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Public consultation on the ACER efficiency comparison for natural gas TSOs

Fields marked with * are mandatory.

Introduction

Objective

The objective of this consultation is to gather views and information from stakeholders on the objectives and design of the ACER efficiency comparison (AEC) for natural gas TSOs. The design to be used to complete this task will be finalised by 4 October 2025. Two additional phases of the project will follow to request and validate the TSO data (phase II) and to complete the modelling work (phase III). The input from the consultation will be used by the Agency's when completing the design phase.

The Agency is consulting on two documents providing the objectives and design of the AEC:

- **D02: AEC Objectives and Criteria**
- **D03: AEC Method, Data and Process.**

Stakeholders are invited to read this material. Complementary to these two files, the Agency provides in this consultation document several questions requesting input on specific topics discussed under D02 and D03. Stakeholders who wish to submit input can provide it via the EU Survey tool displays input fields for each of these questions.

Target group

This consultation is addressed to stakeholders, including end consumers (household, industrial, power generation), shippers, environmental and consumer associations, academics and TSOs.

Contact and deadline

Replies to this consultation should be sent using the EU Survey tool:

https://ec.europa.eu/eusurvey/runner/ACER_efficiency_comparison

In addition, stakeholders can provide input related to the consultation documents D02 and D03 that is not covered in the questions. For this purpose, they can submit their input as pdf or word file in a dedicated section of the survey.

Stakeholders can contact ACER in relation to the public consultation using the email: AEC@acer.europa.eu. The maximum size for submitting files using the EU Survey tool is 1 MB. Larger files can be submitted to this functional mailbox.

The deadline for providing input to the public consultation is **17 July 2025, 23:59 hrs (CET).**

For more information please consult ACER website: Link

Download more information:

AEC_Public_consultation_document.docx

Introductory questions

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* **Name of organisation / company**

ENTSOG (European Network of Transmission System Operators for Gas)

Type of organisation

- ○ Government,
- ○ NRAs,
- ○ TSO,
- ○ DSO,
- ○ financial institution (banks, funds etc),
- ○ industry, environmental and consumer associations,
- ○ academia,
- ○ shipper, supplier,
- ◉ other (please specify)
- ○ individual person

*** Please specify "other"**

TSO Association

*** Country**

- (●) EU-27
- ( ) Other

*** Please specify the country**

- ( ) AT - Austria
- (●) BE - Belgium
- ( ) BG - Bulgaria
- ( ) HR - Croatia
- ( ) CY - Cyprus
- ( ) CZ - Czechia
- ( ) DK - Denmark
- ( ) EE - Estonia
- ( ) EU - European Union, for associations covering all EU
- ( ) FI - Finland
- ( ) FR - France
- ( ) DE - Germany
- ( ) EL - Greece
- ( ) HU - Hungary
- ( ) IE - Ireland
- ( ) IT - Italy
- ( ) LV - Latvia
- ( ) LT - Lithuania
- ( ) LU - Luxembourg
- ( ) MT - Malta
- ( ) NL - Netherlands
- ( ) PL - Poland
- ( ) PT - Portugal
- ( ) RO - Romania
- ( ) SK - Slovak Republic
- ( ) SI - Slovenia
- ( ) ES - Spain
- ( ) SE - Sweden

Data protection

ACER will process personal data of the respondents in accordance with Regulation (EU) 2018/1725, taking into account that this processing is necessary for performing ACER's consultation tasks. More information on data protection is available on ACER's website and in ACER's data protection notice.

ACER will not publish personal data.

Consent to the processing of personal data

☑ Your personal data may be processed by the Agency.
Please refer to privacy statement to learn about such processing and your rights.

Confidentiality

Following this consultation, ACER will make public:

- the number of responses received;
- company names, unless they should be considered as confidential;
- all non-confidential responses; and
- ACER's evaluation of responses. In the evaluation, ACER may link responses to specific respondents or groups of respondents.

You may request that the name of your company or any information provided in your response is treated as confidential. To this aim, you need to explicitly indicate whether your response contains confidential information. **You will be asked this question at the end of the survey.**

☑ I have read the information on data protection and confidentiality provided in this section.

Consultation Topics and Questions

Topic 1: Transparency and publication requirements

The Agency will promote transparency on the AEC to ensure access to the TSO data used in the modelling, transparency on NRA decisions and availability of the data to stakeholders.

Without a transparent process for data collection, methodology, calculations and reporting, the process value for NRA would be low. To ensure transparency, AEC should maintain the following principles:

1. Clear established data definitions and data specifications prior to the data collection.
2. Independent audits of financial and asset data for each TSO
3. Open access to all T1 data (non-commercially sensitive)
4. Full references and access to any non-TSO reported parameters (T0 data)

5. The methodology should be documented in a reference document that is independently validated by experts prior to calculations
6. Calculations and reporting of results should be independently audited by third party.
7. The individual reporting should specify each step in the process as to enable each NRA to reproduce the input data.

By combining a sound method and model selection, adequate choice of efficiency metrics, regulatory alignment, transparency, due process, and adaptations to new tasks, NRAs can trust the AEC as a legally robust, fair, and enforceable source of information about the economic, quality and capacity performance of their TSO. This strengthens the credibility and acceptance of efficiency targets while minimizing legal risks.

At the same time, the Agency will ensure that the information published is not commercially sensitive for TSOs.

Transparency is discussed in reports D02: section 7.2 and D03: section 5.1. Annex A of D03 contains a list of variables and parameters that would likely be made public as part of the T1 dataset.

1. How do you value transparency across the different stages and results of the AEC? Please elaborate.

Transparency in the methodology, the process (methodology steps, including treatment of data prior to modelling), and data validation are very important. Full transparency on the methodology of the ACER Efficiency comparison is needed in order for TSOs to understand the approach and the outcome of the comparison. In this sense, apart from transparency, representativity, and stability of results, reproducibility is desirable. TSOs need to be able to understand the whole benchmarking exercise to be able to simulate their score. This also applies to the NormGrid (please see question 18 on this).

2. What are the elements of a TSO benchmark where transparency is most important? Please elaborate.

The methodology and the reasoning behind it should be fully transparent, so TSOs can understand how results come to arrive. It is essential for ACER to demonstrate that the selected variables will be representative of efficiency and do not vary depending on outliers. European TSOs have observed a high intransparency in the process for TCB18 and TCB21, their analyses and results. Models for benchmarking changed during the process and throughout the different reports. By design, the results of this efficiency comparison for each TSO remain hard to understand even to experts and can only be interpreted by Sumicsid. This makes representativeness questionable. TSOs (also in the past) have only received individual reports from Sumicsid, interpreting their results exclusively. TSOs could not make assumptions or find explanations concerning other TSOs' results because of these individual and TSO-exclusive reports. A balance should be found between keeping the necessary confidentiality of sensitive TSO data and the necessary transparency of results for TSOs and NRAs to interpret the conclusions of the efficiency comparison. A robust Non-Disclosure Agreement (NDA) between, on the one hand, Sumicsid/ACER/the contracted auditors and consultants, and, on the other hand, TSOs should be elaborated to guarantee the confidentiality of TSO data. NRAs and TSOs should be consulted on this NDA and on the way sensitive data will be used. An NDA should make sure that sensitive data will not be shared with other stakeholders – which includes TSOs and NRAs. Data transfer needs to be via secure channels, as the data will be commercially sensitive and also a national security topic (including GIS data if needed – see section 4.2. of D03, there is potential of misuse and attacks against critical infrastructure. National

security clearance and approval from political or governmental authorities is needed. This may be a topic out of the control of NRAs and concerns national security). All templates and data inputs need to be properly explained with guidance and support, in order to guarantee comparability and the same approach to filling out. It is essential for TSOs to understand which data will have to be provided, well in advance of the methodology approval. This is also to identify potential confidentiality (commercially sensitive) issues and safety/security concerns. In any case, data shared with ACER should not go beyond what is shared with the NRA, or create any additional reporting hurdles. Data quality and reasonable securitization measures are a necessary condition, but this does not solve the methodological problems outlined above and before.

3. What other approaches to transparency should ACER consider when designing and publishing the AEC? Please elaborate.

All TSOs should get information at the same time and at an equal level. Sumicsid should explain the results in an easily understandable way and an auditor should explain limits of the study, as well as potential risks and drawbacks of the benchmark. NRAs should transparently justify any decisions taken in regard to the ACER efficiency comparison. "Technical progress" that is considered in the benchmark results has to be explained because all inputs and output are not linked to qualitative data.

Topic 2: Challenges for natural gas transmission networks in the context of decarbonisation

The synthesis document D02, establishing the objectives of the AEC, identifies the key challenges that natural gas transmission networks will face in the future (see sections 2.1 –2.3). These include (1) the likely decrease in natural gas transported volumes; (2) the CAPEX additions resulting from new forms of gas, biogas and LNG connections; (3) the removal of assets for repurposing and, potentially, decommissioning; and (4) the extension or replacement of assets reaching the end of their technical operating life.

4. What are the key features that the ACER should consider when designing a methodology to measure the efficiency of natural gas TSO infrastructure? Please elaborate.

No comparison of efficiency will be able to capture the in-depth reality of TSOs in their national circumstances and therefore it will fall short of assessing the actual situation. In the current context of energy transition, a heavily backward-looking approach (as Sumicsid seems to be preparing) is of very little benefit as it won't inform NRAs or TSOs about the best practices to face this new investment cycle. ENTSOG believes that the results of the European TSO efficiency comparison are not a suitable tool for NRAs when setting the allowed or target revenue. Such revenues are based on investments deemed by the NRA essential for the system. For example, it is crucial to preserve security of supply. We believe that efficient investments in secured and decarbonised supplies should be safeguarded. Prior to validating TSO investments, NRAs already consider the appropriate levels of investments to find a delicate trade-off between security of supply and affordable tariffs for network users. ENTSOG welcomes the publication of the Action Plan for Affordable Energy in February 2025, which confirms the existing approaches used by NRAs all over Europe. It is unlikely that the new AEC will further improve this NRA assessment, considering that it will not clearly capture all relevant parameters at the Member State (MS)-level. TSO regulations already include efficiency targets, as also confirmed by transparency requirements from the Tariff Network Code (Commission Regulation (EU) 2017/460). NRAs shall consider allowed revenues based on TSOs' specific and national circumstances - without the need to factor in a mandatory EU-wide efficiency benchmark, which is not able to capture the granularity of TSO businesses and circumstances. The fundamental issues with such an EU comparison cannot be solved with changing specific

parameters or switching from one methodology to another. National specifics, large numbers of cost drivers and diverse strategies cannot be subsumed in a single EU score. The AEC shall not be a prescriptive influence on NRAs setting the allowed or target revenue. Any EU-wide comparison is highly theoretical, it is subject to simplifications and specific assumptions, and many factors that influence a TSO's business (e.g. EU energy policy, NRA decisions) are out of the scope of the TSO's influence. An improved theoretical efficiency score also does not mean that the TSO is more efficient in reality or that its services have been upgraded. It might just mean that the gap between this TSO and the TSO used as benchmark has reduced because the model assesses the latter TSO is less efficient than before. Each European country has its own specific features regarding the macroeconomic environment, the age of the gas assets, technical regulations, historical and current trade constraints, energy policy, environmental regulations and regulatory incentives. Such features are significant and difficult to take into account on a benchmark statistical model (whether DEA, SFA, TFA, DFA, FDH,…). Ignoring these differences can lead to superficial conclusions that are not only unhelpful but potentially detrimental to strategic planning, and the overall financial health of TSOs. Therefore, the results of such an efficiency comparison exercise should only be considered for illustrative purposes, not as a scientific formula to set 'the' optimal level of revenues for each TSO. NRAs should continue to set the allowed and target revenues in their respective domains on the factors they deem relevant.

5. How should the decrease in network utilisation be taken into account when measuring the efficiency of TSOs. Please elaborate.

Network utilisation depends on external factors (demand, supply, gas flows) that are outside the TSOs control. Network utilisation can also change quickly – as we see with the Russian invasion of Ukraine. It is not a factor that is controlled by the TSO but by shippers and the market. In the context of decarbonization and decommissioning, TSOs are legally obliged to serve their remaining customers and – to a varying degree – are obliged to maintain additional infrastructure for crisis situations. Network utilisation, therefore, should be excluded from the scope of the AEC. It should be noted that network utilization is assessed within multiannual grid planning. In particular, CAPEX resulting from the multiannual grid planning should be excluded from the efficiency comparison, because TSOs have no decisional power on planning. The resulting grid plans (national grid plans and the TYNDP) are subject to stakeholder review. They are approved by NRAs or ACER. Obligations resulting from multiannual grid plans should not have a negative impact on a TSO's efficiency evaluation. The efficiency depends on which parameters demonstrate to the NRA that resources are being used optimally on the basis of overall economic relevance and the tariff cost allocation exercise, which is far more complex and nuanced than an econometric exercise simplification. This aspect needs to be adequately recognised by acknowledging the fact that the benchmark should only be used for information and high-level orientation purposes. Network use will be less and less a relevant efficiency parameter, with gas networks being increasingly key for the overall functioning and resilience of the integrated energy system (including electricity and hydrogen). TSOs are just fulfilling their legal obligations in terms of supply.

Topic 3: Legacy investments

The efficiency of natural gas TSOs is largely impacted by legacy investments carried out prior to the liberalisation of the EU gas natural gas sector. Past investments, prior to deregulation, were not always undertaken with an efficiency focus. For instance, pre-deregulation decisions may have been prompted by other owners and for national or non-economic reasons. Furthermore, investments in transition states prior to EU-membership are in some cases subject to hyperinflation or non-market prices for labour or equipment.

These observations, which are valid for gas TSOs and important for incentive regulation of future investments and operations, call for a periodised analysis of the past capex. The relevance of determining the exact investment efficiency for assets that date more than 30 years ago (i.e. prior to the First Directive) and to assure the comparability of their market conditions are likely less important than the comparability of recent investments and new assets. The Agency considers informative to analyse the impact of **legacy investments** in the AEC by providing results with and without legacy investments. For the latter, the Agency proposes to control for these costs using standardized values to, as discussed in section 6.6 of document D02. The Agency proposes the entering into force of Directive 98/30/EC (First Gas Directive) as the cut-off date to identify legacy investments.
The AEC will include all the legacy investments and, as a sensitivity analysis, the AEC will calculate the same model but with legacy investments neutralized to standardized values to understand the impact on efficiency. When legacy investments are included in the modelling, their value should be reassessed for the purpose of comparison (see 6.5). Opex is not affected by this sensitivity analysis as all assets in use are part of the physical output.

The AEC results calculated with and without legacy investments should be considered by the NRAs when taking a decision on the allowed or target revenue of the TSOs.

6. Is the proposal to address the comparability problem of legacy investments acceptable and effective for the purposes of the AEC? Please elaborate.

As we do not have the transparent full methodology of the ACER Efficiency Comparison currently, we cannot judge the impact of this question and subsequently cannot answer this question – and regardless of a full methodology, this comparison still remains highly theoretical. What is a legacy investment for a TSO may not be a legacy investment for another TSO, depending on the date of development of the infrastructure. Some MSs had their gas networks developed in the 1970s, others in the 1990s and even later sometimes, which means that it is not always possible to consider that legacy investments were not affected by the start of the liberalisation. It's important to bear in mind that the coming benchmark results will correspond to a period that takes into account a RAB including old assets that were commissioned in the context of the times, with a view to developing the network, particularly across borders, and ensuring security of supply, while future challenge will modify the nature of assets. Future investments will respond to other challenges in addition to the need for security of supply, such as the integration of new gases, decarbonization and adapting the existing network to localised production and sector coupling, all with a view to reducing CH4 consumption. NRAs' decisions to approve investments must be based on the merits and motivations of the investment, the results of the benchmark must not hamper investment decisions. Any benchmark is highly theoretical, and choices of parameters and retreatments will remain subjective. No method will be able to mirror the reality of TSOs. Any method will fall short of capturing the reality of TSOs – also we do not know if a theoretical “efficient” TSO will be efficient in real life. As highlighted in question 1, transparency is of high importance and the simplifications in the methodology implied that TCB reports were not interpretable by stakeholders and TSOs.

7. Do you consider the entry into force of the First Gas Directive in 1998 to be an adequate cut-off point for identifying legacy investments? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see question 6 for our answer). It would be difficult to accept even a period of 5 years as free from structural changes. These structural changes render pure statistical approaches for the analysis of efficiency, or benchmarks, potentially biased, probably less representative and less fit for informative purposes, at best. Depending on the MS, the impact of the cut-off

date for legacy investments varies significantly (some TSOs incurred ongoing investments decided prior to 1998 and finalised after 1998). In addition, it should be noted that, at the time of publication of the First Gas Directive in 1998, the EU comprised only 15 Member States. For these MSs, it is indeed a possibility to consider that the start of liberalisation with the First Package took place in 1998, because the transposition of this text was required shortly afterwards. However, for the 12 other MSs which joined after 1998 – let us disregard the cases of Cyprus and Malta which have no TSO network – the implementation of the First Package necessarily took place significantly later than 1998. For these new MSs, any investment that took place between 1998 and the moment they joined the EU can't be necessarily considered as impacted by the First Package liberalisation. Hence, we don't think that the 1998 date will represent an appropriate and representative cutoff date to isolate legacy investments.

8. How should different efficiency levels pre- and post- liberalisation be considered in the TSO allowed revenue methodologies? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see question 6 for our answer). The liberalisation of the gas market is not the only structural change that should be considered. Besides, there have been regional impacts that do not affect all countries equally.

Topic 4: Comparability of TSO costs

The AEC proposes a series of measures to enable the comparability of TSOs costs and performance, which are described in sections 6.1-6.7, 7.3 of document D02.

The AEC is proposed to ensure comparability through means of defining a strict functional and asset scope, controlling for joint ownership or operation of assets, structural and organizational differences, standardizing asset depreciation, asset ages for used installations, standardizing capital costs, labour cost corrections, controlling for overhead cost allocation, inflation adjustments, opening balances, price and currency differences, environmental heterogeneity with respect to land use and cover, slope, soil properties, wetness based on spatial asset locations, as well as excluding costs and investments that relate to out-of-scope or exceptional events.

9. Are the comparability measures proposed in the documentation effective and necessary? Is there redundancy or inadequate measure among the instruments?

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6). These measures are welcome, but do not account for the totality of heterogeneity, or even for the main part of it... The Report D02 is not specific enough on the treatment of these specificities, the list is not complete, the methods remain both unknown and questionable. This aspect is important, so more elaboration is needed even if one would never capture all national differences. The simplifications to cover geography, terrain, meteorology, and technical-economic constraints in one single standardized approach for EU-27 whilst retaining representativeness, seem wishful and theoretical at best.

10. Are there some comparability measures in the documentation that are too inappropriate or ineffective in the adjustments? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6). It is difficult to judge due to the absence of sufficient details within the materials provided. Plus, some of the measures mentioned seem highly theoretical. In addition, it is doubtful that one correction coefficient for a specific data would allow to compare 25 different MSs (Cyprus and Malta have no gas TSO network).

Topic 5: Static efficiency

The proposed efficiency metrics are described in chapter 4 of document D02 and the choice of efficiency analysis methods is discussed in chapter 2 of document D03. The main result of the AEC is a static modelling carried out with DEA. SFA will provide secondary results used for validation.

A static deterministic model is focusing on a single year and uses variables that are not subject to random effects, primarily execution-based outputs and services directly derived from installed assets. The analysis is not sensitive to cost changes over time across Europe. DEA is a method that uses a minimal set of assumptions and delivers scores also for smaller sample of operators.

The use of DEA for benchmarking TSOs is well established and has been used in TCB (TCB18, TCB21 and E2GAS) and also in the German benchmark for natural gas TSOs (Reference: Swiss Economics, Sumicsid, 4Management (2018) Kostentreiberanalyse und Effizienzvergleich der Gasfernleitungsnetzbetreiber EFG3, Final report for Bundesnetzagentur).

11. Do you consider the proposed approach to provide the primary efficiency measure of the AEC adequate? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6). The main problems related to DEA are: 1. Given the deterministic nature of DEA, all noise present in the data (due to differences in reporting criteria among TSOs and possible measurement errors in the input data), all deviations from the efficient frontier are assumed to be inefficiency; 2. The deterministic nature of DEA also means that it is not possible to calculate confidence intervals or other measures of uncertainty for the estimated inefficiency scores in a straightforward manner; 3. When relying on international data, such as in a pan-European benchmarking study, it becomes more difficult to ensure that data is comparable across operators and that all exogenous differences have been adequately accounted for. The approach proposed by Sumicsid is much similar to the ones adopted in TCB18 and TCB21 and in neither of these exercises participants were able to interpret the results in order to detect what factors could explain not being a peer (whenever that was the case).

12. Do you agree that a static model could provide useful input for NRA regulatory rulings? If not, what other options you would propose? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6).

Topic 6: Dynamic efficiency

The energy transition is expected to result in lower demand for natural gas. The evolution of demand and entry points depend on many factors, most of them being uncontrollable by the TSO which networks are sized to

match the peak network use.

In this context, TSOs with older assets are likely to have over-capacity in a context of decreasing demand while TSO with more recent assets can dimension the assets to the actual demand. In an efficiency analysis, the use of actual demand (gas volume or entry point) used as an output would lead to TSOs with more recent assets appearing as more efficient, as their asset capacity more closely match the actual output.

In an environment of decreasing use of infrastructure having utilisation metrics in a benchmark implies that TSOs are rewarded (or penalized) for bringing the size/capacity of the network in line with decreasing demand.

For that reason, the static (one-year) efficiency model in AEC will use only asset-based outputs instead of utilization-based outputs to compare like with like.

However, to provide information on, and incentives for, the correct asset intensity facing fuel substitutions, AEC will also incorporate a dynamic efficiency model, covering several years of operations. In this case, to monitor the volume transported and peak load development in the natural gas sector and the adaptation of assets to outputs, usage-based outputs will also be used. The inclusion of usage-based outputs in the dynamic model will capture how TSO can adapt to changing circumstances.

For this calculation, the Agency proposes to use SFA as a primary method and DEA as a secondary method for confirmation.

The use of dynamic modelling considering network utilisation is discussed in sections 3.3 and 4.7 of document D02 and in section 2.5 of document D03.

SFA is not only the academically most used dynamic method, but also and foremost the relevant tool to explore and address random variables or data errors in the AEC, thereby providing a valuable validation of the correctness of the static model results.

13. Do you consider appropriate to provide additional efficiency scores taking into account network utilisation? Why? Please elaborate.

Please see our answer to question 5. Furthermore, we do not consider appropriate to add a dynamic efficiency to this benchmark exercise, especially regarding network utilisation. Network utilisation depends on external factors (demand, supply, gas flows) that are outside the TSOs control. Network utilisation can also change quickly – as we see with the Russian invasion of the Ukraine. If this were to be a factor, some TSOs would've seen a large drop in efficiency after the Russian invasion of the Ukraine due to being a country with transit flows from Russia. Others would've been increasingly efficient due to new flow patterns or LNG terminals. This shows the highly theoretical nature of "being efficient" based on network utilisation. A utilisation-based output is out of the hands of TSOs. As it is not a factor that is controlled by the TSO but by shippers and the market, it should not be a factor in an efficiency comparison. Security of supply and risk considerations (decisive in infrastructure sizing) may not be adequately taken into consideration into this efficiency benchmark focus, whilst today this is a key consideration for energy systems performance metrics. Network use will be less and less a relevant efficiency parameter, with gas networks being increasingly key for the overall functioning and resilience of the integrated energy system (including electricity and hydrogen).

14. Do you consider the proposed method design appropriate (SFA as primary method and DEA and secondary method)? Why? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6). We do not consider appropriate to add a dynamic efficiency to this benchmark exercise. It is an administrative burden to collect and provide data for 4 years instead of only 1 year. Furthermore, some data will be volatile and so not appropriate for an efficient benchmark. For instance page 14 of D02 reads: 'the efficiency change was negative, -0.7% to -1.3% per year.' How could we compare one year to the other if your relative mark is changing because the target (the efficiency frontier) is changing every year? Regarding the methodologies, we have the following comments. DEA has the limitations expressed in the reply to the prior questions. For SFA there is the problem that the benchmark may not reflect the operational realities creating unrealistic frontiers. The method is still subject to sensitivity to outliers and, also, creates specification inflexibility that performs rather poorly with diverse datasets. It may become very challenging to distinguish noise from inefficiency. The model is prone to invalid efficiency comparisons in case of model misspecification (multicollinearity and other elements need to be better controlled within the specification to prevent over-representation of some aspects, but not only: SFA remains based on assumptions related to the distribution of errors and inefficiency that could be not correct). Hence, whilst the whole exercise has a theoretical interest, operationally, results are not reliable enough as to base NRA decisions on TSOs efficiency on the basis of its findings.

15. Is the use of two methods a strength for the analysis or a source of ambiguity in the interpretations? Why? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6). In this case, using two methods is not sufficient to confirm or reject any potential hypothesis on efficiency. Method results may more or less converge or diverge without it implying any causal relationship with efficiency, due to all the aspects indicated above (non-exhaustive).

Topic 7: Data quality

For the purpose of ensuring data quality, the Agency proposes several layers of validation, including:

- Asset system and audited financial statements.
- Clear guidelines and templates.
- NRA check of the data submitted by TSOs Cross-validation of all TSO datasets, including technical engineering validation.
- Data analysis by the consultant.

The processes for the validation of the data to ensure the quality of the dataset are described in chapter 4 of document D03.

The AEC proposes an integrated data validation strategy in six steps involving TSOs, NRAs, ACER, consultants and auditors to ensure maximum data quality.

16. Do you agree with the data validation approach outlined? What other alternative measures should ACER consider ensuring the quality of the data? Please elaborate.

Regardless of the consistency of data submitted by TSOs and NRAs, the interpretations that can be drawn from the AEC are limited as we already noted in previous answers.

Topic 8: Technical input on benchmarking

The AEC is an empirical assessment of total cost, actual and efficient levels, related to services performed by structurally comparable operators. Intrinsically, the mission is a methodological challenge requiring the mobilization of the best possible statistical, operations research and econometric methods that are relevant to the problem at hand.

In in chapter 7 of document D02 and chapters 2 and 3 of document D03 with references, some of the methods and techniques used are described and discussed. However, the documents do not purport to provide a full technical description, for this the underlying documents and the references to this note could be consulted.

Some of the techniques have been discussed in past projects, we list some of the relevant aspects as consultation questions, without claim of exhaustiveness.

17. The criteria in section 7.7 of document D02 list 'relevance' as a criterion for the model specification. However, data mining techniques such as principal component analysis or machine learning may derive good predictions of total cost without an explicit cost function. Do you agree that this criterion is sound and necessary for the AEC purposes? What measures can be taken to assure relevance of the results? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6). Machine learning techniques embed very complex assumptions that alter results, it would be difficult to justify why some assumptions are taken instead of others within the technical specification (and results are affected). Sometimes (for some techniques) there may even be reproducibility issues (even with the same set of assumptions) that would imply that a different run would take a different path, producing different results. The methods proposed in this question imply no causality check regarding efficiency measurement. This means that choosing the variables by hand would be arbitrary and ex-ante (potentially biased and influencing results – as is the case in the method suggested). Using data mining or exploratory techniques (the mentioned ones or others) to support this choice may introduce some neutrality, but transfers the problem to the choice of method and assumptions (also very difficult to justify) and does not solve the representativeness problem that is inherently linked to this analysis (as explained in the prior replies) due to the lack of a clear causality link.

18. The comparison of assets with different dimensions and material is partially based on a normalized grid metric (NormGrid). Is the use of such normalization acceptable and robust for the AEC? Please elaborate.

The selection of variables and the weighting of inputs in the past benchmarks are highly subjective and theoretical. TSO businesses and the European gas grid have dimensions, specificities, and context, that cannot be meaningfully captured in simple statistical models. As mentioned in question 1, transparency is of high importance. The estimation of the NormGrid is (and also has been in the past) a black box for TSOs and NRAs.

Therefore there should be a fully detailed transparency level for the NormGrid (including variables, assumptions and the methodology). This would enable more detailed comments from our side. It is important to be more detailed in this aspect, since this element of the methodology is likely to be very decisive for results.

19. Service quality is not explicitly modelled among the parameters in chapter 3 of document D03. Should service *quality* be part of the benchmarked outputs? If so, how can it be measured?

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6). This is a relevant question, and it should be approached by the consultant with some alternative method proposals. We can discuss on their fitness for purpose and representativeness once these methods are presented. We would like to highlight the challenge to approach service quality with any technique of measurement that (even if it is quantitatively supported) is not qualitative. The aim of the efficiency benchmark was to be quantitative, scientific, and objective.

20. Do you agree with the output variable selection methods in section 3.2 of document D03? What improvements can be made? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6).

21. Do you agree that the environmental correction factors listed in section 3.3 of document D03 are relevant and important for the AEC? What improvements can be made? Please elaborate.

The selection of variables and the weighting of inputs in the past benchmarks are highly subjective and theoretical. Furthermore, TSO businesses and the European gas grid have dimensions that cannot be captured in simple statistical models. Transparency on such environmental correction factors is important. There should be a fully detailed transparency level for such factors (including variables, assumptions and the methodology). Some retreatments of data are done to compare different environments (e.g. wet or dry ground) and national specificities (e.g. labour cost). However, their impact on the results is unclear and their calculation in the past experience of TSOs is only theoretical and indicative, based on theoretical assumption/method choices (as valid as many others), oversimplified, and leading to qualitative outcomes that are not necessarily neutral. It is important to quote a risk of circularity here: there are high chances that what will be defined as important in these classification schemes will turn out to be important in the outcomes. The metric and the result are not unrelated. Any methodology for TSO efficiency comparison is highly theoretical (please see question 6 for further details).

22. Do you consider it useful, in the analysis of the dynamic efficiency of TOTEX, to take national capital cost differences—particularly the WACC—into account when assessing the evolution of the optimal cost structure, especially the balance between OPEX and CAPEX? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6).

23. Are there missing structural or environmental factors that should be included in the analysis? Please elaborate.

Any methodology for TSO efficiency comparison is highly theoretical (please see our answer to question 6): the selection of variables and the weighting of inputs in the past benchmarks are highly subjective. Furthermore, TSO businesses and the European gas grid have dimensions that cannot be captured in simple statistical

models (e.g., impossible to find a proper measure of the impact of altitude or slope in terrain for every asset type).

24. Please provide any other view relevant to the topic of the consultation.

1800 character(s) maximum

Any EU-wide comparison is highly theoretical, it is subject to simplifications and specific assumptions, and many factors that influence a TSO's business (e.g. EU energy policy, NRA decisions, security of supply and risk considerations, or even the impact on other energy vectors that the gas system sustains) are out of the scope of the TSO's influence. An improved theoretical efficiency score also does not mean that the TSO is more efficient in reality or that its services have been upgraded. It might just mean that the gap between this TSO and the TSO used as benchmark and as per the variables that have been qualitatively selected has reduced. The model assesses the latter TSO is less efficient than before, but there lacks a causal link to operational efficiency and ultimately representativeness. Therefore, the results of such an efficiency comparison exercise should only be considered for illustrative purposes, not as a scientific formula to set 'the' optimal level of revenues for each TSO. NRAs should continue to set the allowed/target revenues and to define efficiency/quality targets and incentives for TSOs in their respective domains on the factors they deem relevant. If submission of wrong data should be punished: This AEC is a pilot for many TSOs, submission of wrong data by mistake should not be punished. A lot of data needs to be submitted and the guidelines for submission are not clear yet – so wrong data submitted by mistake should be flagged and corrected naturally, but not punished. Information status: This ENTSOG response corresponds to our best understanding of the questions, subject to the limited visibility we have at this moment on the methodology and data requests that will be decided by ACER and Sumicsid.

25. Please upload your file(s) in case you would find it necessary to provide any additional information from your side.

Maximum file size is 1 MB. If your file is bigger, please use the functional mailbox: AEC@acer.europa.eu.

9b959801-70e2-4faa-b310-ac390feaa970/About_ENTSOG_and_its_members.pdf

Question on confidentiality

* **ACER evaluates and may publish the received input. Do you consent that the submitted input is published?**

- (●) Yes, ACER may publish the submitted replies.
- ( ) Yes, ACER may publish the submitted replies **anonymously**.
- ( ) No, ACER may not publish the submitted replies.

* **Does your submission contain confidential information?**

- ( ) Yes
- (●) No

Contact

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