



BUILDING EUROPE'S HYDROGEN AND RENEWABLE GAS MARKETS

REPORT

Catherine Banet





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ABOUT THE AUTHOR



Catherine Banet (PhD) is a CERRE Research Fellow and Professor at the University of Oslo, Faculty of Law, Scandinavian Institute of Maritime Law, Head of the Department of Energy and Resources Law, Norway. She is a member of the Advisory Academic Group (AAG) to the International Bar Association (IBA), Section for Energy, Environment and Natural Resources and Infrastructure Law (SEERIL), and Chair of the Board of the Norwegian Energy Law Association.

Her fields of expertise include energy law, environmental law, competition law and EU/EEA law. Her research focuses on renewable energy, support schemes and alternative financing models, energy market design, energy infrastructures regulation, climate change mitigation measures, including carbon capture and storage (CCS).



LIST OF ABBREVIATIONS

ACER	Agency for the Cooperation of Energy Regulators
DSO	Distribution System Operator
CCS	Carbon Capture and Storage
CEER	Council of European Energy Regulators
CEN	European Committee for Standardization
DSO	Distribution System Operator
EC	European Commission
EE1st	Energy Efficiency First
EIA	Environmental Impact Assessment
ENNOH	European Network of Network Operators for Hydrogen
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
EU	European Union
EU DSO Entity	European Entity for Distribution System Operators
H ₂	Hydrogen
HNO	Hydrogen Network Operator
ISO	Independent System Operator
ITC	Inter-TSO compensation mechanism
ITO	Independent Transmission Operator
LNG	Liquified Natural Gas
LTS	Long-Term Strategy
NDP	Network Development Plan
NECP	National Energy and Climate Plan
NRA	National Regulatory Authority
RFNBOs	Renewable Fuels of Non-Biological Origins
P2G	Power-to-Gas
RAB	Regulated Asset Base
R&D	Research and Development
R&D&I	Research, Development and Innovation
RED	Renewable Energy Directive
RES&LC gases	Renewable and Low Carbon gases



RNFBO	Renewable Fuel of Non-Biogenic Origin
TFEU	Treaty on the Functioning of the European Union
TPA	Third Party Access
TSO	Transmission System Operator
TYNDP	Ten Year Network Development Plan
VIP	Virtual Interconnection Point
VIU	Vertically Integrated Undertaking



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EXECUTIVE SUMMARY

Background

On 15 December 2021, the European Commission put forward the Hydrogen and Decarbonised Gas Markets Package, designed to enable the decarbonisation of natural gas consumption by boosting the use of hydrogen and renewable gases within the European Union (EU).

The gas supply disruption following the war in Ukraine has revealed the delays in completing the energy transition away from fossil fuels and the lack of coordination in this process among Member States. It also created a new momentum for hydrogen and renewable gases. Achieving the objectives of the REPowerEU Plan relies notably on scaling up renewable hydrogen and biomethane, which can provide a significant contribution to security of supply and climate neutrality. This context sheds a new light on the ongoing revision of the gas market legislation.

With this new legislative package, the European Commission (EC) seeks to lay out ground rules to provide clarity and allow for the formation of a market that is bound to fall under a comprehensive regulatory framework by 2030/2035. Based on an analysis of the legislative package, the present report aims to identify which key regulatory issues need to be addressed at EU level in the short-term, as they will shape the hydrogen and renewable gases market in Europe.

A gas market re-design, in a system integration perspective

With the revision of the 2009 Gas Directive and Gas Regulation, the package can be seen as the gas counter-part of the electricity market reforms of the Clean Energy Package for All Europeans. This raises questions of regulatory alignment between the EU electricity and gas legislation. The interaction between the two sets of legislation must be duly assessed during not only the adoption of the new package, but also the upcoming reform of electricity market rules. Regulatory alignment between gas and hydrogen, but also between gas and electricity regulation will enable energy system integration.

Grid regulation as a short-term priority

This report focuses on gas grid regulation. Infrastructure planning, conditions for connection to the grid and access to transport capacity, operatorship and unbundling rules, interoperability, certification, and injection/blending requirements, represent crucial issues for getting hydrogen and renewable gases to the market. Gas infrastructure operators play a strategic role in that context, that must be both valorised and carefully regulated. Grid development has a necessary European dimension, underpinned by the objective of reinforcing the resilience of the European energy system based on a higher share of low carbon and renewable energy sources, more decentralised energy production and a more integrated, efficient and affordable energy system.

The report reviews the proposed gas grid regulatory regime, focusing on the three following elements:

- the EU governance architecture for cross-border coordination of gas grids development;
- the strategic role of gas system operators; and
- the regime for access to the grid for hydrogen, renewable and low carbon gases.



The assumption of two main infrastructure pathways, and the uncertain level playing field between the different gases

Despite a common legislative framework, the EC proposal defines differentiated rules for hydrogen and methane gases. This is based on the assumption made by the EC in its Impact Assessment Report that two parallel infrastructure pathways will develop across the EU, one based on hydrogen, and one based on methane, including biomethane and synthetic gases. In the proposal, the whole regulatory regime for grid is built on this dichotomy between pure hydrogen and methane-based infrastructures.

This raises the fundamental question of whether the EU legislator can achieve a level playing field between the different gases in one single legislative framework for the different gases. If one common set of rules is certainly desirable, the report questions what should be the common pillars of this new market design legislation for renewable and decarbonised gases. There is a need for further clarity as to the different and joint regulatory pathways for the different gases. Beyond some common regulatory principles, the approach favoured in the package is not anymore the one of a single market for gas, but the one of an 'internal market for hydrogen' and an 'internal market for methane'.

Common principles for gases grids regulation

The report identifies grid regulation as the critical element for the short-term development of renewable and decarbonised gases, that should be guided by the following four key guiding principles:

- integrated energy system planning, across energy carriers, including through the use of EU governance tools;
- efficient and coordinated permitting procedures for infrastructure projects;
- safe, effective and smart operation of networks and related infrastructures;
- evolutive access regime to the grid, based on common minimum rules.

Conclusions and Recommendations for Improvement

The report raises **three central questions** related to the regulatory approaches to follow in the package, and formulates recommendations on how to address them:

1. Under which regulatory models may hydrogen and renewable gases value chains and markets develop across EU Member States?

- Regulatory models existing in mature markets cannot be copied to markets which are still emergent. This calls for an **evolutive and adaptive regulatory approach**, based on a mix between **EU harmonised legislation and elements of dynamic regulation** until the new energy mix reaches a steady state.
- **The proposal should introduce a distinction between transmission and distribution for pure hydrogen infrastructures.** The distribution level should be better acknowledged.
- Establishing a new European organisation for the collaboration between hydrogen network operators (ENNOH) is in line with the two-infrastructure pathway envisaged by the European Commission. However, it creates unnecessary complexity, is cost-inefficient and will weaken energy system integration efforts. **ENTSO-G should be tasked to promote the development and functioning of hydrogen infrastructures, in addition to natural gas.**



- **A hard threshold date in 2030 for the full application of the default regulatory regime is highly ambitious and premature**, even if fast track permitting procedures are applied. A postponement to 2035, as proposed in the Council negotiations, should be maintained. A flexible approach should be applied during the transitory phase. Thereafter, any exemption or derogation must be based on clear criteria (e.g., emergent market, geographically confined networks), and subject to regulatory authorities approval and conditions.
- **The synergy between cross-sectoral activities of gas operators (i.e., natural gas and hydrogen) must be better enabled.** Some provisions - e.g., on ownership unbundling for gas transmission system operators (TSOs) and hydrogen network operators (HNOs) - can be too strict to enable the hydrogen or renewables/low carbon gases market to develop across sectors. This applies to both TSOs and distribution system operators (DSOs). **This argues in favour of an 'intermediary pathway' for infrastructure regulation.**
- By imposing the ownership unbundling model, TSOs operating under the independent transmission operator (ITO) model will be prevented from engaging in hydrogen network activities, while other TSOs in countries operating under the ownership or independent system operator (ISO) model (for vertically integrated undertaking, VIU), will more easily invest in the same activities. **To ensure regulatory alignment, the ITO model should continue to be available beyond the threshold date, as proposed in the Council negotiations.**
- Less stringent unbundling rules should be made available for small HNOs under a certain threshold, as proposed by the Agency for the Cooperation of Energy Regulators (ACER) and the Council of European Energy Regulators (CEER).
- **Regional cooperation** is an important step in developing the internal market for gases. The draft legislation is still vague on this point, and should be reinforced to provide clearer guidance to regulatory authorities, TSOs and HNOs.

2. Does the Hydrogen and Decarbonised Gas Markets Package provide both the visibility and regulatory flexibility required for the development of these value chains and markets, as well as energy system integration?

- **Targeting the right level of EU harmonisation** - The legislative framework should combine both top-down and bottom-up elements, and should therefore target the right level of EU harmonisation. The report identifies some key grid-related requirements that are considered to be central to the shaping of the market for decarbonised and renewable gases, and therefore subject to EU harmonisation. These requirements cover the traditional regulatory mechanisms for infrastructure management, i.e., planning, unbundling, access regime, capacity-allocation and congestion management. An evolutive regulatory approach between EU harmonisation and dynamic regulation should be applied to these topics. Not all elements need to be fully harmonised. In terms of balance between harmonisation and dynamic regulation, **it is critical to leave sufficient flexibility to local markets**, in particular for renewable gases.



- **Targeting the right degree of EU harmonisation** - There is still a large amount of uncertainty on the role of hydrogen in the energy system, and how widespread its use will be. The approach proposed in the Package is in many respects complex, for a market still to develop. Some requirements are too strict and lack justifications (e.g., imposing a blending threshold of 5% of hydrogen to TSOs at interconnection points in the natural gas system; a reduced target of 2%, as proposed during the Council negotiations, is more appropriate).
- **Risk of regulatory uncertainty while waiting for the adoption of multiple implementing rules** - Many practical implementation rules will be adopted in the form of network codes and guidelines, by delegated or implementing acts of the EC. **The need for implementation legislation should be better anticipated**, as it might be too late to wait for the adoption of the relevant acts. E.g., the regime for grid connection should be reinforced directly in secondary legislation, instead of leaving all details to network codes.
- **More focus on energy system integration is required** - The regulatory framework should better enable energy system integration, with a central role for grid operators. This requires encouraging the planning of the decarbonisation of the gas grids with biomethane, blends and pure hydrogen in a more holistic manner. This also requires allowing grid operators to ensure, at least temporarily, cross-vector activities, in full respect of the unbundling and competition law rules. The new provisions on integrated network planning are positive. They should be maintained and represent a first step towards the promotion of energy system integration perspective across legislative acts. They should go further in the integration of DSOs in the planning processes.

3. How does the Hydrogen and Decarbonised Gas Markets Package interact with other pieces of EU legislation adopted or proposed by the European Commission?

- **Need for a more consistent wording and clearer structure** - The structure of the Directive and Regulation, and the mix between general rules, exemptions and different regimes applicable to different gases, may raise both transposition and implementation challenges. The numerous exemptions to the default regime may also be challenging for the consistency of the regulatory approach. Adjustments to the structure will facilitate the reading and correct transposition and implementation of the text.
- **Need for regulatory consistency across the EU legislation** - Regulatory consistency between the proposals for recast of the EU gas legislation and other pieces of EU legislation should be pursued in the following ways:
 - i. ensure consistency between **definitions** across the legislation;
 - ii. ensure the consistency of the **legal regimes** across the legislation with respect to:
 - the infrastructure pathway approach;
 - integrated planning requirements across sector legislation, and coordination of investment strategies to deliver on the Energy Union's objectives;
 - planning procedures for gas grid developments and involvement of grid operators;
 - iii. ensure consistency between **cross-sector policy goals**, such as the promotion of renewable gases across sectors, sustainability and fiscal criteria;



- iv. avoid potential **overlaps** with the Renewable Energy Directive (REDII) as to the regimes for grid connection for renewable gases production;
- v. address potential **contradictions with REDII** when introducing a regime for preferred access, in order to ensure a level playing field among renewable and low carbon gases.



1. INTRODUCTION

1.1 Context and objective of the report

To reach the Union's 2050 climate neutrality objective¹ and to complement the large-scale electrification of the energy system it envisions, the European Commission (EC) aims to spur the development of a comprehensive hydrogen and renewable gases value chain across the continent. A higher share of these gases was already perceived as an unavoidable pathway in the 2018 European Long-Term Strategic Vision Communication.² Since July 2020 and the publication of its Hydrogen Strategy,³ the EC has backed a number of private sector initiatives to support the nascent industry, which it sees as an important driver of its global competitiveness and sustainability strategy. Many governments have also advanced a national hydrogen strategy to accompany and stimulate further industrial initiatives. The gap to reach the announced EU targets however is large, as hydrogen accounted for less than 2 % of Europe's present energy consumption in 2022,⁴ and its use is primarily limited to produce chemicals and fertilisers.⁵ Demand for hydrogen in other applications, such as the heavy industry, power generation, transport and building sectors is increasing but remains low to compare.⁶ With 96 % of this hydrogen production coming from natural gas, a shift towards renewable hydrogen will require important changes to production and transportation methods.

The vision is also more holistic as it encompasses all gaseous fuels, including renewable and low carbon gases. Biogas, biomethane, renewable and low carbon hydrogen as well as synthetic methane (all together renewable and low carbon gases) are to fall under one common legislative framework. These gases still play a limited role in the energy mix, but the EC estimates that they could represent some two thirds of the gaseous fuels in the 2050 EU energy mix, with fossil gas combined with carbon capture and storage (CCS) representing the remainder.⁷ Likewise, although the share of biogas and biomethane is still limited, these gases build for a large part on proven and profitable technologies, while innovation will help scale them.⁸ Following the invasion of Ukraine by Russian forces and the consequent disturbances on the energy markets, the EU increased its targets for hydrogen and renewable gases as part of the REpowerEU Plan.⁹ Such high level of ambition raises questions of source of supply, both domestic and imported, with a possibly intense global competition for decarbonised carriers in the years to come.¹⁰

¹ Regulation (EU) 2021/1119 of the European Parliament and the Council of 30 June 2021 establishing the framework for achieving climate neutrality (European Climate Law), Art. 2.

² European Commission, 'A Clean Planet for All: a European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy', COM(2018) 733, p.7 and pp.8-10.

³ European Commission, Communication, A hydrogen strategy for a climate-neutral Europe, COM(2020) 301 final, 8.7.2020.

⁴ Hydrogen Roadmap Europe Fuel Cells and Hydrogen Joint Undertaking (FCH JU), *Hydrogen roadmap Europe : a sustainable pathway for the European energy transition*, Publications Office, 2019, p.11.

⁵ International Energy Agency, Global Hydrogen Review 2022, pp. 16-68.

⁶ Ibid.

⁷ European Commission, proposal for a directive on common rules for the internal markets in renewable and natural gases and in hydrogen, COM(2021) 803 final, 15.12.2021, p.1 (hereafter 'draft recast Gas Directive').

⁸ European Commission Joint Research Centre (JRC), Heat and Power from Biomass – Technology Development Report, 2019. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC118318/jrc118318_1.pdf

⁹ European Commission, Communication, 'REPowerEU Plan', COM(2022) 230 final, 18.5.2022.

¹⁰ International Renewable Energy Agency, Geopolitics of the Energy Transformation – The Hydrogen Factor, 2022, pp.39-67.



To pursue this vision and act on the regulatory side, on 15 December 2021, the European Commission put forward the Hydrogen and Decarbonised Gas Markets Package, which aims at boosting the use of hydrogen and renewable gases, among other gaseous fuels, within the EU.¹¹ The most crucial element of the package for the future of hydrogen and renewable gases regulation will be the revision of the EU gas legislative framework, particularly the Gas Directive¹² and Gas Regulation¹³ from 2009. This package was presented by the European Commission as the second part of the Fit for 55 package. **By analysing the legislative package and some national case studies, the present report aims to identify which key regulatory issues need to be addressed at EU level in the short-term, as they will shape the hydrogen and renewable gases market in Europe.** The report aims to introduce the background for the proposals, contribute to the ongoing legislative negotiations and to anticipate its implementation by pointing out some challenges.

With the Hydrogen and Decarbonised Gas Markets Package, the EC seeks to lay out ground rules, provide clarity and **allow for the formation of a market** that is bound to fall under a **comprehensive regulatory framework by 2030**. This is in order to reach the end-goal of a 100% sustainable gas industry by 2050. It will therefore be crucial to set **clear parameters and objectives**, but also provide market players with the **flexibility** required to **experiment and scale up** the use of underlying technologies and market solutions. It will also be crucial to let Member States and regulatory authorities contribute to the development of an enabling regulatory framework, while EU harmonised rules are to ensure cross-border trade in renewable and low carbon gases across the EU by removing existing and upcoming barriers.

Given Europe's now reinforced energy independence objectives, the Hydrogen and Decarbonised Gas Markets Package covers strategic areas for national and EU energy policy that will be hotly debated. To start with, EU legislators must agree on underlying issues related to **clear definitions** of renewable and low-carbon hydrogen, **organisation of the market**, **EU governance architecture**, **consumer rights**, **hydrogen blending mandates** as well as **infrastructure management requirements**. The recast Gas Directive and Regulation will be the main legislative framework to clarify these issues, but they are also interdependent with provisions in other legislative acts, such as the Renewable Energy Directive (REDII)¹⁴, the Energy Efficiency Directive (EED)¹⁵ and the Energy Performance of Buildings Directive (EPBD)¹⁶, which are also under revision under the Fit for 55 Package. Therefore, the report also discusses their **interaction and consistency with other legislations**.

¹¹ European Commission, 'Commission proposes new EU framework to decarbonise gas markets, promote hydrogen and reduce methane emissions', Press release, 15 December 2021.

¹² 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.

¹³ Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005.

¹⁴ Directive (EU) 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).

¹⁵ Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency.

¹⁶ Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast).



Hydrogen and renewable gases markets are likely to develop under different models, at different scales – both large and small local projects - and with different operatorship models across EU Member States, where the infrastructure operators' role will evolve alongside further energy system integration. Additionally, the legislative framework must **enable sufficient flexibility to account for national specificities, develop nascent value chains and promote technology innovation**. New topics like additionality rules, natural synergies from power-to-gas (P2G), sector coupling and offshore interactions of Renewable Fuels of Non-Biological Origins (RFNBOs) with the electrical Modular Offshore Grid (MOG) design choices are gaining considerable relevance and **triggering both pan-European competition and cooperation**. In the meantime, an **affordability crisis** is looming, forcing policymakers to carefully weigh their decisions in terms of efficient market design and attractiveness of new private investment capital. The war in Ukraine has revealed the delays in completing the energy transition and the lack of coordination in this process among Member States. Both affordability and security of supply considerations argue in favour of a more diverse energy mix, where an all-electric design (mono carrier) may not necessarily be the best model for all. Therefore, a diversity of energy sources, including the use of hydrogen and renewable gases alongside electricity, will be needed, driven by the principle of sovereignty of EU Member States over their energy mix.¹⁷

With hydrogen and renewable gases markets still nascent in Europe, there is a need for **a regulatory roadmap** for the decarbonisation of the gas sector and more generally of the energy system. There is also a need to efficiently look for synergies across energy carriers to gain flexibility and to make the best use of the infrastructure that already exists before committing the public to new investments in the regulated sector. The ambition is to elaborate a **'forward-looking design for competitive decarbonised gas markets'**.¹⁸ As for the electricity sector, this is likewise a **market design issue**. It requires regulatory action through legislative frameworks that can be accompanied by commercial initiatives.¹⁹

This report addresses the gas side of the ongoing market design discussion, focusing on infrastructure legislation. Conditions for access to the grid, transparent and non-discriminatory tariffs, interoperability, certification, whole energy system considerations and a level playing field among all decarbonised energy carriers represent crucial issues for getting hydrogen and renewable gases to the market and for making the energy system more efficient as a whole. Gas infrastructure operators play a strategic role in that context, that must be both valorised and carefully regulated in order to ensure the development of the hydrogen market, in close collaboration with market actors and regulatory authorities. Grid development also has a necessary European dimension, underpinned by the objective of reinforcing the resilience of the European energy system based on a higher share of low carbon and renewable energy sources, more decentralised energy production and a more integrated, efficient and affordable energy system.

¹⁷ Art. 194(2), Treaty on the Functioning of the European Union (TFEU).

¹⁸ European Commission, proposal for a directive on common rules for the internal markets in renewable and natural gases and in hydrogen, COM(2021) 803 final, 15.12.2021, p.1.

¹⁹ For a discussion on the manner to de-risk by law investments in hydrogen and carbon capture and storage, and the need for acting on both legislation and contracts, see: Alice O'Brien and Catherine Banet, 'De-Risking the Hydrogen-CCS Value Chain Through Law', *European Energy and Environmental Law Review* Volume 30, Issue 2 (2021) pp. 24-41.



1.2 Research questions

This report focuses on **short-term priorities in the regulatory approach that can influence the shaping of the hydrogen and renewable gases market**. It focuses more specifically on **gas grid regulation**, as this is a critical issue for getting the different gases to the market, and in doing so, delivering the different expected benefits of emissions reduction, security of supply and, in the long run, competitiveness and affordability.

The report raises **three central questions**:

- 1. Under which regulatory models may hydrogen and renewable gases value chains and markets develop across EU Member States?** The objective is to identify some key legal and regulatory requirements that will influence the shaping of the market in the short-term.
- 2. Does the Hydrogen and Decarbonised Gas Markets Package provide both the visibility and regulatory flexibility required for the development of these value chains and markets, as well as energy system integration?** Answering this question will enable to identify the pros and cons of the regulatory approach proposed in the Package, notably in terms of level and degree of harmonisation.
- 3. How does the Hydrogen and Decarbonised Gas Markets Package interact with other pieces of EU legislation adopted or proposed by the European Commission?** This will help identify the risks of inconsistency across EU legislation.

Answers to these questions are summarised at the end of the report in a **list of recommendations** for improvement.

1.3 Methodological approach

This report is based on a **legal-dogmatic analysis**, focusing on legal interpretation of legislative proposals and currently applicable legislation, case law, literature and authorities' practice. **National examples** are included throughout the report. They illustrate best practices or innovations in the regulatory approach. The analysis of the national legislation is based on open sources and data from impact assessment reports by the EC.

The drafting of this report took place during the negotiations around the Hydrogen and Decarbonised Gas Markets Package. Some of the pieces of legislation were under negotiation, and the report refers to the available text versions at the date of writing.

Policy recommendations for the improvement of proposed legislation are spelt out throughout the report and summarised at the end and in the executive summary.



1.4 Structure of the report

The report is construed around **three analytical sections** (2,3 and 4) and **a concluding section** (5).

Section 2 contains a synthetic review of the proposals for recast of the Gas Directive and Gas Regulation (hereafter draft recast Gas Directive and Regulation), focusing on their main components. The objective is to situate the three key issues to be assessed in detail in the rest of the report.

All three key issues selected for the in-depth analysis relate to infrastructure regulation, as justified at the start of **Section 3**. These are:

- the EU governance architecture for cross-border coordination of gas grids development;
- the strategic role of system operators; and
- the regime for access to the grid for hydrogen, renewable and low carbon gases.

Section 3 of the report analyses these three topics in detail, with references to national examples to put the proposed new legislation in perspective with existing national practices.

Section 4 looks at the manner other existing and proposed EU pieces of legislation, notably as part of the Clean Energy Package and Fit for 55 Package, interact with the draft recast Gas Directive and Regulation on the three pre-selected issues.

Section 5 concludes on whether the package is fit for purpose, answering the three main research questions raised by the report. It stresses the advancements proposed and to be kept, and develops some recommendations for improvement where shortcomings are identified. The outcome serves as a direct contribution to the legislative procedure, with the aim to adopt an adequate EU-level regulatory framework for hydrogen, low carbon and renewable gases, supportive of the EU's energy transition and system integration objectives, and respective of Member States' specificities.



2. ANALYSIS OF THE HYDROGEN AND DECARBONISED GAS MARKETS PACKAGE: TOWARDS GAS MARKET(S) RE-DESIGN

This section reviews the Hydrogen and Decarbonised Gas Markets Package, focusing on the key provisions of the draft recast Gas Directive and Regulation, with the view of assessing its coverage and structure. Before this synthetic review, the context of the Package is recalled. Special attention is given to the intention of the European Commission to reform the design of the gas market or, as suggested by the title of the package itself, to reform the market design framework to support the development of several 'gas markets'. This raises fundamental questions pertaining to the regulatory approach and scope for this single EU legislative framework that is to cover different gases.

2.1 Background of the package: Gas market(s) re-design

On 15 December 2021, the European Commission adopted a package of new legislative proposals focusing on the decarbonisation of the EU gas market through the uptake of renewable and low carbon hydrogen, but also renewable gases such as biogases, biomethane and synthetic fuels (E-gases). The package also includes proposals on methane emissions regulation, but this later aspect falls outside the scope of this report.

The package builds on the EU Hydrogen Strategy from July 2020.²⁰ More generally, it falls under the implementation of the European Green Deal, and aims to contribute to the fulfilment of EU energy and climate targets, as enshrined in the European Climate Law.²¹ A proposed increase of the EU targets, notably for the share of renewable energy sources in EU total final energy consumption to 40 or 45% by 2030, as part of the revision of the Renewable Energy Directive,²² will also affect the level of ambition for renewable hydrogen.²³ A long-term goal for the package is to enable the replacement of fossil fuels by renewable and low carbon gases. The revision of the gas legislation is also motivated by the aim to better align the gas legislation with the electricity legislation, revised in 2019 as part of the Clean Energy For All Europeans Package. Finally, the implementation of the package aims to contribute to the strengthening of security of supply and resilience of the EU energy system, by

²⁰ European Commission, Communication, A hydrogen strategy for a climate-neutral Europe, COM(2020) 301 final, 8.7.2020, Brussels.

²¹ The set objective for the proposals for recast is 'to facilitate the penetration of renewable and low-carbon gases into the energy system enabling a shift from fossil gas and to allow these new gases to play an important role towards achieving the EU's 2030 climate objectives and climate neutrality in 2050.' (draft Directive Recital 6)

²² Proposal from the EC as part of the REpowerEU Plan. This increased has been back by the European Parliament in its vote on the revision of the Renewable Energy Directive, as part of the Fit-for-55 Package (European Parliament, 'Parliament backs boost for renewables use and energy savings', Press Release, 14.09.2022).

²³ While such an increase has been backed by the European Parliament, the Council did not agree on it at its December 2022 meeting, and several Member States prefer keeping the 40% target. See, for the European Parliament: Amendments adopted by the European Parliament on 14 September 2022 on the proposal for a directive of the European Parliament and of the Council amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 (COM(2021)0557 – C9-0329/2021 – 2021/0218(COD)), P9_TA(2022)0317, proposed amendment to Art. 3(1). See, for the Council: Council of the EU, Transport, Telecommunications and Energy Council (Energy), 19 December 2022, Main results. <https://www.consilium.europa.eu/en/meetings/tte/2022/12/19/>



securing domestically-produced renewable and low-carbon gases, facilitating cross-border flows and enhancing system synergies.

The package comprises, among others:

- the recast of the Directive on Common Rules for the Internal Market on Natural Gas;²⁴
- the recast of the Regulation on Natural Gas Transmission Networks;²⁵
- as well as amendments, through the Gas Regulation, to several related acts, including the Gas Security of Supply Regulation (EU) 2017/1938, ACER Regulation (EU) 2019/942 and REMIT Regulation (EU) No 1227/2011.²⁶

With legal basis in the recast Gas Regulation, the European Commission may adopt Implementing or Delegated Acts for the development of network codes and guidelines to complement the provisions of the Directive and Regulation.²⁷

The proposal for the recast Directive and Regulation refers to a dual legal basis, with both Article 194(2) TFEU (energy provision) and Article 114(1) TFEU (internal market). However, the draft Directive and Regulation only refer to Article 194(2) TFEU. Pursuant to the Commission, the planned measures aim at advancing the four objectives set out in Article 194 TFEU, and contributing to the decarbonisation of the EU's economy.²⁸

The recast of the currently applicable Gas Directive and Regulation is necessary as they have shown their limits in terms of enabling the scale up of hydrogen and low carbon and renewable gases. The regulatory shortcomings do not stem from the Gas Directive and Regulation alone, but these two acts have an important role to play in shaping market rules, while other pieces of legislation like the Renewable Energy Directive (REDII, under revision) will influence the nature of gas as a commodity or the support given to certain sources of production.

The shortcomings observed are both a result of the EU harmonised legislation, narrowed down to mostly natural gas, and national legislations on hydrogen, low carbon and renewable gases following different approaches, such as obligation and costs to connect to the grid, or inter-EU entry/exit tariffs.

Notably, the EC observes that, under current legislation, there are no rules at EU level regulating dedicated hydrogen networks or markets and low-carbon fuels. Since Member States have already adopted strategies and legislative changes in order to enable hydrogen, low carbon and renewable gases development, **there is a risk of fragmentation of the internal market** that calls for EU-

²⁴ Proposal for a Directive of the European Parliament and of the Council on common rules for the internal markets in renewable and natural gases and in hydrogen, COM(2021) 803 final, 15.12.2021 (hereafter 'EC proposal for recast Gas Directive').

²⁵ Proposal for a Regulation of the European Parliament and of the Council on the internal markets for renewable and natural gases and for hydrogen (recast), COM(2021) 804 final, 15.12.2021.

²⁶ Ibid.

²⁷ Draft recast Gas Regulation, Art. 52.

²⁸ EC proposal for recast Gas Directive, p.5.



intervention, in line with the principles of subsidiarity and proportionality.²⁹ Such fragmentation could hamper the integration of national hydrogen networks and markets, thereby preventing or deterring cross-border trade in hydrogen. Harmonising rules for hydrogen infrastructure at a later stage (i.e., after national legislation is in place), would lead to increased administrative burdens for Member States and higher regulatory costs and uncertainty for companies, especially where long-term investments in hydrogen production and transport infrastructure are concerned.³⁰

For biomethane, without an initiative at EU level, it is likely that by 2030, a regulatory patchwork would still exist regarding access to wholesale markets, connection obligations and TSO/DSO cooperation measures. Likewise, without some harmonisation at the EU level, renewable and low-carbon gases producers will be facing vastly different connection and injection costs across the EU, resulting in an unequal playing field.

In its Impact Assessment, the European Commission also concludes that the current regulatory framework does not enable the deployment of hydrogen and the development of dedicated hydrogen infrastructure next to the already existing methane-based infrastructure. An important starting point for the revision of the EU legislation is therefore that the latter did not enable the deployment of hydrogen - and renewable gases - as an independent energy carrier via 'dedicated hydrogen networks'. According to the EC, this is due to the lack of rules on the operation of new hydrogen infrastructures or the repurposing of existing natural gas networks for the future transport of hydrogen. The security of gas supply regulation also does not address the security challenges of hydrogen deployment.³¹

The adoption of the recast Gas Directive and Gas Regulation would not only enable the integration of renewable and low carbon gases into the market, but would also establish a hydrogen market with dedicated infrastructure, alongside other gases. For the European Commission, the adoption of the legislative package would 'establish a market for hydrogen', create the right environment for investment, and enable the development of dedicated phases, before and after 2030.³² The legislative proposals contain rules aimed at building both the necessary markets and infrastructures.

The package can be seen as the gas counter-part of the electricity market reforms of the Clean Energy Package for All Europeans, as it proposes a revision of gas market rules. As happened for electricity, the EU legislator is moving from the third to the fourth generation of EU legislation in that area too, with a few years of difference. The new Electricity Directive and Regulation have been adopted in 2019, now raising **questions of regulatory alignment between the EU electricity and gas**

²⁹ EC proposal for recast Gas Regulation, p.6-7.

³⁰ EC proposal for recast Gas Directive, p. 6.

³¹ Commission Staff Working Document, Impact Assessment Report, Accompanying the Proposal for a Directive of the European Parliament and of the Council on common rules for the internal markets in renewable and natural gases and in hydrogen (recast), and Proposal for a Regulation of the European Parliament and of the Council on the internal markets for renewable and natural gases and for hydrogen (recast), SWD/2021/455 final, 15 December 2021., p.9.

³² European Commission, 'Commission proposes new EU framework to decarbonise gas markets, promote hydrogen and reduce methane emissions', press release, 15 December 2021.



legislation. The interaction between the two sets of legislation should be duly assessed during the adoption of the new package and the upcoming revision of electricity market rules. Section 4 of this report maps some of the interactions between the two sets of rules from an infrastructure perspective.

2.2 Different gases, but one legislative framework

A central question of regulatory approach for this package is to know whether the EU legislator should think in terms of one single gas market or several gas markets.

Enlarged material scope of application

The proposal of the European Commission is itself entitled ‘Directive/Regulation on common rules for the internal markets in renewable and natural gases and in hydrogen’ (underlying added). A main novelty of the package is therefore to explicitly enlarge the material scope of application of the gas legislation to cover all gases, i.e., gases based on both fossil and renewable sources, both low carbon and renewable hydrogen, and to explicitly include biogas, biomethane, and synthetic fuels (E-gas). The scope enlargement is made explicit, compared to the more implicit wording of the current Gas Directive, that does not contain a definition of the different gases encompassed beyond natural gas.³³

An alteration to this gas-wide approach, is the fact that the text defines different regimes for the different gases, as further explained below.

Gas(es) market definition

The EC stresses that, despite the minor contribution of these gases to the current EU energy mix, the proposal covers the ‘market design for gases, including hydrogen’.³⁴ To design market rules for gases able to compete in the same market instead of separate markets is a crucial initial question for the regulatory approach to follow. This has fundamental consequences for the development of the related markets, as well as for the assessment of the competition situation on those. For example, in the context of competition cases, the relevant product and geographic markets will be among the first steps in the assessment of possible distortion of competition in the form of a possible abuse of dominant position. The existence of competing fuels in the same relevant geographic and product market will be an important assessment criteria.

The European Commission had to perform this analysis in a state aid case related to a Swedish measures in favour of biomethane.³⁵ In this case, the Swedish authorities pre-notified an aid to the Commission for the project Gothenburg Biomass Gasification, so-called ‘GoBiGas project’. The aid was notified under the Community Framework for State aid for research and development and innovation (the R&D&I Framework). The Swedish authorities (Swedish Energy Authority) argued that the purpose

³³ Gas Directive, Art. 1(2).

³⁴ EC proposal for recast Gas Directive, p.1.

³⁵ State aid N 276/2010 – Sweden Aid for the project "GoBiGas" C(2010)8921final, 14.12.2010



of the measure was to financially support R&D activities relating to the development of a pre-commercial demonstration plant for indirect gasification of low-quality forest raw material into biomethane. The biomethane produced from these forest residues were to be fed into the gas grid and sold on the market at market conditions. Interestingly, the Swedish authorities argued that the biomethane produced should not be seen as a separate market, in particular since it would be combined with natural gas on the grid. They argued that the product market was the market for gas of natural gas quality, including both natural gas and biomethane on the grid. The European Commission agreed that the total 'methane market' was the relevant 'product market' for biomethane, in line with previous State aid decisions taken by the Commission.³⁶ In these cases, the Commission did not only assess the product market, but also the 'technology market' and this in addition to the geographic market.

Some main conclusions from this and other cases are that the Commission often does not distinguish between the energy sources solely on the basis of their environmental performance as long as the products are substitutable. The physical substitutability of the products are therefore of primarily importance. As a consequence, **the total 'methane market' is usually deemed to be the relevant product market for biomethane. The technology market is usually recognised to be global, due to international competition. However, a possible point of divergence in the assessment could be the scope of the geographical market. While the methane market can be deemed to be at least European, the characteristic of the demand for biomethane could be local or national.** The relevant geographic market for biogases is often to be local (e.g., in relation to heat production) compared with other gaseous energy carriers that are supported by more extended transport infrastructures with less loss of energy.

The question also has a technical aspect, since increasing the volumes of biomethane, hydrogen, as well as LNG, will affect gas quality, safety and thereby the design of all types of gas infrastructure (import/export terminals, conversion, storage, transmission, distribution), and not least end-user appliances. These technical constraints, often accompanied by the application of standards, will also influence the choice in developing infrastructures.

Considering these different gases as substitutable products on the same market will therefore depend on their physical characteristics, the level of blending allowed, as well as the demand for these products.

The assumption of two main infrastructure pathways for gases

The manner infrastructures will develop may also influence the definition of the relevant market. **In its Impact Assessment Report, the European Commission takes the view that 'two main pathways are likely to emerge in parallel and expected to develop at different pace across the EU:**

³⁶ See for example, State aid SA.29249 (N493/2009) \$ - Projet GAYA (Soutien de l'ADEME en faveur du projet « GAYA »), C(2010) 1725 final, 24.03.2010



- **a hydrogen-based infrastructure will progressively complement the network for methane gases;**
- **a methane-based infrastructure in which natural gas will progressively be replaced by other sources of methane (i.e., biomethane and synthetic methane, possibly occasionally blended with hydrogen).'³⁷**

These two parallel infrastructures will in most cases deliver two different types of commodity to the market, and could be considered as two different product markets if their use is not interchangeable. **It is important to note that the whole package builds on this fundamental preliminary distinction, as analysed further in Section 3.**

This assumption of two separate infrastructure pathways, made by the European Commission, which is supported by several stakeholders and national regulatory authorities, will represent a change compared to today's legislation. Indeed, under the current Gas Directive 2009/73/EC, gases other than natural gas can already be transported in the natural gas system, subject to compatibility and safety requirements and in accordance with the principle of non-discrimination. This entails that, without the adoption of a new legislation, hydrogen would fall under the scope of application of the Gas Directive, under the conditions set by the latter.

Hydrogen transport through the natural gas network is clearly covered by the current Gas Directive. However, transporting it through a pipeline dedicated to hydrogen, i.e., without any link to the natural gas network, seems to fall outside the scope of the Gas Directive, since the Directive is applicable to other types of gases 'as far as such gases can technically and safely be injected into, and transported through, the natural gas system'.³⁸ In the current state of the legislation, there are no EU-law provisions specifically addressing a transportation system purely dedicated to hydrogen. This does not prevent from developing hydrogen transportation pipeline infrastructures, but it certainly brings legal uncertainty and may lead to different national approaches. In the context of an integrated internal market for energy, including for hydrogen, a minimum harmonisation of hydrogen transport networks regulation at EU level is both necessary and proportionate, justifying EU intervention. **Current shortcomings are to be addressed by making the current Gas Directive a 'gases directive' applicable to a broad range of gases, rather than by adopting a new legal act dedicated to hydrogen, as it is the most appropriate approach to respect the current architecture of the EU energy legislation.** The approach proposed by the European Commission must therefore be preserved.

Harmonisation of legal definitions

An important effort has been made in recent legislative proposals by the European Commission to update and streamline the definition for the different gases across legislation. The relevant acts are

³⁷ Commission Staff Working Document, Impact Assessment Report, Accompanying the Proposal for a Directive of the European Parliament and of the Council on common rules for the internal markets in renewable and natural gases and in hydrogen (recast), and Proposal for a Regulation of the European Parliament and of the Council on the internal markets for renewable and natural gases and for hydrogen (recast), SWD/2021/455 final, Part 1/2, 15 December 2021, p.2.

³⁸ Directive 2009/73/EC, Art. 1.2.



the Renewable Energy Directive (REDII), the draft recast Gas Directive and the draft recast Gas Regulation. In addition, standards are already adopted, other standards are under development, and the Commission is to adopt delegated acts on the criteria for different gaseous products, including renewable hydrogen.³⁹ **Despite the efforts made to elaborate and streamline definitions, it is crucial to ensure consistency among them and across legislative acts and standards. There is still a risk of divergence, with important consequences for both the commodity market and infrastructure development.**

Reaching a level playing field between the different gases

Despite a common legislative framework, the EC proposal defines differentiated rules for hydrogen and methane gases. The proposals for the Directive and Regulation refer to dedicated hydrogen networks, blending levels, integration of renewable gases into the networks, and the legal requirements vary for these different gas infrastructures.

This diversity of gases in the infrastructures also means that the future market will face a multiplicity of actors at different levels: local, regional, national, cross-boundary and international (with export/import infrastructures). **Projects of all sizes will be necessary to reach the increased targets. This should also be duly taken into account when elaborating the market design rules.**

Differentiating rules according to the level in the grid reflects some realities, as the different gases will interact differently with the energy system. Notably, new production of biogases, including biomethane, and e-fuels, will primarily connect at the distribution level, while large volumes of hydrogen production or import will be connected to transmission. This reality justifies regulatory differentiation between the different gases.

This raises the fundamental question of **whether the EU legislator can achieve a level playing field between the different gases in one single legislative framework for the different gases. If one common set of rules is certainly desirable, the next question is to know what the common pillars of this new market design legislation for renewable and decarbonised gases should be**, in a market and energy mix still counting for the most part on natural gas, at least in the near future. **There is a need for further clarity as to the different and joint regulatory pathways for the different gases.**

Beyond these common regulatory principles, the approach favoured in the package is not anymore the one of a single market for gas, but one 'internal market for hydrogen' and an internal market for methane.⁴⁰

³⁹ Under the Renewable Energy Directive (REDII), the European Commission is to adopt two delegated acts on (i) Renewable Fuels of Non-Biological Origin (RFNBO), setting the criteria for products that fall into the "renewable hydrogen" category; (ii) the methodology for GHG savings, including a detailed scheme to calculate the life-cycle emissions of renewable hydrogen as well as recycled carbon fuels to meet the greenhouse gas emission reduction threshold set in REDII.

⁴⁰ Draft recast Gas Regulation, Art. 40(1)-(2).



2.3 Increased targets following the REpowerEU Plan

The REPowerEU Plan puts additional pressure on the timescale and on the ambitious level for diversifying the gas supply via notably higher production levels of biomethane and hydrogen.

The targets increase from the Fit for 55 Package to the REpower EU Plan can be summarised in the table below. The table is adapted from the one included in the Annex to the Commission's REpowerEU Plan.⁴¹

	Fit for 55	REpowerEU	Natural gas consumption reduction by end 2022 (bcm)	Additional natural gas reduction compared to Fit for 55 by end 2030 (bcm)
Renewable hydrogen	5.6 million tonnes , saving 9-18.5 bcm (revision REDII)	Produce 10 million tonnes and import 10 million tonnes of renewable hydrogen in the EU by 2030 Long-term needs: 27 bcm (domestic and import) by 2027 & beyond Renewable hydrogen use reaches 20 Mt by 2030 (of which about 4 Mt as ammonia)	-	25-50
Sustainable biomethane	17 bcm by 2030	Production of 35 bcm by 2030 (backed by ITRE)	3.5	18
Biomass in power generation	1 bcm in 2030	No change		
RFNBOs in industry	50% of hydrogen consumed in industry is renewable by 2030 (supported by ITRE)	78% of hydrogen consumed in industry is renewable by 2035 (supported by ITRE)		

Figure 1: The increase of targets for hydrogen and renewable gases from the Fit for 55 Package to the REpowerEU Plan

Increasing the targets entails a deeper gap to fill. It also puts higher pressure on domestic EU production. In the view of the European Commission, the existing gas rules focus on fossil-based natural gas, mainly imported from outside the EU, and 'do not address the specific characteristics of

⁴¹ European Commission, Communication, REPowerEU Plan, Annexes 1 to 3, COM(2022) 230 final, 18.5.2022. See also for a similar example of synthesis table: The Oxford Institute for Energy Studies, RePowerEU: Can Renewable Gas help reduce Russian gas imports by 2030?, July 2022, p.2.



decentralised renewable and low-carbon gases production within the EU'.⁴² At the same time, import targets for renewable hydrogen have also been increased following the adoption of the REpowerEU Plan. This means that **the new legislation should aim to facilitate both domestic production and imports/cross-border trade.**

The goal for biomethane is to increase the production of **biogas** but also boost its subsequent **conversion into bio-methane.**

2.4 Review of the main components of the proposals for the recast Gas Directive and Regulation

Against this background, the objective of the proposals for the recast Gas Directive and Regulation is to 'create a legislative framework for establishing an EU hydrogen and renewable gases market'. For that, the new rules aim to facilitate the penetration of renewable and low-carbon gases into the energy system, enabling a shift from natural gas based on fossil-fuels and to allow for these new gases to play their role in reaching the EU climate neutrality goal in 2050.

The following sections present, in a synthetic manner, the **main provisions of the proposed recast Directive and Regulation, organised thematically.** They present the general rules, while derogations will also apply, notably for allowing transitory periods for market actors and operators to adapt.⁴³

The objective of such review is to get a complete picture of the regulatory regime proposed in the new package for the regulation of the gas markets, covering all gases, both natural gas (including biogas and biomethane) and hydrogen.

2.4.1 Revised scope of application and new definitions

In terms of material scope of application, the proposal involves an extension to all gases. This leads to a list of new definitions, where the following terms are central: 'natural gas', 'renewable gas'⁴⁴, 'gases', 'low-carbon hydrogen'⁴⁵, 'low carbon gas'⁴⁶, 'low carbon fuels'⁴⁷. In the proposal, 'natural gas' means 'all gases that primarily consist of methane, including biogas and gas from biomass, in particular

⁴² Proposal for a Directive of the European Parliament and of the Council on common rules for the internal markets in renewable and natural gases and in hydrogen, COM(2021) 803 final, 15.12.2021, p.8.

⁴³ E.g. under Article 60, draft recast Gas Regulation, and derogations in favour of major new natural gas and hydrogen infrastructures.

⁴⁴ Proposed new definition: renewable gas means 'biogas as defined in Article 2, point (28) of Directive 2018/2001, including biomethane, and renewable gaseous fuels part of fuels of non-biological origins ('RFNBOs') as defined in Article 2, point (36) of that Directive'. Draft Art. 2(1), recast Gas Directive.

⁴⁵ Proposed new definition: low carbon hydrogen means 'hydrogen the energy content of which is derived from non-renewable sources, which meets a greenhouse gases emission reduction threshold of 70%'. Draft Art. 2(10), recast Gas Directive.

⁴⁶ Proposed new definition: low-carbon gas means 'the part of gaseous fuels in recycled carbon fuels as defined in Article 2, point (35) of Directive (EU) 2018/2001, low-carbon hydrogen and synthetic gaseous fuels the energy content of which is derived from low-carbon hydrogen, which meet the greenhouse gas emission reduction threshold of 70%'. Draft Art. 2(11), recast Gas Directive.

⁴⁷ Proposed new definition: low-carbon fuels means 'recycled carbon fuels as defined in Article 2 of Directive (EU) 2018/2001, low-carbon hydrogen and synthetic gaseous and liquid fuels the energy content of which is derived from low-carbon hydrogen, which meet the greenhouse gas emission reduction threshold of 70%'. Draft Art. 1(12), recast Gas Directive.



biomethane, or other types of gas, that can technically and safely be injected into, and transported through, the natural gas system'.⁴⁸ However, 'gases' mean 'natural gas and hydrogen'⁴⁹.

Most of these terms are already defined in the Renewable Energy Directive (REDII), but the multiplicity of the terms and, above all, the cross-references in the text of the proposal to the different terms in an alternative manner, may bring some confusion. For example, some general principles that applied under the current Gas Directive now relate to 'natural gas' or 'gas', while some of these same gases will benefit from some exemptions to these principles.

As part of the revision of REDII, the European Parliament and the Council have proposed the adoption of new definitions. Of particular relevance for hydrogen is the Parliament's proposal to add a definition for 'renewable hydrogen', meaning 'hydrogen produced through the electrolysis of water (in an electrolyser, powered by electricity stemming from renewable sources, or through the reforming of biogas or biochemical conversion of biomass, if in compliance with sustainability criteria set out in Article 29 of Directive (EU) 2018/2001 of the European Parliament and of the Council'.⁵⁰ Although the draft recast proposal for Gas Directive extensively refers to 'renewable hydrogen', it does not provide for a legal definition of it. Once the revised REDII will be adopted, there will be a need to add new cross-references in the Gas Directive and Regulation.

The structure of the Directive and Regulation, and the mix between general rules, exemptions and different regimes applicable to different gases, may raise both transposition and implementation challenges. Adjustments in terms of structure could facilitate the reading and correct implementation of the text. As a first example, Chapters II and III of the draft recast Gas Regulation cover both hydrogen infrastructures. Chapter II is to cover general rules related to the 'hydrogen systems' while Chapter III is to cover the 'hydrogen networks'. However, 'hydrogen networks' form part to the hydrogen systems, and some requirements included in Chapter II will also apply to hydrogen network operators (and aspects to be covered by Chapter III). As a second example, the cross-reading between related provisions between the draft recast Gas Directive and the Gas Regulation on e.g., hydrogen interconnectors or infrastructure planning requirements are made difficult. As a third and final example, the provisions on 'regional cooperation' could be moved elsewhere in the text. It sounds notably more logical to address 'authorisation procedure' before 'regional cooperation', and not the reverse.⁵¹ Some reorganisation of the provisions can facilitate the reading.

In terms of geographical scope of application, it is notable that the proposal contains rules to be applied to both onshore and offshore hydrogen transport infrastructures. The proposal also

⁴⁸ Draft recast Gas Directive, Art. 2(1).

⁴⁹ Draft recast Gas Directive, Art. 2(3).

⁵⁰ P9_TA(2022)0317, Amendments adopted by the European Parliament on 14 September 2022 on the proposal for a directive of the European Parliament and of the Council amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of the Council and Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, new Art. 47ac.

⁵¹ Draft recast Gas Directive, Art. 7 and 6 respectively.



contains provisions concerning the application of EU law to import infrastructures, that leads to an extension of the EU legislative regime to these assets. To enshrine this in public international law, the proposal requires that bilateral agreements are signed for each import infrastructure, reflecting the choice of applicable legislation on the related asset.

2.4.2 General rules for the organisation of the markets

Chapter II of the proposed recast Directive lays down the rules to ensure competitive, consumer-centred, flexible and non-discriminatory markets for gas. It contains provisions on **market access**, including free choice of supplier, removal of barriers to cross-border trade (Art. 3), market-based supply prices (and possible derogations through public interventions in price setting for the supply of natural gas) (Art. 4), public service obligations (Art. 5). Further, Chapter II includes provisions on the promotion of regional cooperation (Art. 6), both for natural gas and hydrogen network operators. It contains rules on authorisation procedure (e.g., licence, permission, concession, consent or approval) for the construction or operation of natural gas facilities, hydrogen facilities and hydrogen system infrastructures (Art. 7). The Directive includes new provisions on the certification of renewable and low carbon fuels (Art. 8) as well as technical rules (Art. 9). Chapter II of the proposed recast Regulation also deals with organisation of the markets, and completes the Directive with a **list of 'general principles'** covering price formation, TSOs/DSOs cooperation, balancing rules, market-based incentives for investment, removal of cross-border gas flows and regional cooperation (Art. 3).

Provisions on unbundling of operators are spread in the Directive and the Regulation, based on the distinction between operators of natural gas system and hydrogen networks. The unbundling regime for transmission system operators for natural gas is covered by Chapter IX of the proposed recast Directive. The chapter is divided into six sections covering the following items: ownership unbundling (Section 1, Art. 54), independent system operators (Section 2, Art. 55 and 56), independent transmission operators (Section 3, Art. 57 to 61). Further provisions follow on the unbundling regime for dedicated hydrogen network operators (Art. 62 to 64), the certification of natural gas and hydrogen system operators (Section 5, Art. 65 to 67), and unbundling and transparency of accounts (Section 6, Art. 68 and 69). Article 4 of the proposed recast Regulation provides for the regime of separation of regulated asset bases. Unbundling rules for natural gas DSOs are provided in Article 42 of the Gas Directive.

As it is already the case today, secondary legislation will be supplemented by the adoption of detailed rules in the form of **network codes and guidelines** (Chapter IV of the proposed recast Regulation, Art. 52 to 59). There will be specific network codes for hydrogen (Art. 54). Member States keep the right to maintain or introduce more detailed measures, as far as these are compatible with Union law (Art. 57).

2.4.3 Consumer empowerment, consumer protection and retail markets

Chapter III of the proposed recast Directive provides a set of rights for the empowerment of final consumers of gases. It provides rules on basic contractual rights (Art. 10), switching rights and fees (Art. 11), and rules on comparison tools (Art. 12). It contains rules on active customers (Art. 13), and



citizen energy communities (Art. 14). It contains provisions on billing (Art. 16), smart and conventional metering for natural gas (Art. 16, 18, 19, 20) and hydrogen (Art. 17), and data management (Art. 21, 22). It also contains provisions on single points of contact (Art. 23), right to out-of-court dispute settlement (Art. 24) and vulnerable customers (Art. 24).

2.4.4 Infrastructure regulation

Rules on infrastructure regulation are covered by several chapters of the draft Directive and Regulation, and represent an important part of the package. In line with the 'two infrastructure pathways', the regime distinguishes between hydrogen and natural gas infrastructures.

Access regime

General principles for the regime for infrastructure access are defined in Chapter II, Section 1 (Art. 3) of the proposed recast Regulation. Chapter IV of the proposed recast Gas Directive comprises three sections that cover: **access to natural gas infrastructure**, including renewable and low carbon gases (Section I, Art. 26-30); **access to hydrogen infrastructure**, including TPA regime for hydrogen networks, terminals and storage (Section II, Art. 31-33); and **refusal of access and connection, for both natural gas and hydrogen** (Section III, Art. 34). Chapters II and III of the proposed recast Regulation supplement the Directive. Chapter II contains rules on **third-party-access** services concerning TSOs (Art. 5) and hydrogen network operators (Art. 6), as well as access to services concerning natural gas storage, hydrogen terminals and LNG facilities and hydrogen storage facilities (Art. 7). Chapter II, Section 3 of the proposed recast Regulation contains rules on the need for TSOs to **offer capacity for renewable and low carbon gases** (Art. 18).

Rules applicable to transmission, storage and system operators of natural gas

Chapter V of the proposed recast Directive details the tasks of natural gas transmission, storage and LNG system operators (Art. 35) and confidentiality rules for natural gas TSOs and transmission system owners (Art. 36). The draft Directive foresees common rules on the decision-making powers of the responsible TSOs and network operators regarding the connection of new production facilities for renewable and low carbon gases to the transmission system (Art. 37) and the connection of natural gas and hydrogen to the transmission system and the hydrogen network (Art. 38). The Gas Regulation completes the Directive with rules on: transparency requirements concerning TSOs (Art. 30), transparency requirements concerning natural gas and hydrogen storage facilities, LNG facilities and hydrogen terminals (Art. 31), record keeping by TSOs (Art. 32).

Chapter II, Section 2 of the proposed recast Regulation contains rules on network access, including on: tariffs for access to networks (Art. 15), tariff discounts for renewable and low carbon gases (Art. 16), revenues for gas TSOs (Art. 17).

Distribution system operations of natural gas, including renewable and low carbon (RES&LC) gases

Chapter VI of the proposed recast Directive sets rules on distribution system operation of natural gas that include: the designation of distribution system operators (DSOs) (Art. 39), the definition of their tasks (Article 40), and the decision-making powers regarding the connection of the new production



facilities for renewable and low-carbon gases to the distribution system (Art. 41). The chapter also contains rules related to the unbundling of DSOs (Art. 42). Additional rules cover the confidentiality obligations of distribution system operators (Art. 44) and closed distribution systems (Art. 44), and combined operator (Art. 45).

Chapter II, Section 4 of the proposed recast Gas Regulation deals with the regime for DSOs, with rules on firm capacity for renewable and low carbon gases to the distribution system (Art. 33), transparency requirements (Art. 35). The role of the European entity for DSOs is notably addressed in the draft recast Regulation (Art. 36, 37, 38). Article 8 of the proposed recast Regulation defines rules for the market assessment to be performed by LNG and storage system operators in terms of demand for new investments allowing the use of RES&LC gases in their facilities.

Rules applicable to the dedicated hydrogen networks and their operators

Chapter VII of the proposed recast Directive deals with dedicated hydrogen networks and defines the tasks of hydrogen networks, storage and terminal operators (Art. 46). It also contains rules on existing hydrogen networks (Art. 47) and geographically confined hydrogen networks (Art. 48), hydrogen interconnectors with third countries (Art. 49), and confidentiality for operators (Art. 50). Chapter III of the draft recast Regulation contains rules on dedicated hydrogen networks: cross-border coordination on hydrogen quality (Art. 39). Chapter III of the proposed recast Regulation focuses on cross-border coordination on hydrogen quality, the European Network of Network Operators for Hydrogen (ENNOH), its tasks, Ten Year Network Development Plan (TYNDP) for hydrogen, costs, and consultation, the monitoring by the Agency for the Cooperation of Energy Regulators (ACER), regional cooperation, and transparency requirements. Transparency requirements are set for hydrogen network operators (Art. 48), and record keeping in the hydrogen system (Art. 49).

Chapter VIII of the proposed recast Directive elaborates on network development and powers to make investment decisions (Art. 51) and hydrogen network development reporting (Article 52). It also provides for rules on the financing of cross-border hydrogen infrastructures (Art. 53).

The proposed recast Gas Regulation contains rules on the organisation and duties of the European network for TSOs for gas (Art. 21, 22, 23), and cooperation of TSOs (Art. 28). The draft Gas Regulation complements the Directive's provision concerning the role and tasks of ENNOH (Art. 40, 41, 42). Regional cooperation of hydrogen network operators is also foreseen (Art. 47).

Capacity allocation mechanisms and congestion management procedures

Chapter II, Section 1 of the proposed recast Gas Regulation defines principles of capacity-allocation mechanisms and congestion-management procedures (Art. 9 and 11), trading of capacity rights (Art. 11), balancing rules and imbalance charges (Art. 12), certification of TSOs and hydrogen network operators (Art. 13), and cooperation of transmission system operators (Art. 14).



Gas quality and blending

The proposed recast Gas Regulation contains rules on the cross-border coordination on gas quality (Art. 19), as well as on hydrogen blends at interconnection points between Union Member States in the natural gas system (Art. 20).

Infrastructure agreements with third countries

Article 79 of the proposed recast Directive contains general rules as to the possibility for TSOs, hydrogen network operators and other economic operators to maintain in force or conclude technical agreements on issues concerning the operation of pipelines between an EU Member State and a third country, as long as these agreements are compatible with EU law or relevant decision of the regulatory authorities, and is notified to the regulatory authorities of the Member States concerned. Article 81 provides for derogations to the rules on natural gas transmission lines when those go to or originate from third countries. Article 82 provides rules for the conclusion of infrastructure agreement with third countries.

2.4.5 Role of regulatory authorities

Chapter X of the proposed recast Directive defines the regime for regulatory authorities, including rules on their designation and independence (Art. 70), on their general objectives (Art. 71), on their duties and powers (Art. 72), on the manner to deal with decision making and complaints (Art. 73). The chapter also contains rules on regional cooperation between regulatory authorities on cross-border issues (Art. 74). Finally, the chapter covers issues of compliance with the network codes and guidelines (Art. 75), and on record keeping (Art. 76). The proposed recast Regulation addresses the role of regulatory authorities in Art. 25.

The role of ACER is precised in several parts of the Gas Directive and Regulation. The monitoring role of ACER is addressed in Article 29 of the proposed recast Gas Regulation.

2.5 Balance between EU harmonised legislation and dynamic regulation

Before moving forward with the in-depth analysis, the question of the regulatory approach to be applied to a sector still at its early stage must be raised. Legal frameworks have an important enabling role, but they must also take into account the stage of development of the sector. They should notably enable technology innovation, including further digitalisation, adaptation of usage, and new products and services. To compare with, when the first gas market directive was adopted in 1998,⁵² the gas market was already developed, based on large infrastructures. Even then, the decision was made to follow a gradual regulation of the sector, that further matured through three legislative packages. For this reason, **regulatory models existing in mature markets cannot be copied to markets which are still emergent. This calls for an evolutive and adaptive regulatory approach, based on a mix between**

⁵² Directive 98/30/EC of the European Parliament and of the Council of 22 June 1998 concerning common rules for the internal market in natural gas.



harmonised legislation and elements of dynamic regulation until the new energy mix reaches a steady state.

In their joint Bridge to 2025 Conclusions Paper,⁵³ ACER and the Council of European Energy Regulators (CEER) argue in favour of ‘a new system of dynamic and targeted regulation’ in EU law in the sector of decarbonised gases, in order to notably improve market functioning and address emerging issues. They also point out the challenge for policy and regulation to balance the need for predictability and the need to support innovation.⁵⁴ A dynamic regulatory approach is particularly relevant in areas where new assets, products and activities are still developing, and where it might be difficult to set harmonised rules today. Ultimately, dynamic regulation became part of CEER’s 3-D-Strategy on digitalisation-decarbonisation-dynamic regulation.

Dynamic regulation relies on a close monitoring of the energy market by regulatory authorities at national level, supported by ACER at the EU level when necessary. Regulatory authorities may decide on appropriate regulatory intervention at national and regional level, notably with the objective to avoid any risk of abuse of dominant position by network owners. This intervention should be based on pre-defined EU-wide regulatory principles that will enable a level-playing field within the internal energy market. Indeed, a regulatory system cannot rely solely on dynamic regulation, and such approach must be balanced with legal certainty to ensure the necessary investments and avoid a risk of fragmentation of the legislation within the EU.

The most common dynamic regulatory tools are: regulatory sandboxes, pilot projects, and consultation procedures with market participants, all these in complement to classic regulatory tools.⁵⁵ The main areas where dynamic regulatory tools have been implemented are: access conditions to networks for the experimental deployment of innovative technologies and services, tariff structure, price and revenue control, regime for energy communities, and smart metering.

However, a pure dynamic approach cannot be favoured, particularly if it hampers the respect of some minimum levels of European standardisation and harmonisation, raising barriers for both the internal energy market and interoperability of the energy system. As pointed out in the Impact Assessment Report accompanying the proposal for recast Gas Directive and Gas Regulation, this might result in too high lack of legal certainty and risk of regulatory fragmentation across the Member States, with possible negative effects on network interconnectivity and, as a result, on the integration of hydrogen market(s).⁵⁶

There is also an important timing element in the introduction of the new regime proposed in the Hydrogen and Decarbonised Gases Package. The ultimate goal for the EC is to establish ‘a competitive

⁵³ ACER and CERRE, Bridge to 2025 Conclusions Paper, 19 September 2014.

⁵⁴ Ibid. p. 16.

⁵⁵ CEER, CEER Approach to More Dynamic Regulation, 8 April 2021.

⁵⁶ Commission Staff Working Document, Impact Assessment Report, SWD(2021) 455 final, 15.12.2021, point 5.2 Options discarded at an early stage.



hydrogen market with dedicated infrastructures', but the market rules need to be flexible enough to let the market develop at the start. Also, it is fair to assume that the market will develop at different paces in Europe, more rapidly in some countries than in others. Therefore, the EC proposes that the new market rules (i.e., unbundling rules, access regime and TPA) will be applied in two phases, before and after 2030, and that some few exemptions will continue to apply after that date.

A dynamic approach cannot mean regulatory uncertainty in the legal regime applied. The proposal for Gas Directive and Regulation foresees the adoption of several delegated and implementing acts. The late adoption of such acts will create a high risk of regulatory uncertainty and refrain investments, as already witnessed with the adoption process for delegated acts on hydrogen and low carbon gases under REDII. A very strict regulatory formulation of extensive requirements for the nascent technologies can also cause an investment leakage to other economic zones, especially considering more advantageous conditions for hydrogen in these latter ones (e.g., the US Inflation Reduction Act). Any flaw in the design of the regulation for these first-time developments could cost the system considerably in terms of synergies, efficiency and affordability for the integration of renewables. The whole set of circumstances calls for a very clear, effective, simple and dynamic approach to regulation, as a prerequisite for market development. It is not an easy balance to achieve, and complexity is very high with multiple interlinkages among many regulations.

Based on an assessment of the subsidiarity and proportionality principles, the European Commission has proposed to adopt harmonised legislation on the following elements:⁵⁷

- criteria ensuring a non-discriminatory access to natural gas and hydrogen systems;
- the setting of harmonised principles for tariffs, or the methodologies underlying their calculation, for access to the natural gas network, but not to storage facilities;
- third-party access services;
- principles for capacity-allocation;
- principles for congestion-management;
- transparency requirements for grid operators;
- balancing rules and imbalance charges;
- facilitation of capacity trading.

Not all these elements of regulation are subject to full harmonisation, but concern for example harmonisation of methodologies, that is in line with current practice.

In terms of balance between harmonisation and dynamic regulation, it seems particularly critical to leave sufficient flexibility to local markets, in particular for renewable gases. Under a more flexible approach, the regulatory authorities will play a central role in monitoring and adjusting the need for regulatory intervention to avoid any distortion on the market. Likewise, more flexibility will probably be necessary on: the transition from regulated and negotiated tariffs for access to hydrogen networks,

⁵⁷ See notably Draft Recast Gas Regulation, Art. 1.



due to the burden and complexity of elaborating tariffs before moving to negotiated access; the choice of unbundling model, where the independent transmission operator model (ITO) could remain an option instead of a strict deadline to 2030 for moving to ownership unbundling. **These examples of mix between harmonised provisions and dynamic regulation would accompany the development of the markets from a bottom-up approach.**

The regulatory approach needs to be evolutive, based on a mix of harmonised legislation and dynamic regulation, also because the timeline for change is difficult to predict with certainty. In the Commission's proposal, 2030 is defined as a threshold date for many elements of the regulatory regime (e.g., unbundling, tariffs).⁵⁸ In previous studies, the transitional phase was set to start from the early twenties to about 2045, followed by a steady state around and post 2050, a time where most natural gas should be phased out of European networks.⁵⁹ With the series of new long-term gas sales and purchase agreements⁶⁰ signed by European companies following the war in Ukraine, such a complete phase out will not happen before 20-25 years. According to the 'hydrogen scenario' of the Commission's 2018 Long-term Strategic Vision, the adjustment of gas distribution grids and heating equipment to accommodate high shares of hydrogen is to allow for a mix up to 50% in gas distribution in 2050 and 70% in 2070.⁶¹

In conclusion, the traditional regulatory mechanisms for infrastructure management must be covered by the EU legislation (e.g., unbundling, access regime, capacity-allocation, congestion management, etc.), but not all elements need to be fully harmonised. On several aspects, adopting common criteria or harmonised methodologies is sufficient.

The cross-sectoral perspective (e.g., between natural gas and hydrogen) must be better taken into account. Some provisions (e.g., on ownership unbundling for gas TSOs and hydrogen network operators) can be too strict to enable the hydrogen or RE-LC gases market to develop across sectors. This applies to both TSOs and DSOs.

Sufficient flexibility must be left to local markets, in particular for renewable gases. More flexibility is needed on: the transition from regulated and negotiated tariffs for access to hydrogen networks; the choice of unbundling model, where the ITO could remain an option instead of a strict deadline to 2031 for moving to ownership unbundling.

A hard threshold date in 2030 for the full application of the main regulatory regime is highly ambitious and premature, even if fast track permitting procedures are applied. It is also too static to let the market solutions develop based on a bottom-up approach. There are also too much uncertainties related to the international situation and how energy supply routes to Europe will

⁵⁸ During the Council negotiations, it has been proposed to postpone the threshold date to 2035.

⁵⁹ European Commission, ASSET Study on The role of Gas DSOs and distribution networks in the context of the energy transition, 2020, p. 40-41.

⁶⁰ Long-term gas and sales purchase agreements can last for 10 to 25 years.

⁶¹ In-Depth Analysis in support of the Commission Communication COM(2018) 773 'A Clean Planet for all A European long-term strategic vision for a prosperous, modern, competitive and climate neutral economy', 28 November 2018, p. 320.



develop. A more flexible approach, as proposed during the ongoing negotiations, should be applied to the transitory phase, where 2030 can be kept as a common objective or postponed, and exemption or derogations are allowed for a period of for example three to five years. Exemptions or derogations must be based on clear criteria (e.g., emergent market, geographically confined networks), and be subject to NRA approval and conditions.



3. MARKET DESIGN RULES FOR GAS INFRASTRUCTURES

Based on the review of the main components of the proposals for Gas Directive and Regulation and the current status of hydrogen and renewable gases projects in Europe, **grid infrastructure regulation is identified as a critical element in the short term development of these gases** (3.1). It will therefore be the focus area for the rest of the report. As a common approach, the report **recommends that the regulation of EU gas grid(s) should be based on a series of four key guiding principles** (3.2). Then, **three specific grid elements of the EU proposals are chosen for a detailed analysis** (3.3).

3.1 Focus on gas grid infrastructures: market entry conditions

The role of European gas grid infrastructures in ensuring market entry

EU legislation distinguishes between different types of gas grid infrastructures and installations, which are encompassed by the broader term of 'system'. Pursuant to the Gas Directive 2009/73/EC, the 'system' means transmission and distribution networks, LNG facilities and/or storage facilities owned and/or operated by a gas undertaking, including linepack and facilities supplying ancillary services and other services necessary for providing access to transmission, distribution and LNG.⁶² Although the Gas Directive deals primarily with natural gas – including LNG - it also applies 'in a non-discriminatory way' to biogas, gas from biomass and other types of gas 'in so far as such gases can technically and safely be injected into, and transported through, the natural gas system.'⁶³

Therefore, the Gas Directive already opens the possibility of injecting other types of gases than natural gas into the natural gas system, subject to compatibility and safety requirements. Existing gas infrastructures can be used for injecting hydrogen and other low-carbon/renewable gases, but also for storing gases. This will enable the re-use or re-purposing of existing assets, which represents a cost-efficient pathway to decarbonisation and addresses the risk of gas infrastructure becoming stranded assets.

Gas infrastructures are well spread in Europe, offshore and onshore, both in connection to production and consumption.⁶⁴ They can contribute to sector coupling between electricity, gas and heat, but also between sectors, such as industry, transport, agriculture and heating. With solutions like power-to-gas, gas infrastructures can enable the further integration of renewable energy sources into the internal energy market, including through storage, but can also supplement electrification efforts, bringing resilience, flexibility and security of supply to the energy system.

However, to release the full potential of both low carbon hydrogen and renewable gases, it is necessary to develop a clear legal framework for gas infrastructures, taking into account the

⁶² Directive 2009/73/EC, Art. 2 (13).

⁶³ Directive 2009/73/EC, Art. 1.2.

⁶⁴ System Development Map 2020-2021, ENTSG-Gas Infrastructure Europe, available at https://www.entsog.eu/sites/default/files/2021-11/ENTSG_CAP_2021_A0_1189x841_FULL_066_FLAT.pdf



differences in physical characteristics of the different gases as well as the demand points and usages. The European Commission is therefore calling for the development of 'dedicated hydrogen infrastructures' on the long term⁶⁵, following the two infrastructure pathway defined in its Impact Assessment (see Section 2.2 above).

The importance of grid access for hydrogen and renewable gases

According to the Commission, renewable hydrogen is expected to be deployed on a large scale from 2030 onwards. The decarbonisation of the energy system is expected to result in the emergence of a global and a European hydrogen value chain, reliant on a cross-border hydrogen market.⁶⁶ **But the lack of hydrogen infrastructure investment hinders market development.** This requires to start working on grid development. **The future energy system, which will include a higher share of hydrogen and renewable gases, will require different types of grid infrastructures, at different levels,** including: closed distribution grids, open local distribution (for decentralised renewable and low-carbon gases production within the EU, transport and heating), transmission, import/export (terminalling), conversion, storage. Likewise, there is a need for both grid reinforcement, repurposing and new grid. These are deemed as critical elements for advancing hydrogen market regulation in the short-term, as access to the grid will facilitate the integration of hydrogen and decarbonised gases in existing and new gas networks.

An important factor when developing the legal framework for hydrogen and renewable gases infrastructures is whether it must embrace the European Commission's short-term and long-term goals. The long-term objective fixed by the European Commission is to reach as much renewable hydrogen in the energy system as possible from 2030 onwards.⁶⁷ However, there is a consensus around the need for a transition phase, where the integration of low carbon hydrogen into the energy system will enable building the market (physical and financial) for renewable gases, including renewable hydrogen. In addition, different types of renewable and low carbon gases will develop, at different paces, across Europe in that period. As recognised by the European Commission, 'the renewable and low carbon gases face today regulatory barriers for market and grid access that represent a comparative disadvantage versus gas'.⁶⁸

The EC Impact Assessment recognises five main drivers, related to the problem area of infrastructure:

1. Constrained market and grid access for local producers of biomethane connected to the distribution grids, divergence of rules regarding obligation to connect and costs of grid connection for renewable and low carbon gases and intra-EU entry/exit tariffs hinder the establishment of a fully integrated, liquid and interoperable EU internal gas market.

⁶⁵ European Commission, proposal for a directive on common rules for the internal markets in renewable and natural gases and in hydrogen, COM(2021) 803 final, 15.12.2021, p.1.

⁶⁶ European Commission Ex-post evaluation, p.7.

⁶⁷ In line with the EU hydrogen strategy, the production of renewable hydrogen in the EU should reach 1 million tonnes by 2024 and up to 10 million by 2030. From then onwards, renewable hydrogen should be deployed at a large scale and replace low-carbon hydrogen.

⁶⁸ Proposal for recast Gas Directive, p.2.



2. Differences in gas quality and hydrogen blending levels can negatively impact cross-border flows and end-users, while current quality rules are not fit to deal with future developments.
3. LNG terminals equipped to receive mainly natural gas, limited access for new gases to LNG terminals.
4. Long-term supply contracts for unabated natural gas causing the lock-in of natural gas and hindering supply of renewable gases towards 2050.
5. Current security arrangements only address risks related to the supply of natural gas and not of renewable and low carbon gases.

Decarbonising the gas grid will require tighter interlinks with other types of infrastructure. For example, there is a clear link between clean gases (low carbon) and the nascent CCS infrastructure, although this latter grid is not to be covered in the legislation under revision that refers exclusively to energy carriers.

In conclusion, grid access is key to develop the market for these gases, as access to the physical infrastructures and transparent tariffs for this latter are fundamental for ensuring access to the commodity market. Put it simply, access to the grid conditions access to the market. The other key topic is the regulation of the commodity itself (certification, standards, etc.,) but procedures on these topics are already ongoing and well advanced although not finalised (i.e., REDII, CEN/ISO standards, RNFBOs).

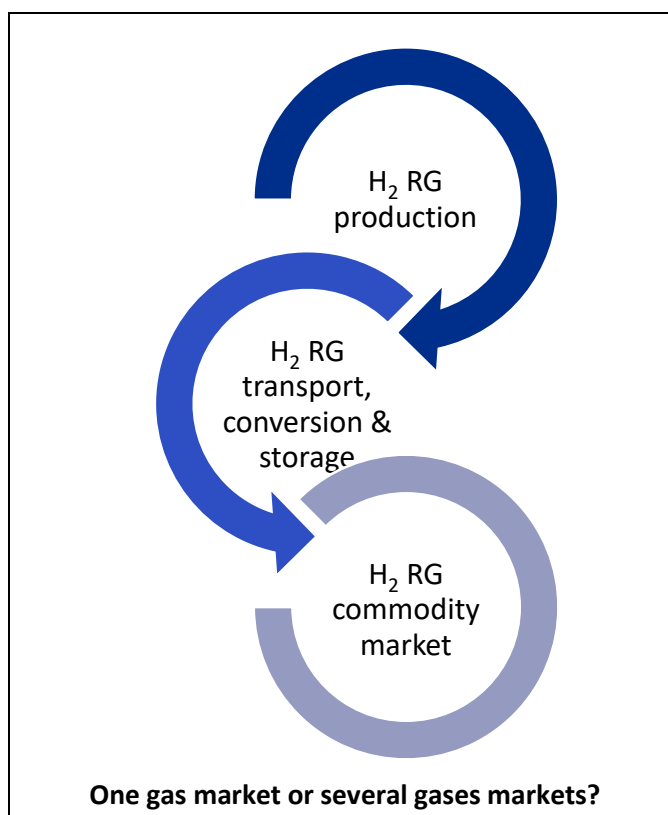


Figure 2: Three points of consideration for the regulation of hydrogen and renewable gases (RG) markets.

Source: Author's own elaboration.



3.2 Common principles for hydrogen and renewable gases infrastructure regulation

The present author argues that the regulation of the gas grid(s) should be guided by the following **four key guiding principles**, in order to enable a higher share of hydrogen and renewable gases within the energy system, in a cost-effective, sustainable and resilient manner⁶⁹:

- Integrated energy system planning, including through the use of EU governance tools (3.2.1);
- Efficient and coordinated permitting procedures for infrastructure projects (3.2.2);
- Safe, effective and smart operation of networks and related infrastructures (3.2.3);
- Evolutive access regime to the grid, based on common minimum rules (3.2.4).

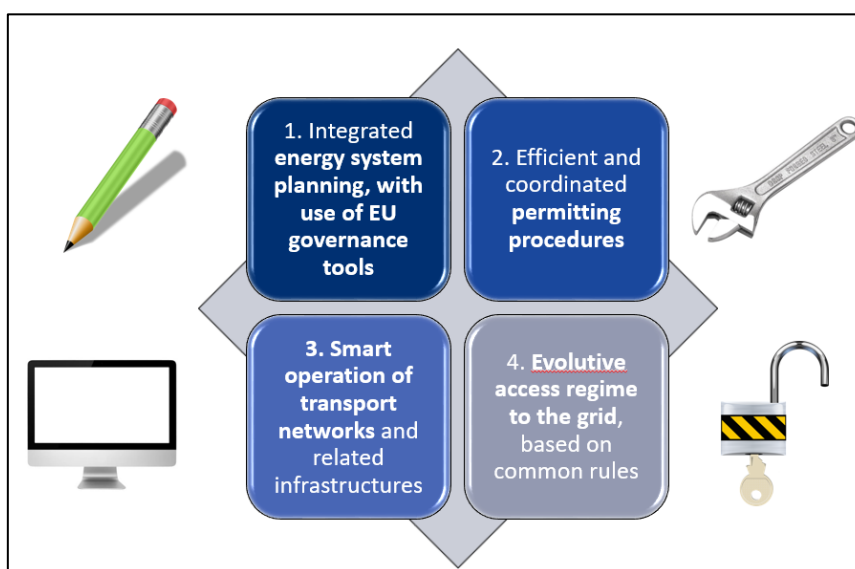


Figure 3: The four key principles for gas market re-design: infrastructure regulation

Source: Author's own elaboration. 'Key principles for gas market re-design: infrastructure regulation', based on C. Banet, in M. Van der Spek et al., 'Perspective on the hydrogen economy as a pathway to reach net-zero CO₂ emissions in Europe', Energy & Environmental Science, 2022

3.2.1 Integrated energy system planning, infrastructure development and governance tools

To enable the integration of hydrogen and renewable gases into the energy market and the coupling of different sectors, it will be necessary to **apply an 'energy system' approach from the inception of energy policy, which means applying integrated energy system planning**. This integrated approach will not reverse the acquis of the liberalisation of the energy market and the principles of unbundling, but it will enable a better coordination between production, transport infrastructure, usages, and

⁶⁹ C. Banet, in M. Van der Spek et al., 'Perspective on the hydrogen economy as a pathway to reach net-zero CO₂ emissions in Europe', Energy & Environmental Science, 2022, DOI: 10.1039/D1EE02118D



even management of natural resources, by better connecting production processes to infrastructure developments and usages. This is also relevant for biogas and biomethane.

To start with, it must be reminded that energy planning occurs at both at the **energy system** and the **energy infrastructure** levels.

Energy system planning

Energy system planning is the process of designing and implementing policies regarding the development of the energy system in all its components (generation, storage, conversion, transport, and consumption). Energy planning can be undertaken at a local, national, regional or even global level. A major and growing challenge for energy planning is to ensure consistency between different policy objectives and different planning levels. While energy modelling is often the basis of energy planning policies, the need to clarify processes, objectives and responsibilities through legal requirements arises rapidly. Historically, countries have developed their national energy planning framework differently, both in terms of legal bindingness (from a simple guidance document to a binding legal framework) and content (from few general objectives and targets to full programming law). Examples of comprehensive legal frameworks on energy planning are, however, rare. Recently, long-term energy planning has become a more common tool supported by dedicated legal requirements, which may contribute to spreading good practices and to harmonisation, at least within the EU.

Here, the effects of the liberalisation of energy markets on energy planning processes must be acknowledged. The intended consequence of liberalisation was to split former incumbents into different entities and to let new competitors enter competitive market segments (while natural monopolies must be regulated). Under pre-liberalisation models, energy planning was conducted internally, within companies, and in addition often combined electricity, gas and heat in their portfolio. **The multiplication of market actors, as part of the liberalisation reform, has created new challenges for energy system planning.** In many jurisdictions, generation and transport infrastructure planning are conducted individually and separately from each other. This calls for new forms of coordination among a larger number of actors.⁷⁰

Energy infrastructure planning

By contrast, energy infrastructure planning has been subject to detailed regulation for a long time, including in EU legislation. It is also pursued in an increasingly integrated manner, between TSOs at the regional and EU levels (through the Ten Year Network Development Plans), but also between TSOs and DSOs at the national level.⁷¹

⁷⁰ This has been described as 'de-integration' of energy planning. See A. Weber et al., 'Long-term Power System Planning in the Context of Changing Policy Objectives', Berlin University of Technology, 2013, 3.

⁷¹ Catherine Banet, 'Planning for Resilience: Resilience as a Criterion in Energy, Climate, Natural Resources, and Spatial Planning Law', in C. Banet and others (eds), *Resilience in Energy, Infrastructure, and Natural Resources Law: Examining Legal Pathways for Sustainability in Times of Disruption* (Oxford University Press, 2022), Chapter 4, p. 50.



Integrated planning

With the view of ramping up the use of hydrogen and renewable gases into the grid(s), there will be a need to increase requirements in terms of integrated energy system planning. This implies a better coordination, through integrated planning processes, of grids development to match the expected hydrogen and renewable gases (particularly biomethane) production. Interestingly, the Gas Directive 2009/73/EC already refers to and even defines ‘long-term planning’ with the specific meaning of planning supply and transport capacity of natural gas undertakings on a long-term basis, for the purpose of meeting demand, diversification of sources and security of supply to customers.⁷² **Member States may also introduce long-term planning as part of the public service obligations that they can impose on gas undertakings,** in relation to security of supply, energy efficiency/demand-side management, and for the fulfilment of environmental goals including renewable energy sources.⁷³ Based on the arguments put forward above, it would be beneficial to keep that approach and extend it to hydrogen and renewable gases. To a large extent, it is what the European Commission is proposing to do in the REPowerEU Plan, suggesting **to perform ‘regional assessments of network development’ and to match them with the potential of sustainable biomass production. This ‘matching’ exercise should also include the mapping and identification of ‘renewables go-to areas’ as regards biogas and biomethane production plants.**⁷⁴ **This approach should be kept and reinforced in the final text of the Gas Directive and Regulation.**

In liberalised markets, energy models and plans have been elaborated separately for the different energy carriers and the different chain segments (generation, infrastructure, supply). The upcoming *energy system integration*⁷⁵ calls for a more holistic approach, i.e., a ‘system approach’, to energy system planning. Several regulatory incentives already exist in the legislation. The EU Governance Regulation calls for moving towards a system approach in energy planning,⁷⁶ and makes direct reference to it under the security of supply-dimension of the Energy Union.⁷⁷ A second reference is made in the draft revised Regulation on guidelines for trans-European energy infrastructure (TEN-E), where TSOs must follow an ‘energy-system wide’ approach when elaborating their methodologies for cost-benefit analysis to projects of common interest and projects of mutual interest.⁷⁸ While those

⁷² Directive 2009/73/EC of 13 July 2009 concerning common rules for the internal market in natural gas, as amended, Art. 2(30) (Gas Directive).

⁷³ Ibid, Art. 3.2.

⁷⁴ Commission Staff Working Document, ‘Implementing the REPowerEU Action Plan: Investment needs, hydrogen accelerator and achieving the bio-methane targets’, SWD(2022) 230 final, Brussels, 18.5.2022, p. 40. In its explanation of the measure, the Commission writes the following :

‘The outcome should be an assessment of the network development needs, matching them with the potential of increased biogas and biomethane production derived from the national biogas and biomethane strategies. The analysis should be undertaken by the distribution system operators (DSOs), in coordination with transmission system operators (TSOs) and national regulatory authorities.

As a result, regional maps with the highest potential for biogas and biomethane production due to the availability of raw materials (i.e. waste/ residues), existing operating biogas plants and current connection capacity should be established.

This action should take into account the permitting legislative proposal adopted by the Commission on 18 May 2022, in particular the mapping and identification of ‘renewables go-to areas’ as regards biogas and biomethane production plants.’

⁷⁵ Energy system integration refers to the planning and operating of the energy system ‘as a whole’, across multiple energy carriers, infrastructures, and consumption sectors.

⁷⁶ Governance Regulation, Recitals (3), (23), (25), (39), Art. 4.

⁷⁷ Ibid, Art. 8.2(a).

⁷⁸ Council of the EU, Proposal for a Regulation on guidelines for trans-European energy infrastructure and repealing Regulation (EU) No 347/2013, General Approach of 11 June 2021, Draft Art. 11.1.



provisions offer an opportunity to promote *integrated energy system planning*, the requirements remain quite general and indirect.

To reach the envisaged volumes of hydrogen and renewable gases within the European energy system, it will be necessary to ensure enough capacity in transport infrastructures and to develop an appropriately designed infrastructure network connecting the relevant supply and demand points.

Based on the assumption of a two-infrastructure pathway, the planning of the hydrogen network and of the methane-based network would occur separately. This does not prevent the responsible operators to plan their respective grids in a more integrated manner – following an intermediary pathway - , but it must be acknowledged that hydrogen offers a higher level of energy system integration, notably with electricity, because of the different production methods. On its side, biomethane enables the integration of decentralised biogas and biomethane production.

Energy Union governance mechanism

At the EU level, Regulation (EU) 2018/1999 on the Governance of the Energy Union (the Governance Regulation) promotes integrated energy system planning as a new common tool for achieving the objectives of the Energy Union and the Union's 2030 Climate and Energy Framework. The Governance Regulation defines different instruments as part of the 'governance mechanism',⁷⁹ two of which being the integrated national energy and climate plans (NECPs) and the long-term strategies (LTSS).⁸⁰ The NECPs and the LTSS offer an opportunity to advance in the effort of integrated energy system planning. However, the current focus of the Governance Regulation is primarily on the formal integration of the processes for the elaboration of NECPs, and on the identification of interlinkages between the five dimensions of the Energy Union⁸¹ with a target compliance perspective rather than on the energy system integration. The requirements in terms of integrated energy system planning remain quite general and indirect, whilst they are not part of the assessment criteria for the elaboration and assessment of the NECPs and LTSS. **An option for improvement would be to incorporate a requirement to systematically assess the potential for energy system integration, including for the different energy carriers/vectors such as hydrogen and renewable gases, as part of the integrated planning across sectors, including climate.**

In the case of renewable gases, depending on the sources of production, an integrated planning approach between the energy system and land-use planning (for forestry resources for biomass) and agriculture (for manure for biomethane), would be extremely relevant. This could enable planning infrastructure development in close relation to production sources. In its REPowerEU Plan, the European Commission proposed a slightly similar idea, with the development of national strategies on sustainable biogas and biomethane production, and the use or integration of a biogas

⁷⁹ Regulation (EU) 2018/1999, Art. 1.1.

⁸⁰ Regulation (EU) 2018/1999, Art. 1.1.

⁸¹ Regulation (EU) 2018/1999, Art. 3.3(b).



and biomethane component in the NECPs.⁸² According to the Commission, the aim of such national strategies would be 'to assess the Member States' national potentials for biogas and biomethane production and the effective integration of the latter into the grid'⁸³. The strategies should also provide a trajectory to reach the identified national potentials by 2030 and 2050.

3.2.2 Efficient and coordinated infrastructure permitting procedures

The complexity of existing permitting procedures for hydrogen and renewable gases is a risk factor in the development of these projects. As of now, **a number of separate permits must be obtained through the whole supply chain:** permits for hydrogen/ renewable gases production, grid connection and transmission, storage licenses (if this is part of the infrastructure), emissions permits, building permits under urban and land planning legislation, and safety and civil protection permits. Most of these permits require a preliminary environmental impact assessment and public consultation rounds. Parallel permitting procedures is a well-known risk of delays for such projects. It increases administrative and financial burdens for project developers. This is particularly true in cases of interrelated, overlapping activities which require permissions from several agencies responsible for separate components of the supply chain. Some countries have developed good practices, but the permitting procedures are still cumbersome in most EU countries.

Simplification of the permitting process for hydrogen and renewable gases could be achieved through conditional or unconditional permit exemptions for certain elements of the supply chain. Simplification could also be achieved through the creation of a single regulatory body ('one-stop shop' or single permit) to oversee permitting processes for the entire supply chain, or through mandated coordination between existing regulatory agencies responsible for permitting processes. There is a need to streamline permitting processes at both the national and the EU level to ensure that the various levels of consent are considered in a timely and cost-effective manner. As a positive example, EU cross-border energy infrastructure projects selected as Projects of Common Interest deal with a single national authority for obtaining permits and benefit from an accelerated permit granting process.⁸⁴ Another example is the possibility given to Member States to exempt renewable energy projects from the environmental impact assessment (EIA) under specific conditions⁸⁵, as laid down in the Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy (emergency measures).⁸⁶

A common requirement for permitting procedures, like under REDII, is that they are necessary, transparent and proportionate.⁸⁷ This includes ensuring coordination between agencies,

⁸² Commission Staff Working Document, 'Implementing the REpowerEU Action Plan: Investment needs, hydrogen accelerator and achieving the bio-methane targets', SWD(2022) 230 final, Brussels, 18.5.2022, p.35.

⁸³ Ibid.

⁸⁴ Regulation 347/2013 of 17 April 2013 on guidelines for trans-European energy infrastructure [2013] OJ L115/45, art 1(2).

⁸⁵ E.g. the project is located in a dedicated renewable or grid area for a related grid infrastructure which is necessary to integrate renewable energy into the electricity system, and that the area has been subjected to a strategic environmental assessment in accordance with Directive 2001/42/EC.

⁸⁶ Council Regulation (EU) 2022/2577 of 22 December 2022 laying down a framework to accelerate the deployment of renewable energy, Art. 6.

⁸⁷ Directive (EU) 2018/2001, Recital 43.



implementing concrete time limits for decisions (with sanctions for overruns), transparency with regard to process and cost, as well as the obligation to designate one-stop shops for authorisation, certification and licensing.⁸⁸ It may be **valuable for similar legislative requirements to be developed for the hydrogen and renewable gases supply chain, particularly in relation to the permits required for various sectoral applications of these gases.**

A final important consideration is the role of permitting processes in increasing public support and acceptance of hydrogen and renewable gases activities. Requirements for the inclusion of impact assessments, consultation processes and compensation mechanisms or ownership for local populations could ensure the feasibility of the project, particularly with regard to supply chains involving hydrogen and renewable gas storage, recharging stations or large-scale production trials, by offering a platform to communicate benefits and cement public support before construction. **The respect and improvement of public consultation procedures is therefore fundamental for avoiding local opposition and related litigation risks. It may also result in additional benefits for both the project developer and local populations.**

3.2.3 Safe, effective and smart operation of networks and related infrastructures

The deployment of hydrogen and renewable gases is at the same time benefiting from the existing regime for gas and facing the constraints of that same regime. Operation of hydrogen networks and related installations or services – such as storage – are good examples of this. Certain TSOs or DSOs may be interested and well placed for taking operatorship responsibility for hydrogen transport and storage infrastructure and commercial operations. However, they may be prevented to do so by unbundling rules.

At the EU level, both the Electricity and Gas Directives define requirements for the unbundling of upstream/downstream ownership structures and functions. The objective of the unbundling regime is to foster competition on the energy market by separating the activities of energy generation and supply from the operation of transmission and distribution. There is currently a lack of legal clarity with regards to the grid operators' unbundling requirements between commercial and grid activities regarding new activities such as hydrogen storage. Key to the deployment of hydrogen projects and the integration of hydrogen into the internal energy market will be to precise the legal qualification of hydrogen storage activities, including the applicability of the unbundling regime.

3.2.4 Evolutive regime for access to gas grid based on common minimum rules

Access to the gas grid

Although grid connection requirements exist, uncertainties around grid access conditions may remain, particularly for new types of energy generation capacity like hydrogen and renewable gases, depending on the level of national experimentation. Grid access is a significant factor for integrating hydrogen and renewable gases into the energy market, and in determining the viability – including

⁸⁸ Directive 2018/2001, art 15(1) and 16.



commercial – of new energy projects. **To reduce this uncertainty, specific legislative measures have been introduced, specifically priority or guaranteed access and dispatch.** Priority access to the grid provides assurance to connected energy generators that they will be able to sell and transmit their energy when the source is available. Guaranteed access ensures that all energy that is already sold (because integrated into the spot market) obtains access to the grid. Those two measures must therefore be seen as counterparts. They have already been used in the context of the Renewable Energy Directive 2009/28/EC (now repealed) for enabling the integration of electricity generation from renewable energy sources into the internal energy market.

Under existing rules, the EU allows Member States to grant mandatory priority or guaranteed access to the grid for renewable energy, indigenous fuels and CHP-applications (combined with guaranteed transmission of electricity). This access can be granted, provided operations are in accordance with the national electricity permitting scheme and the Electricity Directive. There is therefore precedent of allowing priority or guaranteed access to the grid for low-carbon energy sources. Importantly, the Energy Efficiency Directive (also under revision) states that priority access for CHP to the grid must not endanger renewable energy expansion. This tends to indicate that EU rules favour the deployment of renewable energy (including therefore renewable hydrogen) over alternative low-carbon energy sources (such as fossil hydrogen with CCS), for the purpose of supporting primarily renewable energy sources. **This calls for a review of the grid access regime in the view of integrating larger volumes of low carbon hydrogen – including green hydrogen – into the energy market,** as envisaged in the EU Hydrogen Strategy and most of the newly released national hydrogen strategies.

Third party access (TPA) regime and tariffs conditions

TPA is commonly defined as the legally enforceable right of economically independent undertakings to access and use, under specific terms (regulated or negotiated), various energy network facilities owned by other companies.²⁶⁶ TPA is a fundamental regulatory instrument to address natural monopolies in network industries. In the current state of development of the hydrogen markets, a strict TPA regime seems disproportionate and may even refrain the development of hydrogen infrastructures. When hydrogen is blended with natural gas in natural gas networks, the TPA regime under the gas legislation will normally apply, but the legislation does not foresee yet a clear TPA regime for pure hydrogen networks. To that respect, the original text of the Hydrogen and Decarbonised Gas Market Package contains several concrete proposals for improvement, such as the application of a negotiated access until 2030, followed up by a regulated access after 2030 (proposed to be postponed to 2036 during the Council negotiations). Tariffs conditions, including at injection points and for cross-border interconnections, are also made more precise.

Grid conversion

The conversion of gas grids to hydrogen should be a priority measure in the integration of hydrogen into the energy market. It has a series of benefits, notably in terms of cost saving, local acceptance and environmental protection, by avoiding the duplicating of transport infrastructures. This has been duly taken into account in the Hydrogen and Decarbonised Gas Market Package, but the extent to which gas grid operator investments in grid conversion will be allowed to recover their costs through e.g., tariffs, still need to be further clarified. Notably, the cross-subsidisation of hydrogen networks by



natural gas network revenues could be allowed subject to conditions. Grid conversion operations should also be subject to safety requirements.

3.3 Selected topics for the in-depth analysis

The following key topics have been selected for an in-depth analysis, where the focus is on critical regulatory elements that will shape the market(s) for hydrogen and renewable gases and influence their take-off in the short term:

- the EU governance architecture to better coordinate grid development (3.3.1);
- the strategic role of network operators (transmission, distribution, storage and terminals) (3.3.2);
- the regime for access to the grid for hydrogen and renewable gases (3.3.3).

3.3.1 EU governance architecture for cross-border coordination of gas grids development

(i) The concept of EU governance architecture

The term 'governance architecture' is used with different meanings in the EU climate and energy context. The Governance Regulation is based on the idea that the coordination between Member States' efforts for the attainment of the 2030 and long-term EU objectives and targets need a steering tool at EU level in the form of a 'governance mechanism'. The Regulation lays down the architecture necessary for the implementation of this governance mechanism. The adoption of the Governance Regulation follows previous calls made by stakeholders (such as TSOs and power pools)⁸⁹ to **define an appropriate governance architecture at the European level to ensure efficient market integration**. The European Commission echoes the same call for a stronger EU governance system to address cross-border issues that could represent barriers to the integration of the energy markets.⁹⁰ Part of this model could be the creation of supra-national bodies that would ensure coordination between national actors. Such bodies would complete the already existing cooperation between infrastructure operators and NRAs on matters such as the elaboration of network codes and guidelines.

In the context of gas infrastructures, **governance architecture refers to the overall organisation of the collaboration between actors involved in grid development for gases. At EU level, it deals with the areas of cross-border coordination in the activities performed by grid operators, NRAs, the cooperation between TSOs and DSOs and the role of a European coordination entity, such as ENTSO-E or ENTSO-G. In the Package, the European Commission proposes the establishment of a new European coordination entity, called the European Network of Network Operators for Hydrogen**

⁸⁹ EPEX SPOT, 'Policy paper 2015: Advocacy for an integrated and competitive electricity market in Europe - Ten considerations by EPEX SPOT', Paris, 2015, at 11. In this paper, EPEX SPOT recommended accompanying the electricity Target Model by 'an appropriate governance architecture at European level', that would be applicable on Market Coupling activities. This was deemed crucial to ensure an efficient day-to-day operation of these complex mechanisms.

⁹⁰ Commission Staff Working Document, Evaluation Report, Accompanying the proposal for a Directive and the proposal for a Regulation of the European Parliament and of the Council on the internal markets for renewable and natural gases and for hydrogen (recast), SWD(2021) 457 final, at 58.



(ENNOH). In this section, the following issues are discussed in the light of the proposals made by the Commission: the role of the proposed ENNOH entity, the question of TSO/DSO cooperation and dialogue between DSO and regulators, the role of the new EU DSO entity, and how to put DSOs for biogases/biomethane in today's legal framework.

The set up of an EU governance architecture for gas grids will have great influence on the manner in which grid infrastructures will be planned, developed and therefore which hydrogen and renewable gases production will access the market.

(ii) Establishment of a European Network of Network Operators for Hydrogen (ENNOH) and comparison of EU coordination between hydrogen and natural gas network operators

ENNOH, the new entity that the Commission proposes to establish, will be a separate network operators entity, dedicated solely to hydrogen.

Here it is important to recall the **distinction made in the regulatory regime between 'hydrogen network' and 'hydrogen system'**. Based on the draft proposal for a Directive, 'hydrogen network' means *'a network of pipelines used for the transport of hydrogen of a high grade of purity with a view to its delivery to customers, but not including supply'*.⁹¹ 'Hydrogen system' has a broader meaning and means *'a system of infrastructure, including hydrogen networks, hydrogen storage and hydrogen terminals, which contains hydrogen of a high grade of purity.'* This definition mirrors the one for 'natural gas system'.

Another important **distinction is made in the regulatory regime for gas grid infrastructures between the ones relating to 'natural gas' and 'hydrogen'**. This is in line with the preliminary standpoint of the European Commission in its Impact Assessment Report that two main pathways will emerge for gases across Europe, one for (i) hydrogen-based infrastructure, i.e., pure hydrogen infrastructures, and (ii) a methane-based infrastructure in which natural gas will progressively be replaced by other sources of methane, including biomethane and synthetic methane, and possibly occasionally blended with hydrogen. As a result of this, the whole regulatory regime for grid is built on this dichotomy between pure hydrogen and methane-based infrastructures.

The establishment of ENNOH will go through a transition phase⁹², with the set up of a 'temporary platform' that will involve ACER as well as relevant market participants, including ENTSO-G, ENTSO-E and the EU-DSO entity (see figure 4).⁹³ The temporary platform will work on the scoping issues relevant for the 'building up of the hydrogen network and markets'.⁹⁴ This confirms the objective of

⁹¹ Draft recast Gas Directive, Art. 2(20)

⁹² The process for the elaboration of the statutes of ENNOH is described in Art. 40(3)-(8) of the draft gas regulation, where the first step is the submission of draft statutes, list of members and rules of procedure by network operators to the Commission and ACER; thereafter ACER has four months to make the necessary consultations and submit its opinion to the Commission; the Commission delivers its opinion within three months; the network operators have three months to adopt and publish the statutes and rules of procedures. In total, the procedure can take up to ten months from the submission of the first drafts to final adoption, i.e. July 2025.

⁹³ Draft recast Gas Regulation, Art. 41(1).

⁹⁴ Ibid.



the Commission to develop a dedicated regulatory framework for hydrogen, both at the level of network and markets. Until ENNOH is established, ENTSO-G will be responsible for the development of the Union-wide network development plans for gas and hydrogen. Therefore, ENTSO-G will be responsible for the early planning of the hydrogen grid infrastructures at EU level.

In this configuration, it seems that the planning of infrastructure for or with renewable and low carbon gases will remain within the competence of ENTSO-G. Indeed, according to draft Gas Regulation, ENNOH will be tasked to cooperate with ENTSO-E and ENTSO-G, reflecting this repartition of sectors among EU energy network operators entities.⁹⁵ The description of the tasks allocated to ENTSO-G refers solely to the 'natural gas transmission network'.⁹⁶ Two main conclusions can be drawn for this. First, based on the definition of 'natural gas', biogases and gases from biomethane will fall under the competence of ENTSO-G. Second, since ENTSO-G is tasked to ensure cooperation between European TSOs, it will only cover transmission matters, and not distribution. Similarly, the mandate of the EU-DSO Entity, as defined in the Electricity Regulation,⁹⁷ is revised and extended to cover 'distribution networks which are part of the natural gas system'.⁹⁸ As a conclusion, **rules related to the EU coordination of transmission of natural gas, including biogases and biomethane, will fall under the competence of ENTSO-G, while EU coordination of distribution networks for the same gases will fall under the competence of the EU-DSO Entity.**

The EU-DSO Entity gets further recognition in the legislative package. It is associated to rule elaboration at different stages, and notably on network codes and guidelines that will set the details of the infrastructure regimes.⁹⁹ It is notable that it will cover both electricity and gas, which could raise some issues of consistency compared to the approach followed for transmission. The approach proposed by the European Commission has been of separating cooperation between European TSOs within electricity on the one hand, and natural gas on the other hand. For distribution, the contrary will apply, with European DSOs for electricity and gas collaborating within the same EU entity. With ENNOH being responsible for the EU cooperation for the whole system, both transmission and distribution, there is a lack of consistency in the approach across vectors. The only reason for not separating cooperation between European DSOs for natural gas and electricity could be to promote sector integration. If so intended, the EU-DSO Entity should then also cover hydrogen, which is not the case. **The recast Directive and Regulation should be more consistent on this point of the EU governance architecture for distribution operators.**

To moderate this apparent strict dichotomy between transmission and distribution for natural gas, certain tasks of ENTSO-G will cover the whole system, i.e., both transmission and distribution.¹⁰⁰ Such is the case for the elaboration of a European supply adequacy outlook that shall cover the overall

⁹⁵ Draft recast Gas Regulation, Art. 42(1)(c).

⁹⁶ Draft recast Gas Regulation, Art. 21-23.

⁹⁷ Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (Electricity Regulation), Art. 52 to 57.

⁹⁸ Draft recast Gas Regulation, Art. 38(1). See as well Art. 37(1).

⁹⁹ Draft recast Gas Regulation, Art. 33-38.

¹⁰⁰ Draft recast Gas Directive, Art. 2(29).



adequacy of the 'gas system'. For other matters, the tasks given to ENTSO-G also seem to extend to distribution, since covering the 'gas networks', but the wording of the draft Regulation would benefit from further clarification on the matter. For example, the list of network codes that ENTSO-G is tasked to elaborate include i.a.,: 'network security and reliability rules', 'network connection rules', 'third party access rules', 'energy efficiency regarding gas networks', or 'cyber security regarding gas networks'.¹⁰¹ A limit to the interpretation of the scope of application of this provision is that network codes 'shall be developed for cross-border network issues and market integration issues'.¹⁰² It shall not either limit Member States' right to establish national network codes which do not affect cross-border trade.¹⁰³ Therefore, it seems that ENTSO-G could adopt network codes encompassing the whole natural gas network (both transmission and distribution), as far as cross-border issues are concerned.

This repartition of coordination competences of transport operators for natural gas is therefore based on the distinction between the transmission and distribution levels. Such a distinction does not appear in the regime for hydrogen transport, since ENNOH will be responsible for the coordination of the European 'hydrogen network', defined as the 'network of pipelines used for the transport of hydrogen of a high grade of purity', although it does not include supply.¹⁰⁴ This is confirmed by the manner in which ENNOH will ensure the cooperation between hydrogen and natural operators. Pursuant to the draft Regulation, ENNOH is to develop recommendations relating to the coordination of technical cooperation between, on the one hand, 'gas transmission and distribution system operators', and, on the other hand, 'hydrogen network operators' in the Union. It appears clearly that the draft legislation does not make a distinction between transmission and distribution levels in the hydrogen network.

¹⁰¹ Draft Gas Regulation, Art. 23(6).

¹⁰² Draft Gas Regulation, Art. 23(7).

¹⁰³ Ibid.

¹⁰⁴ Draft Gas Directive, Art. 2(20).

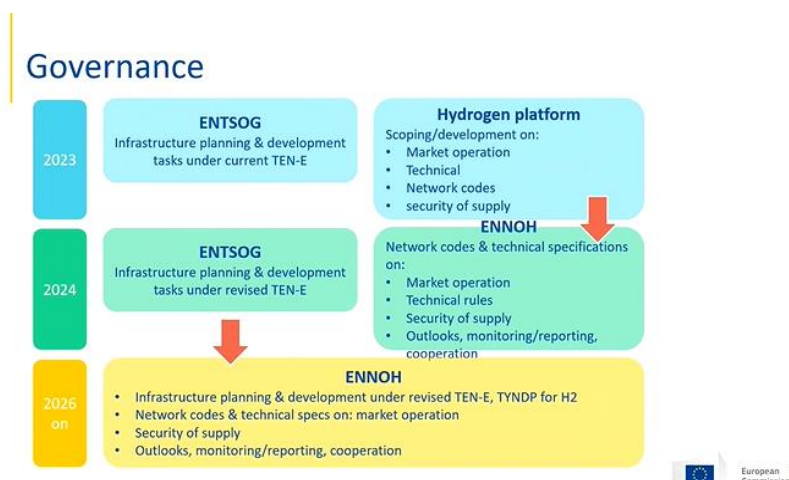


Figure 4: The proposed EU architecture for hydrogen governance

Source: European Commission

ENNOH will notably be tasked with the promotion of a dedicated hydrogen network, the adoption and publication bi-annually of a non-binding Union-wide ten-year network development plan (including a European supply adequacy outlook), cross-border coordination and interconnector network construction, and the elaboration of specific technical rules such as network codes.¹⁰⁵ The objective is to ensure sound management of the EU hydrogen network and facilitate the trade and supply of hydrogen across EU borders. Because the cooperation at EU level concentrates on network infrastructures, the level of EU coordination will be less important for other system infrastructures than networks, i.e., other infrastructures than pipelines, such as LNG terminals and storage facilities.

The idea of creating a new EU coordination organisation has received mixed criticism, as it appears as a too sophisticated set-up for a market that does not yet exist. The European Commission foresees a transitory phase, between ENTSO-G and the moment ENNOH is established. Nevertheless, the proposal is criticised for being too complex and even counter-productive to the objective purposed. Some stakeholders suggested that ENTSO-G could fulfil the role, or even a hydrogen leg to ENTSO-G could be sufficient. As a matter of example, the TYNDP 2022 for gas already includes hydrogen projects.¹⁰⁶

Arguments in favour - A main motivation for the European Commission to propose a separate entity seems to be the objective of making sure that hydrogen networks will develop independently from the influence of gas system operators. Gas networks should then be subject to dedicated rules with a dedicated regulator.

¹⁰⁵ Draft recast Gas Regulation, Art. 42-43.

¹⁰⁶ Include references.



Arguments against - ENNOH will be responsible for hydrogen networks, which may reinforce the separation between the regulatory framework for gases, with on the one hand hydrogen-based infrastructure and on the other hand a methane-based infrastructure in which natural gas will be progressively replaced by other methane sources such as biomethane. This is in line with the vision developed by the European Commission in its Impact Assessment Report.¹⁰⁷

A separate architecture for hydrogen and renewable gases seems even more complex to put in place at the distribution level. The interaction between gas and hydrogen TSOs/DSOs might be unavoidable in practice. A first step will be to distinguish in the legislation between the transmission and distribution of hydrogen, and to provide legal definitions. Concerning network planning, cooperation between TSOs and regulators needs to evolve further. At the moment, there is one joint organisation at EU level. To have several regulators/ENTSO organisations for the different gases might be counter-productive for ensuring energy system integration. In addition, it may complicate the coordination, both in terms of planning and operation, between networks for hydrogen on the one hand, and networks for methane and renewable gases on the other hand. Based on the proposals, networks for methane and renewable gases still seem to fall under the competences of ENTSO-G. In addition, many hydrogen networks will be repurposed from gas ones, which requires a coordination between operators for the management of the assets.

Finally, another fundamental question is the one of the **competence the new organisation will receive in the development of new market rules, particularly network codes**. Pursuant to the draft recast Regulation, ENNOH will be involved in the development of proposals for network codes or guidelines, as its counter part ENTSO-G.¹⁰⁸

(iii) Role of regulatory authorities

The proposal for the recast Gas Directive refers to the role of regulatory authorities (Chapter X). Notably, 'regulatory authorities need to be able to take decisions in relation to all relevant regulatory issues if the internal market in hydrogen is to function properly'.¹⁰⁹ Energy regulators should have the power to issue binding decisions in relation to natural gas or hydrogen undertakings and to impose effective, proportionate and dissuasive penalties on natural gas or hydrogen undertakings, which fail to comply with their obligations, or to propose that a competent court imposes such penalties on them. Energy regulators should also be granted the power to decide, irrespective of the application of competition rules, on appropriate measures ensuring customer benefits through the promotion of effective competition necessary for the proper functioning of the internal market in natural gas and in hydrogen.¹¹⁰ This is an adaptation of the current Gas Directive, with an extension of the scope of hydrogen.

¹⁰⁷ See Section 2.2 above.

¹⁰⁸ Draft recast Gas Regulation, Art. 52.1.

¹⁰⁹ Draft recast Gas Directive, recital 104.

¹¹⁰ Draft recast Gas Directive, recital 105.



The role of regulatory authorities is integrated in the proposed EU governance architecture, notably on the question of the network codes and cross-border issues.¹¹¹ The proposal foresees regional cooperation between regulatory authorities on cross-border issues.¹¹²

(iv) Role of ACER

The role of ACER is defined in Regulation (EU) 2019/942 of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators. The Package does not foresee any change to the tasks ACER performs within electricity and gas, but will extend those to the hydrogen sector. For example, the proposed recast Directive provides that ACER's mandate of annual monitoring and reporting of market performance in its annual market monitoring report (obligation in Regulation (EC) No. 715/2009) will be retained, with its scope extended to hydrogen.¹¹³

Therefore, ACER will see its role and competence extended to hydrogen activities, with new decision competences allocated to the Agency. For example, in case of restriction of cross-border flow of hydrogen, regulatory authorities from each country have an obligation to discuss the restriction, request the concerned network operators to perform specific mitigation actions, and if the disagreement remains, the NRAs shall take a joint coordinated decision for removing the recognised restriction.¹¹⁴ Under the later joint coordinated decision, NRAs shall agree on the allocation of investment costs to be borne by each hydrogen network operator for implementing the agreed solution, as well as the manner the solution will be integrated into the tariffs after 1 January 2031. The role of ACER will be twofold. First, ACER can make recommendations to the RAs on the details of the cost allocation decisions. Second, in case a lack of agreement between NRAs, ACER will decide on the restriction, following the process defined in Article 6(10) of Regulation (EU) 2019/942.

3.3.2 The strategic role of gas system operators

System operators play a strategic role in the energy transition, both at transmission and distribution level.¹¹⁵ They must remain 'neutral market facilitators'¹¹⁶ while enabling the energy transition and ensuring security of supply. They are confronted with the many challenges of a more integrated, digitalised and decentralised energy system, and are at the forefront in building a more resilient energy system.¹¹⁷ Hydrogen, biogas and power-to-gas technologies are to play an increasing role in decarbonising the grid. Gas system operators will need to enable this transition, but could also play a more active role in it. This questions system operators' status, tasks and economic model.

¹¹¹ Draft recast Gas Directive, Art. 72.

¹¹² Draft recast Gas Directive, Art. 74.

¹¹³ EC proposal for recast Gas directive, p.13.

¹¹⁴ Draft recast Gas Regulation, Art. 39.

¹¹⁵ See also previous CERRE reports on the role of network operators: M. Pollitt, M. Giuliotti, A. Covatariu, D. Duma, 'The active distribution system operator (DSO) – An international Study', Center on Regulation in Europe (CERRE), 2022; Pollitt, M., Giuliotti, M. and Anaya, K. (2021), Optimal Regulation for European DSOs to 2025 and Beyond, Centre on Regulation in Europe (CERRE), 2021.

¹¹⁶ Pursuant to Art. 31(5) of the Electricity Directive, each DSO must 'act as a neutral market facilitator in procuring the energy it uses to cover energy losses in its system in accordance with transparent, non-discriminatory and market-based procedures, where it has such a function'.

¹¹⁷ C. Banet, C. Kong Chyong and F. Már Baldursson, Energy Infrastructure Resilience, CERRE Issue Paper, January 2023 (upcoming).



Importantly, the injection of hydrogen and renewable gases, will take place at different levels of the grid. New gas facilities for biomethane for example, will primarily connect at distribution level. By contrast, hydrogen can be imported through pipelines via terminals (pure or using a hydrogen carrier like ammonia), but can also be used locally. Other configurations are also possible, as the market and the technologies (e.g., compressors) develop. To many respects, **gas grid operators are in a strategic position to connect both local and imported production sources, integrate renewables into the energy system, and influence grid planning and so market developments.** In the ASSET Study on the role of gas DSOs ordered by the European Commission, authors conclude that the distribution segment will considerably increase compared to transmission, where production/imports will be 'substantially reduced'.¹¹⁸

The following paragraphs discuss the manner facilitating an increasing share of hydrogen and renewable gases into the grid will challenge gas system operators' role and how the recast Gas Directive and Regulation should regulate them.

(i) The different types of grid and system operators in the proposal

The package is construed around the dichotomy between dedicated hydrogen infrastructures and natural gas infrastructures, the later ones including the transport of biogas and biomethane. In the following, the same distinction is kept to present the different types of system operators. The operator is to be a natural or legal person who carries out the function of development and operation of the infrastructures listed below.

The following categories of **hydrogen** infrastructures are defined in the recast Gas Directive and Regulation:

- **Hydrogen system**, means 'a system of infrastructure, including hydrogen networks, hydrogen storage, and hydrogen terminals, which contains hydrogen of a high grade of purity'.¹¹⁹
- **Hydrogen network**, means 'a network of pipelines used for the transport of hydrogen of a high grade of purity with a view to its delivery to customers, but not including supply';¹²⁰ Note that the hydrogen network operator can also be responsible for developing the interconnections with other hydrogen networks.¹²¹
- **Hydrogen storage facility**, means 'a facility used for the stocking of hydrogen of a grade of purity: (a) including the part of an hydrogen terminal used for storage but excluding the portion used for production operations, and facilities, and facilities reserved exclusively for hydrogen network operators in carrying out their functions; (b) including large, in particular

¹¹⁸ European Commission, ASSET Study on The role of Gas DSOs and distribution networks in the context of the energy transition, 2020, p. 10.

¹¹⁹ Draft recast Gas Directive, Art. 2(5). It is notable that the proposal does not contain any definition of the purity threshold.

¹²⁰ Draft recast Gas Directive, Art. 2(20).

¹²¹ Draft recast Gas Directive, Art. 2(22).



underground, hydrogen storage but excluding smaller, easily replicable smaller hydrogen storage installations'.¹²² **Hydrogen linepack**¹²³ can also be used for hydrogen storage.

- **Hydrogen terminal**, means 'an installation used for the transformation of liquid hydrogen or liquid ammonia into gaseous hydrogen for injection into the hydrogen network or the liquefaction of gaseous hydrogen, including ancillary services and temporary storage necessary for the transformation process and subsequent injection into the hydrogen network, but not any part of the hydrogen terminal used for storage'.¹²⁴
- **Hydrogen interconnector**, means 'a hydrogen network which crosses or spans a border between Member States, or between a Member State and a third country up to the territory of the Member States or the territorial sea of that Member State'.¹²⁵

The following categories of **natural gas** infrastructures are defined in the recast Gas Directive and Regulation:

- **System**, means 'any transmission networks, distribution networks, LNG facilities and/or storage facilities owned or operated by a natural gas undertaking, including linepack and its facilities supplying ancillary services and those of related undertakings necessary for providing access to transmission, distribution and LNG'.¹²⁶
- **Natural gas system**, means 'a system of infrastructures, including pipelines, LNG terminals and storage facilities, which transport gases, that primarily consist of methane and include biogas and gas from biomass, in particular biomethane, or other types of gas that can technically and safely be injected into, and transported through the natural gas pipeline system'.¹²⁷
- **Upstream pipeline network**, means 'any pipeline or network of pipelines operated and/or constructed as part of an oil or natural gas production project, or used to convey natural gas from one or more such projects to a processing plant or terminal or final coastal landing terminal'.¹²⁸
- **Transmission**, defined as 'the transport of natural gas through a network, which mainly contains high-pressure pipelines, other than an upstream pipeline network and other than the part of high-pressure pipelines used in the context of local distribution of natural gas, with a view to its delivery to customers, but not including supply'.¹²⁹ Note that the TSO could also be responsible for the interconnections with other systems in addition to transmission.¹³⁰

¹²² Draft recast Gas Directive, Art. 2(6).

¹²³ Draft recast Gas Directive, Art. 2(7). Hydrogen linepack means 'the storage of hydrogen of a high grade of purity by compression in hydrogen networks, excluding facilities reserved for hydrogen network operators carrying out their functions'.

¹²⁴ Draft recast Gas Directive, Art. 2(8).

¹²⁵ Draft recast Gas Directive, Art. 2(34).

¹²⁶ Draft recast Gas Directive, Art. 2(29).

¹²⁷ Draft recast Gas Directive, Art. 2(4).

¹²⁸ Draft recast Gas Directive, Art. 2(15).

¹²⁹ Draft recast Gas Directive, Art. 2(16); Draft recast Gas Regulation, Art. 2(1)(2).

¹³⁰ Draft recast Gas Directive, Art. 2(17).



- **Distribution**, means 'the transport of natural gas through local or regional pipeline networks with a view to its delivery to customers, but not including supply'.¹³¹ Note that the DSO could also be responsible for the interconnections with other systems in addition to distribution.¹³²
- **Storage facility**, means 'a facility used for the stocking of natural gas and owned and/or operated by a natural gas undertaking, including the part of LNG facilities used for storage but excluding the portion used for production operations, and excluding facilities reserved exclusively for transmission system operators in carrying out their functions'.¹³³
- **LNG facility**, means 'a terminal which is used for the liquefaction of natural gas or the importation, offloading, and re-gasification of LNG, including ancillary services and temporary storage necessary for the re-gasification process and subsequent delivery to the transmission system, but not including any part of LNG terminals used for storage'.¹³⁴
- **Interconnector**, means 'a transmission line which crosses or spans a border between Member States for the purpose of connecting the national transmission system of those Member States or a transmission line between a Member State and a third country up to the territory of the Member States or the territorial sea of that Member State'.¹³⁵
- **Direct line**, means 'a natural gas pipeline complementary to the interconnected system'.¹³⁶

The draft Gas Regulation defines a threshold date for the definition of 'new infrastructure' to 4 August 2003.¹³⁷ Infrastructure completed after that date will be considered as new.

¹³¹ Draft recast Gas Directive, Art. 2(18).

¹³² Draft recast Gas Directive, Art. 2(19).

¹³³ Draft recast Gas Directive, Art. 2(25).

¹³⁴ Draft recast Gas Directive, Art. 2(27).

¹³⁵ Draft recast Gas Directive, Art. 2(33).

¹³⁶ Draft recast Gas Directive, Art. 2(35).

¹³⁷ Draft recast Gas Regulation, Art. 2(1)(38).

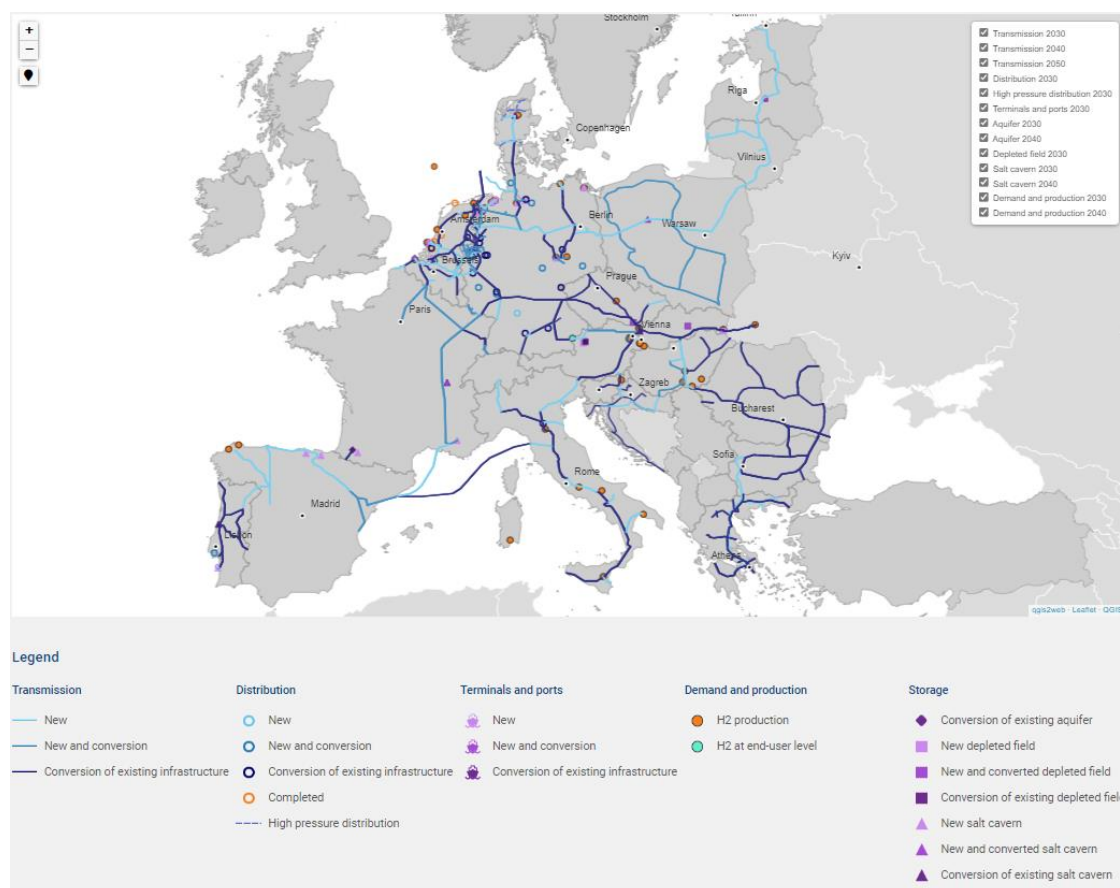


Figure 5: The H₂ Infrastructure Map

Source: *H₂ Infrastructure Map Europe* (h2inframap.eu)

(ii) Unbundling regime for grid operators

Unbundling refers to the separation of activities that can be subject to competition (competitive activities like production and supply of energy) from activities where competition is not possible or allowed (monopolistic activities, like transmission and distribution, that are regulated monopolies in the EU). The joint operation of these activities by the same company can lead to discriminatory behaviour towards third parties, with negative effects on the use of infrastructure, management of production resources and final price for consumers. Unbundling these activities counts among the tools aimed at opening up markets to competition.

The reinforcement of the degree of unbundling under EU law has happened in parallel to an increasing privatisation of TSOs as well as the increase participation of third-country ownership in European TSOs.¹³⁸

¹³⁸ Council of European Energy Regulations (CEER), 'Implementation of TSO and DSO Unbundling Provisions. Update on Clean Energy Package Outlook. CEER Status Review', 2019, pp. 15, 17-18.



There are different degrees of unbundling that can be applied either at the vertical level (separation of production from supply) or the horizontal level (separation from other network activities). From the least to the most restrictive, the unbundling regimes are: management and account unbundling¹³⁹, functional unbundling¹⁴⁰, legal unbundling¹⁴¹, independent system operator model (ISO¹⁴² or ITO¹⁴³), and ownership unbundling.¹⁴⁴

Through the different legislative packages, both for gas and electricity, the EU has refined and strengthened the regime for unbundling, with stricter requirements for transmission than distribution. Since the Third Energy Package of 2009, the default regime has been ownership unbundling for TSOs, and legal unbundling for DSOs as a minimum. For DSOs, exemptions apply when they serve less than 100,000 customers; they can then rely on account or functional unbundling. The Clean Energy Package, that includes a revision of the Electricity Directive only, does not change this, but allows electricity system operators to be involved in other types of emerging, commercial activities, such as storage facilities or electric vehicles charging points that they can own, develop, manage or operate. Electricity DSOs can also be involved in data management, subject to specific requirements. A similar evolution of the unbundling regime for gas DSOs in relation to new activities (e.g., hydrogen storage) is to be foreseen, notably to enable grid operators to combine operatorship activities, within the gas sector but also across energy carriers. This will raise issues for both vertical and horizontal unbundling.

As lately reported by CEER in its 2019 status review of the implementation of the TSO and DSO unbundling provisions, Member States are still following different approaches when implementing the unbundling requirements, with different numbers, size and activity profiles for TSOs and mostly DSOs.¹⁴⁵ For example, as concerns TSOs, in 2020, 25 Member States applied the ownership unbundling model, ten Member States applied the ITO model, and the ISO model was applied in two countries.¹⁴⁶ The flexibility left to the Member States in the implementation of the unbundling requirements under the Third Energy Package, including the derogations for isolated or emergent markets, has been deemed as sufficient, to let the market develop in a sufficiently competitive manner.¹⁴⁷

The unbundling regime proposed in the Gas Directive and Regulation is discussed in the following paragraphs, for both natural gas and hydrogen successively.

¹³⁹ Management and accounting unbundling requires that accounts of transmission and distribution activities must be separated from other activities.

¹⁴⁰ Functional unbundling requires the network and competitive activities to be separated into different, independent units.

¹⁴¹ Legal unbundling requires to set up a separate legal entity for network activities.

¹⁴² Under the Independent System Operator (ISO) model, energy supply companies may still formally own gas or electricity transmission networks, but must leave the entire operation, maintenance, and investment in the grid to an independent company.

¹⁴³ Under the Independent Transmission System Operator (ITO) model, energy supply companies may still own and operate gas or electricity networks but must do so through a subsidiary, and all important decisions must be taken independent of the parent company.

¹⁴⁴ E. Cabau, revised and updated by L. Sandberg, 'Unbundling of Transmission System Operators', in C. Jones and W.-J. Kettlewell (eds.), EU Energy Law – Vol. I, The Internal Energy Market (Claes & Casteels, 2021) Chapter 4.

¹⁴⁵ Council of European Energy Regulations (CEER), 'Implementation of TSO and DSO Unbundling Provisions. Update on Clean Energy Package Outlook. CEER Status Review', 2019. For an summary of the implementation of the TSO and DSO unbundling rules of the Third Energy Package for Gas in the Member States, see Heidecke, L., Kustova, I., Flickenschild, M., Dijkhof, Y., Larmi, I., Van Til, H., Van Benthem, M., Nguyen, N., The Revision of the Thrid Energy Package for Gas, Publication for the committee on Industry, Research and Energy (ITRE), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2022, pp.33-34.

¹⁴⁶ Ibid.

¹⁴⁷ A. Barnes, 'Can the current EU regulatory framework deliver decarbonisation of gas, Oxford Institute for Energy Studies, 2020.



For natural gas TSOs, three models of vertical unbundling are made available,¹⁴⁸ as it is already the case in the currently applicable legislation:

1. Ownership unbundling, as the main option¹⁴⁹,
2. the independent system operator (ISO) model¹⁵⁰, or
3. the independent TSO (ITO)¹⁵¹.

At distribution level, in case a natural gas DSO is part of a vertically integrated undertaking, it must as a minimum be legally unbundled, i.e., independent in terms of legal form, organisation and decision making from other activities not relating to distribution. However, this does not create an obligation to implement ownership unbundling.¹⁵² Exemptions to the unbundling rules can be applied by Member States for integrated natural gas undertakings serving less than 100,000 connected customers.¹⁵³

Concerning hydrogen, the Commission argues that the 'emergence of vertically integrated undertakings could be avoided in the first place by setting clear up-front rules'¹⁵⁴. This is seen as a better solution than the adoption of 'costly ex-post unbundling requirements that would take time to implement.'¹⁵⁵ However, the approach is quite strict for a nascent market and infrastructures that are still to be developed. Many stakeholders brought attention to the risk that such a strict regime will prevent system owners from making capital-intensive investments in hydrogen infrastructures.

For dedicated hydrogen networks, the proposed default regime for the **vertical unbundling of HNOs¹⁵⁶** is **ownership unbundling**, that is the most stringent unbundling model available.

Three types of exemptions are foreseen to the default regime of ownership unbundling for hydrogen network operators until at the latest 31 December 2030:

- The **independent system operator (ISO)** model is proposed to be available for existing hydrogen networks, which belonged to vertically integrated undertakings at the entry into force of the new Directive.¹⁵⁷
- The ITO model for hydrogen networks belonging to VIUs at the entry into force of the Gas Package - A contested element is the expiry date of the **Independent Transmission Operator (ITO) unbundling model** by 31 December 2030, as some Member States are worried that this could hamper the development of hydrogen networks, and thus markets, because the gas

¹⁴⁸ Draft recast Gas Directive, Art. 35(7).

¹⁴⁹ Draft recast Gas Directive, Art. 54.

¹⁵⁰ Draft recast Gas Directive, Art. 55.

¹⁵¹ Draft recast Gas Directive, Art. 57-58.

¹⁵² Draft recast Gas Directive, Art. 42.

¹⁵³ Draft recast Gas Directive, Art. 42(4).

¹⁵⁴ Draft recast Gas Directive, recital (55).

¹⁵⁵ Ibid.

¹⁵⁶ Draft recast Gas Directive Art. 62.

¹⁵⁷ Draft recast Gas Directive, Art. 47.



TSOs with ITO unbundling model would not be incentivised to invest into repurposing of their infrastructure.¹⁵⁸

- Longer derogation periods are available for **geographically confined hydrogen networks**, beyond 31 December 2030,¹⁵⁹ but the derogation will expire as of 1 January 2031 when: a competing renewable hydrogen producer wants to get access to the network; or where the exempted hydrogen network becomes connected to another hydrogen network.¹⁶⁰

After 2030, only two exemptions will remain:

- ISO model for existing networks of VIUs; and
- For geographically confined networks, up to conditions.

Where vertically integrated TSOs participate to cross-border regional cooperation, the proposal for Gas Directive requires the joint undertaking to establish and implement a compliance programme, to avoid risks of discriminatory and anticompetitive conduct. Such programme will be subject to ACER approval, and compliance will be ensured by internal compliance officers.¹⁶¹

In terms of **horizontal unbundling**, several situations are foreseen.

- Concerning the relationship between natural gas system owners, hydrogen system operators and natural gas or hydrogen storage operators, the EC proposes a regime of **legal unbundling** (separate subsidiary, but no functional unbundling).¹⁶² Legal unbundling will continue to be the default regime after 2030. Whereas the joint operation of hydrogen networks and gas or electricity grids can create synergies and should thus be allowed, the EC proposes to organise activities of hydrogen network operation in a separate legal entity in order to ensure transparency regarding financing and the use of access tariffs.
- The **combined operation of hydrogen networks**, storages and terminals is rendered possible.
- **Concerning combined operatorship across energy carriers, unbundling of accounts for both natural gas and hydrogen undertakings** apply in parallel.¹⁶³ Where a transmission or network operator provides regulated services for gas, hydrogen and/or electricity, i.e., across vectors, it must apply the regime of management and unbundling of accounts. The objective is to have a regulated asset base (RAB) separately for gas, electricity or hydrogen assets.¹⁶⁴ Some financial transfers are allowed, based on a series of specific criteria and subject to additional recommendations to be issued by ACER.¹⁶⁵

¹⁵⁸ Discussion note on the Directive on common rules for the internal markets in renewable and natural gases and in hydrogen and the Regulation on the internal markets for renewable and natural gases and for hydrogen (recast), General Secretariat of the Council of the European Union, 18 October 2022

¹⁵⁹ Draft recast Gas Directive, Art. 48(1).

¹⁶⁰ Draft recast Gas Directive, Art. 48(2).

¹⁶¹ Draft recast Gas Directive, Art. 6(3).

¹⁶² Draft recast Gas Directive, Art. 56.

¹⁶³ Draft recast Gas Directive, Art. 68-69, Draft recast Gas Regulation, Art. 4.

¹⁶⁴ Draft recast Gas Regulation, Art. 4(1).

¹⁶⁵ Draft recast Gas Regulation, Art. 4(2)-(4).



The proposed transition period for hydrogen markets by the end of 2030 appears in several articles throughout the draft recast Directive and Regulation. In addition to the unbundling rules referred to above, the Regulation proposes that no tariffs for access to hydrogen networks at interconnection points between Member States are charged from 1 January 2031 (Article 6 of the Draft Regulation) which should be substituted by the creation of a compensation mechanism for financing cross-border infrastructures among the relevant HNOs (Article 53 of the Draft Gas Directive). By the end of 2030, Member States shall ensure the implementation of regulated TPA to hydrogen networks (Article 31 of the Draft Gas Directive) and HNOs can benefit from derogations for existing hydrogen networks and geographically confined networks (Article 47 and 48 of the Draft Gas Directive).¹⁶⁶

Some Member States considered that the fixed date of 2030 for this regulatory transition for TSOs does not provide sufficient flexibility and time for a hydrogen market to develop and mature sufficiently. In many provisions, the date of 31 December 2030 is the end-date, but the application of the post-2030 regime can be anticipated, leading to different regulatory situations across the EU. **The end-date of the transition period should be applied in a similar manner across Europe. The lack of harmonised end-date of the transition period at an EU level entails the risk of divergent regulatory systems across borders that could hamper the development of an efficient internal market.**¹⁶⁷

To conclude, the approach of ownership unbundling as the main regime as of 2031 appears to be too rigid on several points, and does not ensure a sufficient level-playing fields across all operators and energy carriers:

- **Regulatory alignment between gas and hydrogen, but also between gases regulation and electricity regulation, must be kept.** Previous research concluded that there is a lack of evidence to support the benefit of excluding the ITO model from the regulation of hydrogen networks, despite the arguments raised by the Commission that there are no, or limited, incumbent operators at the current stage of the market, and that a simpler regime could therefore apply. Nevertheless, applying ownership unbundling as proposed will impact negatively the natural gas operators¹⁶⁸, and may prevent positive synergies with hydrogen activities.
- By imposing the ownership unbundling model, TSOs operating under the ITO model will be prevented from engaging in hydrogen network activities, while other TSOs in countries operating under the ownership or ISO model (for VIU), will more easily invest in the same activities. This creates barriers and a lack of level playing field between TSOs. **To ensure**

¹⁶⁶ Discussion note on the Directive on common rules for the internal markets in renewable and natural gases and in hydrogen and the Regulation on the internal markets for renewable and natural gases and for hydrogen (recast), General Secretariat of the Council of the European Union, 18 October 2022

¹⁶⁷ Discussion note on the Directive on common rules for the internal markets in renewable and natural gases and in hydrogen and the Regulation on the internal markets for renewable and natural gases and for hydrogen (recast), General Secretariat of the Council of the European Union, 18 October 2022

¹⁶⁸ Heidecke, L., Kustova, I. Flickenschild, M., Dijkhof, Y., Larmi, I., Van Til, H., Van Benthem, M., Nguyen, N., The Revision of the Third Energy Package for Gas, Publication for the committee on Industry, Research and Energy (ITRE), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, Luxembourg, 2022, pp. 36-39.



regulatory alignment, the ITO model should continue to be available beyond the threshold date, as proposed during the Council negotiations.¹⁶⁹

- **The end-date of the transition period comes too early, and a postponement of 3 to 5 years should be allowed.** In its progress report of 12 December 2022,¹⁷⁰ the European Council indicates that the date for the end of the transition phase will be postponed to 2035, which is in line with this report commendation, and should be kept.
- **The end-date of the transition period must be practiced in a harmonised manner to avoid any distortion on the internal energy market.**
- The unbundling regime applies to the entire hydrogen network, since there is no distinction between transmission and distribution. **A distinction should be introduced between transmission and distribution for the hydrogen network.**
- Ownership unbundling seems as a disproportionate measure for the infrastructures that requirement upfront investments or that do not represent monopolies. **Less stringent unbundling rules should be made available for small hydrogen network operators under a certain threshold, as proposed by ACER-CEER.¹⁷¹**
- **Concerning horizontal unbundling, further flexibility must be given in the ramp-up phase by allowing to start with accounting unbundling until the default regime of legal unbundling applies.** This will enable more synergies for operators across network operations between the different energy carriers.

(iii) Certification process for operators

In line with the currently applicable legislation, the proposal for recast of Gas Directive and Regulation defines a process of certification of network operators by regulatory authorities, distinguishing in the present case between the certification process for TSOs for natural gas, the hydrogen operators¹⁷², and certification in relation to third countries¹⁷³. Pursuant to this procedure, a TSO or hydrogen operator, can only be approved and designated as operator once the specific certification procedure has been completed. The objective of the certification procedure is to verify whether the applicant operator complies with the unbundling rules.

By contrast, the procedure for operators of other natural gas and hydrogen infrastructures will be based on **designation by the Member States or by the owner of the infrastructure**. In such a case, the Member States or the owner of the infrastructure will designate the operator for a period of time determined by the Member States. The provision applies to natural gas storage, hydrogen storage,

¹⁶⁹ In the third revision of the proposals, the European Commission communicated to the Council that the proposal no longer contains an expiry date for the ITO unbundling model and explicit possibility for the Commission to review the feasibility of the ITO unbundling model by 2031. The time limitation for the ISO unbundling model was removed. The ownership unbundling model remains the default regime. Source: Council of the European Union, Note from the General Secretariat of the Council to Permanent Representatives Committee/Council, Progress Report on the proposal for a Directive of the European Parliament and of the Council on common rules for the internal markets in renewable and natural gases and in hydrogen, and proposal for a Regulation of the European Parliament and of the Council on the internal markets for renewable and natural gases and for hydrogen(recast), Doc. 15754/22, 12 December 2022, p. 4.

¹⁷⁰ Ibid.

¹⁷¹ ACER-CEER, Position Paper on the key regulatory requirements to achieve gas decarbonisation, 2021, p.5.

¹⁷² Draft recast Gas Directive, Art. 65, and Draft recast Gas Regulation, Art. 13.

¹⁷³ Draft recast Gas Directive, Art. 66.



LNG facilities and hydrogen terminals.¹⁷⁴ A similar system of designation applies to DSOs.¹⁷⁵ The approach proposed is therefore much more flexible than for natural gas TSO and hydrogen network operators, but in line with current practice for natural gas storage and LNG system operators.¹⁷⁶

(iv) Cooperation between TSO, DSO and other operators on grid planning and development, capacity management and system use

As outlined in the Commission's Energy System Integration Strategy, coordinated planning and operation of the entire EU energy system, across multiple energy carriers, infrastructures and consumption sectors is a prerequisite to both, affordability and achieving the 2050 climate objectives. The EC Impact Assessment to the Hydrogen and Decarbonised Gases Markets Package also stresses the current lack of coordination between operators. A closer cooperation between TSOs and DSOs is necessary as congestion management, balancing and demand response have become relevant issues at distribution level. Specifically, the EC Impact Assessment notes the fact that DSOs were not explicitly included in TSO planning.

Cooperation between system operators within natural gas and hydrogen

TSOs and DSOs for gases - both natural gas and hydrogen – will represent a diversity of actors and diversity of business models in a sector under development. The same applies to operators of storage sites and terminals, with supposedly a similar trend towards privatisation as observed for TSOs. As a consequence, regulating the interaction between these actors may appear as a moving target, but cooperation around some core areas will be instrumental in ensuring the cost-efficient development of the networks for developing both low carbon gases to consumers and security of supply.

As a first step, the European Commission proposes to reinforce the involvement of DSOs in planning tasks. There will also be a better link between TYNDP and the national Network Development Plans (NDPs). The proposal foresees that the national NDPs should be based on a joint scenario for electricity, gas and hydrogen. It should be aligned with NECPs, as well as EU-wide TYNDP.

In addition, in an energy system perspective, there is a need to continue and strengthen the cooperation between operators for gas and electricity. This cooperation is at the moment primarily envisaged at the level of network planning, and primarily at transmission level.

TSOs and DSOs shall cooperate with each other, with the view of ensuring the effective participation of market participants connected to the grid in retail, wholesale and balancing market.¹⁷⁷ DSOs should also cooperate with other DSOs and TSOs 'to coordinate maintenance, system development, new connections and the operation of the system' with the view 'to ensure system integrity and with a view to maximise capacity and minimise the use of fuel gas'¹⁷⁸. For example, the recast Gas regulation

¹⁷⁴ Draft recast Gas Directive, Art. 67.

¹⁷⁵ Draft recast Gas Directive, Art. 39.

¹⁷⁶ Gas Directive, Art. 12.

¹⁷⁷ Draft recast Gas Directive, Art. 35(3) and Art. 40(7).

¹⁷⁸ Draft recast Gas Regulation, Art. 34.



provides that DSOs and TSOs are to work together to enable **reverse flows** from the distribution to the transmission network or alternative means to facilitate the market integration of renewable and low carbon gases.

The draft recast Gas Directive and Regulation include new provisions encouraging TSO-DSO cooperation as well as cooperation between DSOs. However, not much details are provided about the manner to ensure this cooperation in practice. The most relevant processes are ought to be: network planning and the contribution of DSOs to the elaboration of network codes and guidelines. There are also very limited provisions on the manner storage site operators and terminal operators will be involved in this coordination. The Directive and Regulation should be more prescriptive in terms of cooperation between system operators, notably at the level of planning and go beyond scenarios development.

Safeguards as to misused of shared information and risk of collusion

The risk of possible collusion between operators is identified in the proposal, but few safeguards are proposed.

The draft recast Gas Directive emphasises the need for LNG and storage system operators to cooperate, both within one Member States and regionally, to ensure efficient use of facilities capacities as well as synergies between these facilities.¹⁷⁹ The manner operators of these infrastructures should cooperate, and within which limit - notably under competition law constraints - is not defined in the text.

Similarly, the draft recast Gas Directive acknowledges implicitly that transmission, storage and LNG system operators may have access to commercially sensitive information obtained from third parties during negotiations for access to the system or when providing access.¹⁸⁰ The same applies to operators of hydrogen network, hydrogen storage facility and hydrogen terminal.¹⁸¹ The draft Directive provides that such information should not be misused in the context of sales or purchases of natural gas or hydrogen, but does not provide for specific safeguards such as it is usually the case under unbundling rules. This can be attributed to the diversity of infrastructure operators involved, but operators in a strategic position within transmission, storage or LNG could indeed access such information. Such collusion of information would in principle be deemed as contrary to competition law rules, more precisely the prohibition against anti-competitive agreements between businesses (Article 101 TFEU).

Coordinate and integrated infrastructure planning between electricity, gas, hydrogen and heating

The proposal contains reinforced provisions on integrated network planning, that is welcome. TSOs are required to elaborate a ten-year network development plan (TYNDP), based on existing and forecast supply and demand, following a phase of consultation. The draft Gas Directive plans for at

¹⁷⁹ Draft recast Gas Directive, Art. 35(9).

¹⁸⁰ Draft recast Gas Directive, Art. 36.

¹⁸¹ Draft recast Gas Directive, Art. 50.



least one single network plan per Member State. The system integration perspective is taking into account by the fact that operators for different types of energy infrastructures (LNG terminal, storage, distribution, hydrogen network, district heating and electricity operators) must be consulted and submit relevant information to TSOs. Gas network operators have to include information on infrastructure that can be decommissioned or repurposed.¹⁸² Additionally, during the elaboration of the TYNDP, TSOs shall take into account the following other parameters: possible alternatives to system expansion, such as demand response, revised consumption data based on the energy efficiency first principle (EE1st), exchange of information across electricity and gases systems on optimal location and size of energy storage and power to gas assets.¹⁸³

There will be separate hydrogen network development reporting to ensure that the construction of the hydrogen system is based on a realistic demand projection.

Further alignment is foreseen with the Governance Mechanism for the Energy Union. Notably, the TYNDPs must be in line with the integrated National Energy and Climate Plans (NECPs) and the climate-neutrality objective, as defined in the Governance Regulation.¹⁸⁴ Consistency between the plans must be checked by the competent national authorities.¹⁸⁵

Regional cooperation

The draft recast Gas Directive requires Member States to promote regional cooperation between natural gas TSOs and hydrogen network operators with the view of creating a 'competitive internal market for gases' and facilitate the integration of isolated systems forming gas islands. The Commission is also obliged to provide sufficient guidance on regional cooperation when it considers that EU rules are necessary.¹⁸⁶ The provision does not provide much information as to the scope, legal bindingness and content of such 'guidance', which would be useful. It is understood that the development of regional markets will contribute to the forward creation of an internal market for gases. Similarly, ACER is also given the role of 'making appropriate recommendations', when it considers that binding rules on regional cooperation are required. The wording of the current proposal indicates that only guidance and recommendations will be put forward by the Commission and ACER respectively.

(v) Revenues and economic model for grid operators

Grid operators will need to make a series of investments to enable the injection of new gases into their networks, run a more digitalised and integrated grid, and plan for possible re-purposing and extensions. This will notably include the purchase of new appliances to accommodate new types of gases (e.g., compressors to inject new gas and odorant removal facilities, or metering appliances) and conversion operations for re-purposing. Financing these diverse activities will need to come from

¹⁸² Draft recast Gas Directive, Art.51.

¹⁸³ Draft recast Gas Directive, Art.51(3).

¹⁸⁴ Draft recast Gas Directive, Art. 51(2).

¹⁸⁵ Draft recast Gas Directive, Art. 51(5).

¹⁸⁶ Draft recast Gas Directive, Art. 6(1).



other sources than only tariffs, which raises a series of questions, including in terms of cross-subsidisation. Access to EU project financing, such as Important Projects of Common European Interest (IPCEI), is excluded from the analysis below.

The proposal contains several provisions on the use of revenues by operators across operations within natural gas and hydrogen, notably as part of the unbundling regime (account unbundling) and separation of regulatory asset base (RAB).¹⁸⁷ With an increasing interaction between transmission and distribution and across energy carriers, it is necessary to have a clear regime concerning cross-subsidisation and the use of revenues by operators.

The proposed regulation (Art. 4) opens for the possibility of cross-sectoral subsidisation of activities between the natural gas and hydrogen operators (and/or electricity), where charges paid by gas consumers may contribute to the financing of hydrogen infrastructures. Member States may allow financial transfers between regulated services that are separated RAB. The revenues used for the financial transfer will be collected as a 'dedicated charge', from exit points to final customers located within the same Member States as the beneficiary of the financial support, based on a published methodology approved by the Regulatory Authority. ACER must issue recommendations on methodologies to be used in this context. When approving the dedicated charges, the Regulatory Authority must take into account the hydrogen network development report submitted to them by the HNOs.¹⁸⁸ If Member States decide to allow for 'dedicated charges' as a means of co-funding new hydrogen infrastructure, the report should support the regulatory authority in its assessment of these charges.¹⁸⁹

Stakeholders have expressed scepticism as to this approach, being an inefficient way to recover the cost of hydrogen. The argument is that, given that many gas consumers are households while hydrogen consumers will primarily be industries, there is a risk that households will pay for the decarbonisation of industries. Although hydrogen infrastructures cannot be paid initially only by hydrogen consumers, a solution is to use the general taxation or the revenue from the EU emissions trading scheme (EU ETS) to finance the new infrastructures. However, the EC proposal allows for cross-sectoral subsidies only under very specific conditions and the NRA approval. It is important that these safeguards are kept as a minimum, but the framework around the financial transfers through dedicated charges could be further improved. Harmonised detailed methodology will be left to ACER, but the adoption process for ACER's recommendation will also take time.

The EC also proposes to advance on the interconnection of hydrogen markets in the Union and thereby facilitate investments in cross-border hydrogen infrastructure. Under the regulated Third-Party Access regime, in the absence of cross-border transportation tariffs after 31 December 2030, a system of

¹⁸⁷ Draft recast Gas Regulation, Art. 4.

¹⁸⁸ Draft recast Gas Directive, Art. 52. in Member States where a hydrogen network will be developed, reporting on the development of hydrogen infrastructure should ensure that the construction of a hydrogen system is based on realistic and forward-looking demand projections, including potential needs from the perspective of the electricity system.

¹⁸⁹ Draft recast Gas Directive, Recital 114.



financial compensation should provide financial incentives for market participants to develop cross-border interconnectors (see 3.3.3(iii) below).¹⁹⁰

3.3.3 Regime for access to the grid for hydrogen and renewable gases, including tariffs

Despite the addition of new gases, the same challenges of access regime to the grid may persist. This is due to the fact that transport infrastructures, including for hydrogen and methane gases, are likely to constitute a natural monopoly, resulting in non-competitive market structures. There will also be a diversity of connection situations, and so connection regimes, with a diversity of users and producers to connect to the system, with both imported volumes and decentralised production.

In its Impact Assessment, the European Commission already identifies the following shortcomings: constrained market and grid access for local producers of biomethane connected to the distribution grids, divergence of rules regarding obligation to connect and costs of grid connection for renewable and low carbon gases, and intra-EU entry/exit tariffs hinder the establishment of a fully integrated, liquid and interoperable EU internal gas market.

The following sections analyse the content of the proposals for Directive and Regulation concerning grid connection and grid access for hydrogen and natural gases respectively.

(i) Difference between grid connection and grid access issues

Distinction between the infrastructure market and the commodity market

Grid access issues can be classified according to the distinction between **connection** and **access**. A producer must first be connected to the grid in order to get access to the available capacity in it, and send its gas into the transport infrastructure. Both matters relate to the so-called '**infrastructure market**'. Connecting to and getting access to the grid will make it possible for the producers to get access to the '**commodity market**'.¹⁹¹ Access to the commodity market will itself be regulated by separate rules.

Due to the focus of the report on infrastructure regulation, the following analysis focus on the infrastructure market (connection and access to the grid). Some aspects of the commodity market will be referred to when relevant, but to a much lesser extent.

Distinction between grid connection and grid access issues

Grid connection will typically cover issues related to, among others: availability or lack of physical connection; in case of the need to build connection, allocation of costs for network expansion; connection fees; grounds for connection refusal; connection agreements.

¹⁹⁰ Draft recast Gas Directive, Recital 119.

¹⁹¹ As summarised by the European Commission when it accepting commitments by EDF Suez in an antitrust case on the French gas market: 'New entrants into gas markets require access to gas import infrastructure (such as pipelines and liquefied natural gas terminals). Insufficient access to infrastructure limits their ability to acquire customers, no matter how competitive their offers may be. Preventing new entrants from gaining access to infrastructure therefore, hinders the development of competition in energy markets.' (IP/09/1872, 3 December 2009).



Grid access will typically cover issues related to, among others: regulatory incentives in the form of priority access and dispatch; access conditions and possible grounds for refusal, including rules for calculating available capacity, technical requirements (e.g., quality, pressure); choice of access regime (negotiated or regulated); in case of regulated access, tariffs setting and possible tariff discounts; access to ancillary services; capacity allocation and congestion management.

In the draft recast Gas Directive and Regulation, the provisions on connection are much more limited than the ones on access conditions. The provisions on connection of new production facilities for renewable and low carbon gases, storage, LNG regasification facilities, hydrogen terminals and industrial customers, to the transmission system, the distribution system and the hydrogen network respectively remain brief and general. They require that the TSO/DSO establish and publish transparent and efficient procedures for non-discriminatory connection and that these procedures must be subject to approval by the regulatory authorities.¹⁹² Supplementary rules will be adopted in the form of network codes.

The regime for connection to the grid should be reinforced in the text of the Directive/Regulation, instead of leaving all details to network codes. At least, some principles should be defined. Notably, the connection of local production plants of renewable and low carbon gases and their integration into the system including the reverse flow to the TSO level should be facilitated. Per today, Member States apply different rules as concerns the repartition of costs for new connections.¹⁹³

¹⁹² Draft recast Gas Directive, Art. 37 and 38 (for TSO) and Art. 41 (for DSO).

¹⁹³ ASSET Project, Hydrogen generation in Europe: Overview of key costs and benefits, July 2020, pp.11-12



(ii) Regime for access to the hydrogen system

Access to hydrogen networks

The European Commission proposes a transitional regime for access to the hydrogen network.¹⁹⁴ Until 31 December 2030, Member States can apply a negotiated or regulated access. In case of negotiated access, the regulatory authorities must ensure that the hydrogen network users are able to negotiate access to the hydrogen networks, and so in good faith. Regulatory authorities must also provide guidance to hydrogen network users on how negotiated tariffs will be affected when regulated TPA is introduced. In case of regulated regime, the tariffs or the methodologies underlying their calculation, are to be approved by regulatory authorities. As of 1st January 2031, a regulated access, based on published tariffs, must be in place. During the Council negotiations, the threshold date has been postponed to 1 January 2036.

HNOs must publish information on their website about the contractual terms and tariffs charged for network access and, where applicable, balancing charges.¹⁹⁵ The capacity made available must be the 'maximum capacity' of the hydrogen network, taking into account system integrity and efficient network operation.¹⁹⁶ The maximum duration for the capacity contracts is set to 20 years for infrastructures completed by the entry into force of the regulation, and 15 years for infrastructures completed after this date. Regulatory authority can request shorter duration.¹⁹⁷ Under the default regime of regulated access, information about tariffs for each network point must be published on an online platform operated by ENNOH. This will be completed by a network code on capacity allocation for hydrogen networks.¹⁹⁸

Although the feasibility of a threshold date in 2030 is uncertain, the approach seems sound and resembles the one adopted for liberation (with at that time the progressive enlargement of the definition of eligible customers to all customers). It will be important to keep the same date across the EU for the application of the regulated access regime.

However, as pointed out before, **the proposal does not distinguish between transmission and distribution levels within hydrogen networks. Such a distinction should be introduced, where regulated access with tariffs after the threshold date should be applied to transmission, while the choice between regulated and negotiated regime should be left to the Member States for the distribution level. More flexibility is required at distribution level for accommodating different local situations.**

Access to hydrogen terminals

Terminals for the conversion of liquid hydrogen or liquid ammonia into gaseous hydrogen will represent an important means of hydrogen import, but not the only one (e.g., import pipelines).

¹⁹⁴ Draft recast Gas Directive, Art. 31. Draft recast Gas Regulation, Art. 6.

¹⁹⁵ Draft recast Gas Regulation, Art. 6(1).

¹⁹⁶ Draft recast Gas Regulation, Art. 6(2).

¹⁹⁷ Draft recast Gas Regulation, Art. 6(3).

¹⁹⁸ Draft recast Gas Regulation, Art. 6(8).



Competition is expected among these import sources, including between import terminals.¹⁹⁹ After conversion, gaseous hydrogen will be injected into the hydrogen network. Despite the expected needs for developing hydrogen terminals, investments will be needed to develop new infrastructures, owned and operated by a diversity of actors (both private and public, with EU or foreign shareholders).

According to the proposal, access to hydrogen terminals must be based on a **negotiated TPA regime**, where regulatory authorities can assist parties to negotiate access in good faith. Negotiated TPA will apply from the start. Regulatory authorities will also be responsible for monitoring conditions for TPA to hydrogen terminals and their impact on the hydrogen markets.²⁰⁰

The approach seems appropriate, flexible enough as the default regime, and in line with the current regime for natural gas. However, in the ramping up phase, exemptions can be applied, subject to the supervision by Regulatory Authorities. **Because of the importance it has to secure investments, additional clarity and flexibility for terminals operators/owners will be needed.** Notably, exemptions to the TPA requirement is foreseen for 'a defined period of time'.²⁰¹ This lacks precision and should be further explicated.²⁰² Additional requirements as to how to set conditions for exemptions are provided and are deemed sufficient.²⁰³

Access to hydrogen storage facilities

Hydrogen can be stored in different types of facilities. The regime for access targets primarily large scale storage in 'hydrogen storage facilities' (mostly underground) and 'hydrogen linepack',²⁰⁴ because of the risk of natural monopoly due to the expected scarcity of such storage facilities.

For this reason, access to hydrogen storage shall be based on a system of regulated TPA, based on published tariffs, from the start. The tariffs, or the methodologies underlying their calculation, must be approved by the regulatory authority before their entry into force.²⁰⁵

Due to the strategic role large scale hydrogen storage will play and based on the assumption of scarce available storage sites, the approach sounds appropriate.

Access to cross-border hydrogen interconnections

The Commission proposes to remove cross-border tariffs for access to dedicated hydrogen networks at interconnection points as of 1 January 2031 (1st January 2036 after Council negotiations).²⁰⁶ It argues that, as it is already the case for electricity, this would create a level playing field for hydrogen

¹⁹⁹ Draft recast Gas Directive, Recital 73.

²⁰⁰ Draft recast Gas Directive, Art. 32.

²⁰¹ Draft recast Gas Regulation, Art. 7 and 60.

²⁰² Draft recast Gas Regulation, Art. 60(1).

²⁰³ Draft recast Gas Regulation, Art. 60(2)-(11)

²⁰⁴ See definitions provided in Section 3.3.2 (i) above.

²⁰⁵ Draft recast Gas Directive, Art. 33.

²⁰⁶ Draft recast Gas Regulation, Art. 6(7).



production and avoid so-called ‘pancaking’ of tariffs between transmission providers’ borders,²⁰⁷ which is important to prevent an increase of costs for final consumers. However, the Commission also warns that ‘implementing a system of zero-level cross-border tariffs and appropriate cost sharing mechanisms may be more feasible in an early stage of hydrogen infrastructure deployment than in a mature market where considerable investments into infrastructure have been made’. Therefore, in order to ensure the development of cross-border hydrogen interconnections in the absence of cross-border tariffs, the Commission proposes a financial compensation mechanism among cross-border hydrogen network operators.²⁰⁸ The concerned projects must be included in the EU-wide TYNDP, but must not be a project of common European interest (PCEI).

The mechanism proposed resembles the one for electricity, so-called Inter-TSO compensation mechanism (ITC). The application of the ITC mechanism to cross-border hydrogen networks (or natural gas infrastructures) will necessarily differ from electricity transmission, because of the nature of the energy carriers, with different tariff methodologies to agree upon. Authors have argued that it would probably be less difficult to design an ITC mechanism between cross-border hydrogen network operators, as long as one agrees on the methodology to apply.²⁰⁹ Again, much will be left to network codes. The Commission will be empowered to adopt implementing acts, establishing network codes notably for setting rules on harmonised transmission tariff structures, in line with Article 72(7) of the recast Gas Directive and Articles 15 to 16 of the recast Gas Regulation.²¹⁰ The network codes will cover several aspects of the tariffs methodology, including the procedure for providing a discount for renewable and low carbon gases.

As part of the negotiations, three main options were proposed by the European Commission to the Member States:

- *To implement a review mechanism for the year 2031 at Union level, where the Commission would review, based on pre-established criteria (e.g., market functioning, competition effects divergence of rule on cross-border trade), the market conditions in [2028] and, where appropriate, would adopt a decision to postpone the obligations for zero-level cross-border tariffs for hydrogen networks.*
- *To postpone the obligation for zero-level cross-border tariffs for hydrogen networks until year [TBC].*
- *To replace the obligation for zero-level cross-border tariffs as of 1 January 2031 by a joint decision on cross-border tariffs by the national regulatory authorities, with a final ACER decision in case of disagreement.*²¹¹

²⁰⁷ The ‘pancaking’ of tariffs (or charges) happens when different national entry and exit fees are cumulated at interconnection points, instead of having a joint assessment of the transmission charges for the use of the transmission facilities through e.g., an open access transmission tariff or a zero-level cross-border tariff that is compensated by financial compensation mechanism.

²⁰⁸ Draft recast Gas Directive, Art. 53.

²⁰⁹ A. Pototschnig and I. Conti, ‘An Inter-TSO Compensation Mechanism for renewable and low-carbon gases’, Florence School of Regulation, Policy Briefs; 2022/53.

²¹⁰ Recast Gas Regulation, Art. 53(1).

²¹¹ Discussion note on the Directive on common rules for the internal markets in renewable and natural gases and in hydrogen and the Regulation on the internal markets for renewable and natural gases and for hydrogen (recast), General Secretariat of the Council of the European Union, 18 October 2022.



Discussions in the Council showed that some Member States prefer keeping the existing tariff mechanism also for hydrogen, whilst others would like to postpone the implementation of zero-level cross-border tariffs for hydrogen networks.²¹²

Regime for hydrogen interconnectors with third countries

The EU regime for hydrogen networks as defined in the Gas Directive and Gas Regulation will be fully applicable to hydrogen interconnectors with third countries. This prolongs the jurisdiction of EU law to the interconnections with third countries and is in line with previous revisions of the gas legislation. In addition, to ensure the implementation of the requirements notably under public international law, an intergovernmental agreement must be signed for each hydrogen interconnector between the EU and the connected third country or third countries. This agreement will set the rules for the hydrogen interconnector, including, when appropriate, rules on third-party access, tariff regulation and on the unbundling of the operator of the hydrogen interconnector.

Pipeline interconnectors with third countries can serve as a means of transport for imports or exports of hydrogen. The EC proposes that the operating rules for such hydrogen interconnectors with third countries and rules on the certification of renewable and low-carbon hydrogen are enshrined in an **intergovernmental agreement** to ensure a coherent regulatory framework and its consistent application for the entire infrastructure.

(iii) Access to the natural gas system, focusing on renewable gases

Access to transmission and distribution grid for natural gas

The general rule of third party access applies to natural gas distribution and transmission, and LNG terminals.²¹³ It also applies to citizen energy communities that manage distribution networks.²¹⁴ **The choice between negotiated and regulated access is left to the Member States.** The rules as of TPA to upstream natural gas pipeline networks²¹⁵ and storage for natural gas²¹⁶ are almost unchanged compared to Directive 2009/73/EC.

Regulatory support: priority access, dispatch

Priority access is a regime that has been used in the former Renewable Energy Directive as a manner to provide regulatory support to renewable energy generation. As part of the progressive integration of renewable sources into the electricity market, the regime for priority access has been removed from REDII. Concerning biomethane, it appears that the regulatory approach varies between Member States. For example in Germany, biomethane is injected with priority in comparison to natural gas. New gas plants are also excluded from most balancing obligations. While the injection of biomethane

²¹² Discussion note on the Directive on common rules for the internal markets in renewable and natural gases and in hydrogen and the Regulation on the internal markets for renewable and natural gases and for hydrogen (recast), General Secretariat of the Council of the European Union, 18 October 2022.

²¹³ Draft recast Gas Directive, Art. 27(1).

²¹⁴ Draft recast Gas Directive, Art. 27(3).

²¹⁵ Draft recast Gas Directive, Art. 28.

²¹⁶ Draft recast Gas Directive, Art. 29.



happens at the local level, this divergence of legal regime may result in distortion of competition, calling for a harmonised approach at EU level.

Access to trading place, and integration of distribution systems to transmission system into the entry-exit system

As a general rule, Member States must ensure that renewable and low carbon gases get access to the market and infrastructure, regardless of whether the production facility is connected to transmission or distribution networks.²¹⁷ As a further integration measure, the Commission proposes that the access of renewable and low-carbon gases to the wholesale market should be facilitated by providing a new definition of an **'entry-exit system'** and ultimately ensuring that production facilities connected to the distribution system are part of it. Under the new definition, distribution networks will be integrated into the scope of the entry-exist system that is the aggregation of all transmission and distribution systems (or all hydrogen networks) to which one specific balancing regime applies.²¹⁸

National practices on this point vary. Under certain legislative, the entry-exist system has already been extended to distribution networks. Other countries, like France, the integration of biomethane into the market has been ensured by the establishment of 'a right to injection' into the gas network.

As pointed out by French Energy Regulation Commission (CRE), extending the entry-exit system to distribution network would also require a re-organisation of the contractual and tariff model, as foreseen in the European Target Model, and subsequently revising the network code on Capacity Allocation Mechanisms (CAM) and the network code on Harmonised Transmission Tariff structures (TAR).²¹⁹

Financial incentives: tariff discounts for renewable and low-carbon gases in the natural gas system

The Commission proposal contains various tariff discounts whose main objective is to financially encourage the uptake and cross-border trade of renewable and low-carbon gases²²⁰:

- Under Article 16 of the Draft Regulation, 75% tariff discount is to be implemented at entry points from production facilities of renewable and low-carbon gases and 75% discount from transmission tariffs to and from gas storages in the natural gas system.
- A 100% tariff discount is to be implemented at all interconnection points for renewable and low-carbon gases in the natural gas system. Once the revenue of a TSO from these tariffs is reduced by 10% as a consequence of the discount, the impacted TSO as well as all neighbouring TSOs are required to negotiate an inter-TSO compensation mechanism.²²¹
- The details of the application of the discounts are to be set in a network code.

²¹⁷ Draft recast Gas Directive, Art. 26.

²¹⁸ Draft recast Gas Regulation, Art. 2(30). See also Draft recast Gas Directive, Art. 2(53).

²¹⁹ Commission de Régulation de l'Énergie (CRE), Réponse à consultation, Contribution de la Commission de Régulation de l'énergie à la proposition législative de la Commission européenne de révision des règles communes pour le marché intérieur du gaz, April 2022.

²²⁰ Draft recast Gas Regulation, Art. 16.

²²¹ See procedure defined in draft recast Gas Regulation, Art. 16(5)(c).



There was no agreement between Member States as to the common approach to follow. As noted by the Council, some Member States are in favour of prioritising renewable, while others are worried that the tariff discounts will not result in an increase of the uptake of these gases, but will lead to loss of revenues for the regulated gas TSOs and may entail higher price of fossil gas for final customers.²²²

The definition of such extensive – and differentiated – discounts would contravene some basic principles of tariff setting and market-based signals. **To be validated, discounts should be justified in specific benefits. Biomethane injected and used at local level would use less grid capacity than imported gas, and would more logically justify a discount from general tariffs. A 100% tariff discount at all interconnection points for renewable and low-carbon gases would be complex to implement, also raising questions of tracking of the different gases.**

As part of the negotiations, Ministers were invited to reflect on the following points:

- *To differentiate between renewable and low-carbon gases discounts, i.e., different level of discounts for renewable and low-carbon gases.*
- *Not to implement tariff discounts at all interconnection points, including entry points from and exit points to third countries, while Member States shall implement discounts at entry points from renewable and low carbon production facilities and at entry points from and exit points to storage facilities.*
- *Not to implement mandatory discounts for renewable and low-carbon gases, i.e., full tariff to be paid to transport renewable and low-carbon gases.*

As part of the third revision of the draft proposals, amendments were added to provide Regulatory Authorities with the competence to decide on whether to decrease or reject discounts for injection from production facilities and storage. This will satisfy the interest of Member States that have or expect to have large volumes of renewable/low carbon gases in their energy mix, or may be concerned about the consequences of the injection of such gases into their energy system (cross-border flows). The tariff discounts at entry and exit points to and from third countries were removed from the proposal.

²²² Discussion note on the Directive on common rules for the internal markets in renewable and natural gases and in hydrogen and the Regulation on the internal markets for renewable and natural gases and for hydrogen (recast), General Secretariat of the Council of the European Union, 18 October 2022



(iv) Injection requirements, blending and technical rules

Interoperability and safety issues

The Impact Assessment conducted by the European Commission reveals differences in gas quality parameters, and in hydrogen blending levels into natural gas system. Both can negatively impact cross-border flows and end-users application. This can have potential negative risks on the internal market. In addition, the current gas quality rules are not fit to deal with future developments. The application of standards is a common manner to address such risks. The same approach is also favoured so far in the EU context, where stakeholders participating in the 36th Madrid Forum support the Commission to mandate CEN to develop standards for the quality of hydrogen in the hydrogen network and at end-users, for the purpose of agreeing on joint quality standards.²²³

Hydrogen blending

Hydrogen blending level requirements are not a consensual issue. Requiring TSOs to allow a set percentage of blending, faces a series of challenges related to: safety issues, notably at consumption level for industries; costs of investment in blending stations; imposing solutions chosen in one Member State to another Member States and its operations downstream. Therefore, it seems premature to require TSOs to accept a set percentage of blending without setting a clear methodology to assessing the technical and market consequences of such a measure. However, the outcome of the stakeholder's consultation reveals that the majority agrees that it can be a first necessary step, although costly, to move towards energy system decarbonisation. The main benefit of accepting a certain level of blending is to ensure that new hydrogen production will get access to the gas market, at least in its first phase of development. However, allowing blending hydrogen into natural gas would reduce the value of hydrogen, which is an expensive gas to produce.

On the issue of blending, the International Energy Agency (IEA) concludes that, while the costs associated with hydrogen blending are relatively low, emissions savings are limited (with only a 10% CO₂ reduction at a blending rate of 30%). In terms of emissions reduction, the IEA is of the opinion that blending should be a transitional solution than can 'help build up stable sources for low-carbon hydrogen demand until a dedicated hydrogen transport system is developed'. Likewise, supportive policies and regulatory mechanisms, including blend certificates and/or guarantees of origin, could spur hydrogen trading and pipeline transport development.²²⁴

In the Commission's proposal, the allowed cap for hydrogen blends is set at 5% by volume for all cross-border points in the natural gas system.²²⁵ The rule will apply from 1 October 2025, and will be implemented through a procedure for cross-border coordination of gas quality between first TSOs and then the regulatory authorities, in case of occurred cross-border trade restriction due to gas quality differences.²²⁶ A level that is cost-efficient in terms of adaptation and abatement costs. The

²²³ 36th Madrid Forum, https://commission.europa.eu/system/files/2022-05/mf36_conclusions.pdf

²²⁴ <https://iea.blob.core.windows.net/assets/e57fd1ee-aac7-494d-a351-f2a4024909b4/GlobalHydrogenReview2021.pdf>

²²⁵ Draft recast Gas Regulation, Art. 20(1).

²²⁶ Draft recast Gas Regulation, Art. 19.



TSOs will consequently be obliged to accept a level of hydrogen blend up to 5% by volume at interconnection points.

Allowing a certain level of blending would not be in line with the Commission's vision of a two main infrastructure pathway, but would represent an intermediary one. Imposing a 5% blend of hydrogen at interconnection points appears as a prescriptive measure, while the legislation does not define processes for assessing the consequences of such blending. It also hampers the value of hydrogen itself and raise safety issues. If a maximum percentage of accepted hydrogen blending is to be applied, the measure must be accompanied by common assessment rules. The maximum blending level could also be set at a lower level to start with, in order to assess the effects of the measure. Studies have concluded differently as to the technical feasibility of blending hydrogen with natural gas into the existing gas infrastructure, and a precautionary approach should be applied.²²⁷

In the third version of the revised proposals submitted to the Council, it appears that the maximum level of hydrogen blend into the natural gas network at interconnection points was changed from 5% to 2%. The reduced blending rate reflects a compromise between the scepticism of certain Member States towards blending and ensuring cross-border flows of gas.²²⁸

Injection of renewable gases into the natural gas grid

Different studies performed by the European Commission also reveal the differences in regulatory regime for grid injection of biomethane between Member States. Countries like Austria, France, Germany, Italy and the Netherlands have adopted ambitious policy framework accompanied by supportive regulatory regimes.

France offers an interesting case study. The French legislation has been authorising the injection of biomethane into the gas network since 2011.²²⁹ By 31 December 2021, 365 installations injected biomethane into natural gas networks. They had a production capacity of 6,4 TWh/year, representing an increase by 56 percent in one year.²³⁰ The objective set by the Energy and Climate Law of 8 November 2019 is to reach a target of 8% of renewable energy in the gas networks.²³¹ The French Environment and Energy Management Agency (ADEME) estimates that, by 2050, it would even be possible to cover 100% of gas consumption with renewable gas provided that the gas system continues to develop and acts in complementarity with the electricity network.²³²

²²⁷ Marcogaz, Overview of available test results and regulatory limits for hydrogen admission into existing natural gas infrastructure and end use, 2019.

²²⁸ Progress report, 12 December 2022.

²²⁹ Décret n° 2011-15971 du 21 novembre 2011 relatif aux conditions de contractualisation entre producteurs de biométhane et fournisseurs de gaz naturel, décret n° 2011-15942 du 21 novembre 2011 relatif aux conditions de vente du biométhane aux fournisseurs de gaz naturel pris en application de l'article L. 446-2 du code de l'énergie, arrêté du 23 novembre 2011 modifié fixant les conditions d'achat du biométhane injecté dans les réseaux de gaz naturel.

²³⁰ Ministry of Ecological Transition, France, 'Le Gouvernement accélère le développement de la production de biométhane avec le lancement d'un nouveau dispositif de soutien par appel d'offres', press release, 28 April 2022.

²³¹ Loi n° 2019-1147 du 8 novembre 2019 relative à l'énergie et au climat.

²³² ADEME, 'Mix de gaz 100 % renouvelable en 2050 ?', 2018/01.



Another example is Germany, with the use of injection certificates for biomethane production. The German biogas registry managed by the Germany Energy Agency (dena) is used as a platform to document injection certificates for biomethane production (volumes, properties and origin of biomethane).

The different national injection regimes often only concern biomethane, whereas other renewable gases are not concerned.²³³ Therefore, a harmonised minimum approach at EU level covering all renewable gases must be promoted in order to ensure a level playing field among them and further promote energy production and consumption from renewable energy sources.

Monitoring of gas quality

The monitoring of gas quality in relation to the blending and injection operations, and the respect of safety requirements, will rely on technical rules (e.g., purity, emissions, threshold for blending).

The development of technical rules for safety as well as the minimum technical design and operational requirements for the connection to the system of LNG facilities, storage facilities, other transmission and distribution systems, direct lines, as well as the hydrogen system, remains a national competence.²³⁴ These rules shall be notified to the European Commission, pursuant to Directive (EU) 2015/1535 on technical regulations, and ACER may put forward recommendations as to achieve a better compatibility of the rules. Member States also retain the competence to require TSOs, DSOs and hydrogen network operators in their territory to publish technical rules to achieve this goal. Such technical rules could include gas quality, gas odourisation and gas pressure requirements.

Hydrogen network operators (HNOs) may be asked by regulatory authorities to ensure efficient hydrogen quality management in their networks where necessary for system management. When undertaking such activities, hydrogen network operators should comply with applicable hydrogen quality standards.²³⁵

At the cross-border level, the draft Gas Directive defines procedure to the coordination of hydrogen quality between HNOs and regulatory authorities.²³⁶ Similar procedures already exist for natural gas.²³⁷

A more harmonised approach to the development and adoption of technical rules for notably gas quality, gas odourisation, gas pressure and connection tariffs is needed. The approach proposed leaves a large margin of appreciation to the Member States and their regulatory authorities. Harmonisation initiatives at EU level will primarily come via recommendations made by ACER. The

²³³ European Commission, ASSET Study on The role of Gas DSOs and distribution networks in the context of the energy transition, 2020, p. 11.

²³⁴ Draft recast Gas Directive, Art. 9.

²³⁵ Draft recast Gas Directive, Recital 79, Article 72.1(f).

²³⁶ Draft recast Gas Regulation, Art. 39.

²³⁷ Draft recast Gas Regulation, Art. 19.



question of quality standards for the conversion of existing infrastructures must also be better addressed in the proposals.



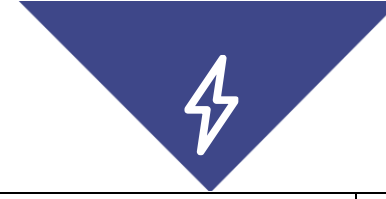
4. INTERACTION BETWEEN THE HYDROGEN AND GASES PACKAGE WITH OTHER EU LEGISLATION (EXISTING AND PROPOSED)

The mapping of the interaction between the different pieces of legislation forms a part of the impact assessment work performed by the European Commission. The following table summarises and critically analyses the interaction between the draft recast Gas Directive and Regulation and proposed or adopted relevant legislation, focusing on the three selected topics for the in-depth analysis. The objective is to identify any gaps or risks of inconsistency.



4.1 Comparative table

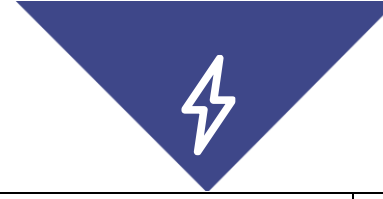
LEGISLATIVE ACT	CONTENT	GOVERNANCE ARCHITECTURE	SYSTEM OPERATORS' ROLE	GRID ACCESS
Governance Regulation on the Energy Union - Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action	<p>The Regulation establishes a governance mechanism to implement strategies and measures designed to meet the objectives and targets of the Energy Union and the long-term Union greenhouse gas emissions commitments consistent with the Paris Agreement. The mechanism will also stimulate cooperation between Member States, and enable the Union and its Member States' reporting under the UNFCCC and the Paris Agreement.</p>		<p>The Governance Regulation focuses on formal planning requirements to achieve the Energy Union targets. Sector specific goals should be taken into account. There must be consistency check of the NECPs with the Energy Union objectives. (Art. 4)</p> <p>Annex I of the Regulation provides for the template to be used for the NECPs.</p> <p>Pursuant to Art.7, Member States shall provide a general overview of the investment needed to achieve the objectives, targets and contributions set out in the national plan, as well as a general assessment on the sources of that investment</p> <p>Pursuant to Art. 23, Member States shall include in their integrated national energy and</p>	



LEGISLATIVE ACT	CONTENT	GOVERNANCE ARCHITECTURE	SYSTEM OPERATORS' ROLE	GRID ACCESS
			<p>climate progress reports information on the implementation of the following objectives and measures including, among others: (c) main infrastructure projects envisaged other than Projects of Common Interest, including infrastructure projects involving third countries, and, to the extent feasible, a general assessment of their compatibility with, and contribution to, the aims and targets of the Energy Union;</p> <p>NECPs shall describe the measures implemented or planned to achieve interconnection targets and increase interconnectivity: Current interconnection level and main interconnectors; Projections of interconnector expansion requirements (including for the year 2030). (See template NECPS Annex I).</p>	
RED II - Directive (EU) 2018/2001 of the European Parliament	The Directive establishes a common framework for the promotion of energy from			National rules concerning the authorisation, certification and licensing procedures that are



LEGISLATIVE ACT	CONTENT	GOVERNANCE ARCHITECTURE	SYSTEM OPERATORS' ROLE	GRID ACCESS
and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast) – REDII is currently under revision, both as a consequence of the Fit for 55 package and of the REpowerEU Plan.	renewable sources. It sets a binding Union target for the overall share of energy from renewable sources in the Union's gross final consumption of energy in 2030. It also lays down rules on financial support for electricity from renewable sources, on self-consumption of such electricity, on the use of energy from renewable sources in the heating and cooling sector and in the transport sector, on regional cooperation between Member States, and between Member States and third countries, on guarantees of origin, on administrative procedures and on information and training. It also establishes sustainability and greenhouse gas emissions saving criteria for biofuels, bioliquids and biomass fuels (Art. 1).			<p>applied to plants and associated transmission and distribution networks must be proportionate and necessary and contribute to the implementation of the energy efficiency first principle. (Art. 15(1)). Among others, Member States must ensure that rules concerning authorisation, certification and licensing do not discriminate between applicants and take fully into account the particularities of individual renewable energy technologies (Art. 15(1), 2nd para. (b)).</p> <p>The Directive provides general rules on administrative procedures for authorisation, certification and licensing (streamlined, objective, transparent and proportionate). (Art. 15(1)).</p> <p>Art. 20 deals with access to and operation of the grids. Several requirements are directly relevant for the integration of renewable gases into the gas grid:</p>



LEGISLATIVE ACT	CONTENT	GOVERNANCE ARCHITECTURE	SYSTEM OPERATORS' ROLE	GRID ACCESS
				<ul style="list-style-type: none"> - Member States must assess the need for grid extension (Art. 20(1)); - Member States must require TSOs and DSOs to publish technical rules on network connection that include gas quality, gas odoration and gas pressure requirements (Art. 20(2). - Member States must require TSOs and DSOs to publish the connection tariffs to connect gas from renewable sources based on objective, transparent and non-discriminatory criteria (Art. 20(2). <p>Art. 25-28 deal with the promotion of renewable energy in the transport sector, as well as the certification criteria for biofuels, bioliquids and biomass fuels produced from food and feed crops. Art. 29-33 deal more specifically with sustainability and greenhouse gas emissions saving criteria for biofuels, bioliquids and biomass fuels.</p>



LEGISLATIVE ACT	CONTENT	GOVERNANCE ARCHITECTURE	SYSTEM OPERATORS' ROLE	GRID ACCESS
REDII – Common position of the Council ²³⁸			Amendments to Art. 24 (8)-(10), will provide the possibility (not mandatory) for Member States to extend the assessment and coordination requirements about information and limitation to the right to disconnect by end of change of contract to consumers to gas transmission and distribution system operators, including hydrogen networks and other energy networks.	
REDII – Position parliament ²³⁹				The Parliament proposes that the Commission shall develop a ' global hydrogen import strategy ' with the view of promoting a European hydrogen market. The measures included in the strategy shall aim to promote a level playing-field, based on equivalent rules or standards in third countries in terms of environmental protection, sustainability and mitigating climate change. The strategy shall include

²³⁸ <https://data.consilium.europa.eu/doc/document/ST-10488-2022-INIT/en/pdf>

²³⁹ https://www.europarl.europa.eu/doceo/document/TA-9-2022-0317_EN.pdf



LEGISLATIVE ACT	CONTENT	GOVERNANCE ARCHITECTURE	SYSTEM OPERATORS' ROLE	GRID ACCESS
				indicative milestones and measures for imports. Member States shall take appropriate measures to implement the strategy in their integrated national energy and climate plans. The strategy shall also take into account the need to develop access to energy for local people. (proposal for amendment to Article 22a, 1(a)).
TEN-E Regulation – Regulation (EU) 2022/869 of the European Parliament and of the Council of 30 May 2022 on guidelines for trans-European energy infrastructure	The TEN-E regulation aims to better support the modernisation of Europe's cross-border energy infrastructure for the European Green Deal. It lays down guidelines for the development and interoperability of the priority corridors and areas of trans-European energy infrastructure (energy infrastructure priority corridors and areas) set out in Annex I. It provides for the identification of projects on the Union list of projects of common interest and of projects of mutual interest. It	Regional groups (Groups) shall be established in accordance with the process set out in Section 1 of Annex III (regional lists of projects). The membership of each Group shall be based on each priority corridor and area and their respective geographical coverage as set out in Annex I. Decision-making power in the Groups shall be restricted to Member States and the Commission (decision-making body), and based on consensus (Art. 3(1)). TSOs, DSOs, project promoters, will be part to the Group, and for energy infrastructures falling under the competence of	Planning role of grid operators – The Regulation introduces hydrogen infrastructure as a new infrastructure category for European Network Development. The link is made to different existing plans. PCIs that fall under the energy infrastructure categories of Annex II to the TEN-E Regulation must become integral part of: - the relevant regional investment plans under Art. 34 of the Electricity Regulation (EU) 2019/943;	The Regulation provides for a definition of ' dedicated hydrogen assets ' meaning: infrastructure ready to accommodate pure hydrogen without further adaptation works, including pipeline networks or storage facilities that are newly constructed, repurposed from natural gas assets, or both (Art. 2(17)). Repurposing is defined as 'the technical upgrading or modification of existing natural gas infrastructure in order to ensure that it is dedicated for the use of pure hydrogen'. (Art. 2(18)).



LEGISLATIVE ACT	CONTENT	GOVERNANCE ARCHITECTURE	SYSTEM OPERATORS' ROLE	GRID ACCESS
	<p>provides for the streamlining, more closely coordinating and accelerating permit granting processes for the selected projects. It provides rules for the cross-border allocation of costs and risk-related incentives for projects on the Union list.</p> <p>Relevant projects covered by the TEN-E Regulation for the purpose of this table include: hydrogen projects, electrolyzers, and smart gas grid projects.</p>	<p>national regulatory authorities, the EU-DSO entity and ENTSO-G will also be part to the Group.</p> <p>By 24 January 2023, ACER must publish the framework guidelines for the joint scenarios to be developed by ENTSO-E and ENTSO-G, and thus following a process of consultation with all relevant stakeholders (Art. 12(1)). The Guidelines defines criteria that should be taken into account in the underlying ENTSO-E and ENTSO-G scenarios, in particular in the field of infrastructures assessment and network development planning (Art. 12(1)).</p> <p>Infrastructure gaps identification – Within six months of approval of the joint scenarios report, and every two years thereafter, the ENTSO-E and ENTSO-G must publish the</p>	<ul style="list-style-type: none"> - the relevant national ten-year network development plans under Art. 51 of the Electricity Directive (EU) 2019/944; and - other national infrastructure plans, as appropriate (Art. 3(6)-(7) TEN-E Regulation). <p>TSOs, DSOs and other operators must cooperate with each other in order to facilitate the development of projects on the Union list in their area (Art. 5(2)).</p>	



LEGISLATIVE ACT	CONTENT	GOVERNANCE ARCHITECTURE	SYSTEM OPERATORS' ROLE	GRID ACCESS
		'infrastructure gaps reports' developed within the framework of the Union-wide ten-year network development plans (Art. 13).		
ACER Regulation - Regulation (EU) 2019/942 of the European Parliament and of the Council of 5 June 2019 establishing a European Union Agency for the Cooperation of Energy Regulators (recast)	ACER's mandate of annual monitoring and reporting of market performance in its annual market monitoring report (obligation in Regulation (EC) No. 715/2009) will be retained, with its scope extended to hydrogen. ACER's annual reporting will replace the Commission's reporting obligations that are currently still existing under the Gas Directive. The detailed proposals will ensure that ACER's monitoring is complementary to other monitoring exercises (especially monitoring under the Governance of the Energy Union and Climate Action) avoiding any overlaps.	The ACER Regulation refers extensively to the involvement of ENTSO for Electricity and Gas.	The ACER Regulation refers extensively to the involvement of TSOs, DSOs and the EU DSO entity in several procedures under its responsibility (opinion, information collection, reporting, monitoring, decision).	



Other pieces of legislation will interact with the regulation of gases infrastructures, but in a more indirect manner and are therefore not subject to a detailed comparative analysis. Among those texts are:

- **the Electricity Directive;**
- **the Alternative Fuels Infrastructure Regulation (AFIR).** The Regulation requires Member States to expand their network of recharging and refuelling infrastructure in line with zero emissions car sales, and to install charging and fuelling points at regular intervals on major highways;
- **the Energy Performance in Building Directive (EPBD),** notably because gaseous fuels are currently dominating the European heating and cooling supply and the cogeneration plants
- **the Energy Taxation Directive,** which includes definition of products ranked according to their environmental performance, including renewable and low-carbon hydrogen fuels used as heating fuels; and
- **the Energy Efficiency Directive.**



4.2 Conclusions

The following main conclusions can be drawn from the analysis in the comparative table.

4.2.1 Need for consistency between definitions and entities across the legislation

As different pieces of legislation refer to hydrogen and renewable gases, there is a need to check the consistency of the definitions across the legislation. New definitions (e.g., on 'renewable hydrogen') are also proposed by the Council and the Parliament as part of the revision of the Renewable Energy Directive (REDII), that must then be reflected in the recast Gas Directive and Regulation.²⁴⁰

The energy legislation currently in force refers to the current governance architecture involving ENTSO-E and ENTSO-G. Establishing a third entity, ENNOH will require an extensive and detailed revision of the currently binding legislation in order to bring it in line with the creation of such entity.

4.2.2 Need for consistency of legal regimes across the legislation

Consistency in the infrastructure pathway approach

Consistency is needed across the legislation as to the manner to implement the two-main infrastructure pathways for gases that the Commission has based its proposals on. For example, the TEN-E Regulation provides for definition of 'dedicated hydrogen assets' and 'repurposing' that seems very much in line with the approach in the draft recast Gas Directive and Gas Regulation. Nevertheless, other related legislation, for example the Energy Governance Regulation or the ACER Regulation, will need to be aligned.

Integrated planning across sector legislation, and coordination of investment strategies to deliver Energy Union's objectives

The objective of the European Commission is to promote integrated planning throughout the different sector legislation, i.e., climate, energy, maritime, transport and even agriculture. This would contribute to a more consistent implementation of the different parts of the European Green Deal. Per today, only the Regulation on the Governance of the Energy Union foresees an integrated approach to planning, but limited to minimum consistency requirements around energy and climate planning. The main instruments are the National Energy and Climate Plans (NECPs). NECPs are seen as the necessary tools for a more strategic energy and climate planning. Therefore, to ensure target and objective compliance, their use should be further promoted. Identical consistency requirements are also to be found in the draft Gas Directive, this time in relation to the Ten-Year Network Development Plan to be submitted by TSOs, that shall be in line with the NECPs and with the integrated national energy climate reports.²⁴¹ The insertion of such consistency provisions is welcome and seen as a minimum

²⁴⁰ See above point 2.4.1 on the proposed inclusion of a definition for 'renewable hydrogen' by the European Parliament.

²⁴¹ Submitted in accordance with Regulation (EU) 2018/1999 and support the climate neutrality objective set out in Article 2(1) of Regulation (EU) 2021/1119



requirement. The control of the enforcement of such provisions must however be reinforced to give the provisions sufficient effect.

All energy network operators with planning duties, including network operators, should be associated to this planning work. This goes in a both directions: (i) network operators must take into account the sector targets and objectives, as well as consistency with the Energy Union objectives, when developing their network plans; (ii) the pipeline of projects identified by the network operators must be reflected in the NECPs.

Planning procedures for grid developments and involvement of grid operators

The TEN-E Regulation defines priority procedures and lists of projects that will complete standard planning and permitting procedures. This is expected to lead to an alignment of the procedures and of the priority criteria for investment decisions. The planning and permitting requirements of the TEN-E Regulation have particular importance for grid operators and NRAs (set up of regional groups, elaboration of joint scenarios to be developed by ENTSO-E and ENTSO-G, infrastructure gaps identification). The Regulation introduces hydrogen infrastructure as a new infrastructure category for European Network Development, and PCEIs must be integrated into the relevant regional and national development plans.

4.2.3 Need for consistency between cross-sector policy goals

Promotion of renewable gases across sectors and sustainability and fiscal criteria

The legislator will need to ensure consistency across sectors for the quality and competitive use of biomass and biogases. For example, Articles 25-28 of REDII deal with the promotion of renewable energy in the transport sector, as well as the certification criteria for biofuels, bioliquids and biomass fuels produced from food and feed crops. Articles 29-33 of the same directive deal more specifically with sustainability and greenhouse gas emissions saving criteria for biofuels, bioliquids and biomass fuels.

4.2.4 Potential overlaps

Grid connection for renewable gases production: possible overlap with REDII

Article 20 of REDII deals with access to and operation of the grids. Several requirements are directly relevant for the integration of renewable gases into the gas grid:

- Member States must assess the need for grid extension (Art. 20(1));
- Member States must require TSOs and DSOs to publish technical rules on network connection that include gas quality, gas odorization and gas pressure requirements (Art. 20(2)).
- Member States must require TSOs and DSOs to publish the connection tariffs to connect gas from renewable sources based on objective, transparent and non-discriminatory criteria (Art. 20(2)).

4.2.5 Potential contradictions

Non-discrimination, level playing field vs. preferred access regime – possible contradiction with REDII

REDII requires Member States to ensure that rules concerning authorisation, certification and licensing for plants and associated transmission and distribution for renewables-based energy do not discriminate between applicants (i.e., level-playing field) while take fully into account the



particularities of individual renewable energy technologies.²⁴² The draft recast Gas Directive foresees a regime of priority access for renewable gases that will introduce some discrimination between applicants.

²⁴² REDII, Art. 15(1), 2nd para. (b).



5. A LEGAL REGIME FIT FOR PURPOSE? CONCLUSIONS AND RECOMMENDATIONS FOR IMPROVEMENT

5.1 Choice of EU regulatory model for hydrogen and renewable gases

Under which regulatory models may hydrogen and renewable gases value chains and markets develop across EU Member States? Is the energy system perspective sufficiently taken into account?

As indicated by its title, the Hydrogen and Decarbonised Gas Markets Package deals with the reform of the gas legislation, in order to enable the development of several 'gas markets'. This raises fundamental questions of regulatory approach and scope for one single legislative framework that is to cover different gases.

Gas market re-design

This legislative package is a new market design package for 'gases', and the counter-part of the ongoing discussion on electricity market design. **The interaction between the two sets of legislation should be duly assessed during the adoption of the new package and the upcoming revision of electricity market rules.**

It is positive to observe that the package aims to address the current shortcomings of Directive 2009/73/EC and Regulation (EC) No 715/2009 in decarbonising the gas sector by defining **one single legislative framework for all gases** rather than by adopting a separate legal act dedicated to hydrogen. This enables preserving the integrity of the internal energy market, facilitating regulatory alignment between gases for operators, and promoting energy system integration.

A main novelty of the package is to cover all renewable and low carbon gases, including renewable and low carbon hydrogen, biogas, biomethane, synthetic fuels (E-gas). However, the proposal refers primarily to natural gas and hydrogen, and lacks sufficient clarification as to the development of renewable gases markets. **There is a lack of visibility for renewable gases compared to hydrogen in the proposal.**

In this redesign of the market rules for gases, grid regulation deserves central attention, as it will have a great influence on the shaping of the market in the short term. Gas grid regulation is therefore a priority for advancing hydrogen and renewable and low carbon gases. Notably, access to the physical infrastructures and transparent tariffs for this latter are fundamental for ensuring access to the commodity market. **Put it simply, access to the grid conditions access to the market.**



The assumption of two infrastructure pathways: the missing intermediary pathway

An important distinction is made in the proposed regulatory regime for gas grid infrastructures - and therefore markets - between the ones relating to 'natural gas' vs. 'hydrogen'. This is in line with the **assumption made by the European Commission in its Impact Assessment Report that two main pathways for gas infrastructures will develop at different paces across Europe:**

- (i) a hydrogen-based infrastructure completing progressively the network for methane gases, i.e., pure hydrogen infrastructures;
- (ii) a methane-based infrastructure in which natural gas will progressively be replaced by other sources of methane, including biomethane and synthetic methane, and occasionally blended with hydrogen.

The assumption of a two-pathway approach to infrastructure development is fundamental for the shaping of the market in general, and for the regulatory approach of the legislative proposal.

However, the hydrogen market is still at its early stage and the transition phase towards more mature markets **will also require an intermediary pathway** to accommodate experiments (e.g., levels of blending and ownership/operatorship models), innovation (e.g., new uses, storage facilities), national specificities (bottom-up approach) and diversity of production/import sources, both onshore and offshore. **It should be a gas market design fit for all partners, also non-EU countries, of the European internal energy market.**

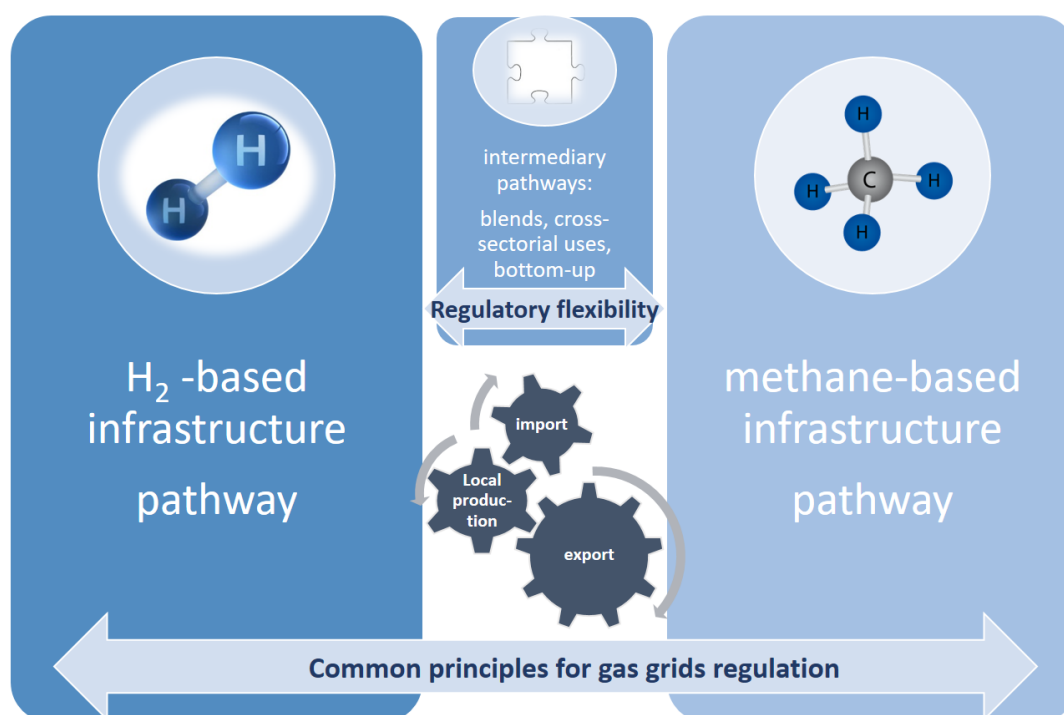


Figure 6: The multiple gas infrastructure pathways

Source: Author's own elaboration.



Towards an internal market for hydrogen and an internal market for methane gases: risk of splitting the internal energy market for gas?

A fundamental preliminary question is whether hydrogen is to be considered as a new market or part of an existing market in an energy system that is under transformation. When reading the proposal, it seems that the EC considers it as a new, specific market, but at the same time, this market relies on existing infrastructures, allowing for blending ('decarbonisation of gas markets'). Although much depends of the structure of the energy mix, in principle all energy carriers could compete between each other in an integrated energy system and under a level playing field. However, the approach favoured in the package is not anymore one of a single market for gas, but of an 'internal market for hydrogen' and an internal market for methane. **The energy system approach should be better preserved, in particular in the transitioning phase of the market and the infrastructures. Therefore, an intermediary pathway is required.**

An evolutive regulatory approach based on a mix between legislative harmonisation and dynamic regulation

Regulatory models existing in mature markets cannot be copied to markets which are still emergent. This calls for an evolutive and adaptive regulatory approach, based on a mix of EU harmonised legislation and elements of dynamic regulation until the new energy mix reaches a steady state.

The traditional regulatory mechanisms for infrastructure management must be covered by the harmonised EU legislation (e.g., unbundling, third party access regime, tariffs), as well as technical standards for gases. However, not all elements need to be fully harmonised, and on some aspects, adopting common principles, criteria or harmonised methodologies is sufficient.

Common principles of gas grid regulation

The regulation of the gas grid(s) should be guided by the following four key guiding principles, in order to enable a higher share of hydrogen and renewable gases within the energy system, in a cost-effective, sustainable and resilient manner:

- 1. Integrated energy system planning, including the use of EU governance tools**
- 2. Efficient and coordinated permitting procedures for infrastructure projects**
- 3. Safe, effective and smart operation of networks and related infrastructures**
- 4. Evolutive access regime to the grid, based on common minimum rules**

Integrated energy system planning is a key enabling requirement for a fast and cost-effective development of gas grids, with a higher share of hydrogen and renewable gases, and system interaction with electricity. This implies better coordination of grids development to match the expected hydrogen and renewable gases (particularly biomethane) production through integrated planning processes. To a large extent, it is what the European Commission is proposing to do in the REpowerEU Plan, suggesting to perform 'regional assessments of network development' and to match them with the potential of sustainable biomass production. This **'matching' exercise should also include the mapping and identification of 'renewables go-to areas'** as regards biogas and biomethane production plants. **This approach should be kept and reinforced in the final text of the recast Gas Directive and Regulation.**



One major question will be to know how to integrate DSOs for biogases/biomethane in today's framework. **The proposal for recast Directive and Regulation often focuses on the TSO level, and the role of DSOs should be carefully assessed and better reflected.**

EU governance architecture: ENNOH, TSO/DSO cooperation, regional cooperation

Establishing a new European organisation for the collaboration between hydrogen network operators is in line with the two-infrastructure pathway envisaged by the European Commission. However, it creates unnecessary complexity, is cost-inefficient and will weaken energy system integration efforts. **ENTSO-G should be tasked to promote the development and functioning of hydrogen infrastructures, in addition to natural gas.**

The recast Directive and Regulation should be more consistent on this point of the EU governance architecture for distribution operators. Concerning the EU-DSO Entity, it is notable that it will cover both electricity and gas, which could raise some issues of consistency compared to the approach followed for transmission. The approach proposed by the European Commission has been of separating cooperation between European TSOs within electricity on the one hand, and natural gas on the other hand. For distribution, the contrary will apply, with European DSOs for electricity and gas collaborating within the same EU entity. With ENNOH being responsible for the EU cooperation for the whole system, both transmission and distribution, there is a lack of consistency in the approach across vectors. The only reason for not separating cooperation between European DSOs for natural gas and electricity could be to promote sector integration. If so intended, **the EU-DSO Entity should then also cover hydrogen**, which is not the case. Following the same reasoning, **ENTSO-G should also cover hydrogen**. This is also what the ITRE Committee of the European Parliament has proposed in its position adopted on 9 February 2023, calling for **reforming ENTSO-G into a new 'ENTSO-G&H'**.

There is a need for defining a distribution level in pure hydrogen grids. The proposal should introduce a distinction between transmission and distribution for hydrogen infrastructures, as it is for natural gas. The ITRE Committee of the European Parliament voted in February 2023 in favour of this approach, distinguishing between 'HTNO' and 'HDNO' instead of HNO. This approach should be kept. Hydrogen will also be essential in decarbonising some local energy systems, such as residential buildings with hybrid heat pumps and hydrogen heating. The role of hydrogen and other clean molecules in buildings is necessary due to electricity system limitations.

Although the Directive and the Regulation foresee the cooperation between the operators of different infrastructures (particularly TSOs/DSOs), the manner this cooperation should take place and within which limits is not sufficiently defined. The content of this obligation should be made more precise, both as a matter of guidance, but also to avoid collusion between operators. The main objective mentioned for justifying the cooperation is the efficient use of facilities capacity, the synergies between the facilities, taking into account 'system integrity and operation'. Further provisions could be inserted in order to avoid misuse of commercially sensitive information obtained by operators during transactions and operations.



Regional cooperation is seen as an important step in developing forward the internal market in gases. The provisions in the draft recast Gas Directive are still vague on this point, and could be reinforced to provide clearer guidance to regulatory authorities, TSOs and hydrogen network operators.

A more flexible unbundling regime

The approach of ownership unbundling as the main regime as of 2031 appears to be too rigid on several points, and does not ensure a sufficient level-playing field across all operators and energy carriers.

Regulatory alignment between gas and hydrogen, but also between gases regulation and electricity regulation, must be kept. Previous research has concluded on the lack of evidence of the benefit of excluding the ITO model from the regulation of hydrogen networks, despite the arguments raised by the Commission that there are no or limited incumbent operators at the current stage of the market, and that a simpler regime could therefore apply. Nevertheless, applying ownership unbundling as proposed will impact negatively the natural gas operators, and may prevent positive synergies with hydrogen activities.

By imposing the ownership unbundling model, TSOs operating under the ITO model will be prevented from engaging in hydrogen network activities, while other TSOs in countries operating under the ownership or ISO model (for VIU), will more easily invest in the same activities. This creates barriers and a lack of level playing field between TSOs. **To ensure regulatory alignment, the ITO model should continue to be available beyond the threshold date.**

The end-date of the transition period comes too early, and a postponement of 3 to 5 years should be allowed. In its progress report of 12 December 2022 to the European Council, the European Commission indicates that it proposes to postpone the date for the end of the transition phase to 2035, which is in line with this report commendation, and should be kept. The end-date of the transition period must be practiced in a harmonised manner to avoid any distortion on the internal energy market.

The unbundling regime applies to the entire hydrogen network, since there is no distinction between transmission and distribution. **Again, a distinction should be introduced between transmission and distribution for the hydrogen network.**

Ownership unbundling seems a disproportionate measure for infrastructures that require upfront investments or do not represent monopolies. **Less stringent unbundling rules should be available for small hydrogen network operators under a certain threshold, as proposed by ACER-CEER.**

Concerning horizontal unbundling, further flexibility could be given in the ramp-up phase by allowing to start with accounting unbundling until the default regime of legal unbundling applies. This will enable more synergies for operators across network operations between the different energy carriers.



5.2 Degree of EU regulatory visibility and flexibility when developing hydrogen and renewable gases markets

Does the new gas package provide both the regulatory visibility and flexibility required for the development of H2 and Renewable Gas value chains and markets?

Targeting the right level of EU harmonisation

While the EU Hydrogen Strategy promoted the development of national and regional clusters, the Hydrogen and Decarbonised Gas Markets Package contains elements in favour of a joint approach at EU level from the start, including the development of common models for hydrogen assets and infrastructures. **The legislative framework should combine both top-down and bottom-up elements, and should therefore target the right level of EU harmonisation.**

The report has identified some key grid-related requirements that are considered to be central requirements influencing the shaping of the market for decarbonised and renewable gases. An evolutive regulatory approach between EU harmonisation and dynamic regulation should also be applied to these topics. The key grid-related requirements to be harmonised at EU level relate to:

- Integrated perspective in planning;
- Legal status and regulation of operators, notably unbundling rules;
- Grid access conditions, both connection and tariffs;
- Remuneration model for operators when transition towards decarbonised gas grids.

Targeting the right degree of EU harmonisation

There is still a large amount of uncertainty on the role of hydrogen in the energy system, and how widespread its use will be. The approach proposed in the Package is in many respect complex, for a market still to develop. To compare with, when the Third Energy Package for Gas was proposed, the objective was to ensure access to existing infrastructures, while the current Package aims at providing market design rules for infrastructures that are not yet in place.

The different national injection regimes often only concern biomethane, whereas other renewable gases are not concerned. Therefore, **a harmonised minimum approach at EU level covering all renewable gases must be promoted in order to ensure a level playing field among them and further promote energy production and consumption from renewable energy sources.**

Some requirements also appear too restrictive from the start and lack justifications. For example, imposing a 5% blend of hydrogen to be applied by TSOs at interconnection points in the natural gas system appears to be a too strict approach to start with, lacking consensus. If a maximum percentage of accepted hydrogen blending is to be applied, the measure must be accompanied by common assessment rules. The maximum blending level could also be set at a lower level to start with, in order to assess the effects of the measure. **The proposal by the Council consisting of a 2% blend seems more appropriate.**



Risk of regulatory uncertainty while waiting for the adoption of multiple implementing rules

Many practical implementation rules will be adopted in the form of network codes and guidelines, by delegated or implementing acts of the European Commission.²⁴³ This is in line with established procedures within the EU electricity and gas legislative frameworks, and will therefore represent an expansion of this legislation practice to hydrogen, renewable and low carbon gases.

This has a series of consequences. First, the adoption of implementation should be better anticipated, as it might be too late to wait for the adoption of the relevant network codes and guidelines. For example, network codes are expected to cover matters related to: common binding hydrogen quality specification for cross-border hydrogen interconnectors, cost benefit analyses for removing cross-border flow restrictions due to hydrogen quality differences, interoperability rules for cross-border hydrogen infrastructure, including addressing interconnection agreements, units, data exchange, communication and information provisions among relevant market participants (Art. 39(11) draft recast Gas Regulation).

Then, in the draft recast Gas Directive and Regulation, the provisions on connection are much more limited than the ones on access conditions. **The regime for connection to the grid should be reinforced in the text of the Directive/Regulation, instead of leaving all details to network codes.** At least, some principles should be defined. Notably, the connection of local production plants of renewable and low carbon gases and their integration into the system including the reverse flow to the TSO level should be facilitated. Per today, Member States apply different rules as concerns the repartition of costs for new connections.

More focus on energy system integration is required

The regulatory framework should better enable energy system integration, with a central role for grid operators. This requires **encouraging the planning of the decarbonisation of the gas grids with biomethane, blends and pure hydrogen in a more holistic approach. This also requires allowing grid operators to ensure, at least temporarily, cross-vector activities, in full respect of the unbundling and competition law rules. The vision proposed in the Hydrogen and Decarbonised Gas Markets Package is focused on two pathways and more interaction between these pathways should be ensured. The same applies to interaction with both electricity and heating and cooling.**

The proposal contains new incentives for taking into account a system integration perspective, but primarily at TSO level. The TSOs bear the main responsibility for integrating this perspective as part of the elaboration of the TYNDP. Energy system integration is therefore primarily pursued at the level of network planning, in the form of consultation of operators for other types of infrastructures across energy carriers, but also optimal use of infrastructures (e.g., storage, decommissioning). **The new provisions on integrated network planning are positive. They should be maintained and represent**

²⁴³ Draft gas Regulation, Chapter IV.



a first step towards the promotion of energy system integration perspective across legislative acts. They could go further in the integration of DSOs in the planning processes.



5.3 EU regulatory consistency

How do the recast Gas Directive and Regulation interact with other pieces of EU legislation?

Need for a more consistent wording and clear structure

The wording of the Directive and Regulation can be made more consistent. The structure of the Directive and Regulation, and the mix between general rules, exemptions and different regimes applicable to different gases, may raise both transposition and implementation challenges. The **numerous exemptions** to the default regime might also be challenging for the consistency of the regulatory approach. **Adjustments to the structure could facilitate the reading and correct transposition and implementation of the text.**

Need for consistency across the EU legislation

Regulatory consistency between the proposals for recast of the EU gas legislation and other pieces of EU legislation must be ensured in the following ways:

1. **Ensure consistency between definitions and entities across the legislation;**
2. **Ensure the consistency of legal regimes across the legislation:**
 - **Consistency in the infrastructure pathway approach;**
 - **Integrated planning across sector legislation, and coordination of investment strategies to deliver on the Energy Union's objectives;**
 - **Planning procedures for grid developments and involvement of grid operators;**
3. **Ensure consistency between cross-sector policy goals. Promotion of renewable gases across sectors and sustainability and fiscal criteria;**
4. **Avoid potential overlaps with REDII as to the regimes for grid connection for renewable gases production;**
5. **Address potential contradictions with REDII as to the introduction of a regime for preferred access, in order to ensure a level playing field among renewable and low carbon gases.**



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Centre on Regulation in Europe



Avenue Louise 475 (box 10)
1050 Brussels, Belgium
+32 2 230 83 60
info@cerre.eu
www.cerre.eu
📧 @CERRE_ThinkTank
🌐 Centre on Regulation in Europe (CERRE)
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