

TYNDP 2024

The Hydrogen and Natural Gas TYNDP

HEAT
SUPPLY
INDUSTRY
NATURAL GAS
RETROFIT
BIOGAS
NETWORK
DECARBONISE

Feedback Document



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1 FROM DRAFT TO FINAL TEN-YEAR NETWORK DEVELOPMENT PLAN (TYNDP) 2024

1.1 WHAT HAS HAPPENED SINCE THE DRAFT TYNDP PUBLICATION?

The draft TYNDP 2024 was submitted to the Agency for the Cooperation of Energy Regulators (ACER) on 20 October 2025 and received ACER's favourable Opinion¹ on 16 December 2025.

1.2 WHY A FEEDBACK DOCUMENT?

The purpose of this document is to gather and reply to feedback received from both ACER and the European Commission (EC) regarding the draft TYNDP 2024. It describes which part of this

feedback is already addressed in the final TYNDP 2024 and which is planned to be used in future cycles, indicating which process it will feed into.

1.3 COMPARISON OF PAST ASSUMPTIONS AND PROJECTIONS OF GAS DEMAND AND SUPPLY WITH ACTUALLY OBSERVED (HISTORICAL) LEVELS

At each TYNDP edition, ENTSOG critically reviews input data by comparison with real evolution on the energy market – focusing on demand scenarios and supply potentials. This process formalises the ongoing review of key assumptions, and is a base for developing new elements as part of the stakeholder engagement process.

Figure 1 compares the TYNDP 2024 natural gas supply potentials for year 2030 with the actual historical imports to Europe. For Norway, Algeria, Caspian sea and Libya, 2024 imports have materialised in the range of the potentials expected for year 2030 in TYNDP 2024.

The maximum LNG supply potential for Europe is expected to increase in line with the anticipated global expansion of LNG export capacity by 2030.

The supply configuration assumes a minimisation of Russian natural gas use. Under this assumption, other pipeline supply sources are utilised at their maximum, and the simulation results indicate that Russian pipeline gas does not contribute to the overall supply mix.

¹ [ACER Opinion no. 13/2025 on ENTSOG's draft TYNDP 2024](#)

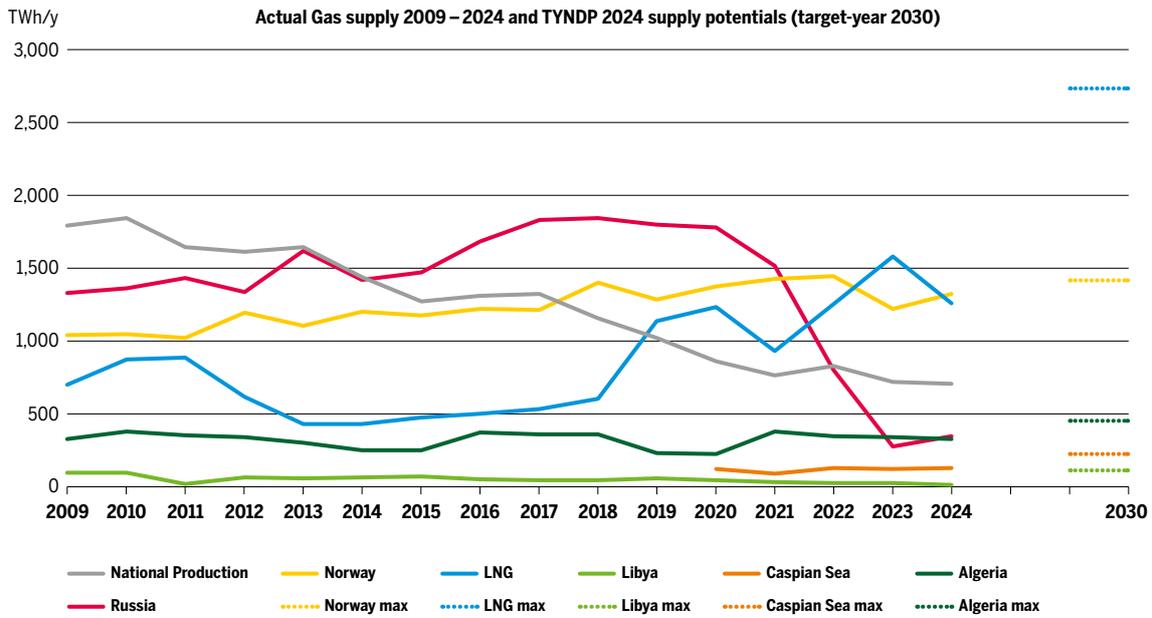


Figure 1: Actual natural gas supply 2009–2024 and TYNDP 2024 supply potentials (target-year 2030)

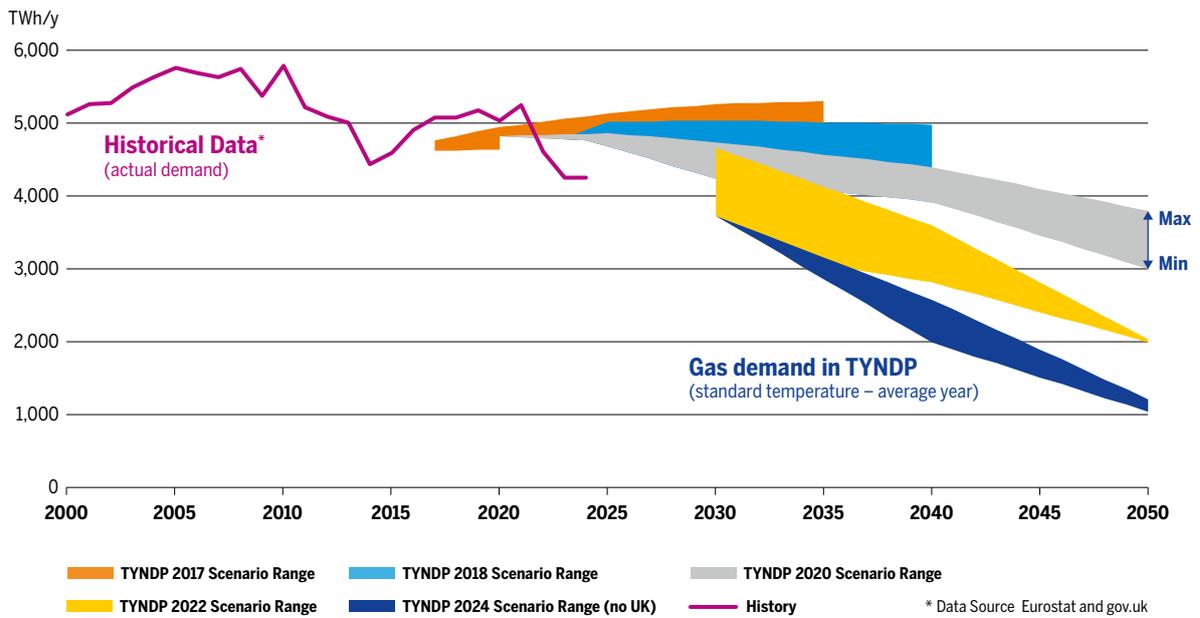


Figure 2: Actual EU27+UK natural gas demand 2000–2024, TYNDP Scenario demand data

Since 2022, gas demand in Europe fell sharply due to high prices and supply cuts from Russia following its invasion of Ukraine, prompting renewables to expand, industries to switch fuels or reduce output, and households to save energy. Mild weather further reduced heating needs. Total EU gas consumption fell by around 7 % in 2023 compared to 2022, following a larger drop of approximately

of 12 % in the previous year, marking some of the lowest demand levels recorded in recent decades and reflecting broad reductions across major consumers, including Germany, Italy and France. In 2024, demand remained broadly stable relative to 2023, at historically low levels. Mild weather and increased electricity production from renewable sources have been central to this trend.

The methane demand in scenarios decreased from the 2022 cycle to the 2024 cycle. The range shown for the 2024 cycle represents the “national trends” values for 2030 and the range between the two deviation scenarios (“distributed energy” and “global ambition”) when going to 2040 and 2050. The sharp decrease comparing the 2022 and 2024 scenarios is mainly a result of a lesser use of methane in power generation.

For more context and a longer-dated market retrospective, a short overview of European gas demand evolution in the previous ten-year period is provided.

The years 2015 and 2016 were a period of gas demand growth, due to mostly heterogeneous sector and country-specific factors. An element common to several countries, in the first half of 2016, was coal-to-gas switching, when coal prices soared, partly in consequence of the Carbon Price Floor² policy in the UK.

Gas demand further increased, from roughly 4,900 TWh at end-2016 to about 5,100 TWh in 2017, as moderate fuel switching continued. Higher gas prices were supported by strong power generation demand and storage injections, providing support to hub prices in summer and higher consumption in winter.

In 2018, demand stabilised close to 5,100 TWh. An extreme cold spell early in the year put stress on hub prices, pushing them to multi-year highs. Early-warning mechanisms were activated in several countries, as significant storage withdrawals were observed. Later in the year, lower summer consumption allowed to refill storages, followed by lower consumption in the last quarter of 2018 compared to 2017.

Gas further consolidated its position ahead of coal in the power generation merit order during 2019, reaching close to 5,200 TWh. Warm weather in the first quarter supported high storage levels entering summer. LNG strengthened its role in supplying the European gas market. Ample supply and declining prices limited storage withdrawals in the final quarter.

In 2020, COVID-19 lockdowns severely affected the economy and energy markets, driving European gas prices to a nine-year low. Mild winter conditions further reduced demand, while storage reached its highest level in six summers, achieving 95 % filling by end-September.

This oversupply situation resulted in low storage use entering 2021, as lockdowns eased and gave way to economic recovery. Gas prices at European hubs rose to their highest level in a decade, supported by colder-than-usual weather in April and May. By end-September, European storages only reached 75 % filling levels, aggravated by thinner LNG supply during winter 2020/21. This was due to higher Asian LNG prices as well as the Suez Canal blockage in late March 2021. Algerian, Norwegian and Russian gas partially offset the shortfall, alongside a new source from the Caspian region, Azerbaijan, which began commercial gas deliveries to the EU via the Trans Adriatic Pipeline in November 2020.

2 <https://www.gov.uk/government/publications/excise-notice-ccl16-a-guide-to-carbon-price-floor/excise-notice-ccl16-a-guide-to-carbon-price-floor>



2 ACER OPINION AND RECOMMENDATIONS TO THE DRAFT TYNDP 2024

This section provides feedback to the conclusions and recommendations issued by ACER.

The content of the ACER opinion on the draft TYNDP 2024 should be read together with its other Opinion documents, on individual components of the TYNDP 2024, namely on the Joint Scenarios report³, of 30 September 2024 and on the Hydrogen Infrastructure Gaps Identification (IGI) report⁴, of 27 May 2025. ENTSOG's feedback to ACER's Opinion on the draft IGI report was inserted at the beginning of the report itself, and will not be restated in this document.

³ [ACER Opinion 05/2024 on ENTSO-E and ENTSOG Scenarios for TYNDP 2024 and Guidelines](#)

⁴ [ACER Opinion 05/2025 on ENTSOG's draft Hydrogen Infrastructure Gaps Identification report](#)

2.1 RECOGNITION OF IMPROVEMENTS

The ACER Opinion nr. 13/2025 included the following recognition of improvements achieved in the process, methodology and outcome of the draft TYNDP 2024, compared to TYNDP 2022:

1. Revisions to the Guidelines for Project Inclusion (GPI) and the Implementation Guidelines for Project-specific Cost-Benefit Analyses of Hydrogen Projects (Annex D1), having improved the clarity and quality of the TYNDP.

In the GPI, the adaptations highlighted by ACER, to the administrative and technical criteria include: excluding natural gas projects with limited progress, considering capacity reductions due to repurposing or retrofitting and accepting CO₂ projects based on repurposed natural-gas infrastructure.

In Annex D1, ACER's recommendations provided during consultation, were reflected in the post-consultation version of the document, namely: removing the "alternative-fuel approach" that determined fuel switching and removing the principle on "frequency of hydrogen supply disruption", pending further consultation on both topics. ACER also welcomed the inclusion of the societal cost of carbon (SCC) in Annex D1, using values suggested by the European Investment Bank, as well as the sensitivities considered.

2. Improvements to the Hydrogen Infrastructure Gaps Identification (IGI) Report, including simulation results under the assumptions of "unlimited" import capacity, as requested by ACER in its Opinion nr. 05/2025.

Other improvements that supported the Hydrogen IGI report included a more detailed explanation of the unlimited simulations methodology and an improved graphical illustration of examples in the Hydrogen IGI methodology (Annex D2).

3. Integration of the Dual Hydrogen-Electricity Model into the cost-benefit analysis. Furthermore, ACER welcomed the first-time assessment of cross-sectoral interlinkages, in form of the market rents indicator (B4), notwithstanding improvement recommendations presented in the following section of this document.
4. Greater transparency through a public visualisation platform and reinforced stakeholder engagement.
5. The early exchanges regarding the technical information included in the draft projects' list (draft Annex A). The fact that National Regulatory Authorities (NRAs) were given the opportunity to provide feedback on the draft list allowed part of the project promoters to amend and improve their submissions accordingly.
6. The contents of the Supply Adequacy Outlook methodology, consistent with the informal feedback provided during the preparation of the TYNDP 2024 guidance documentation.

2.2 RECOMMENDATIONS

The ACER Opinion provides for a number of short-term recommendations listed in the table below, in the order they appear in the ACER Opinion.

ACER also indicates ENTSOG should follow the recommendations in future TYNDP editions, highlighting focus areas: timely delivery, transparency and extension of the scope of the methodologies.

Nr.	ACER recommendations	ENTSOG's answer
a)	<ul style="list-style-type: none"> ▲ Resolve the identified shortcomings in the modelling inputs, assumptions and the calculation of the CBA indicators. Paragraph 66 – recommendation a). 	
	<ul style="list-style-type: none"> ▲ Market rents indicator (B4): include both hydrogen and electricity sector project benefits, adjusting for any double-counting with ENTSO-E's Socio-Economic Welfare indicator (B1). Paragraph 47 	<p>ENTSOG fully supports the proposal and already applies the calculation in its modelling.</p> <p>Originally, indicator B4, covering economic welfare and cross-sectoral rents across hydrogen and electricity, was part of the assessment. After the European Commission decided on 12 May 2025 to exclude B4 from the PCI/PMI assessment, ENTSOG adjusted its methodology to reallocate the monetised benefits previously captured under B4 to the remaining indicators. ENTSOG also provided the EC with results including both adjusted and non-adjusted B4 values as supplementary information.</p>
	<ul style="list-style-type: none"> ▲ Non-GHG emissions variations indicator (B2) – monetisation parameter values: consult more relevant stakeholders on the Value of a Life Year (VOLY) and Value of Statistical Life (VSL) and their sensitivities, without incurring process delays. Paragraph 55 	<p>ENTSOG will compile a list of relevant stakeholders, including those suggested by ACER, and contact them individually in order to obtain their inputs through the consultation questionnaire.</p> <p>Such outreach and follow-up should have reduced impact on the overall TYNDP timeline and at the same time increase participation and inputs needed from a more technical perspective.</p>
	<ul style="list-style-type: none"> ▲ Stressful weather year: consult methodology, include probability of occurrence; approach should draw on sources from institutions specialising in weather and historical data analysis. Paragraph 46 ▲ Curtailed Hydrogen Demand indicator (B5): explain what the 2012 stressful-weather year represents relative to the reference year. Paragraph 48 	<p>The probability of occurrence of the stressful weather year is indicated under section 3.2.10 of Annex D1 – Implementation Guidelines for PS-CBA of hydrogen projects.</p> <p>According to Annex D1, 2012 is indicated as a year with minimised RES and H₂ demand curtailment level, even higher than those of 2009, the stressful weather year used for the calculation of indicator B5. The year 2009 was selected as one of the options considered within the TYNDP 2024 Scenarios process (i.e., 1995, 2008 and 2009).</p> <p>Regarding 2009, specific technical information can be found in: Section 4.1 of the 2024 Scenarios Methodology Report, Section 6.3 of the TYNDP 2022 IoSN Implementation Guidelines, as well as Section 3.2.10 of Annex D1 – Implementation Guidelines for Project-specific Cost-Benefit Analyses of Hydrogen Projects.</p> <p>In TYNDP 2026, ENTSOG is considering changing the approach used for the definition of the stressful weather year. Specifications of the approach will be included in guidance documentation.</p>

Nr.	ACER recommendations	ENTSOG's answer
b)	<p>Extend the scope of implementation of the CBA methodology by considering all scenarios developed by ENTSO-E and ENTSOG.</p> <p>Paragraph 66 – recommendation b).</p>	<p>ENTSOG fully agrees that conducting IGI and PS-CBA on a single scenario limits the assessment of future uncertainties, especially for hydrogen, where market development has a wider range of development possibilities than mature markets.</p> <p>In practice, PS-CBA is performed after the TYNDP, in scenarios selected by the EC. Running PS-CBA assessments under additional scenarios to those specified by the EC, for PCI/PMI assessment purposes, will depend on time availability.</p>
c)	<p>Treat all candidate TYNDP projects equally by implementing a CBA analysis on all projects, not only PCI/PMI candidates, as the TYNDP can support decision-making beyond PCI/PMI selection, for instance at national level.</p> <p>Paragraph 66 – recommendation c)., paragraph 42</p>	<p>While project CBA results can be considered for investment decision-making at national level, ENTSOG perceives its usefulness as limited. First, benefits measured are at cross-border level. Second, TYNDP is a voluntary and non-binding exercise, which does not contain a series of locally relevant projects. Therefore, expanding project CBA would increase modelling and analysis time and require extra verification with project promoters, without providing sufficient input to local decision-makers.</p> <p>For further reference, regulation (EU) 869/2022 (the Trans-European Networks for Energy or the TEN-E regulation) specifies two conditions for projects to require CBA: first, they should be PCI/PMI candidate projects, and second, they should have “reached a sufficient degree of maturity”. ENTSOG, by assessing all PCI/PMI candidate projects, independently of their “maturity” level, already covers a broader scope, providing fair, comparable assessment bases for all such projects.</p>



Picture courtesy of GAZ-SYSTEM

Nr.	ACER recommendations	ENTSOG's answer
d)	<p>▲ Increase the transparency of project information, especially regarding the cost data, the assumptions used and the presentation of results. Paragraph 66 – recommendation d).</p>	
	<p>▲ Publish values of indicators Economic Net Present Value (ENPV) and of the Economic Benefit-to-Cost Ratio (EBCR) information as part of the final TYNDP 2024. Paragraph 51</p>	<p>The hydrogen market is at an early stage. Cost data required for ENPV and EBCR remains sensitive because it is not yet strongly supported by public funding nor subject to strict transparency rules, as in the case of the more established sectors, as the electricity or natural gas sectors.</p> <p>At this stage, cost data for PCI/PMI candidate projects can be required as mandatory in the dedicated data collection. However, cost information for non-PCI/PMI candidates will not be published, given the current stage of the market. Details are available in the feedback on the next line.</p>
	<p>▲ Develop and apply a benchmark-based methodology for project cost estimates to address missing CAPEX data. Include resulting cost estimates for all projects that are part of the TYNDP. Paragraph 52–54</p>	<p>While the complete cost data set was made available to ACER and the EC under confidentiality provisions, together with PS-CBA results, we acknowledge the request as intended for general transparency purposes.</p> <p>ACER calculates that capital expenditure (“CapEx”) information is available for 56 % of all TYNDP 2024 projects and for 53 % for PCI/PMI status candidates. The remaining data mostly corresponds to non-PCI/PMI candidate projects, which are exempt from the obligation of having CapEx values published. Promoters' right to cost data confidentiality is important in this early stage of the market, when competitive positions are being established.</p> <p>The recommendation will be implemented as of the TYNDP 2026 cycle by providing a range for promoters which opted for cost confidentiality. Such ranges will be based on average cost values provided to ENTSOG and unitary investment costs from ACER. Proposed ranges will be reviewed with respective promoters.</p>
	<p>▲ Publish all technical documentation and modelling-tool specifications (including topology), for replication by stakeholders. Paragraph 57</p>	<p>Detailed, node-level topology is available in Annexes II and III of Annex D1 – Implementation Guidelines for PS-CBA of hydrogen projects, as well as in the visualisation platform. The visualisation platform was developed as an alternative to extensive, detailed output data publication, which was signalled as overly exhaustive and challenging to process. Regarding simulation assumptions, these were also published in form of annexes to Annex D1, covering installed capacity and market assumptions, emission factors, etc.</p>
	<p>▲ Publish the list of rejected projects in the final TYNDP 2024 and the future TYNDPs, disclosing the reasons for exclusion. Paragraph 58</p>	<p>The list of rejected projects for TYNDP 2024 will be made available, in form of an additional sheet to Annex A.</p>

Nr.	ACER recommendations	ENTSOG's answer
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- e) ▲ Ensure that the TYNDP is delivered in a timely manner and based on consistent data, so that it can be a solid basis for the PCI/PMI selection process.

Paragraph 66 – recommendation e).

- ▲ Address delays by tackling root causes of the recurring TYNDP submission delays.

Paragraph 38, 39

ENTSOG acknowledges that PS-CBA results corresponding to the infrastructure gaps identified as part of TYNDP 2024 were provided at a point which limited NRAs' assessment window.

As ACER notes in paragraph 39, the TYNDP process involves a complex sequence of interdependent steps, which, despite best efforts, led to the observed delivery timing. New stakeholder consultation requirements, and regulatory opinion and approval steps in the updated TEN-E (2022 revision) extended the TYNDP process. Part of the regulatory opinions and approvals steps suffered delays compared to stipulated durations; timing of the PCI/PMI process, the slight adaptation of which could have mitigated delays, remained unchanged.

Specifically, ENTSOG's 2023 timeline (used by ACER as a reference) did not foresee:

- ▲ delayed regulatory approval of the single-sector hydrogen CBA methodology (consulted in February-May 2023 and approved in February 2025),
- ▲ later-than-planned approval of the 2024 Scenarios (January 2025), delaying IGI simulations, which require final Scenarios results to start,
- ▲ late availability of key PCI/PMI process assumptions for PS-CBA, further postponing the exercise.

ENTSOG expects the 2026 cycle to be less affected by the factors that contributed to the delays in TYNDP 2024. However, implementing all ACER's recommendations – such as adding scenarios to the IGI and project CBA, extending project CBA to all projects, or changing the modelling approach – may cause comparable delays. Such developments should be planned over cycles, according to priority and resources.

- ▲ Publish methodological elements and project CBA results of future draft TYNDPs in time for (NRA) consultation, i.e. ahead of the PCI/PMI selection process.

Paragraph 40, 63

Methodological elements for project CBA are expected to be available by spring 2026, as part of [Annex D1 – Implementation Guidelines for PS-CBA of hydrogen projects](#).

ENTSOG plans the TYNDP process in advance and aims to finalise it at the earliest possible, to proceed to project CBA and deliver its results in time for PCI/PMI process consultations.

Drawing on past experience, ENTSOG has already taken preventive steps, such as anticipating communication on key project CBA assumptions and timing considerations to the EC and ACER or having started the project data collection significantly earlier compared to the TYNDP 2024.

The availability of regulatory opinions and approval decisions, to the extent possible, within prescribed timeframes, would likewise support an optimal process.

LIST OF ABBREVIATIONS

ACER	Agency for the Cooperation of Energy Regulators
B2	Non-GHG Emissions Variations Indicator for project CBA
B4	Market Rents Indicator for project CBA
B5	Curtailed Hydrogen Demand Indicator for project CBA
CAPEX (CapEx)	Capital Expenditure
CBA	Cost-Benefit Analysis
EBCR	Economic Benefit-to-Cost Ratio
EC	European Commission
ENPV	Economic Net Present Value
ENTSO-G	European Network of Transmission System Operators for Gas
EU	European Union
GHG	Greenhouse Gas
GPI	Guidelines for Project Inclusion
H₂	Hydrogen
IGI	Infrastructure Gaps Identification
IoSN	Identification of System Needs
LNG	Liquefied Natural Gas
NRA s	National Regulatory Authorities
PCI	Project of Common Interest
PMI	Project of Mutual Interest
PS-CBA	Project-specific Cost-Benefit Analysis
RES	Renewable Energy Sources
TEN-E	Trans-European Networks for Energy
TYNDP	Ten-Year Network Development Plan
UK	United Kingdom
VOLY	Value of a Life Year
VSL	Value of Statistical Life

COUNTRY CODES (ISO)

AL	Albania	LU	Luxembourg
AT	Austria	LV	Latvia
AZ	Azerbaijan	LY	Libya
BA	Bosnia and Herzegovina	MA	Morocco
BE	Belgium	ME	Montenegro
BG	Bulgaria	MK	North Macedonia
BY	Belarus	MT	Malta
CH	Switzerland	NL	Netherlands, the
CY	Cyprus	NO	Norway
CZ	Czech Republic	PL	Poland
DE	Germany	PT	Portugal
DK	Denmark	RO	Romania
DZ	Algeria	RS	Serbia
EE	Estonia	RU	Russia
ES	Spain	SE	Sweden
FI	Finland	SI	Slovenia
FR	France	SK	Slovakia
GR	Greece	TM	Turkmenistan
HR	Croatia	TN	Tunisia
HU	Hungary	TR	Turkey
IE	Ireland	UA	Ukraine
IT	Italy	UK	United Kingdom
LT	Lithuania		

LEGAL DISCLAIMER

The TYNDP was prepared by ENTSOG on the basis of information collected and compiled by ENTSOG from its members and from stakeholders, and on the basis of the methodology developed with the support of the stakeholders via public consultation. The TYNDP contains ENTSOG own assumptions and analysis based upon this information.

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In particular, the information hereby provided with specific reference to the Projects of Common Interest (“PCIs”) and Projects of Mutual Interest (“PMIs”) is not intended to evaluate individual impact of the PCIs and PMIs and PCI candidates and PMI candidates. For the relevant assessments in terms of value of each PCI and PMI the readers should refer to the information channels or qualified sources provided by law.

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