ACER
European Union Agency for the Cooperation of Energy Regulators

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OF THE EUROPEAN UNION AGENCY
FOR THE COOPERATION OF ENERGY REGULATORS

of 29 October 2024

on the review of gas and hydrogen national Network Development Plans to assess their consistency with the EU Ten-Year Network Development Plan

THE EUROPEAN UNION AGENCY FOR THE COOPERATION OF ENERGY REGULATORS,

Having regard to Regulation (EU) 2024/1789 of the European Parliament and of the Council of 13 June 2024 on the internal markets for renewable gas, natural gas and hydrogen, amending Regulations (EU) No 1227/2011, (EU) 2017/1938, (EU) 2019/942 and (EU) 2022/869 and Decision (EU) 2017/684 and repealing Regulation (EC) No 715/2009 (recast/2005)[1], and, in particular, Article 26(9) and Article 60(2) thereof,

Having regard to the outcome of the consultation with ACER's Gas Working Group,

Whereas:

1. INTRODUCTION

(1) The Opinion reviews the most recent editions of the European Union (EU) gas and hydrogen national development plans (NDPs)[2] in view of ACER's task to assess their consistency with the EU-wide Ten-Year Network Development Plans for gas and hydrogen (EU TYNDP), pursuant to Article 26(9) and Article 60(2) of Regulation (EU) 2024/1789.

(2) The consistency of methodological aspects between NDPs and the EU TYNDP was assessed through a survey among national regulatory authorities (NRAs) from 6 June until 5 July 2024, to which 23 NRAs submitted a response[3]. The projects' consistency, i.e. the inclusion of EU TYNDP projects in most recent gas NDPs, is assessed based

[1] OJ L, 2024/1789, 15.7.2024

[2] The review addresses natural gas and hydrogen network planning at the transmission level including selected observations regarding storage and regasification terminals.

[3] In addition, Cyprus, Denmark, Romania did not submit responses to the questionnaire underlying the survey. The Swedish NRA did not submit responses arguing that there is currently no gas or hydrogen NDP, as it is not required by national law.

on information publicly available from the European Network of Transmission System Operators for Gas (ENTSOG)[4].

(3) This Opinion focusses on:

a. methodologies for gas network planning as well as the integration of decarbonised and low carbon gases (hydrogen and biomethane) in the gas networks;

b. developments in hydrogen network planning as well as a review of the development of existing hydrogen infrastructure.

(4) The Opinion summarises the main findings and includes recommendations aimed at improving consistency between national and European gas and hydrogen network planning. Detailed information supporting the findings is included in the Annexes.

2. MAIN FINDINGS FOR GAS NETWORK PLANNING

2.1. Status of most recent gas NDPs

(5) According to the information provided to ACER, all gas NDPs required by national law[5] are up to date, with two notable exceptions, Spain[6] and Croatia. Regular updates of gas NDPs every two years or less would enhance the consistency and robustness between national and EU-wide network planning. A list with links to the most recent gas NDPs is presented in Annex I.

2.2. Frequency and consolidation of gas NDPs

(6) Since the most recent consistency assessment of NDPs and EU TYNDP carried out by ACER in 2022, some changes in governance and regulatory processes have been observed. In Italy, the adaptation of a new legislation[7] introduced several changes to the gas NDP process. These changes will apply to the upcoming NDP in 2025 and include a change in the frequency from annual to biennial and the adaptation from currently separate gas NDPs (one per TSO) to a single consolidated gas NDP at transmission level, prepared by the main gas TSO.

(7) In 11 Member States (MS), the biennial publication frequency is consistent between NDPs and EU TYNDP. In nine MS, the publication frequency is annual. Spain is an exception with a four-year cycle[8].

[4] Link to latest list of projects included in the TYNDP 2024, published on 18 June 2024 by ENTSOG: https://www.entsog.eu/tyndp#entsog-ten-year-network-development-plan-2024 (Annex A)

[5] Cyprus, Luxembourg and Malta have a derogation under Article 9 of Directive 2009/73/EC regarding the establishment of transmission system operators. Furthermore, Sweden and Finland are not required by national law to carry out a gas NDP. Finland, Luxembourg (TSO develops gas NDP based on national law) and Malta provided answers to the questionnaire, where applicable.

[6] In the case of Spain, competences regarding network planning correspond to the Ministry. The Spanish NRA, CNMC, has no competences in the network planning process, e.g., in updating the NDP.

[7] Law n. 214/2023 (Annual Market and Competition Law), which entered into force on 31 December 2023.

[8] The Spanish NRA (CNMC) reports a four-year cycle but points out that the last gas NDP was approved in 2008, and it has not been updated yet.

(8) In all MS except France, a single gas NDP at transmission level is prepared. In France, both gas TSOs, GRTgaz and Téréga, draft a separate NDP. In MS with multiple gas TSOs, a consolidated gas NDP by the respective TSOs is prepared.

(9) ACER supports the move towards a biennial frequency of NDPs in accordance with Article 55 of Directive (EU) 2024/1788[9] on common rules for the internal markets for renewable gas, natural gas and hydrogen. A biennial frequence strikes a balance between keeping the NDPs up to date and aligning NDPs with the EU TYNDP frequency, thus contributing to higher consistency. At the same time, a biennial frequency allows sufficient time for a proper consultation on the draft NDP and minimises delays.

(10) ACER also welcomes that some NDPs of MS where more than one network operator exists have evolved towards a consolidated transmission NDP, also including Liquified Natural Gas (LNG) and Underground Gas Storage (UGS) projects. A consolidated NDP adds value by presenting joint analyses of investment needs and reflecting such needs into a single document.

2.3. NRA's oversight over the draft gas NDPs

(11) The role of NRAs to scrutinize network development plans varies across MS. In eleven MS, the respective NRA is formally empowered to approve or reject the draft proposal of the gas TSO(s) and to make or request changes to it. In nine MS, the respective NRA does not have approval power, and the NRA role varies. A more detailed description on the scrutiny of NDPs by the respective NRAs is provided in Annex II.

(12) ACER reaffirms its view that strengthening the NRAs' oversight and regulatory powers over NDPs could improve the consistency and efficiency of network planning at both national and EU-wide levels.

2.4. Project inclusion in gas NDPs: type of projects

(13) Meeting market demand for capacity and meeting predefined policy scenarios are the main drivers for network development. Out of 20 reporting NRAs, seven NRAs report that network development is both market- and scenario-driven, while further seven NRAs report a mainly market-driven and four NRAs report a mainly scenario-driven network development.

(14) In terms of the asset types included in the gas NDP, no changes have been observed since 2022. In addition to transmission assets, which are included in the NDPs of all Member States, seven MS[10] also include LNG terminals and/or UGS projects in their gas NDPs. The NDPs of all MS except Estonia contain network development projects

[9] OJ L, 2024/1788, 15.7.2024.
[10] BE, GR, PT and Spain include LNG terminals; BE, BG, ES, HU, PT and SK include underground gas storages

(20 MS)[11]. Furthermore, replacement projects (11 MS) and decommissioning projects[12] (8 MS) are covered in the respective gas NDPs.

(15) ACER encourages Member States to allow for the inclusion of decommissioning and repurposing projects in gas NDPs in accordance with Article 55 of Directive (EU) 2024/1788. These projects will be needed to have gas networks ready for energy transition in view of the expected decline of gas demand in the mid- and long-term.

2.5. Project information and transparency of costs

(16) The projects collected in the EU TYNDP include project information, among other, on the commissioning year, the project maturity, the schedule and implementation status, associated costs for a limited number of projects[13] and information on NDP inclusion, where applicable.

(17) At national level, 18 reporting NRAs indicate that gas NDPs include project information on:

- commissioning date (18 MS);
- implementation status (15 MS);
- increase of cross-border capacity (15 MS);
- publicly available project cost data (13 MS);
- required financing sources (9 MS).

(18) Similarly to the EU-TYNDP, project cost information is not publicly available in the NDPs of several MS due to alleged confidentiality concerns of the project promoters.[14]

(19) ACER reiterates its recommendation that fundamental project information (such as information on commissioning date, project status, increase of transport capacity, where relevant) should be published in the NDPs. Both TYNDP and all NDPs should include investment cost information, at least in an aggregated manner, as costs are essential information for evaluating investment proposals.

2.6. Methodological approach to gas network development planning

(20) At EU level, the network development planning is carried out by ENTSOG and follows three main steps: building of scenarios, identifying infrastructure needs and assessing projects to determine each project's potential benefit compared to its costs. At national level, MS define their own process for how scenarios are developed, whether and how the needs assessment is carried out and how potential solutions to those needs are assessed before projects are included in the NDP. Inconsistencies in

[11] The gas NDP of Estonia does not include network development projects, considering a major gas demand reduction.
[12] Decommissioning projects also include projects for repurposing reasons.
[13] Due to confidentiality claims by project promoters, the CAPEX for 144 out of 326 (44%) projects is not included.
[14] Project's cost information is publicly not available in the gas NDP of Austria for some projects and for all projects in the NDPs of Croatia, Czech Republic, Hungary and Poland due to confidentiality concerns of project promoters.

the methodologies may affect robustness and reliability of the network planning, which may lead to inaccurate insights on which policy decisions might be based.

2.6.1 Scenarios and cross-border coordination

(21) Scenario development is typically the first step of network planning, where the future evolution of gas demand and supply, along possibly other energy vectors such as electricity and hydrogen, is assessed. The EU TYNDP scenarios are jointly developed by ENTSO-E, ENTSOG, and in the future also by the European Network of Network Operators for Hydrogen (ENNOH). The EU TYNDP for 2022 considers three scenarios: one scenario based on national policies and strategies and two top-down scenarios covering different time horizons up to 2050.

(22) At national level, the number of scenarios/visions used for the elaboration of the respective gas NDP(s) ranges between one scenario (7 MS) and four (1 MS, France). The time horizon of these scenarios spans around 10 years in the NDPs of all MS, except for Italy, which extends to the year 2040.

(23) The alignment of scenarios with policy targets varies significantly between MS. Most of the responding NRAs (12 out of 19) report an alignment of NDPs scenarios with different national and/or EU-wide plans, of which 10 NRAs report and alignment with the latest NECPs, seven NRAs report an alignment with Fit for 55 scenarios for achieving climate neutrality and five NRAs report an alignment with the REPowerEU plan (diversification of supplies, etc.) The remaining seven NRAs report an alignment only with other relevant scenarios at national level or were not able to assess any alignment of scenarios.

(24) ACER stresses the importance that NDPs and the EU TYNDP should be based on compatible scenarios aligned with decarbonisation targets of national and European Energy Climate plans.

(25) The number of scenarios jointly developed for gas and electricity increased to six MS[15], namely Belgium, Czech Republic, Italy, the Netherlands, Portugal and Spain. A total of nine NRAs report that infrastructure operators other than gas transmission operators are considered in the scenario development process, such as gas and electricity distributor system operators (DSOs), LNG and storage system operators, as well as adjacent gas TSOs.[16]

(26) ACER welcomes the slight progress in the development of joint gas and electricity scenarios and the increased engagement with the distribution level, which are instrumental to create robust and consistent planning scenarios for efficient network planning. ACER finds that proper consultation and coordination between operators during the preparation of NDP scenarios contributes to improve the consistency of network planning.

[15] Based on ACER Opinion 09/2020 and ACER Opinion No 05/2021, there was little shift to a more integrated electricity and gas planning.
[16] Annex II provides detailed information on the role of different infrastructure operators and the exchange of information with the gas TSO.

2.6.2 Stakeholders' consultation

(27) Stakeholder consultations are essential for devising network plans serving the needs of network users and other stakeholders, both at national and EU level.

(28) ENTSOG carries out a public consultation during the elaboration of the draft EU TYNDP, thus offering a platform for the engagement of market players and other stakeholders. However, the level of engagement of stakeholders' during the EU TYNDP development process has decreased over time.

(29) At the national level, 15 out of 21 responding NRAs report that public consultations are held in the scenario building process (run either by TSO or the NRA). In Belgium, Hungary, Luxembourg and Portugal, consultations only target specific stakeholders, such as Ministries, NRAs and other market players. In Czech Republic, there is no formal consultation carried out, but the scenarios are developed under the supervision of the market operator with assistance of relevant stakeholders.

(30) ACER welcomes NRAs' and TSOs' efforts to appropriately involve stakeholders in the NDP process and considers it important to improve the NDPs' quality and public acceptance.

2.6.3 Infrastructure Needs Identification

(31) In most MS (11 out of 20), infrastructure needs are identified and quantified either as part of the NDP or as a stand-alone activity and report. In the gas NDPs of Greece, Ireland, Italy, and Latvia, there are some activities on infrastructure needs, but without the use of formal concept and metrics.

(32) Infrastructure needs are mostly determined as a combination of different approaches, such as security of supply assessments (diversification of gas supply), system and market studies, economic tests (capacity auction, market consultation, demand shippers). Only the gas NDP of Slovakia includes the outcome of decarbonisation assessments (e.g., network investments for additional biomethane volumes) in its process of needs identification.

(33) 15 NRAs noted that the respective gas NDP uses network modelling via hydraulic simulations (carried out for assessments of the ability of the network to cover stress/high demand situations) and 13 MS use market studies including projections of gas market fundamental data (supplies, demand, peak demand capacity and prices). However, sector-integrated modelling, at least covering the electricity and the gas sectors, are much less frequently used: only three NRAs report the use of such integrated modelling in the gas NDPs.

(34) Target cross-border capacities are identified and quantified by the TSO(s) of most of the responding MS (12 MS). Half of these identified target cross-border capacities (6 MS) are aligned with the most recent NDPs of the neighbouring Member State(s) or adjacent countries.

(35) ACER deems that the coordination of cross-border capacities and other projects with significant cross-border impact presents room for improvement and should be better coordinated across neighbouring NDPs. Effective coordination requires up-to-date

NDPs and regular discussions between neighbouring TSOs and NRAs on cross-border issues.

2.6.4 Cost-benefit and SoS evaluation

(36) The gas NDPs of seven MS use a cost-benefit analysis for evaluating the net benefits of gas infrastructure investments. Six NRAs report the use of other analyses used to evaluate investments.

(37) Only the Italian and Lithuanian NRA confirm that the NDP contains an economic evaluation of the value of cost of disruptions of gas supply due to potential gas supply interruptions.

(38) ACER notes that the evaluation of the value of the cost of disruptions of gas supply in NDPs is very challenging, but this assessment remains relevant in view of existing risks of gas supply route disruption.

2.7. Readiness of gas transmission networks for injection of hydrogen and biomethane

2.7.1 Biomethane injection in gas transmission networks

(39) Biomethane, as a sustainable alternative to fossil gas, plays a significant role in achieving the EU's energy transition objectives. The REPowerEU plan calls for increasing biomethane production to 35 bcm by 2030[17]. This represents a significant increase from current production levels, which will have to be integrated into the gas network.

(40) Compared to 2022, some progress can be observed regarding biomethane developments. NRAs from seven MS[18] report that biomethane is currently physically injected into the gas transmission system[19]. In seven MS, there are investments/ adaptations foreseen to allow or increase direct injection of biomethane into the gas transmission system.

(41) ACER notes an upward trend in the inclusion of biomethane developments/projects in the gas NDPs, increasing from 11 MS in 2020 and 12 MS in 2022 to 15 MS in 2024[20]. In comparison to 2022, Latvia has now included biomethane projects, while Austria, Poland and Slovakia incorporate biomethane primarily for scenario building assumptions.

(42) In four MS[21], there are obligations for gas network operators to prioritise direct biomethane injections into the gas transmission system. Almost half of the responding NRAs (10 MS) report that gas transmission network operators must provide a connection point for direct biomethane injection upon request by a network user.

[17] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483
[18] DE, ES, FI, FR, IE, IT, LT.
[19] By the end of 2022, France had 514 biomethane production sites connected to the natural gas network. In Spain, there are two cases and Finland had four examples.
[20] Only four NRAs report the inclusion of biomethane projects in the gas NDP. These projects include network adaptations to allow direct biomethane injection at transmission level, direct connection points for biomethane injection at transmission level and reverse flow capacity from the distribution to the transmission network.
[21] DE, FR, HU and PL

(43) ACER recommends that all gas NDPs include infrastructure investments for biomethane injections to support its integration into the EU's gas transmission network. At the same time, further cooperation between transmission system operators (TSOs), distribution system operators (DSOs), and biomethane producers is essential to ensure that gas network planning aligns with biomethane production growth. Priority access and connection for biomethane injections to the gas transmission network, along with incentives for biomethane production, are instrumental to facilitate the achievement of biomethane targets.

2.7.2 Blending of hydrogen in gas transmission networks

Role in EU regulation

(44) Unlike biomethane, which can be easily integrated into the gas grid, hydrogen blending poses both technical and economic challenges[22]. The EU gas and hydrogen Regulation recognises that blending hydrogen into the natural gas system should be a last-resort option, as it is less efficient than using hydrogen in its pure form and reduces its economic value[23]. Blending also impacts the operation of gas infrastructure, natural gas end-user applications, and the interoperability of cross-border systems.

(45) According to EU Regulation, MS retain the right to decide whether to allow hydrogen blending in their national gas systems and to what degree such blending will be allowed. However, in order to prevent market segmentation, a Union-wide dispute-settlement mechanism was introduced for cases in which there are disagreements on gas quality, including up to 2% hydrogen blending at cross-border interconnection points[24]. This mechanism is designed to avoid restrictions to cross-border flows due to gas quality differences at interconnection points between Member States.

National developments

(46) While several NRAs reported in the past that their respective MS plans to increase hydrogen acceptance into the natural gas network[25], few changes have been observed. Notably, in 2021, the Latvian gas TSO established a hydrogen steering group in cooperation with the neighbouring operators (Estonia, Finland and Estonia). In 2023, these operators completed the first part of a jointly implemented research and development project on the possibilities of hydrogen injection into the gas transmission system of Estonia, Finland, Latvia and Lithuania. The study concluded that, theoretically, with relatively small investments in the transmission system, it is possible to transport natural gas with a hydrogen admixture ratio of 2% – 5%.

[22] Enabling hydrogen blending requires network adaptations, especially in gas quality measurement systems. Metering equipment requires upgrades or chromatograph replacement to be able to measure hydrogen concentrations. Gas turbines, compressor stations, CNG tanks and some types of storage can only accept low hydrogen concentration (< 5%) and may also need retrofitting.
[23] Regulation (EU) 2024/1789 on the internal markets for renewable gas, natural gas and hydrogen, recital (74). This Regulation is part of the hydrogen and decarbonised gas market package.
[24] Ibid, Article 21.
[25] See ACER Opinion No 8/2022, pp.10-11 and Annexes.

(47) In total, five MS (Austria, Germany, Italy, Latvia and Spain) have allowed hydrogen injection into the gas transmission network, the same countries as in 2022 with the addition of Latvia.

(48) Similarly, the maximum hydrogen concentration accepted by TSOs in the natural gas network remains almost unchanged. The hydrogen concentration limit at gas transmission level ranges from 0.1% in Latvia to 10% in Austria[26] and Germany.

3. MAIN FINDINGS FOR HYDROGEN NETWORK PLANNING

(49) The European Union has set policy ambitions as regards hydrogen in the EU Hydrogen Strategy[27], Fit for 55 Package[28] and the updated REPowerEU plan[29]. These aim for an aspirational demand target of 20 million tons of green hydrogen by 2030, with ten million tons expected to be produced in the EU and ten million tons imported from outside the EU[30]. Achieving this large-scale hydrogen demand would require a dedicated European hydrogen pipeline network, including both new dedicated hydrogen pipelines as well as repurposing existing natural gas pipelines to transport pure hydrogen.

(50) Given the uncertainties in future hydrogen demand, supply and need of transportation services, the future topology and scale of efficient hydrogen networks remain largely uncertain. The hydrogen and decarbonised gas market package[31] and the revised TEN-E Regulation[32] provide the overarching EU legal and regulatory framework for developing a hydrogen market and infrastructure on a European scale, which will need to be developed and implemented in the years to come.

3.1. National hydrogen strategies and framework for network planning

(51) Hydrogen strategies are comprehensive plans developed by governments to promote the production, distribution, and use of hydrogen as a clean energy source. The strategies shape the direction for future policy frameworks and guide network planning developments. While at European level the EU has adopted a hydrogen strategy in 2020, followed by the revision of the TEN-E Regulation in 2022 and the newly adopted hydrogen and decarbonised gas market package in 2024, MS are at different stages of developing their national hydrogen strategies and legal framework for hydrogen network planning.

(52) NRAs report that all MS except Estonia and Malta either already have an existent hydrogen strategy (15 MS) or plan to have one in the near future (6 MS). This is

[26] Compared to 2022, the H2 concentration limit at gas transmission level increased in Austria from 4% to 10%.
[27] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0301
[28] https://ec.europa.eu/commission/presscorner/detail/en/IP_23_4754
[29] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483
[30] However, several sources suggest a total EU hydrogen consumption in 2030 that lies below the objectives presented in the Hydrogen Strategy and the REPowerEU.
[31] Directive (EU) 2024/1788 and Regulation (EU) 2024/1789
[32] Regulation (EU) 2022/869

consistent with 2022, with the addition Lithuania and Slovenia, which are now planning a hydrogen strategy.

(53) NRAs from six MS -Belgium, Czech Republic, Germany, Malta, Poland and Portugal- report the existence of a national legal framework for hydrogen transmission regulation. In these six MS, the NRAs report to have some competence over hydrogen infrastructure. In Czech Republic, Malta, Poland and Portugal, hydrogen is defined by national law as a part of natural gas, so NRAs have indirectly some competence over the hydrogen sector. In Belgium, the NRA -CREG- recently gained competences for hydrogen transmission following the 2023 Belgian Hydrogen Law. CREG's current competences consist of advisory powers over the hydrogen NDP, with the Ministry for Energy having the competence to approve the NDP. In Germany, the NRA has competence in the approval of the so-called "hydrogen core network"[33]. Furthermore, operators of hydrogen networks can voluntarily declare to the NRA that their hydrogen network should be subject to regulation.

(54) Hydrogen network planning framework may either be integrated with gas NDPs or handed separately for gas and hydrogen sectors[34]. NRAs report that currently eight MS[35] have included hydrogen in the most recent gas NDPs (i.e. integrated gas and hydrogen NDPs). In most MS (15), there is no framework for H2 network planning in legislation. However, in 13 MS, the gas network operators are promoting plans and/or studies for H2 network planning.

(55) The integrated gas and H2 NDPs, as implemented by eight MS, cover different type of hydrogen network development[36]. Projects for repurposing existing gas pipelines to dedicated 100% hydrogen pipelines are covered in the NDPs of Austria, Czech Republic, France, Germany, Portugal, while new dedicated hydrogen pipeline projects are included in the NDPs of Austria, Belgium, Germany, Latvia, Lithuania and Portugal.

3.2. Existing and future hydrogen infrastructure

(56) Hydrogen infrastructure is still in its early stages of development. The overall number of MS with an existing hydrogen pipeline system did not change since 2022. However, several NRAs report on concrete plans to establish and/or expand hydrogen infrastructure in their respective MS.

(57) Belgium, France, Germany and the Netherlands report the existence of 100% hydrogen dedicated pipeline networks for industrial purposes, i.e., networks which

[33] The "hydrogen core network" is the starting point of hydrogen transmission network in Germany. Gas TSOs jointly draft a planned hydrogen core network to the NRA, according to the Energy Industry Act. The core network aims at connecting key areas of hydrogen production, consumption, storage and import and consists of repurposed natural gas infrastructure and newly built pipelines. At the preparation of this Opinion, the draft is at public consultation stage and pending of approval by the German NRA.

[34] Directive (EU) 2024/1788, Article 55 foresees a "single network development plan per Member State for natural gas and one single network development plan per Member State for hydrogen, or one joint plan for natural gas and hydrogen per Member State".

[35] AT, BE, CZ, DE, FR, LT, LV, PT.

[36] These projects have different levels of advancement in the gas NDPs, e.g. planning status, implementation status.

connect several industrial sites. In Belgium, there is a highly developed pipeline network of more than 600 km with cross-border connections with the Netherlands and France that serves industrial purposes (e.g., oil refineries) and is operated by the H2 production companies (e.g., Air Liquide). In the Netherlands, hydrogen pipelines exist and are owned and operated by private commercial companies. Hynetwork Services BV (a 100% subsidiary of Gasunie) will develop and operate the national hydrogen network.[37]

(58) Additionally, 12 MS plan to develop hydrogen pipeline networks in the future. For example, in Finland, there are concrete plans of a first national hydrogen transmission project by the gas TSO Gasgrid[38]. Italy's 2022 gas NDP includes a proposal for a hydrogen pipeline network expanding 2800 km from north to south, combining newly built infrastructure and repurposed gas pipelines. In Luxembourg, the gas TSO signed an MoU with the Belgian HTNO Fluxys hydrogen and the French gas TSO, GRTgaz, to foster cooperation in H2 infrastructure.

3.3. Regulatory developments for hydrogen network planning

(59) The hydrogen and decarbonised gas market package and the revised TEN-E Regulation provide the overarching legal and regulatory framework for the development of a hydrogen market and network at European level. According to EU Regulations, the European Network of Network Operators for Hydrogen (ENNOH) shall consist of certified Hydrogen Transmission Network Operators (HTNOs). Among other tasks, ENNOH shall develop a non-binding TYNDP for the hydrogen sector.

(60) According to NRAs' input, Belgium is the only MS with an officially certified and designated HTNO -Fluxys hydrogen SA/NV- designated in April 2024[39] to manage hydrogen transmission (not storage or terminals). In several other MS[40], gas TSOs are currently "acting" as operators of future hydrogen networks and are expected to be officially appointed as HTNO and certified once the revised Gas Directive is transposed in the Member States providing the legal basis. For example, in Spain[41], Enagás Infrastructuras de Hidrógeno, S.L.U. has provisionally been designated as

[37] HNS owns and operates a hydrogen pipeline (Dow-Yara: https://www.hynetwork.nl/en/about-hynetwork/hydrogen-pipeline-dow-yara). Construction work has started on a first part of the national hydrogen network (https://www.hynetwork.nl/en/news/now-we-can-really-start-building-in-rotterdam)

[38] Information about the first H2 transmission project: https://gasgrid.fi/en/2023/02/15/finlands-first-hydrogen-transmission-project-moves-forward-demonstration-project-will-create-conditions-for-hydrogen-infrastructure-development-in-finland/

[39] In view of the hydrogen and decarbonised gas market package, the procedure for certification and designation will likely be "renewed".

[40] In Croatia, Ireland, Portugal, Slovak Republic and Spain, the gas TSO (or subsidiaries of the gas TSO) takes the role of "acting" HTNO.

[41] In Spain, Royal Decree – Law 8/2023 requires the provisional HNO to prepare a non-binding proposal for ten-year hydrogen backbone infrastructure plan that had to be turned into the Ministry for the Ecological Transition and Demographic Challenge in April 2024. Enagás Infrastructuras de Hidrógeno, S.L.U. has been appointed as provisional HNO. A resolution of the Secretary of State of Energy has recently been published in the Spanish Official Journal publishing the Council of Ministers Agreement of 30 July 2024 empowering Enagás Infrastructuras de Hidrógeno, S.L.U. for the provisional exercise of the functions of development of European Projects of Common Interest of hydrogen networks.

HTNO, while in the Netherlands, Hynetwork Services BV is tasked to develop and operate its national hydrogen network.

(61) As the hydrogen market is still in its nascent stage, and future hydrogen demand and supply remain uncertain, consulting potential network users is crucial for understanding future hydrogen infrastructure needs. According to NRAs, market consultations that collect the interest of hydrogen network users have been carried out in eight MS[42]. During these market consultations, NRAs often played no role or, as in Germany and Austria, have an observing role. None of the NRAs have reported plans to organise open seasons (with a binding commitment phase).

(62) ACER notes that the absence of a national legal framework for hydrogen infrastructure planning prevents some regulatory authorities from assessing hydrogen infrastructure plans. It is anticipated that MS will enact legislation to establish a framework for hydrogen network planning until summer 2026, possibly allocating on NRAs oversight responsibilities over hydrogen network plans. It is crucial that both European and national hydrogen network plans address the interests of market players in developing hydrogen transportation capacities, as this is a key driver of hydrogen infrastructure projects. Given the early stages and uncertainties associated with hydrogen market development, it is essential to synchronize and coordinate the development of hydrogen markets and infrastructure as much as possible. Furthermore, coordination and alignment of assumptions between hydrogen, natural gas as well as electricity scenarios and network development processes, both at national as well as at European level, is needed to overcome issues such as spatial competition and to ensure security of supply and sector integration.

4. CONSISTENCY OF PROJECTS IN GAS AND HYDROGEN NDPS AND THE DRAFT EU TYNDP 2024

4.1. Consistency of project inclusion in plans

(63) To ensure a comprehensive monitoring of network planning, it is important that there is consistency of projects included in different network development plans. A lack of consistency renders an unclear picture of network development, which may raise uncertainty for decision-makers about network development.

(64) ACER notes that 166 out of the 326 (51%) projects included in the draft EU TYNDP 2024 are listed in most recent NDPs[43], like the share of project consistency observed for the EU TYNDP 2022 (49%) and for the EU TYNDP 2020 (55%). However, the

[42] AT, BE, DE, ES, HU, IT, LU, NL, and planned in LT, LV. These market consultations were carried out by ministries and/or TSOs/Market Area Manager.
[43] Link to latest list of projects included in the TYNDP 2024, published on 18 June 2024 by ENTSOG: https://www.entsog.eu/tyndp#entsog-ten-year-network-development-plan-2024 (Annex A)

level of project consistency still lags considerably behind the levels observed for the EU TYNDP 2018 (75%)[44].

Table 1: Number of NDP projects included in the EU TYNDP 2024, per project type

Project Type	TYNDP projects	TYNDP projects Included in latest gas NDP	Share of NDP inclusion
Biomethane	5	3	**60%**
Gas transmission pipeline	72	66	**92%**
Hydrogen	202	67	**33%**
LNG	12	8	**67%**
UGS	11	10	**91%**
Other	24	12	**50%**
Total	**326**	**166**	**51%**

(65) There is a significant difference in the level of project consistency between the different project types included in the EU TYNDP 2024, as shown in Table 1. Gas transmission pipeline projects have the highest consistency with 92% of projects that are included in the latest gas NDP(s). Hydrogen projects, which have nearly tripled in number compared to 2022, are included in only 33% of cases in the latest gas NDP(s).

(66) Furthermore, the consistency of draft TYNDP 2024 projects included in the respective NDPs differs significantly between MS. A detailed overview of the consistency per sector and per country is shown in Annex IV.

(67) Despite the minimal improvement and the overall relatively low level of consistency of project inclusion in the EU-wide and national development plans, the inclusion rate of hydrogen TYNDP projects in the NDP(s) rose significantly from 17% in the EU TYNDP 2022 to 33% in the EU TYNDP 2024.

(68) The data suggests that as national plans for hydrogen infrastructure will develop, a better alignment between EU-level plans and national plans can be anticipated over time. ACER recommends that project promoters consult with national authorities on hydrogen projects before applying to the TYNDP process to increase the consistency of European and national network planning[45].

[44] For comparison, see ACER Opinion No 14/2019 on ENTSOG's draft TYNDP 2018, ACER Opinion No 02/2021 on ENTSOG's draft TYNDP 2020, and ACER Opinion No 08/2022 on ENTSOG's draft TYNDP 2022 https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2014-2019%20on%20the%20ENTSOG%20draft%20TYNDP%202018.pdf https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2002-2021%20on%20the%20ENTSOG%20draft%20Ten-Year%20Network%20Development%20Plan%202020.pdf https://www.acer.europa.eu/sites/default/files/documents/Publications/Opinions/ACER_Opinion_08-2022.pdf

[45] Regulation (EU) 2024/1789, Article 32 requires the TYNDP to "build on national investment plans".

4.2. Cross-check of draft TYNDP 2024 and gas NDP information

(69) ACER and NRAs cross-checked the input data (project attributes) of the draft TYNDP 2024 project candidates as submitted by the project promoters. The NRAs reviewed these candidates early in the TYNDP 2024 development process. The NRAs' views and comments on the projects were communicated to ENTSOG, primarily to enhance the quality of the input data for TYNDP 2024 and to allow NRAs to express their general comments and concerns on the draft projects at an early stage.

(70) Out of 14 responding NRAs, 8 NRAs had either general and/or project-specific comments and remarks on the draft TYNDP 2024 projects[46]. Projects for which comments were received as well as general comments are listed in Annex IV.

(71) ACER calls on project promoters to ensure that coherent and reliable project information is provided in NDPs, in the EU TYNDP, and during the project implementation monitoring. ACER asks ENTSOG and promoters to thoroughly consider and accept the remarks from NRAs on draft TYNDP projects, which are mostly intended to increase the consistency of national and European network planning.

5. CONCLUSION

(72) ACER has carried out a comprehensive review of gas and hydrogen network planning, primarily based on the information provided by national regulatory authorities (NRAs) and project information provided by the European Network of Transmission System Operators for Gas (ENTSOG).

(73) ACER's review finds:

a. some improvements in the methodological consistency of NDPs with the EU-TYNDP, notably, a shift of gas NDP developments towards a biennial frequency, a shift of operators' plans towards a consolidated, single gas NDP and an increase of jointly developed scenario processes, especially between gas and electricity.

b. different practices regarding the methodologies applied for gas and hydrogen network planning. This includes the number and use of scenarios, the approach to identify infrastructure needs and the time alignment between network development plans at national level and EU level.

c. a significant increase in the consistency of hydrogen projects included in the draft TYNDP and most recent NDPs from 17% in the 2022 edition to 34% in the 2024 edition of the EU TYNDP plan. Despite this improvement, the overall project consistency remains much lower for hydrogen projects compared to natural gas transmission pipeline projects (92%). This discrepancy is mainly explained by the inclusion of a large number of hydrogen projects in the EU

[46] Croatia, Germany, Portugal, Slovenia, Spain, Italy, Hungary and Latvia

TYNDP that are not always included in national hydrogen network plans and to the fact that hydrogen network plans are still to be developed in some MS.

(74) ACER observes that the recently adopted hydrogen and decarbonised gas market package, which contains new provisions for integrating renewable and low-carbon gases into the existing gas system also aims at better aligning gas NDPs with the EU-TYNDP. Key alignments include a biennial frequency of gas NDPs, consolidation of operators' plans into one single gas NDP per MS and joint development of scenarios for electricity, gas and hydrogen. ACER notes that MS may opt for a joint plan for gas and hydrogen or separate plans.

(75) ACER recognizes the progress made in developing legal and regulatory frameworks for hydrogen in selected Member States (e.g. Belgium, Germany). However, it also identifies a need for further implementation of the hydrogen and decarbonised gas market package provisions related to network planning in numerous Member States,

HAS ADOPTED THIS OPINION:

1. ACER has reviewed most recent gas and hydrogen national network development plans (NDPs) across Europe to assess their consistency with the draft European-wide ten-year network development plan (EU TYNDP) of 2024.

2. ACER issues several recommendations aimed at improving the consistency between gas NDPs and the EU TYNDP in light of achieving more comprehensive and robust information on network planning on which policy decisions may be based.

The NDPs should:

a. Ensure meaningful consultations with relevant stakeholders. National and neighbouring operators should coordinate and exchange information on key areas such as scenarios, identifying infrastructure gaps, and cross-border projects.

b. Be as time aligned as possible with the EU-TYNDP development process to contribute to better consistency and coordination in planning between the European and national level.

c. Be subject to strengthened NRAs' regulatory oversight[47] in those MS where, so far, this oversight has been limited.

d. Include relevant project information such as cost data and, for projects included in the EU TYNDP, cross-references between the gas NDP investment item (project) and the EU TYNDP codes.

e. Include, where relevant, a framework for the phase-out, decommissioning and repurposing of natural gas projects to hydrogen projects.

[47] Oversight is seen as limited when NRAs provide non-binding scrutiny (e.g. opinion) on draft plans without hard powers to approve or issue binding amendment requests on draft plans.

f. Be based on compatible scenarios aligned with the decarbonisation targets and, where relevant, on the goals to phase out the remaining dependency on Russian gas.

The EU TYNDP should:

a. Include information on project costs and, where possible, on monetised benefits, in line with the practice observed in the electricity TYNDP.

b. Improve the planning process to avoid the recurrent delays in the development and release of TYNDPs.

c. Build on national network development plans[48]. For projects not included in most recent NDPs addressing cross-border capacity needs, project promoters should consult and seek validation from national authorities on projects before applying to the TYNDP process. For projects included in most recent NDPs addressing cross-border capacity needs, ENTSOG should seek validation from national authorities and explain any exclusion of such projects from the TYNDP.

d. Include infrastructure to be decommissioned.[49]

e. Align the expected market supply and demand developments of renewable hydrogen and biomethane with a prudent assessment of the need for future transportation services.

Done at Ljubljana, on 29 October 2024.

- SIGNED –

For the Agency
The Director

C. ZINGLERSEN

Enclosures, data Annexes:

I - LINKS TO LATEST GAS NDPS
II - GAS NETWORK PLANNING: SUMMARISED FINDINGS
III - HYDROGEN NETWORK PLANNING: SUMMARISED FINDINGS
IV – PROJECT CONSISTENCY OF DRAFT EU-TYNDP WITH NDPS

[48] See Article 32 of Regulation (EU) 2024/1789.
[49] Ibid.