certification rules.[26]

Although 'low-carbon gases', including 'low-carbon H2', are not all 'renewable', they are equated with 'renewable gas' in several provisions of the Gas Package. As 'renewable fuels' they could not be included in the proposal for the revision of the Renewable Energy Directive.[27] Their inclusion in the Gas Package is aimed to fill in that gap.

The definitions of 'low-carbon H2' and 'renewable H2'are contained in two interrelated EU Delegated Acts (DA), as foreseen under Articles 27(3) and 28(5) of the Renewable Energy Directive.

The 'Additionality DA'[28] defines under which conditions H2 and H2-based fuels produced from electricity can be qualified as renewable (or renewable fuels of non-biological origin – RFNBOs).

In the same DA, 'low-carbon H2' refers to H2 derived from non-renewable resources meeting a greenhouse gas emission reduction threshold of 70 per cent.[29] The Renewable Energy Directive requires RFNBOs to reduce emissions by at least 70 per cent compared to fossil fuels such as gasoline and diesel. This threshold is also captured under the terms 'low-carbon gases' and 'low-carbon fuels'.[30]

The calculation of the 70 per cent threshold is further clarified in the Methodology DA.[31] This DA lists what emissions need to be captured under the lifecycle GHG emissions and what rules need to be considered for determining the emissions associated with each input.

To meet the 70 per cent threshold, operators need to provide information supporting its achievement to the national regulators through a voluntary certification process.[32]

The methodology for calculating the 70 per cent threshold remains controversial and, as part of the public consultation process on the Gas Package, multiple stakeholders requested more clarity on the relationship among guarantees of origin (GO), certification and carbon intensity for renewable and low-carbon gases.[33]

[24] Ibid.

[25] In view of the fossil fuel comparator for renewable fuels of non-biological origin set out in the methodology adopted according to Article 29a(3) of Directive (EU) 2018/2001, as well as Article 2(10) of the GD.

[26] Article 9 GD.

[27] EU Directive 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast), PE/48/2018/REV/1, [2018] OJ L 328.

[28] European Commission Delegated Regulation (EU) 2023/1184 of 10 February 2023 supplementing Directive (EU) 2018/2001 of the European Parliament and of the Council by establishing a Union methodology setting out detailed rules to produce renewable liquid and gaseous transport fuels of non-biological origin, [2023] OJ L 157/11.

[29] Ibid., Article 2, first paragraph, point (10).

[30] Ibid., Article 2, first paragraph, point (11)–(12).

[31] European Commission Delegated Regulation (EU) 2023/1185 of 10 February 2023, [2023] OJ L157/20.

[32] Article 9 GD. The Renewable Energy Directive (RED III) updates this process with, e.g., the obligation of gas suppliers to use guarantees of origin when demonstrating the RED share to consumers (the original Article 19(8) for electricity in RED II is now extended to gas); verification criteria regarding compliance with the sustainability and greenhouse gas emissions saving criteria for renewable fuels and recycled carbon fuels that are accounted to targets set in RED III. Articles 19(8), and 30–31 contain the concept of a Union database for tracing of liquid and gaseous transport fuels that are eligible for counting towards RED III targets.

[33] ENTSOG, 'High-Level Position on Hydrogen and Decarbonised Gas Market Package' (2022) p. 3 <www.entsog.eu/sites/default/files/2022-02/ENTSOG%20High%20Level%20Position%20on%20Hydrogen%20and%20Decarbonised%20Gas%20Market%20Package.pdf> accessed 19 February 2024 (hereafter: ENTSOG)

The rules on 'blue' H2 have not yet been finalised in the EU, although some progress is being made. The trilogue agreement on the new Package refers at Article 8(5)A to a further Commission DA on the methodology for assessing greenhouse gas emissions savings from low-carbon fuels. The proposed DA would include minimum carbon capture rates and upstream methane emissions performance standards. However, there are persistent doubts on whether carbon capture technology can consistently deliver capture rates of more than 70 per cent, as foreseen in the definition of low-carbon gas in the Gas Package. Although the first two DAs have met criticism,[34] they do bring further regulatory certainty. The provisional agreement on the Gas Package reached at the end of 2023 also recognises the EU's focus to increase biomethane production.[35]

Having established these distinctions between clean or pure H2 and low-carbon gas and fuels which may contain some H2, but which can still be co-mingled with natural gas, it is now possible to consider the different regulatory frameworks for dedicated H2 and natural gas networks.

2.2.2 *The Gas Package in Detail*

The Gas Package went through the EU ordinary legislative procedure. Multiple trilogue discussions[36] between the EC, the European Parliament (EP) and the Council of the European Union (Council) have taken place, and in the last trilogue[37] a provisional agreement was reached.[38] The Gas Package was formally adopted on 21 May 2024,[39] it was published in the EU Official Journal on 15 July 2024 and entered into force 20 days later.

Regulatory Objectives and Principles

The stated aim of the Gas Package is to prepare for the shift away from conventional fossil or methane gas to renewable and low-carbon gases, in particular biomethane and H2.[40] More specifically, in the EC's views,[41] this means the decarbonisation of gas consumption, the creation of cost-effective, cross-border H2 infrastructure and a competitive H2 market. This would also require the removal of barriers to decarbonisation, as well as the establishment of

[34] Dave Keating, 'EU Sets Out Rules for Green Hydrogen – Inviting Promise and Peril', Energy Monitor (20 February 2023) <www.energymonitor.ai/hydrogen/eu-sets-out-rules-for-green-hydrogen-inviting-promise-and-peril/#:~:text=New%20EU%20green%20hydrogen%20rules&text=The%20act%20requires%20proof%20that,no%20older%20than%2036%20months> accessed on 30 May 2024.

[35] European Council, 'Gas Package: Council and Parliament Reach Deal on Future Hydrogen and Gas Market' <https://consilium.europa.eu/en/press/press-releases/2023/12/08/gas-package-council-and-parliament-reach-deal-on-future-hydrogen-and-gas-market/> accessed 15 February 2024 (hereafter: Council Gas Package).

[36] A 'trilogue' or a 'tripartite meeting' represents the informal interinstitutional negotiation between the EP, the Council and the EC.

[37] November–December 2023.

[38] Recital 6 GD (14 December 2023, interinstitutional file 2021/0425(COD) and Regulation (15 December 2023, interinstitutional file 2021/0424(COD)).

[39] <https://data.consilium.europa.eu/doc/document/PE-105-2023-INIT/en/pdf>. The Gas Directive was published in the Official Journal L2024/1788 on 15.07.2024 and the Gas Regulation was published in L2024/1789 on 15.07.2024.

[40] European Commission, 'Hydrogen and Decarbonised Gas Market Package' <https://energy.ec.europa.eu/topics/markets-and-consumers/market-legislation/hydrogen-and-decarbonised-gas-market-package_en> accessed 15 February 2024.

[41] Ibid.

cost-effective conditions for the transition period – that is, to 2049.[42] For instance, the GD foresees that long-term contracts for unabated fossil natural gas should not be extended beyond 2049 to avoid locking in fossil fuels.[43]

The Gas Package provides several mechanisms to achieve these broad regulatory objectives.

First, 'the main objective of this Directive is to enable and facilitate [the] transition by ensuring the ramp up of a hydrogen market and an efficient market for natural gas'.[44] As a result, the Gas Package includes separate provisions and chapters for (i) dedicated H2 systems (H2 networks, terminals and storage), which contain a 'hydrogen of a high grade purity',[45] and (ii) natural gas systems, which refer to gas composed mainly of methane and other gases that can be technically and safely injected into the natural gas system (such as biomethane, H2).[46]

The creation of a new market design for (pure) H2 is based on the mirroring of some of the regulatory principles applicable to natural gas infrastructures. The various mechanisms provided for achieving this overall goal are linked specifically to the operation of dedicated H2 infrastructure networks, the repurposing of existing gas infrastructure for H2 blends and its transportation, and the designation of H2 network, storage and terminal operators. The Gas Package includes exceptions from some of its regulatory requirements in the shape of 'regulatory holidays' for H2.

Second, a new European Network of Network Operators for Hydrogen (ENNOH) would be created to promote a dedicated H2 infrastructure, cross-border coordination and interconnector network construction, and elaborate on specific technical rules. ENNOH's tasks are therefore identical to those conferred on the European Network of Transmission System Operators (ENTSO)-E (electricity) and ENTSO-G (gas). ENNOH will be a separate entity from ENTSO-E and ENTSO-G.[47]

Fourth, the scope of the Security of Gas Supply Regulation[48] is extended to H2 and to renewable and low-carbon gases.

Regulatory Holidays

The Gas Package contains several transitional provisions in the shape of 'regulatory holidays'. During the initial roll-out period, dedicated H2 networks can enjoy temporary derogations from the default regulatory regime. This includes regulatory holidays from the obligation of granting TPA to the network, ownership unbundling and regulated tariffs. Historically, ad hoc derogations from these provisions provided in the earlier packages have been used to incentivise merchant investment in the natural gas and electricity sectors.[49] These derogations are usually

[42] Ibid.
[43] Recital 144 and Articles 31(3) and 71(1)(s) GD.
[44] Recital 6 GD.
[45] Article 2(4) GD.
[46] Article 2(3) GD and CEER and ACER, 'When and How to Regulate Hydrogen Networks?' (2021), footnote 6 <https://acer.europa.eu/sites/default/files/documents/Official_documents/Position_Papers/Position%20papers/ACER_CEER_WhitePaper_on_the_regulation_of_hydrogen_networks_2020-02-09_FINAL.pdf> accessed 30 May 2024 (hereafter: CEER and ACER).
[47] Council Gas Package.
[48] Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010 published in (2017) OJ L 280/1.
[49] J. Papsch, 'Chapter 11 Derogations and Exemptions' in Christopher Jones (ed.) *EU Energy Law Volume I the Internal Energy Market*, 5th ed. (Edward Elgar 2020) p. 528 (hereafter: Jones, *EU Energy Law*).

granted for a period of up to twenty-five years by relevant national energy regulatory authorities, as endorsed by the EC, through an 'Exemption Decision'.[50]

Ad hoc exemptions are, however, not considered to be sufficient for creating a major impetus for the ramping up of an H2 market. For example, the exemption mechanism[51] cannot be used for H2 networks within Member States, but only for pipelines which cross borders (interconnectors), for storage facilities and for import terminals. This exemption regime has been very successful in delivering new investments in the gas sector in the last twenty years. Nevertheless, a more structural approach to exemptions for H2 seems to be called for.

First, compared to electricity and gas, the H2 value chain will continue to be far more fragmented, with far more actors and with very different business models. Second, that market may be geographically dispersed. H2 could be piped, either blended with natural gas or through dedicated H2 pipelines, or it could be shipped, either in a condensed or liquefied state or via another molecule such as ammonia, methanol or liquid organic hydrogen carrier (LOHC). Third, with current H2 technologies, transport often doubles the price of H2 for the end user.

In the coming years, H2 transport from a terminal, an industrial facility or a cluster is likely to be made up of several different approaches, models and options, including transport by truck or rail. There is likely to be a mix of local H2 networks in industrial clusters and privately owned 'direct lines' serving to connect a single industrial user, H2 terminal or H2 storage facility to the nearest H2 transport network. A 'national H2 grid' linking key clusters might eventually make sense to benefit from economies of scale. However, it cannot be assumed that either supply of H2 or demand for it will evolve such as to justify the roll-out of national H2 networks in the coming years. Hence, and for all these reasons, the traditional approach to monopoly gas grid regulation cannot be transposed to the emerging H2 transport market. These essential differences between natural gas and H2 infrastructure are especially relevant in considering how to balance regulation versus investment incentives.

It is evident that over-regulation can therefore undermine investment in the H2 value chain during a period when the EU needs billions of euros in investment. But equally, 'under-regulation', or at least inadequate transparency on how the future regulatory regime will be applicable to a given investment, can have the same effect.

But 'under-regulation', the lack of effective TPA when an 'essential facility' exists, can also stifle investment in new H2 facilities. H2 suppliers or users will not be able to invest in new production or in decarbonisation of existing production unless they know that they will be able to access transport for H2. If an essential facility exists in this context – such as access to a central H2 grid – transparency with respect to if, when and how it will have access will be essential.

An additional advantage of the 'regulatory holiday' approach is that regulatory certainty can be provided. Investments in H2 would be undertaken on the assumption that regulated third-party access and unbundling, for instance, would be applied post-2032, again providing certainty.[52]

To prevent an 'over-' or 'under-regulation' framework for H2, a solution could have been a 'dynamic regulation' as a basis, as proposed by the European energy regulators body, Council of European Energy Regulators (CEER), together with European Union Agency for the Cooperation of Energy Regulators (ACER) in 2021.[53] This included more intensive levels of

[50] Article 36 of Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC (Text with EEA relevance) [2009] OJ L 211 (hereafter: Third Gas Directive).

[51] Article 60 Regulation – Recasting Article 36 Third Gas Directive.

[52] EU Hydrogen Strategy.

[53] CEER and ACER, p. 2.

regulation depending on the state of market development. The governance of this dynamic regulatory approach was inspired by the concept used in the existing EU regulation of the telecommunications sector, which gives regulators the power to intervene in a flexible and timely manner as a reaction to market dynamics. Regulators routinely assess if an operator is found to be dominant – that is, has significant market power (either individually or jointly) – in which case a specific regulatory obligation, proportionate to remedy the identified problem, must be imposed ex ante.[54]

Furthermore, CEER/ACER argued that this would enable regulation to be implemented in an appropriate manner to the evolution of the H2 sector. The approach in the Gas Package is less nuanced. Article 6 of the Regulation mandates a specific deadline for the expiry of the regulatory holiday period, as from January 2033, without first allowing national regulators to assess the development of the H2 market to justify the imposition of full/default regulation.

The rationale for this approach was in part to provide legal certainty and to tackle 'the expected disadvantages of the proposed approach of ex post regulation, in particular the lack of legal certainty for the required investments in hydrogen facilities and infrastructures with long life cycles and depreciation periods'.[55] But importantly the EC identified the 'risk of regulatory fragmentation across different Member States [having] a detrimental effect on network interconnectivity and the integration of national hydrogen markets and, thereby, on cross-border trade and market development'.[56]

The design of regulatory holidays for H2 investments must nonetheless be viewed alongside the introduction of rules to pursue the additional, parallel objectives of facilitating integration of renewable and low-carbon gas into the existing (methane) gas network. H2 can also be blended with natural gas up to a certain percentage at the interconnection points between EU Member States in the natural gas system.[57] As the transmission of all these gases are subject to full regulation, some form of competition between the existing and new gas networks may emerge. ACER and CEER also recalled that H2 and electricity transport companies are potential competitors, as both means could be used to transport energy from one place to another. This requires careful calibration of certain rules – for example to prevent cross-subsidisation by the users of existing system to the users of the new system. This also implies that potentially competing entities should not have decisive influence over certain investment decisions.[58]

The next sections will assess several of the key building blocks of the Gas Package: unbundling, tariff setting and TPA. We will also consider the controversy surrounding the 'regulated asset base' or RAB, a controversy which has arisen in the context of the regulation of a market in which existing and new infrastructural assets will coexist.

2.3 HOW MUCH TO UNBUNDLE?

The 'unbundling' concept has been one of the main regulatory tools used by the EU institutions in the liberalisation of its gas and electricity markets, leading to the break-up of former vertically

[54] EU Directive 2018/1972 establishing the European Electronic Communications Code (Recast) [2018] OJ L 321.
[55] European Commission staff working document, Impact assessment report accompanying the Gas Package, Brussels, 15 December 2021, SWD(2021) 455 final.
[56] Ibid.
[57] Blended flows will trigger additional cooperation among the TSOs to prevent the occurrence of restrictions due to gas quality (Recitals 6 and 43, Article 19(1) Regulation).
[58] CEER and ACER, p. 7.

integrated monopolies.[59] The evolution of unbundling took several decades in the natural gas and electricity sectors and the adoption of three consecutive EU legislative packages.[60] The EC's energy sector enquiry of 2007, together with the settlement of several competition key cases,[61] had shown that competition concerns related to incumbents' refusals to grant access to their networks to third-party suppliers persisted.[62]

Each successive legislative package introduced different types of functional, management, legal and accounting unbundling of transmission and distribution assets in a vertically or horizontally integrated undertaking. In a 'vertically integrated undertaking', there is a combination of at least one of the functions of transmission, distribution, H2 transport, H2 terminal operation, LNG or natural gas or H2 storage activity, with at least one of the functions of production or supply of natural gas or of H2,[63] in one undertaking/group of undertakings. Therefore, 'vertical unbundling' is the separation of production and supply activities (areas of the market open to competition), on the one hand, from monopolistic network functions such as transmission and distribution, on the other. Under the current rules for transmission assets, Member States may opt for one of three models: independent system operator (ISO[64]), independent transmission system operator (ITO[65]) and ownership unbundling (OU) models.[66] Ownership unbundling is the default rule and the strictest form of unbundling for gas and electricity as network owners must relinquish any form of control over their production and supply assets and sell their shareholder rights to third parties.[67] In addition to the rules on 'vertical unbundling', the GD maintains the 'horizontally integrated undertaking' concept.[68] In a 'horizontally integrated undertaking', at least one of the activities of production, transmission, distribution, supply or storage of natural gas is combined with a non-natural gas activity.[69]

This section focuses on the vertical and horizontal unbundling of dedicated H2 systems and the approach taken in the GD in order to avoid potential conflicts of interest and to promote competition along the value chain.[70] Yet it must be acknowledged that strict OU can prevent

[59] European Commission, *Energy Sector Competition Inquiry – Final Report – Frequently Asked Questions and Graphics* (10 January 2007) <https://ec.europa.eu/commission/presscorner/detail/de/MEMO_07_15> accessed 30 May 2024.

[60] These were dated 1998, 2003 and 2009.

[61] For example, see EC website <https://ec.europa.eu/commission/presscorner/detail/de/MEMO_07_15> accessed 15 February 2024; U. Scholz, S. Purps, 'The Application of EC Competition Law in the Energy Sector', vol. 1, no. 1, Journal of European Competition Law & Practice (2010), pp. 37–51 (hereafter: Scholz, Purps).

[62] EC website; Scholz, Purps.

[63] Article 2(43) GD.

[64] The operation of the asset is outsourced to a third-party independent from the vertically integrated undertaking, while ownership of the asset remains with the latter.

[65] The asset operation and ownership remain within the vertically integrated undertaking, but certain certification requirements are put into place to ensure that shareholders active in production/supply of natural gas do not influence the day-to-day activities of the asset. While it is the most flexible model of unbundling, it requires an extensive regulatory oversight in practice. There is also the ITO+ option, also referred to as 'unbundling à la carte': it does not provide for specific obligations on the TSOs, but allows Member States to maintain their own unbundling; see Jones, *EU Energy Law*, p. 109.

[66] It requires a complete separation of production/supply activities from transmission/storage/distribution.

[67] European Commission, 'Hydrogen and Decarbonised Gas Market Package' <https://energy.ec.europa.eu/topics/markets-and-consumers/market-legislation/hydrogen-and-decarbonised-gas-market-package_en> accessed 15 February 2024.

[68] Undertakings performing at least one of the functions of production, transmission, distribution, supply or storage of natural gas, and a non-natural gas activity (Article 2(38) GD).

[69] Article 2(44) GD.

[70] Article 68 GD onwards.

risk-sharing of the type that was common in the early days of the pipeline and LNG industries, when producers and buyers of gas and LNG took equity stakes in common infrastructure to share risk associated with the development of the market.[71]

2.3.1 *Vertical Unbundling*

Natural Gas Systems

For natural gas systems (pipelines, LNG terminals, storage facilities), the unbundling rules and models provided in the Gas Package remain essentially the same as those contained in the Third Package.

Dedicated Hydrogen Systems

The vertical unbundling rules as applicable to natural gas systems are to be expanded to dedicated H2 systems in the Gas Package.

Chapter IX of the GD in its Article 62 indicates that OU is to be the default rule for dedicated H2 systems and needs to be complied with by two years following the entry into force of the GD. There are two exceptions from this default rule in the GD.

The first is the ISO model, which may be applied by Member States if H2 networks belonged to vertically integrated undertaking (VIU). In earlier versions of the draft GD, the availability of this model was conditioned on its implementation at 'the entry into force [of the GD]'[72] or if applied to H2 networks 'completed before 1 January 2031'.[73] These conditions have been removed.[74] This means that the ISO model may be applied for an H2 asset belonging to a VIU after the entry into force of the GD.

The second is the ITO model, which, if applied to H2 assets by Member States, was initially proposed as an option that would have expired by the end of 2030.[75] This cut-off date was removed in the provisional agreement on the GD at the end of 2023 and in the last adopted version of the GD.

Three main observations are noteworthy here.

First, the cut-off dates that were envisaged to be applied to the unbundling models applicable to H2 dedicated networks were considered unworkable. As the European Network of Transmission System Operators for Gas (ENTSOG) has flagged,[76] the unbundling options cannot be effectively utilised by H2 operators if subject to various restrictions. This approach could have prevented or delayed investment in H2 infrastructure (especially in retrofitted infrastructure).[77]

Second, the possibility given to certified gas network operators to own and operate a H2 network is a significant improvement. An already ITO certified (natural gas or electricity) transmission system operator (TSO) can be certified under the same model and therefore

[71] Alex Barnes, 'The EU Hydrogen and Gas Decarbonisation Package: Help or Hindrance for the Development of a European Hydrogen Market?' OIES Paper (2023) No. 22, p. 14 <www.oxfordenergy.org/wpcms/wp-content/uploads/2023/03/The-EU-Hydrogen-and-Gas-Decarbonisation-Package-ET22.pdf> accessed 30 May 2024.

[72] Article 62(3) in earlier versions of the GD.

[73] Ibid.

[74] Ibid.

[75] Article 62(3a) first paragraph in previous versions of the GD.

[76] ENTSOG, p. 3 .

[77] As highlighted by ENTSOG (p. 3), retrofitting is fundamental for the development of H2 infrastructure.

operate as a dedicated H2 operator, and presumably this would be applicable to gas infrastructure assets ready for retrofitting as dedicated H2 networks.[78]

Third, although the combination of natural gas system-related activities together with H2 supply/production activities in the same VIU has already been allowed, this has been subject to certain conditions. An OU unbundled natural gas TSO has been allowed to have passive investments, minority shareholding, purely financial rights (for example, rights to receive dividends) only, and no voting or appointment rights for the selection of members to company boards or other bodies legally representing a company active in H2 production/supply.[79]

This outcome is now confirmed in Article 68 of the GD, with an additional clarification: if an undertaking engages in H2 production/supply, the OU-certified natural gas TSO shall comply with the same ITO requirements as for a certified H2 transmission network operator.

This clarification brings more flexibility. An OU-certified natural gas TSO can now apply an ITO regime to a dedicated H2 system and be part of the same VIU, with links to production or supply of H2 activities, but not with links to natural gas or electricity production or supply activities and therefore cannot circumvent the OU certification of the natural gas asset.

2.3.2 *Horizontal Unbundling*

Under horizontal unbundling, combining the activities of natural gas systems with the operation of dedicated H2 systems is allowed if two conditions are met: first, a dedicated H2 transmission network operator should be established in a separate legal entity from the activities of natural gas/electricity transmission/distribution and, second, to ensure transparency, there should be separate accounts applicable to different infrastructures.[80]

The main regulatory concern related to horizontal unbundling is the eventual cross-subsidisation between different activities (such as natural gas activities subsidising H2 activities), to the advantage of the integrated undertaking.

However, criticism has been voiced that the requirement of legal unbundling went too far.[81] Accounting unbundling through separation of RABs (monitored and approved by the national regulators) should be sufficient to monitor cross-subsidisation.[82] It was argued that legal unbundling might create too much red tape.[83] In the final version of GD the regulatory approach is softened: legal unbundling could be realised through establishing a subsidiary/separate legal entity in the group of entities controlled by the natural gas TSO without further functional

[78] ACER, 'Report on Future Regulatory Decisions on Natural Gas Networks: Repurposing, Decommissioning and Reinvestments' (4 November 2022) <www.acer.europa.eu/sites/default/files/documents/Media/News/Documents/Future%20Regulation%20of%20Natural%20Gas%20Networks%20-%20Final%20Report%20DNV.pdf> accessed 30 May 2024.

[79] EC Opinion of 3 February 2023 pursuant to Article 3 of the Regulation (EC) No. 715/2009 and Articles 10(6) of Directive 2009/73/EC – Italy – Certification of Snam Rete Gas S.p.A., C(2023) 914 final and EC Opinion of 6 June 2022 pursuant to Article 3 of the Regulation (EC) No 715/2009 and Article 10(6) of Directive 2009/73/EC – Spain – Certification of Enagás Transporte S.A.U. as transmission system operator for gas, C(2022) 3750 final.

[80] Articles 69, 70 and 75 GD. Regarding accounting, the Regulation provides for detailed rules on separation.

[81] Hydrogen Europe Position Paper, 'A Regulatory Framework Fit for a European Hydrogen Market' <https://hydrogeneurope.eu/wp-content/uploads/2022/06/220609-A-regulatory-framework-fit-for-a-European-h2-market-Final-2.pdf> accessed 15 February 2024.

[82] ENTSOG, p. 3.

[83] Ibid.

unbundling and separation of management/staff.[84] In addition, a limited derogation from legal unbundling could be granted if there is positive cost–benefit analysis and impact assessment, and separation of accounts and regulatory asset base.[85]

The GD also confirms that the exchange of commercial information between the H2 network/terminal/storage operators and natural gas transmission or distribution operators, as part of the same VIU, is allowed given the synergies and benefits that may result.[86]

2.3.3 *Cross-Subsidisation from Existing to New Infrastructure Assets*

Repurposing existing natural gas networks may prove to be the most cost-efficient option for the development of a dedicated H2 network on the assumption, amongst others, that the supply and demand of H2 will at least partially follow the current supply and demand for natural gas.[87]

Given that the use of natural gas networks is expected to decrease only gradually so that the need for gas-only networks will remain, and that not all the existing gas infrastructure can be converted to H2, construction of new H2 infrastructure will be necessary. The required financing of H2 infrastructure investment cannot come from revenues from user tariffs alone as these will be insufficient during the initial years of the transition to H2 or would put overly high costs on the initial users. If natural gas tariff revenue were to be used to finance H2 infrastructure this could lead to households financing the decarbonisation of industry.[88] This has given rise to extensive debate on the merits of cross-subsidisation and the need to separate out relevant assets.

Unsurprisingly, the gas TSOs favour a common RAB since operating both gas and H2 networks in a joint asset base would support repurposing, and 'network operators would have the option to finance and de-risk networks across users of both natural gas and H2 infrastructure'.[89] This common RAB 'would enable operators to spread these costs to the larger group of network users and enable them to offer more attractive tariffs to early H2 network users, neutralising investment risks'.[90]

The Gas Package facilitates limited cross-subsidies between the natural gas and H2 sectors. In principle, H2 networks must have separate regulated asset bases from gas and electricity networks. Cross-subsidies between regulated asset bases are allowed so long as they are via dedicated charges at offtake points in the same Member State as the beneficiary of the cross-subsidy. Cross-subsidies can only be for a limited period, cannot exceed one-third of the depreciation period for the subsidised infrastructure and must be approved by regulators.[91]

[84] Recital 83 GD.
[85] Ibid.
[86] Articles 40(1), 54(1) GD.
[87] ACER 'Repurposing Existing Gas Infrastructure to Pure Hydrogen: ACER Finds Divergent Visions of the Future' (16 July 2021) <www.acer.europa.eu/news-and-events/news/repurposing-existing-gas-infrastructure-pure-hydrogen-acer-finds-divergent-visions-future> accessed 30 May 2024.
[88] Laura Heidecke et al., 'The Revision of the Third Energy Package for Gas' (2022), p. 10 <www.europarl.europa.eu/RegData/etudes/STUD/2022/734009/IPOL_STU(2022)734009_EN.pdf> accessed 30 May 2024.
[89] Clifford Chance, 'Focus on Hydrogen: Proposal on the EU Hydrogen and Decarbonised Gas Market Package' (2021) <www.cliffordchance.com/briefings/2021/12/focus-on-hydrogen–proposal-on-the-eu-hydrogen-and-decarbonised-gas-market-package.html> accessed 30 May 2024.
[90] Ibid.
[91] The RAB represents the value of the net invested capital for regulatory purposes, calculated based on the rules defined by laws followed by the national regulatory authorities for determining base revenues for the regulated businesses and thus is used as the basis for the network tariffs setting. Regarding separation of RAB, see Recital 82, Article 69(3) GD and Article 5 Regulation.

Transfers between RABs may be allowed if the national regulators established that, subject to certain conditions, the 'financing of networks through network access tariffs paid by its network users [was] not viable'.[92]

2.4 TARIFF SETTING

The current EU gas market is organised based on entry/exit zones, where the gas TSOs guarantee transmission and support its costs. There are general principles set at EU level regarding transparency of tariff setting, revenue collection, cost drivers and cost reflectivity[93] (through the EU Network Code on tariff structures – TAR NC).[94]

2.4.1 *Tariffs and Discounts for Natural Gas Systems*

The Gas Package facilitates the integration of renewable and low-carbon gases into the existing natural gas network through (i) the reduction of injection costs and (ii) the access granted to the natural gas market.

Renewable and low-carbon gases will benefit from a 100 per cent and 75 per cent discount respectively at the entry points from renewable and low-carbon production facilities[95] and a 100 per cent discount at injection and withdrawal points into and out of gas storage facilities.[96] Until the end of 2025, the national regulators may in principle apply a discount of up to 100 per cent to capacity-based transmission and distribution tariffs at entry points from, and exit points to, underground gas storage facilities and LNG terminals.[97]

2.4.2 *Tariffs for Dedicated H2 Systems*

The applicability of cross-border tariffs to dedicated H2 systems is probably one of the most debated points related to the Gas Package. From the beginning of 2033 (or even earlier if rTPA is applied) certain principles related to tariffs for access to natural gas systems apply to dedicated H2 systems.[98]

2.5 THIRD-PARTY ACCESS REGIME

The introduction of TPA has been a fundamental regulatory instrument for liberalising the energy sector, and one which has evolved throughout the EU gas legislative packages. The new TPA-related provisions in the GD should also be read together with the justification of when refusals to provide access can take place.[99]

[92] Recital 8, Article 5(4) Regulation.
[93] Tariffs should reflect the actual costs incurred 'insofar as such costs correspond to those of an efficient and structurally comparable network operator and are transparent, whilst including an appropriate return on investments' (Article 17(1) Regulation).
[94] Commission Regulation (EU) 2017/460 of 16 March 2017 establishing a network code on harmonised transmission tariff structures for gas, published in (2017) OJ L72/29.
[95] Article 18(1) Regulation.
[96] Idem.
[97] Article 17(3) first paragraph Regulation.
[98] Article 7(7) Regulation. Only Article 15(1), (2), 2b and 2c are applicable, but not Articles 16–17, which apply to natural gas systems.
[99] Article 6–8 Regulation onwards.

2.5.1 *Dedicated Hydrogen Systems*

The Gas Package gives the flexibility to Member States to rely on regulatory holidays to apply negotiated third-party access (nTPA) to dedicated H2 networks up until the end of 2032.[100] After this date, the default rule shall be the regulated, non-discriminatory and objective rTPA.[101]

Access to H2 storage is based on similar TPA rules as for H2 networks, with more flexibility until the end of 2032.[102] This regulatory approach contrasts with the regime applicable to gas storage, whereby either rTPA or nTPA can be applied and without a cut-off date.[103] For H2 terminals, however, the default rule is negotiated TPA.[104]

At the same time, long-term H2 capacity contracts are permissible[105] and can have (i) maximum twenty years for infrastructures completed by 1 January 2028 and (ii) fifteen years for infrastructure completed after that date.[106]

Hence the main differences are rTPA for H2 storage as opposed to nTPA for gas storage, and nTPA instead of rTPA for H2 import terminals. These differences are justified on the basis that H2 storage is likely to be more limited than gas storage for technical reasons but is also more crucial for the H2 system because of the intermittency of renewable electricity generation. H2 import terminals have more potential for competition because of the different means of transporting H2 (for example, ammonia, methanol, LOHCs, hydrogen).

2.6 CONCLUSION

An important starting point for making decarbonisation a reality is to have an appropriate regulatory governance system put in place that incentivises the uptake of renewable and low-carbon gases, but at the same time does not distort the already existing and well-functioning gas market, which is still seen as an essential 'bridge' to the energy transition. Replacing natural gas will be costly and will take time and effort, while the production of renewable H2 will require vast amounts of renewable electricity.

The Gas Package provides a framework to enable renewable and low-carbon gases to enter the market and contribute to decarbonisation, as well as security of supply. This package, which was introduced before the war in Ukraine, had received quite broad support in terms of its overall goals and ambitions, albeit that it has attracted criticism for its overly ambitious approach to an EU-wide H2 market that is yet to develop.

There is growing scepticism as to whether the Gas Package can deliver the desired decarbonisation objectives. Timing does not seem to be on its side. The legislative process was derailed by the war in Ukraine, which triggered an energy crisis in Europe and the EU co-legislators focused attention on emergency legislation to address security of supply issues, as well as rising gas prices.

It is questionable whether the ambitious timelines and targets provided are realistic given the Gas Package, even if now formally adopted, must still be transposed into national legislation of the Member States, which will take another 1–2 years. Based on the experience with the implementation of the 2009 Third Package, none of the Member States achieved the

[100] Section II access to hydrogen infrastructure, Article 35 GD.
[101] Idem.
[102] Article 37 GD.
[103] Article 33 GD.
[104] Article 36 GD.
[105] Contracts concluded between the user and operator of an asset for the booking of capacity in the asset.
[106] Article 7(3) Regulation.

deadline of eighteen months for transposition at national level. It took another three years for nearly all Member States to have the package implemented. Seen in this light, the intended deadlines for the expiry of the various regulatory holidays in the Gas Package do not appear generous. It is highly debated whether the exercise of mirroring the regulation of a mature natural gas regulation to dedicated H2 networks and renewable and low-carbon gases is the right way forward for a nascent market.

Given the early stage of the H2 market and the growing uncertainties around its future development, why would stricter regulation be applied to the initial stages of the new H2 sector when compared with the regulation of the Third Gas Package? Unlike natural gas at the time of liberalisation, there is no well-established, mature H2 market and infrastructure.

Towards the finalisation of the Gas Package legislative process, some of its H2-related provisions have become more flexible in comparison with the EC's initial proposal. Nevertheless, given the targets and cut-off dates in the light of the time required for national transposition, that flexibility may prove insufficient.

FURTHER READING

ACER, *Internal Gas Market in Europe: The Role of Transmission Tariffs*, 2020

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