Framework Guidelines
on rules regarding harmonised transmission tariff structures for gas

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Agency for the Cooperation of Energy Regulators
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This Document contains the Framework Guidelines on rules regarding Harmonised Transmission Tariff Structures in European Gas Transmission Networks, which the Agency for the Cooperation of Energy Regulators has prepared pursuant to Articles 6 of Regulation (EC) No 713/2009 and 715/2009, on the basis of a request from the European Commission dated of 29 June 2012 and subsequent letters of 18 December 2012 and 15 March 2013.

Related Documents

- Scope and main policy options for Framework Guidelines on Harmonised transmission tariff structures (Public Consultation Document), DFGT-2012-G-004, 08 February 2012
- EUI, THINK report on EU involvement in electricity and natural gas transmission grid tariffication, January 2012
- European Commission, DG Energy, Study on Methodologies for Gas Transmission Network Tariffs and Gas Balancing Fees in Europe, December 2009
- Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC, OJ L 211, 14.8.2009
- Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005, OJ L211, 14.8.2009
- Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators, OJ L211, 14.8.2009

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1. General Provisions

1.1. Introduction

Directive 2009/73/EC[1] (hereafter the 'Gas Directive') confers upon the National Regulatory Authorities (NRAs) the power to fix or approve, sufficiently in advance of their entry into force, at least the methodologies used to calculate or establish the terms and conditions for connection and access to national gas networks, including transmission tariffs. Although no specific tariff structure is foreseen or implied by its provisions, the Gas Directive and Regulation (EC) No 715/2009[2] (hereafter the 'Gas Regulation') contain certain requirements which need to be complied with in the final tariff or tariff methodology.

The Framework Guidelines on rules regarding harmonised transmission tariff structures for gas (hereafter the 'Framework Guidelines on Tariffs') aim at providing clear and objective principles, and where appropriate, specific guidance, for the development of a Network Code on harmonised transmission tariff structures for gas (hereafter the 'Network Code on Tariffs'), pursuant to Articles 6(2) and 8(6)(k) of the Gas Regulation. These principles and guidelines are provided in line with the requirements of the Gas Directive and Regulation.

The Framework Guidelines are adopted on the basis of Gas Regulation, which the Network Code on Tariffs will supplement forming an integral part thereof.

1.2. Scope and objectives

These Framework Guidelines, upon which the Network Code on Tariffs will be based, apply to the transmission services offered at all entry and exit points on the gas transmission systems operated by gas Transmission System Operators (TSOs), irrespective of whether such points are physical or virtual. The Network Code on Tariffs shall propose and justify a consistent definition for transmission services in line with Section 1.3. The only exception concerns the provisions applying to new and incremental capacity and the provisions applying to the determination of reserve prices for capacity auctions. These provisions only apply to interconnection points under the scope of the Network Code on capacity allocation mechanisms (hereafter the 'Network Code on CAM')[3]. These exceptions are specified in the relevant chapters.

Consistent with Article 13 of the Gas Regulation, the objective of these Framework Guidelines on Tariffs, and of the Network Code on Tariffs, is to lay down clear and objective requirements for harmonising the gas transmission tariff structures across the EU, to the extent that this is necessary to contribute to the completion and the efficient functioning of the market[4]. Tariff structures developed on the basis of the Network Code on Tariffs shall not disincentive entry-exit zone mergers but should, in case such a merger is considered economically efficient, facilitate it.

[1] Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC, OJ L 211, 14.8.2009, p.94.
[2] Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005, OJ L211, 14.8.2009, p. 36.
[3] Commission Regulation (EU) No 984/2013 of 14 October 2013 establishing a Network Code on Capacity Allocation Mechanisms in gas Transmission Systems and supplementing Regulation (EC) No 715/2009 of the European Parliament and of the Council, OJ L 273, p.5.http://www.entsog.eu/publications/camnetworkcode.html http://www.entsog.eu/publications/camnetworkcode.html
[4] See recitals 7,8, Articles 1 and 13 of the Gas Regulation and Article 13(1) of the Gas Directive.

The Network Code on Tariffs will be evaluated by the Agency. In doing so, the Agency shall consider the degree of alignment with these Framework Guidelines, as well as the fulfilment of the overall objectives of the internal energy market, including maintaining security of supply, supporting the completion and well-functioning of the internal market in gas and cross-border trade, and delivering benefits to consumers, in consistency with the Gas Directive and the Gas Regulation.

1.3. Definitions

The definitions in the Gas Directive, the Gas Regulation, including Annexes, apply to these Framework Guidelines. Moreover, the following definitions also apply:

Transmission service	Any service necessary to transport natural gas through a transmission system, excluding balancing, flexibility, metering, depressurisation, ballasting, odorisation and any other dedicated or specific service.
Tariff structure	A tariff structure is the result of a methodology which is used to calculate the price for transmission services at every entry and exit point of an entry-exit zone In particular, tariff structures address the relation between the tariffs for the different types of services (characterised by elements such as duration, interruptibility, pressure) and overall costs of the TSO.
Transmission tariffs (=transmission charges; network tariffs; network charges)	Transmission tariffs determine what network users have to pay for each transmission service.
Allowed revenue	The maximum level of revenues set or approved by the NRA that a TSO is allowed to obtain within a defined period of time for undertaking its regulated activities.
Auction premium	The difference between the reserve price and the clearing price in an auction.
Bundled reserve price	The reserve price applicable to a bundled capacity product offered at an auction.
Costs	are operational expenditures, depreciation and the cost of capital (which includes the cost of debt and the cost of equity). The costs are determined for a specific year and shall be expressed in the price level of that specific year. They can be determined using either observed costs or incremental costs.
Cost allocation methodology	The methodology that determines the share of the TSO's (allowed) revenues, which is to be collected from the expected sale of transmission services at every entry or exit point.
Cost driver	A cost driver is either an input, throughput or output parameter

	within a TSO's activity which is correlated, irrespective of causation, to the TSO's costs in their entirety or to a subset of them.
Entry point	A point into an entry-exit system, either from an adjacent entry-exit system or from an LNG facility, production facility, storage facility, distribution network, or from a third country, that is subject to network tariffs.
Exit point	A point out of an entry-exit system either into another entry-exit system or into a distribution network, storage facility, transmission-connected consumer, or to a third country, that is subject to network tariffs.
Fixed costs	All costs that are not affected, in the short run, by the amount of transmitted natural gas.
Locational signals	Different price levels that send incentives to network users in order for the network operators to achieve an efficient operation and/or expansion of the gas system.
Multiplier	A factor to calculate reserve prices for non-yearly standard capacity products applied to the proportional yearly reference price, before the application of a seasonal factor, if any.
Non-physical backhaul flows	At unidirectional entry or exit points, the volume of gas nominated to be flowed in the opposite direction to the physical flow.
Payable price	The price to be paid, at the time of use, by the network user to the TSO, for capacity products.
Price cap regime	A tariff regime under which the NRA sets an upper limit to the price, or to the weighted average of the prices of services provided by the TSO.
Reference price	The value of the annual capacity product for each entry and exit point calculated after the application of the cost allocation methodology. Where auctions are used, the reference price is used as the reserve price for the annual capacity product and the basis for setting the reserve prices for capacity products of shorter duration and for interruptible capacity. Where auctions are not used to allocate capacity the reference price is used as the regulated price for the annual capacity product.
Regulated price	The price of capacity products at points where the capacity allocation procedure is not an auction.
Regulatory account	An account aggregating over- and under-recovery of the allowed revenues on an annual basis.

Regulatory period	The period during which a tariff structure or allowed revenue is valid.
Revenue cap regime	A tariff regime under which the NRA sets the allowed revenues for the service(s) provided by the TSO. Tariffs are either defined by the NRA or the TSO, in compliance with the allowed revenues. Where TSOs define tariffs NRAs would approve the tariffs or the tariff methodologies, prior to implementation.
Revenue reconciliation	The reconciliation of the regulatory account following revenue collection.
Seasonal factor	The factor that is applied to reserve prices in order to facilitate efficient utilisation of the infrastructure in different seasons of the year.

1.4. Implementation

The provisions in the Network Code on Tariffs, including those relating to or affecting the tariff levels, shall apply to all contracts from 1 October 2017 at the latest.

To prevent or limit undue negative repercussions resulting from implementation of the Network Code on Tariffs, NRAs may implement mitigating measures before 1 October 2017. In the case of exceptional circumstances such measures may be extended beyond 1 October 2017, by a period not exceeding twenty four months subject to Article 7(4) of the Agency Regulation. These circumstances may include instances, where the transition to the new tariff level by 1 October 2017 would:

- affect the execution of specific contracts;
- not coincide with the commencement of the gas year, tariff setting cycle or regulatory period; or
- where tariffs at individual entry or exit points would increase by more than 20% from one year to the next due to the application of the provisions in the Network Code on Tariffs.

Furthermore, and without prejudice to the provisions set out above, in determining the Network Code on Tariffs, ENTSOG shall carry out an impact assessment on harmonising the transmission tariff setting year, including downstream impacts, across all member states. The Network Code on Tariffs may also include provisions to harmonize the tariff setting year across the EU.

The Network Code on Tariffs shall specify, that all information relevant to implementation monitoring shall be communicated by ENTSOG to the Agency pursuant to Articles 8(8) and 8(9) of Gas Regulation.

The relevant information, and associated timing of communication, shall be determined in full by the Agency in close cooperation with ENTSOG within three months after the entry into force of the Network Code on Tariffs. This information shall be subsequently updated when appropriate. ENTSOG

shall maintain a comprehensive, standardised, digital data archive of the information required by the Agency[5].

The relevant information shall include, but shall not be limited to:

- direct tariff related aspects, such as percentage changes in tariffs, the amount of over- and under-recovery in each year and the size of regulatory accounts;
- beneficiaries and/or concerned parties of the potential over- and under-recovery;
- number of cross-border tariff-related discrimination complaints;
- the value of multipliers or seasonal factors per product, interconnection point, etc. in each year;
- fulfilment of the transparency norms, formulated in the Network Code on Tariffs, in a qualitative and quantitative manner.

The Agency shall share this information with NRAs.

2. Publication requirements

Information shall be published taking into account Article 18(2) of Gas Regulation and Article 41(1)(a) of Gas Directive, which require both TSOs and NRAs to provide reasonably and sufficiently detailed information on tariff derivation, methodology and structure[6]. Fulfilling the data publication requirements should allow network users to be fully aware of the costs underlying the transmission services and obtain a reasonable degree of tariff predictability.

For entry and exit points where transmission services are offered, third parties shall be able to:

- make a reasonable estimation of the reference price from published transmission cost data, including a reasonable estimation of the reference price in the subsequent year(s) within the remainder of the current regulatory period;
- understand all the TSO services offered and the corresponding transmission tariffs;
- understand how individual transmission tariffs have been derived and why they (do not) differ.

In view of these objectives, the Network Code on Tariffs shall require that, irrespective of the regulatory regime applied, the following publication requirements shall be met.

2.1. Initial publication requirements

At the entry into force of the Network Code on Tariffs, NRAs, or where appropriate TSOs, shall launch a public consultation on the proposed methodology for determining reference prices. To allow stakeholders and NRAs of adjacent Member States to provide their opinion, the public consultation shall be published in detail in the official language(s) of the Member State and in English. The Network Code on Tariffs shall specify that the consultation shall contain the following information:

[5] For the avoidance of doubt, it should be understood that all relevant information shall be equally made available, and presented, permitting a wide accessibility and use by stakeholders on EU tariff evolution. TSOs shall provide ENTSOG with the relevant data.

[6] Article 18(2) of the Gas Regulation and its Annex I point 3.4.6 and Article 41 of the Gas Directive.

- An assessment of the proposed methodology against the 'Circumstances' criteria specified in Section 3.2.1 of this document, as may be further elaborated on by ENTSOG in preparing the Network Code on Tariffs.
- All of the relevant input data specified in Section 2.3, necessary to determine tariffs under the proposed methodology.
- The results of the application of the Cost allocation test specified in Section 3.2.2, to the proposed cost allocation methodology included in the consultation, and, if appropriate, an explanation of the extent of, and justification for, any deviation between the two Cost allocation ratios.
- A methodology counterfactual, as further specified in Section 3.2.3 consisting in providing all information listed in the bullet points above, for at least one other of the cost allocation methodologies specified in Section 3.3.1.

2.2. Approval decision and periodic review

Following the Public Consultation, it is the task of the NRA to fix or approve the Cost Allocation Methodology used to determine tariffs for the entry-exit system in its Member State. The Network Code on Tariffs shall specify therefore, that the NRA's approval decision shall contain a detailed explanation and reasoned justification for the choice of methodology, which takes account of the 'circumstances' criteria; the results of the cost allocation test; the methodology counterfactual; and responses to the public consultation, in conjunction.

At least every 4 years, or more frequently if deemed appropriate by individual NRAs, NRAs, shall review and update the detailed explanation and reasoned justification concerning the selection of a tariff methodology. Any proposed changes to the methodology arising from the review shall be consulted on publicly and subject to NRA approval before implementation.

2.3. General publication requirements

At the entry into force of the Network Code on Tariffs, all of the relevant input information necessary to calculate tariffs should be made publicly available in the official language(s) of the Member State and in English by the TSO or, where relevant, by the NRA. At least every four years, or more frequently if deemed necessary by NRAs, this information should be reviewed and updated, and any changes made publicly available.

The following is a non-exhaustive list of relevant information which should be published, and which may be further defined by ENTSOG in preparing the Network Code on Tariffs, relating to the achievement of the objectives mentioned in the first paragraph of this chapter:

I. Inputs for the cost allocation methodology applied, adjusted to the level necessary to run the methodology, including:

A. <u>Inputs on the allowed revenues</u>

- allowed or expected revenues;
- capacity/commodity split: the share of total allowed or expected revenue recovered from capacity-based charges and commodity based charges, respectively;
- entry-exit split: the share of total allowed or expected revenue recovered from entry points and from exit points, respectively;

- cross-border/domestic split: the share of total allowed revenue (or an equivalent, in non-revenue cap systems) recovered from domestic entry and exit points and from cross-border entry and exit points, respectively;
- any (cost) sub-components of allowed revenue related directly to network expansion and charges other than the reference price (e.g. costs for fuel energy relevant to commodity charges, etc.); and
- the exclusion of revenues related to certain dedicated services and/or certain dedicated pieces of infrastructure where applicable.

B. Transmission system characteristics:

- Regulatory asset base (RAB);
- capacity data (technical and booked) relating to all network points to which the tariff methodology applies, allowing the total entry capacity and the total exit capacity to be identified;
- flows for the network points to which the tariff methodology applies, allowing the total flows from entry points and the total flows to exit points to be identified;
- reference conditions for the determination of capacity (technical or booked) or flows:
  - Peak conditions[7] associated with measured values (technical capacity, flows);
  - Average value considered for contractual values (booked capacity); and
  - Where applicable, load flow commitments.
- the network representation used as an input to the methodology, clarifying whether this is detailed or simplified, consistent with the chosen allocation methodology that, when appropriate, shall include segments[8] and allow an evaluation of potential cost drivers from entry points to exit points, including distances, pipeline sizes, and any others that are deemed relevant by the concerned TSOs, or NRAs, if they deem it appropriate. The Network Code on Tariffs shall define possible objective approaches to distance and average distance and shall give guidance on how to simplify the network representation in a transparent, non-discriminatory and objective way;
- Additional technical information about the network, including pipeline lengths and diameters, as well as information on the compressor stations' power.

C. The cost concepts used:

- Observed costs reflect the costs of the existing system which can be determined using:
  - Historical costs: the costs registered when building the existing system;
  - Replacement costs (modern equivalent): the costs if the existing system was to be entirely built again in a specific year.

The observed costs shall be recorded in the audited financial statements or shall be approved by the NRA if the regulatory accounting rules are different from the commercial accounting rules.

[7] The reference conditions for the characterisation of these inputs shall be published and assessed against the relevant supply standard for the system (as provided in the Regulation (EU) No 994/2010, OJ L 295, 12.11.2010, p. 1–2).

[8] The network is split into segments of pipelines connecting entry points, exit points and nodes. A node is a junction where pipelines meet.

- Incremental costs reflect the costs of expanding the system. This approach captures:
    - Long run average incremental costs: the costs required for developing capacity to meet additional demand (and thus provide more capacity);
    - Standardised costs of expansion of the system: the unit price for building new assets, for instance a pipeline, with a specific length and diameter;
    - Investment plan based costs: the costs that are estimated in a specific investment plan for building additional capacity.
- Where relevant, the chosen indexes of inflation and realised inflation, and depreciation have to be specified.

D. Cost-efficiency targets

Information concerning the operation of and impact on allowed revenues of any cost-efficiency incentives approved by NRAs should be published.

E. Locational signals

The published data shall include a description of the approach to locational signals in relation to the associated inputs, main methodology and secondary adjustments.

II. Rules on, and amounts used in the reconciliation of the regulatory account, including treatment of auction revenues;

III. Information on reserve prices, such as level and underlying reasons for multipliers and seasonality factors, and formulas to calculate discounts/reserve prices for interruptible products.

The Network Code on Tariffs shall specify that the information for multiple TSOs in one entry-exit zone shall be published at an entry-exit zone level.

The Network Code on Tariffs shall develop a standardised format for publishing the information specified above (e.g. by integrating it into the EU-wide ENTSOG Transparency platform).

2.4. Publication notice period

The Network Code on Tariffs shall set a minimum notice period of at least 30 days for the publication of revised reference prices by NRAs, or where appropriate, by TSOs, prior to the next gas year, tariff setting period or regulatory period. For network points where reference prices are expected to increase by more than 20% the notice period shall be extended to 60 days.

2.4.1. Incremental and new capacity

After NRA approval, TSOs shall publicly provide at least the following information with a sufficient lead time, before an offer of incremental or new capacity is made for binding commitments:

- PV_{AR} ,the present value of the estimated potential increase of the TSOs' allowed revenue in each year during the economic life of the new asset, which is attributable to the investment (outgoing cash flows);
- The fraction ("f") of the PV_{AR}, which refers to the estimated increase in allowed revenues attributable to the investment that needs to be underwritten by user commitments to pass the economic test (incoming cash flows), including the factors that have influenced the determination of f, which should be quantified, where possible and relevant;

- An estimated projection of tariffs for the bundled yearly capacity products of the capacity expansion(s) considered and an explanation of how it is calculated.

3. Cost allocation and determination of the reference price

The choice of a methodology shall reflect system characteristics in order to best achieve the objectives of Framework Guidelines on Rules regarding harmonised transmission tariff structures for gas[9], and in particular those of non-discrimination, competition and promotion of cross-border trade.

At least every 4 years, the relevant authority shall assess all assumptions regarding the stability and evolution of the input parameters to the tariff methodologies against relevant available technical and market data and outlooks.

In particular, the Network Code on Tariffs shall develop appropriate forecasting models to forecast technical capacity or sale of capacities[10], taking into account the relevant TYNDPs, for the input parameters of the tariff methodology.

3.1. General principles on the determination of the reference price

3.1.1. The capacity-commodity split

The collection of the revenues shall be based on capacity charges, except in the following cases:

- Upon approval or determination by the NRA a specific charge related to the volume actually flowed by network users could be established to cover costs that are mainly driven by the volume actually flowed by networks users (such as compressor fuel cost). Where applied, this charge shall be levied equally for all entry points and equally for all exit points, based on the actual flows of individual network users.
- Upon approval or determination by the NRA, specific charges for dedicated services and/or dedicated infrastructure (such as the provision of metering services), may be established, provided that such charges will be in accordance with the objectives of the Framework Guidelines. The revenue collected from these charges on aggregate will be limited to a maximum of 5% of total (allowed) revenues. The Network Code on Tariffs shall provide for a list of TSO services that could be covered by the provision.

For points which are not under the scope of the Network Code on CAM, alternative methodologies to collect revenues can be applied, subject to the concerned NRA assessing that these alternative methodologies are cost reflective and do not result in cross subsidies between domestic and cross border points. Before such alternative methodologies are applied, the concerned NRA should submit the result of the assessment to the Agency.

3.1.2. The entry-exit split

The split between the revenue to be recovered from entry points of an entry-exit-zone in a Member State and the revenue to be recovered from its exit points will be determined or approved by the

[9] See Section 1.2.

[10] We note that nationally 3 different methods are currently in use to arrive at such assumptions, such as bookings, technical or flow estimates. The choice of method may be determined by NRAs and TSOs, consistent with the chosen cost allocation methodology.

NRA. The split can be either a result of or an input to the applied cost allocation methodology. For cross border entry-exit zones the split shall be determined or approved by all involved NRAs.

Where better fulfilling the objectives of the FG, in particular single market integration, avoidance of barrier to cross border trade and of cross-subsidies between any type of network users, especially between cross-border and domestic network users, the Network Code on Tariffs shall specify that, in setting or approving the cost allocation methodology, the NRA may apply a split based on cost drivers, such as capacity and distance. Otherwise, the NRA shall adopt a 50:50 split, as a general principle.

3.2. Cost allocation methodology selection

Subject to the procedures specified in Section 2.1, a cost allocation methodology will be consulted on and approved by NRAs. The chosen cost allocation methodology will be one of the cost allocation methodologies specified in Section 3.3. The choice will be determined by the following:

- Circumstances criteria;
- Cost allocation test;
- Methodology counterfactual.

Each shall serve as an indicator for the appropriateness of the chosen cost allocation methodology, and should be considered by the NRA in conjunction, in reaching a decision over which methodology to apply following implementation of the Network Code on Tariffs.

3.2.1. Circumstances influencing the choice of a cost-allocation methodology and of the necessary inputs

3.2.1.1. Methodology criteria

The use of a postage stamp methodology should be limited to networks where one of the following criteria is met:

- a significant majority (at least 2/3) of the transmission capacity (proportion to be further specified by the Network Code on Tariffs), is dedicated either to the domestic market or to cross-border gas flows; or
- the difference between the average distance travelled by cross-border flows and the average distance travelled by domestic flows does not exceed a threshold, which shall be determined in the Network Code on Tariffs.

Where this is not the case, the selected methodology should be different from postage stamp and shall take account of the following considerations:

- In a network with a unique geographical node where all the flows converge can be identified, the virtual point based methodology is recommended;
- The choice for or against the matrix methodology, or the virtual point methodology, relative to the capacity weighted distance methodologies, shall consider both the drawback of necessary network representation simplifications and the benefit in cost reflectivity, as compared to the capacity-weighted distance approach.

3.2.1.2. Inputs criteria

Regarding assumptions related to cost concepts, incremental costs may be appropriate in expanding systems, either resulting from an increase in demand, or triggered by a change in the general system sourcing (including a change in the proportion of domestic/ cross-border flows). Conversely, the use of observed costs may be favourable for networks presenting constant or decreasing consumptions, facing limited to no change in the system sourcing.

Regarding assumptions related to capacity, the TSOs communicate capacity values for each entry and exit point in the system at reference conditions. Flows in the system may be used to characterise the capacity. However, unstable flow patterns decrease the quality of forecasts. The Network Code on Tariffs shall define in relation to unstable flow patterns what forecast quality cannot be used and provide appropriate proxies instead.

The capacity assumption shall be consistent with the economic signals expected from the chosen allocation methodology: (i) technical capacity shall be favoured in combination with allocation methodologies providing locational signals, while (ii) the application of booked capacity shall be limited to allocation methodologies that do not provide such signals.

3.2.1.3. Further specification

In determining the Network Code on Tariffs, ENTSOG shall further elaborate on the circumstances which should be taken into account in selecting a primary methodology and applying secondary adjustments, as well as on the consequences of the choices with regard to reaching the objectives of these Framework Guidelines.

In particular, ENTSOG shall assess how the relevance of each methodology is affected by the following parameters:

- Status of the system (Production/Proportion of domestic/cross-border gas flows/Consumption);
- Dynamics of demand (congestion in the system);
- Topological considerations (age of the network, length of the pipeline).

3.2.2. Cost allocation test

An objective of the Network Code on Tariffs is to ensure that the tariffs levied at all entry and exit points on an entry-exit system are cost reflective and thereby avoid cross subsidy between network users. An important indicator of cost reflectivity can be derived from a comparison of the revenues recovered from domestic and cross-border points with an assessment of the network costs imposed by each.

To enable an objective comparison, the Network Code on Tariffs shall develop a detailed test comparing expected revenues and cost drivers of domestic and cross-border points[11]. The NRAs (or the relevant TSOs) shall be responsible for correctly calculating and publishing the results of the test, both on the outcome of a pure application of the chosen cost allocation methodology (and its counterfactual as specified in Section 3.2.3), and on the outcome after potential secondary adjustments.

[11] For the purpose of this test, the points which connect an LNG terminal to a transmission system are considered to be cross-border points.

The test shall be based, *inter alia*, on:

- physical cost drivers in the system (such as, distance and capacity);
- the relative importance of cost drivers, if multiple cost drivers are identified for a system and emerge from a statistical analysis, as follows;
    - the relative importance of the cost drivers shall be proved;
        - additional cost drivers can be allowed if their explanatory value is significant;
        - the number of cost drivers applied in the test shall be limited.

The test has to create transparency regarding:

- the assumptions used in connection to the cost drivers (e.g. due to the national energy policies applied);
- the cost allocation, including assumptions and specifications relating to it.

The test consists of two ratios. For the first ratio:

- the numerator shall be the sum of the revenue (including from commodity charges and other charges, where such charges are levied, consistent with Sections 3.1.1, 3.1.2 and 4.2) which will be collected at the entry points for domestic consumption and at the domestic exit points;
- the denominator shall consist of the cost driver or in case of multiple drivers, the weighted cost drivers underlying the costs incurred by TSOs in order to provide the transmission services to deliver gas to domestic points.

For the second ratio:

- the numerator shall be the sum of the revenue (including from commodity charges and other charges, where such charges are levied, consistent with Sections 3.1.1, 3.1.2 and 4.2) which will be collected at the entry points for cross-border consumption and at the cross-border exit points;
- the denominator shall consist of the cost driver or in case of multiple drivers, the weighted cost drivers underlying the costs incurred by TSOs in order to provide the transmission services to deliver gas to cross-border interconnection points.

The amount of cross-border exit capacity shall be used as a proxy for the amount of entry capacity dedicated to cross-border use on networks where this ratio is not readily identifiable. The rest of the entry capacity shall be considered as dedicated to domestic use. The Network Code on Tariffs shall define a rule to determine the average distance used by cross-border and domestic uses.

The Network Code on Tariffs shall include a mathematical formula of the two ratios. The NRAs shall justify the reasons for any deviation between the two ratios by more than 10%, where the first ratio is compared to the second. If a deviation exceeding 10% results from the use of alternative methodologies to collect revenues and/or reconcile the regulatory account, as specified in Sections 3.1.1 and 4.2 respectively, the NRA shall ensure the revision of the alternative methodologies so that the deviation between the two ratios does not exceed the 10% limit.

In the interest of transparency, the NRAs, and where applicable the TSO, shall publish the input parameters (i.e. the respective sets of revenues and cost drivers used in the test), the underlying values of those and the outcome of the test.

3.2.3. Methodology counterfactual

A methodology counterfactual shall be developed consisting in providing all the information listed in Section 2.1, for at least one other of the cost allocation methodologies specified in Section 3.3.1.

The purpose of the methodology counterfactual is to inform the assessment of the relative benefits the proposed methodology may provide in terms of cost reflectivity, locational signals, transparency, and tariff stability. In establishing the counterfactual, it is therefore important, that the primary data inputs and assumptions are applied consistently between the two methodologies.

Following the public consultation, if NRAs consider that the methodology counterfactual better meets the objectives of the Framework Guidelines, and better satisfies the 'Circumstances' and Cost allocation test criteria, the methodology counterfactual can be approved and implemented, consistent with the requirements specified in Section 2.2.

For the avoidance of doubt, the Postage stamp methodology can be used for counterfactual purposes, even where the postage stamp methodology cannot be applied as the cost allocation methodology because of the restrictions specified in the 'Circumstances' criteria. Where the proposed methodology is the Postage Stamp methodology, the obligation to provide the counterfactual can be omitted.

3.3. Main cost allocation methodologies

One and the same primary cost allocation methodology shall apply to all entry and exit points on an entry-exit system. This rule shall equally apply to entry-exit-zones including several TSO networks[12]. Nothing in the Network Code on Tariffs shall prevent NRAs from establishing and/or approving for each entry-exit zone comprising several TSOs networks an inter-TSO compensation mechanism, as this may be required to reconcile collected revenues with allowed revenues.

The Network Code on Tariffs shall specify that the choice of a cost allocation methodology is limited to the four primary cost allocation methodologies described below. In developing the Network Code, ENTSOG shall consider for each methodology consisting of more than one variant whether it can be described as a single methodology (without variants), with a comparable level of detail and consistent with the Framework Guideline objectives.

3.3.1. Primary cost allocation methodologies

3.3.1.1. Postage stamp

The postage stamp methodology foresees the same reference price at all entries and the same reference price at all exits[13]. The required inputs are the allowed revenue, the split between entries and exits and the assumptions on capacity bookings. The reference price for each category of points is given by the target revenue for entry (respectively exit) divided by the total booked capacity (or a relevant proxy) which is assumed for entry points (respectively exit points).

[12] In planning for a cross-border entry-exit zone merger, the concerned NRAs may consider intermediate steps which would allow separate cost allocation methodologies to be maintained in the different entry-exit zones. This process may be informed by an impact assessment and a cost-benefit analysis of the different steps towards a full entry-exit zone merger with a single cost allocation methodology.

[13] Thus, this methodology does not provide any locational signal.

$$T_{En} = \frac{R_{En}}{BC_{\sum En}}$$

$$T_{Ex} = \frac{R_{Ex}}{BC_{\sum Ex}}$$

Where:

T_{En}: annual tariff at entry points to the system

T_{Ex}: annual tariff at exit points from the system

R_{En}: Revenue to be collected from entry points

R_{Ex}: Revenue to be collected from exit points

$BC_{\sum En}$: Total booked capacity at entry points

$BC_{\sum Ex}$: Total booked capacity at exit points

3.3.1.2. Capacity-Weighted Distance approach

This methodology assumes that the share of the allowed revenue to be collected from each point should be proportionate to its contribution to the cost of the capacity of the system. This share of the allowed revenue, corresponding to the tariff, is based on a (uniform) unit price per capacity per distance.

Variant A

Steps to follow:

1. Define technical capacity at each entry and exit point; define forecasted booked capacity at each entry and exit point; [define (ex-ante i.e. initially, when setting the tariff structure) the share of revenue cap to be collected from entry points and the share of revenue cap to be collected from exit points];

   $C_{E_i}: Capacity\ at\ entry\ point\ i$
   $C_{X_j}: Capacity\ at\ exit\ point\ j$

   $BC_{E_i}: Forecasted\ Booked\ Capacity\ at\ entry\ point\ i$
   $BC_{X_j}: Forecasted\ Booked\ Capacity\ at\ exit\ point\ j$

   R_E: Share of revenue cap to be collected from entry points
   R_X: Share of revenue cap to be collected from exit points

2. Calculate distance between each entry point and each exit point in the system[14];

   $\left[D_{E_iX_j}\right]: matrix\ of\ the\ distances\ from\ entry\ point\ i\ to\ exit\ point\ j$

[14] This can be done by calculating the shortest distance from each entry- to exit-points.

3. Calculate the proportion of technical or booked entry (respectively exit) capacity at each point relative to the total technical or total booked entry (respectively exit) capacity;

$$P_{E_i} = \frac{C_{E_i}}{\sum C_E} \text{ or } P_{E_i} = \frac{BC_{E_i}}{\sum BC_E} \text{ where } P_{E_i} \text{ is the proportion factor of entry point } i$$

$$P_{X_j} = \frac{C_{X_j}}{\sum C_X} \text{ or } P_{X_j} = \frac{BC_{X_j}}{\sum BC_X} \text{ where } P_{X_j} \text{ is the proportion factor of exit point } j$$

4. For each entry point (respectively exit point) , calculate capacity-weighted average distance to all exit points (respectively entry points); average distance is weighted by technical capacity;

$$AD_{E_i} = \sum P_{X_j} \times D_{E_i X_j} \text{where } AD_{E_i} \text{ is the capacity weighted average distance from entry } i$$

$$AD_{X_j} = \sum P_{E_i} \times D_{X_j E_i} \text{where } AD_{X_j} \text{ is the capacity weighted average distance from exit } j$$

5. Determine the weight of each entry point (respectively exit point) as the ratio between the product of its <u>forecasted *booked*</u> capacity with its average distance and the sums of such products for all entry points (respectively exit points);

$$W_{E_i} = \frac{BC_{E_i} \times AD_{E_i}}{\sum BC_{E_i} \times AD_{E_i}} \text{where} W_{E_i} \text{ is the weight of entry point } i$$

$$W_{X_j} = \frac{BC_{X_j} \times AD_{X_j}}{\sum BC_{X_j} \times AD_{X_j}} \text{where} W_{X_j} \text{ is the weight of exit point } j$$

6. Allocate entry cost (respectively exit costs) by multiplying the total share of revenue cap to be collected from entry points (respectively exit points) by the weight of each entry point (respectively exit point);

$$R_{E_i} = W_{E_i} \times R_E \text{ where } R_{E_i} \text{ is the share of the revenue cap to be collected from entry point } i$$

$$R_{X_j} = W_{X_j} \times R_X \text{ where } R_{X_j} \text{ is the share of the revenue cap to be collected from exit point } j$$

7. Determine tariffs by dividing the share of the revenue cap to be collected from a point by its forecasted booked capacity;

$$T_{E_i} = \frac{R_{E_i}}{BC_{E_i}} \text{where } T_{E_i} \text{ is the tariff at entry point } i$$

$$T_{X_j} = \frac{R_{X_j}}{BC_{X_j}} \text{ where } T_{X_j} \text{ is the tariff at exit pont } j$$

<u>Variant B</u>

Whereas variant A addresses all combinations of entry and exit points in the calculations, variant B relies on input from the TSO relating to flow assumptions, in order to:

- restrict the calculation to relevant combinations of entries and exits, as used by the network users;
- identify to which extent the capacity from each entry (or exit) point contributes to the total capacity of a connected exit (or entry) point.

As a result, the calculations presented under steps 1, 2, 4 and 5 above are only carried out for the relevant combinations of entry and exit points, and step 3 is based on capacities able to meet peak flow simulations as submitted by the TSO to the NRA.

3.3.1.3. Virtual point based approach

The principle of the virtual point based approach is to determine entry and exit tariffs for each point to which the tariff applies by weighting capacity at these points according to their distance to a virtual point. The "virtual point" (theoretical location) can be either adjusted for mathematically (Variant A) or determined geographically (Variant B).

Variant A

Variant A applies where it is difficult to specify an appropriate geographical point in the network to act as the Virtual Point.[15]

Under Variant A, entry and exit reference prices can be determined by adjusting appropriated 'Flow Distance' values between entry and exit points and a reference node on the network, for a given entry/exit split[16]. Under the methodology, Flow Distance is the product of the distance and peak flow between each point on the network and the reference node[17]. The reference node can be selected arbitrarily from the physical points in the network. It allows a relationship between all entry points and all exit points to be established. To adjust for the Virtual Point, the Flow Distance values are adjusted for a constant[18]. This is derived from a mathematical formula which is solved for the desired entry/exit split[19]. To obtain tariffs, the adjusted Flow Distance values are then multiplied by the expansion constant, and an annuitisation factor.[20]

The steps necessary to determine entry and exit reference prices under Virtual Point Variant A, are set out in more detail below:

Required inputs

To determine tariffs under Virtual Point Variant A, the following inputs are required:

- An accurate representation of the physical network;
- A representation is developed representing all entry and exit points on the network. The representation is segmented by including a number of additional nodes within the network. It may be appropriate for the additional nodes to assume the position of important physical assets on the network such as a bi-directional compressor station. The number of additional nodes will vary in proportion to the size and complexity of the network;

[15] Typically this is the case in meshed networks.
[16] This split acts as a proxy for the Virtual Point.
[17] Adjusted for the observed direction of flows between nodes at peak.
[18] Upwards for entry, downwards on exit.
[19] See step described below; without this step the Virtual Point would assume the position of the arbitrarily selected reference node, and the split would reflect its aggregate relativity to all entry and exit points on the network.
[20] Note: under Virtual Point Variant A, it may also be necessary to apply an additive constant to adjust for revenue under recovery.

- An appropriate peak day gas flow scenario;
- A peak day gas flow scenario is applied to determine the size and direction of capacity flows between all entry points and exit points and the additional nodes on the network. To achieve a balanced peak day gas flow scenario it is necessary for the sum of flows from all entry points to equal the sum of flows to all exit points;
- A network cost expansion factor (€/GWh/km). Subject to oversight by the NRA, this is calculated on a TSO specific basis, and represents the capital cost of investment that would be required to transport an additional GWh over one kilometre;
- An annuitisation factor. This converts the expansion factor to a daily charge and is calculated assuming a given depreciation period, an allowed rate of return on capital expenditure and, if appropriate, any operating expenditure allowance. This number is dimension unit;
- Where reference prices are adjusted to meet allowed revenues, an additive constant;
- Under Virtual Point Variant A, it may be necessary to apply an additive constant to adjust for revenue under recovery. This would be the case for points under the scope of the Network Code on CAM where it is mandatory for allowed revenues to be recovered by the capacity reference price i.e. neither a commodity nor separate under recovery charge is permitted.

Tariff calculation

1. The first step is to calculate the Flow Distance values for the pipeline segments on the network, as defined by the nodes added to the representation i.e. between each entry point and the nearest node, between each exit point and the nearest node, and between the nodes. The Flow Distance value for each segment is the product of the distance and network flows at peak between each point and its nearest node.

$$FD_s = L_s \times Pk$$

Where

FD_s is the Flow Distance value for segment s (km*GWh)

L_s is the length of segment s (Km)

Pk is the peak flow between each segment based on the peak day gas flow scenario (GWh)

2. Using this information, values are then allocated to each entry and exit point based on the sum of the Flow Distance values between each point and a selected single node on the network[21] known as the 'reference node'. Where more than one path is available between entry and exit points, the path which minimises the Flow Distance is selected[22].

The direction of gas flows between nodes at peak, established when determining the appropriate peak day gas flow scenario, is relevant to this step:

- Flow Distance values are recorded as **positive** for a given pipeline segment when transporting gas between the reference node N and the given entry or exit point E (or between nodes) would be consistent with the direction of flows at peak;

[21] Note: the choice of reference node is not important as the purpose here is to establish a LRMC relationship between entry and exit points on the network.

[22] In an unmeshed network, this path is unique; in a meshed network, it is obtained from computer modelling.

- Flow Distance values are recorded as **negative** for a given pipeline segment when transporting gas between the reference node N and the given entry or exit point E (or between nodes) would be contrary to the direction of gas flows at peak[23].

3. The next step is to adjust the Flow Distance values for each entry and exit point established in Step 2 for the Virtual Point. This is done by solving the equation below to derive a constant consistent with a given entry/exit split[24]. Because the equation has a maximisation function, entry and exit points with negative Flow Distance values are eliminated from the calculation. This assumption is adopted because, by definition, under the methodology, they represent unrealistic flows at peak. Without this step the Virtual Point would assume the position of the arbitrarily selected reference node, and the split would reflect its aggregate relativity to all entry and exit points on the network.

$$Split_{en} . \frac{\sum max(0, en_i + d)}{N_i} = Split_{ex} . \frac{\sum max(0, ex_j - d)}{N_j}$$

Solve for d, where:

$Split_{en}$ is the share of revenue to be collected from entry points

$Split_{ex}$ is the share of revenue to be collected from exit points

en_i is the marginal distance for all entry points i

ex_j is the marginal distance for all exit points j

N_i is the number of entry points

N_j is the number of exit points

d is the constant factor to adjust the marginal distances

4. Having established the constant, it is then added to the Flow Distance values for all entry points, and subtracted from the Flow Distance values for all exit points[25].

$$FD_{f_{En}} = FD_{En} + d$$
$$FD_{f_{Ex}} = FD_{Ex} - d$$

Where

FD_{fEn} (respectively, FD_{fEx}) is adjusted flow distance for a given entry point (respectively, exit point);

FD_{En} (respectively, FD_{Ex}) is the Flow Distance value (km*GWh) for a given entry point (respectively exit point) as determined in step 2.

5. Finally, to determine reference prices for each entry and exit point, the adjusted Flow Distance values are multiplied by the expansion constant, and then the annuitisation factor.[26]

[23] This is because to transport one GWh of gas at peak from reference node the gas would have to flow counter to prevailing gas flows at peak.

[24] Note 1: In the example a 50:50 split is assumed, but a different split could be applied subject to the requirements at Section 3.1.2.

[25] Note 2: depending on the position of the arbitrarily selected reference node, the constant could be a negative number, in which case it would serve to reduce the Flow Distance entry values, and increase those on exit.

[26] As indicated above (see inputs), the reference tariff may be subject to an additive constant in order to recover allowed revenues. If this was the case the additive factor would be applied following step 5.

$$RP_{En} = FD_{f_{En}} \times K \times A$$
$$RP_{Ex} = FD_{f_{Ex}} \times K \times A$$

Where

A is the annuitisation factor[27]

K is the expansion constant[28]

RP_{En} (respectively, RP_{Ex}) is the initial tariff value for a given entry point (respectively exit point) (€/GWh/day).

Variant B

Variant B is appropriate in systems with a single dominant node which can be clearly identified as reference point. This may be the case in non-meshed networks.

Steps to follow

1. Define capacity at each entry and exit point:

C_{E_i}: $Capacity\ at\ entry\ point\ i$

C_{X_j}: $Capacity\ at\ exit\ point\ j$

BC_{E_i}: $Forecasted\ Booked\ Capacity\ at\ entry\ point\ i$

BC_{X_j}: $Forecasted\ Booked\ Capacity\ at\ exit\ point\ j$

2. Determine the geographical location of the virtual trading point:

The virtual point can be determined geographically by selecting a dominant node in the network where most flows occur. The virtual point can be also determined geographically based on the capacity weighted average geographical locations of all entry and exit points.

- Calculate the proportion of entry (or exit) capacity at each point relative to the total entry and exit capacity:

$$P_{E_i} = \frac{C_{E_i}}{\sum C_E + \sum C_X}\ where\ P_{E_i} is\ the\ proportion\ factor\ of\ entry\ point\ i$$

$$P_{X_j} = \frac{C_{X_j}}{\sum C_E + \sum C_X}\ where\ P_{X_j} is\ the\ proportion\ factor\ of\ exit\ point\ j$$

- Multiply the geographical locations (longitude and latitude) of each entry (and exit) point with its proportion factor:

$$L_{E_i} = \left[long_{E_i} \times P_{E_i}; lat_{E_i} \times P_{E_i}\right], where\ L_{E_i}\ is\ the\ capacity\ weighted\ geographic\ location\ of\ entry\ point\ i$$

[27] A description of the annuitisation factor is specified in the 'Required Inputs' section of Section 3.3.1.3.

[28] A description of the expansion constant is specified in the 'Required Inputs' section of Section 3.3.1.3.

$$L_{X_j} = \left[long_{X_j} \times P_{X_j}; lat_{X_j} \times P_{X_j}\right], where\ L_{X_j}\ is\ the\ capacity\ weighted\ geographic\ location\ of\ exit\ point\ j$$

- Summing of the capacity weighted geographic locations to determine location of the virtual point:

$$L_{VP} = \sum L_E + \sum L_X\ \ where\ \ L_{VP}\ is\ the\ location\ of\ the\ virtual\ point$$

3. Calculate distance between each entry point and the virtual point as well as each exit point and the virtual point:

$$\left[D_{E_iVP}\right]: distance\ from\ entry\ point\ i\ to\ VP$$

$$\left[D_{X_jVP}\right]: distance\ from\ exit\ point\ j\ to\ VP$$

4. Calculate the revenue to be collected from all entry points and all exit points from the capacity-weighted distance to the virtual point.

- Calculate the capacity-weighted distance to the virtual point for entry and exit points separately:

$$DC_{E_iVP} = D_{E_iVP} \times \frac{C_{E_i}}{\sum C_E};$$

$$where\ DC_{E_iVP}\ is\ the\ capacity - weighted\ distance\ from\ entry\ point\ i\ to\ the\ virtual\ point$$

$$DC_{X_jVP} = D_{X_jVP} \times \frac{C_{X_j}}{\sum C_X};$$

$$where\ DC_{X_jVP}\ is\ the\ capacity - weighted\ distance\ from\ exit\ point\ j\ to\ the\ virtual\ point$$

- Use the sum of capacity-weighted distances for entry points and the sum of capacity-weighted distances for exit points to determine the entry-exit split. Calculate the revenue collected from all entry points (and revenue collected from all exit points) by multiplying the total revenue by the entry share (and exit share for revenue collected from all exit points).

5. Determine tariffs by minimizing the difference between the calculated revenue from entries and exits on the one hand and the revenue to be obtained by multiplying tariffs by booked capacities on the other hand.

3.3.1.4. Matrix approach

Under this option, the entry and exit capacity charges result from an optimisation process, which minimizes the difference between network charges paid by users and the costs allocated to the individual entries and exits (path costs).

Steps to follow

1. description of the capacity in the system[29];
2. determination of the costs associated with each segment[30];
3. creation of the matrix.

To calculate the unit cost for each possible path (every possible combination of entry and exit points) sum up the unit costs of all segments included in the path considering the direction of flows. The result is a unit cost matrix, which has as many rows as exit points and as many columns as entry points.

4. tariff calculation

The sum of the tariff at a particular entry point and the tariff at a particular exit point shall be as close as possible to the corresponding value in the unit cost matrix.

Once the costs of all paths have been determined, entry and exit charges shall be calculated by an optimization algorithm. For every path, the difference between the unit cost (Cij) and the sum of the corresponding entry and exit charges (ETi and XTj) is calculated and squared. Then, the sum of the squared differences for the entire matrix is minimized.

To avoid negative entry or exit tariffs a constraint shall be put in place.

Formally, minimize $\sum_{ij} (C_{ij} - (ET_i + XT_j))^2$

(for instance $ET_i + XT_j > 0$ V i,j)

Where:

C_{ij} = sum of the unit cost for transporting gas from entry i to exit j

ET_i= tariff for entry i (to be calculated)

XT_j = tariff for exit j (to be calculated)

No unique solution is guaranteed. This issue must be resolved by either:

- fixing the split between entry and exit; or
- applying a further derivation to arrive to a unique solution[31]; or
- fixing one tariff: this will act as a constraint on the optimization.

3.3.2. Secondary adjustments

The above methodologies establish the *unit cost per entry and exit point.*

The setting of tariffs involves certain trade-offs. In order to address those trade-offs, and with a view to adhering to the objectives of the NC, NRAs may decide to adjust methodologies and associated initial tariffs at national level, via secondary adjustments. In the event secondary adjustments are

[29] See Section 2.3 above for possible variants on assumptions on capacity.
[30] See Section 2.3 above for possible variants on assumptions on costs.
[31] See "Entry–Exit Transmission Pricing with Notional Hubs: Can it Deliver a Pan-European Wholesale Market in Gas?", Paul Hunt, Oxford Institute for Energy Studies, February 2008, p. 22 & 23.

used, only the ones listed below shall be allowed, and the adjustments made shall be fully transparent and shall not undermine the initial decision to use a given methodology. If used, they can be applied at the end or, in the case of rescaling and equalisation, be embedded in the various methodologies by creating a homogenous set of points at the beginning of the calculation.

3.3.2.1. Rescaling

A rescaling consists in increasing or decreasing the initial tariffs for the entry and/or exit point.

The Network Code on Tariffs shall only allow rescaling for the following reasons:

- to adjust the allocated initial tariffs that result from the methodology to recover the allowed revenue;
- to avoid negative capacity charges.

While following these objectives, a rescaling may take into account additional constraints, such as the assumed entry-exit split.

Rescaling shall be performed by changing the calculated charge. This can be done by either adding a constant or by multiplying it by a constant. The corresponding multiplier or additive constant for entry and for exit points shall uniformly apply to all entry points in the system and/or all exit points in the system respectively.

The description of a tariff methodology relying on a rescaling shall include an assessment of the effect of this rescaling on the entry/exit split obtained from the strict application of the main methodology. In addition, where a rescaling is used to recover costs the assessment shall cover the consistency of this rescaling with the economic signals, locational signals in particular expected from the chosen allocation methodology.

3.3.2.2. Equalisation

Equalisation results in the same tariff for a certain set of points in the system. In order to avoid cross-subsidisation between cross-border and domestic customers because of equalisation, each set of points subject to equalisation can only include either domestic or cross-border points.

The Network Code on Tariffs shall only allow equalisation for the following reasons:

- security of supply, applied for points that connect assets that serve such purpose;
- price stability, in order to mitigate local forecast errors and compensate for local flow variations; or
- fostering competition in the retail market and/ or in the renewable energy sector.

For each homogenous set of points[32], NRAs may decide between implementing locational signals and equalising the tariffs. Justification for this decision shall be provided at national level, taking into account the stability and the predictability of the flow patterns and comparing the potential benefits from the efficiency gains expected of locational signals and the potential benefits of the tariff stability enabled by equalisation.

[32] That is the following exhaustive list: Entry interconnection points, Exit interconnection points, Domestic entries, Domestic Exits, Entries from Storage, Exits to Storage, Entries from LNG terminals, Exits to LNG terminals, Entries from production points.

Regardless of whether individualised or equalised tariffs apply, they shall be cost reflective, enable network users to efficiently use the system, i.e. minimise costs, and provide for effective cost recovery mechanisms.

3.3.2.3. Benchmarking

Benchmarking[33] can be used as a complementary step to any main methodology. Benchmarking implies reducing the tariff at one point in order to attract greater gas flows. Higher capacity sales at this point would be expected to offset the need for increased tariffs at other points in order to collect allowed revenues.

Benchmarking shall be limited to the point, where the TSO faces effective competition from other TSOs' point or route. The tariff reduction shall be limited to what is strictly necessary to adjust to the competitive tariff level.

NRAs shall apply benchmarking on a case by case basis and shall reason such decision, including the following:

- a proof that "effective pipeline-to-pipeline competition" exists, based on national and EU competition law, by demonstrating that the relevant competing systems imply a real choice for the system users;
- the demonstration that the outcome of any methodology would not allow to meet the competitive tariff level;
- the demonstration that the outcome of benchmarking leads to better meeting the objectives of the Gas Regulation;
- the effect of the benchmarking on the entry/exit split obtained from the strict application of the main methodology.

In this process, neighbouring NRAs shall cooperate with each other in order to ensure a consistent and compatible approach across the Member States concerned.

The proposal for reducing a tariff based on benchmarking, as well as the corresponding tariff increases along with the NRA's reasoning, shall be publicly consulted before the tariffs are set. NRAs shall publish any points that are benchmarked and shall communicate it to the Agency.

3.4. Storage

The Network Code on Tariffs shall specify that, in setting or approving tariffs for entry and exit points from and to gas storage facilities, NRAs shall consider the following aspects:

- The benefits which storage facilities may provide to the transmission system.
- The need to promote efficient investments in networks.

NRAs shall also minimize any adverse effect on cross-border flows.

[33] See Recital 8 and Article 13 (1) of the Gas Regulation.

3.5. Incremental and new capacity

Section 3.5 applies to all incremental and new capacity at entry and exit points under the scope of the Network Code on CAM, where the decision to invest is market-based, i.e. based on binding user commitments made during a CAM auction or open season.

In such situations the decision to invest will be conditional on the validation of an economic test showing that the project is financially viable considering network users' binding commitments to purchase the incremental or new capacity.

3.5.1. Economic test

3.5.1.1. Economic test formula

The Network Code on Tariffs shall specify that network users' binding commitments in respect of an incremental or new capacity project shall be deemed sufficient to justify the investment, when a financial test is passed: the value of expected future payments from network users' commitments shall be equal to or exceed an appropriate proportion of the estimated increase in allowed revenues of the TSO.

The test is formulated as follows and is passed if:

$$PV_{UC} \geq f \bullet PV_{AR}$$

Where:

PV_{UC} is the Present Value of expected network users' commitments (incoming cash flow), which is the auction or allocation clearing price multiplied by the capacity volume commitment for each year where such commitment is obtained, discounted with the cost of capital to its present value.

PV_{AR} refers to the present value of the estimated potential increase of the TSOs' (yearly) allowed revenue, which is attributable to the investment, during the economic life of the new asset. The Network Code on Tariffs shall require TSOs to make their best efforts to provide a reliable estimate.

f is the fraction of PV_{AR} that needs to be underwritten by user commitments to pass the test[34].

The economic test is intended as an ex-ante tool (ahead of the investment decision) to evaluate the financial viability of a project on the basis of the best information available at the time of the investment decision. The proportion of **PV_{AR}** (including, subject to any regulatory efficiency assessment, any **PV_{AR}** cost over runs) not covered by expected future payments from network users' commitments would be recovered, either by future bookings at the point, or from all network users via the revenue recovery mechanism.

3.5.1.2. Criteria to be considered when setting the "f" parameter

The "f" parameter can be determined on an individual project basis, but shall be subject to approval at a Member State level by relevant NRAs. When setting the "f" parameter, the following criteria shall be taken into account:

[34] In circumstances where f is determined to equal zero, the completion of the economic test is not required.

- Duration of network users' commitment period compared to the economic life of the asset; (The longer the commitment period relative to the asset life is, the more can be underwritten by investors, which may justify a higher "f" parameter);
- Capacity set aside for short term bookings, which is at least 10% according to the Network Code on Capacity Allocation Mechanisms; (This may result in a lower "f" parameter, considering that the 10% or part of it will be booked only short term.);
- Positive externalities which may justify a lower "f" (e.g. improvement of competition, improvement of security of supply, investment useful for other points in the network and not just the one where it creates capacity).

3.5.1.3. Single economic test

The Network Code on Tariffs shall specify that a single economic test shall be published, incorporating the aggregate investment requirements of all involved TSOs and NRAs relating to a given capacity project. Only those investment costs directly relating to the incremental capacity should be included. Where NRAs involved determine different "f" factor values, NRAs shall cooperate to determine an aggregate "f" factor value.

If the distribution of PV_{AR} and the PV_{UC} between the TSOs does not allow one of them to meet its specific investment requirement (based on its assessment of "f"), while the single test is passed, TSOs and NRAs may decide to modify the distribution of revenues between the TSOs (by a cost sharing agreement or a different split of the bundle reserve price).

In case of external financial support (e.g. subsidies from the EU), the PV_{AR} should be lowered according to the amount received.

3.5.2. Determination of the price at which users can request incremental or new capacity

The Network Code on Tariffs shall specify that, when determining the minimum price at which network users can request incremental capacity, the reference price as determined by the cost allocation methodology shall apply.

In the specific case, and only in the case, where selling all the incremental or new capacity offered at the reference price would not generate sufficient revenues to pass the economic test with the value of the "f" parameter defined on the basis of the criteria set out in section 3.5.1.2, NRAs may decide to adjust the minimum price at which participants can request capacity. This adjustment shall ensure that the economic test is passed if all the incremental or new capacity offered is subscribed.

The Network Code on Tariffs shall define how this adjustment shall be implemented, taking account of the following principles:

1. Preserving the financial integrity of the economic test;

2. Avoiding cross subsidy between network users;

3. Compatibility with the cost allocation methodology;

4. Avoiding fragmentation of reserve prices at the same entry or exit point.

Applying a premium to the tariff paid by those users booking capacity in the first auction in which incremental capacity is offered (those users triggering the investment) would be consistent with these principles and should be the default option.

In determining the Network Code on Tariffs, ENTSOG shall consider alternative approaches, in addition to the default option. Where such alternatives are consistent with the principles above, ENTSOG shall include them in the Network Code on Tariffs. Where any alternative approaches result in the application of a premium to the reserve price paid by users other than those triggering the investment during the first auction of incremental capacity i.e. by other future users at later auctions, NRAs shall determine a maximum number of yearly auctions for which the minimum premium should apply[35].

4. Revenue reconciliation

4.1. Regulatory account

The specific objectives of the Revenue reconciliation chapter, in addition to Section 1.2, are to ensure the recovery of efficiently-incurred costs by TSOs, to promote financial stability for efficient TSOs, and to promote tariff stability for network users. Therefore, the Network Code on Tariffs shall specify that the determination of tariffs shall seek to minimise any gaps between the revenues which the TSO is entitled to obtain on the basis of the applied regulatory regime and the revenues actually obtained by the TSO.

A regulatory account shall record the difference between the revenues which the TSO is entitled to obtain on the basis of the applied regulatory regime and the revenues actually obtained by the TSO during the same period of time. The Network Code on Tariffs shall specify that each TSO has a single regulatory account.

The Network Code on Tariffs shall specify that NRAs determine or approve, and justify ex-ante (ahead of the revenue collection) at a national level, which fraction of the under- or over-recovery will be logged on to the regulatory account, and which part should be met by the TSO(s) in line with incentive efficiency targets. The Network Code on Tariffs shall specify that NRAs may decide to use a specific account for any over-recovery resulting from auction premia to reduce physical congestion and to avoid situations where TSOs would derive an unregulated benefit from congestion.

Under a price cap regime, where the terms allowed revenue, under and over-recoveries do not apply, only auction premia, where earned, shall be logged on to the regulatory account or shall be used to reduce physical congestion.

4.2. Reconciliation of regulatory account

The Network Code on Tariffs shall specify that NRAs determine or approve how often and how fast the regulatory account has to be reconciled, with a view to allowing for timely cost recovery and avoiding sharp adjustments of network tariffs.

Any revenue under-recovery to be recovered by the TSO and/or revenue over-recovery to be redistributed back to network users, is allocated subsequently to every entry or exit point in accordance with the chosen cost allocation methodology (except in specific cases described in

[35] For the avoidance of doubt, the duration and the amount of any premium paid by those users triggering the incremental capacity will be determined by the binding user commitments necessary to trigger the investment.

Section 4.1 where, subject to NRA approval, a TSO has set up a specific account for any over-recovery arising from auction premia).

The Network Code on Tariffs shall specify that the reconciliation of the regulatory account shall lead to an adjustment of the capacity price e.g. adjustment of the reference prices. As such, the reference price applicable to capacity allocated in a previous auction has to be adjusted accordingly at the time when the capacity can be used. In this way, all entry and exit points will contribute to the reconciliation through an adjustment of the reference price (in order to avoid a situation whereby the adjustment of the reserve price or the regulated price at only one or a few entry or exit points where under- or over-recovery occurred exacerbates the problem).

On entry and exit points not under the scope of the Network Code on CAM, the Network Code on Tariffs shall set out that NRAs may decide to use alternative methodologies to reconcile the regulatory account, while respecting the principles of avoiding cross subsidies between cross-border and domestic flows. Where, consistent with Section 3.1.1, a flow based charge is used to collect revenues to cover costs that are driven mainly by the volume of flows (such as fuel costs), NRAs may decide to apply an adjustment of the flow-based charge to reconcile the regulatory account.

5. Reserve price

This chapter applies to all entry and exit points under the scope of the Network Code on CAM.

In determining reserve prices and the application of any multipliers that may be appropriate, NRA shall take account of the following:

- The balance between facilitating short-term gas trading and efficient revenue recovery;
- The balance between facilitating short-term gas trading and providing long term signals for efficient investment;
- The need to ensure that multipliers applied to interruptible products reflect the probability of interruption;
- The need to ensure that transport contracts signed with non-standard dates or with durations shorter than a standard annual transport contract shall not result in arbitrarily higher or lower tariffs.

NRAs may decide to apply multipliers. Before adopting their decision regarding the application of multipliers, NRAs shall consult with NRAs of adjacent Member States and relevant stakeholders. In adopting their decision, NRAs shall take account of the adjacent NRAs' opinions. If an NRA decides not to apply multipliers reserve prices for all standard capacity products shall be set proportionately to the yearly reference price (i.e. *pro-rata temporis* which means a multiplier of one).

The Network Code on Tariffs shall include mathematical formulations where relevant for the underlying provisions.

5.1. Reserve prices for firm standard capacity products

5.1.1. Quarterly and monthly firm standard capacity products

The Network Code on Tariffs shall set out that the reserve prices for quarterly and monthly firm standard capacity products shall be set by reference to the yearly reference price using the following formula:

$$P_{st} = m * (p_y/365) * d$$

where:

P_{st} is price of short-term product,
m is multiplier,
p_y is price of yearly product,
d is duration of short-term product in days,
For leap years, $P_{st} = m * (p_y/366) * d$.

The Network Code on Tariffs shall set out that, in determining multipliers the following conditions apply:

- In the absence of congestion, NRAs may decide to apply multipliers not lower than 0.5 but not higher than 1.5.
- In the event of congestion at specific entry or exit point, NRAs may decide to allow for multipliers not lower than 0.5, and not higher than 1.

Congestion shall be defined as in point 2.2.3.1 of Annex I to Gas Regulation[36]. When the NRA decides to allow multipliers, the NRA shall take into account whether the TSO has offered additional capacity that has been paid by incentives as defined by Section 2.2. of Annex I of the Gas Regulation.

5.1.2. Daily and within-day firm standard capacity products

The Network Code on Tariffs shall set out that the reserve prices for daily and within-day firm standard capacity products shall be set by reference to the yearly reference price using the following formula:

$$P_{st} = m * (p_y/365)$$
$$P_{st} = m * (p_y/8760) * h$$

where:

P_{st} is price of short-term product,
m is multiplier,
p_y is price of yearly product,
h is duration in remaining hours of the gas day
For leap years, $P_{st} = m * (p_y/366)$ and $P_{st} = m * (p_y/8784) * h$.

The Network Code on Tariffs shall set out that, in determining multipliers the following conditions apply:

- In the absence of congestion, NRAs may decide to apply multipliers between zero and not higher than 1.5.
- In the event of congestion at specific entry or exit point, NRAs may decide to allow multipliers between zero and not higher than 1.

Congestion shall be defined as in point 2.2.3.1 of Annex I to Gas Regulation. When the NRA decides to allow multipliers, the NRA shall take into account whether the TSO has offered additional capacity that has been paid by incentives as defined by Section 2.2 of Annex I to Gas Regulation.

[36] Commission decision of 24 August 2012 on amending Annex I to Gas Regulation.

Table 1: Multipliers

Duration of the short term product	Multiplier range without congestion	Multiplier range with congestion
Quarterly and monthly	0.5 – 1.5	0.5 – 1
Daily and within day	0 – 1.5	0 – 1

5.1.3. Seasonal factors

Seasonal factors may apply to quarterly, monthly, daily and within-day products.

Seasonal factors shall only apply if they improve the gas transmission system's efficient use and cost-reflectivity of reserve prices. When seasonal factors are applied in addition to multipliers, the combination of multipliers and seasonal factors for any standard capacity product with a duration of less than one year may for some seasons be higher than 1.5 or lower than 0.5. However, the arithmetic mean of the products of multipliers and seasonal factors shall over the gas year not be lower than 0.5 and shall not exceed 1.5.

The Network Code on Tariffs shall develop a methodology for determining seasonal factors.

5.2. Reserve prices for interruptible capacity

The Network Code on Tariffs shall set out that reserve prices for interruptible capacity be set at a discount to the reserve price of the firm standard capacity product with equivalent duration.

The Network Code on Tariffs shall set out a methodology for determining reserve prices for interruptible capacity.

The methodology shall meet the following criteria:

- At interconnection points where firm capacity is offered in both directions, the discount(s) for interruptible capacity shall adequately reflect the risk (likelihood and duration) of interruptions, so that if the risk is low, the discount shall also be low. TSOs shall publish their assessment of the risks of interruption. The discount is to be recalculated at least once a year;
- At unidirectional interconnection points where TSOs offer firm capacity only in one direction and capacity is offered in the other direction on an interruptible basis (non-physical backhaul capacity), the methodology for determining the reserve price shall be set to reflect the actual marginal (additional) costs that the TSO incurs to provide this service and shall not be below zero.

6. Virtual interconnection points

This chapter applies to all entry and exit points under the scope of the Network Code on CAM.

According to the Network Code on CAM (Article 19(9)), where two or more entry or exit points connect the same two adjacent entry-exit systems, and when certain conditions are met, the TSOs shall offer the available capacity at one virtual interconnection point. The reserve price for virtual interconnection points shall be established based on the combination of the reserve prices set for the individual entry or exit points. The combination mechanism shall be elaborated in the Network Code on Tariffs consistently with the fulfilment of the overall objectives of these Framework

Guidelines, and especially avoiding that the establishment of a virtual interconnection point creates barriers to cross-border trade.

The Network Code on Tariffs shall include mathematical formulations for the reserve price for virtual interconnection points.

7. Bundled capacity products

This chapter applies to all entry and exit points under the scope of the Network Code on CAM.

The Network Code on Tariffs shall specify that, for bundled capacity products at entry or exit points, the sum of the reserve prices for capacity at entry and exit points (i.e. on both sides of the interconnection point to be bundled) is used as the bundled reserve price for the purpose of capacity auctioning.

The Network Code on Tariffs shall specify that the revenues from the reserve price of bundled capacity products be distributed among the TSOs in proportion to the reserve prices of their capacities in the total bundled capacity. The revenue stemming from the auction premium for bundled capacity, i.e. the revenue that exceeds what would have been obtained based on the bundled reserve price, shall be split between the relevant TSOs on the basis of an agreement between the respective NRAs. NRAs shall immediately inform the Agency of the outcome of such an agreement. If no such agreement is concluded ahead of the auction, the Network Code on Tariffs shall specify that any revenues from the auction premium be split equally between the relevant TSOs.

8. Payable price

This chapter applies to all entry and exit points under the scope of the Network Code on CAM. The Network Code on Tariffs shall set out that, notwithstanding any reserve price adjustments determined by the provisions set out in Chapter 5, the payable price determined in a capacity auction shall be a floating price, which consists of the applicable reference price at the time when the capacity can be used plus the auction premium, if any.

The Network Code on Tariff shall include mathematical formulations for the payable price.

The approach to setting the payable price set out above shall also apply for incremental and new capacity.