Tariff Launch Documentation
TAR136-13
22 January 2014

Network Code on Harmonised Transmission Tariff Structures for Gas

LAUNCH DOCUMENTATION

CONTENTS

1. INTRODUCTION

This document was prepared by ENTSOG, an organisation currently comprising 43 TSOs from 26 European countries, in line with its tasks under Article 6 of the Gas Regulation and pursuant to Article 28 of ENTSOG Rules of Procedure[1] to be followed during the development process of the network codes. This document represents the Launch Documentation ('LD') for the future Network Code on Harmonised Transmission Tariff Structures for Gas ('TAR NC').

The development of the TAR NC is envisaged by Article 8(6)(k) of the Gas Regulation. ENTSOG's obligation to submit a network code for the ACER reasoned opinion is triggered by ENTSOG receiving the respective request/invitation letter from the EC. The EC invitation letter to draft the TAR NC was sent to ENTSOG on the 19th of December 2013 and specified the deadline for this task as the 31st of December 2014[2].

ENTSOG's obligation to conduct an extensive consultation process during the preparation of a network code is stipulated in Article 10(1) of the Gas Regulation. This LD provides the starting point for stakeholder discussion and intends to facilitate the gathering of their feedback. The topics covered in this LD are subject to further discussion during the Stakeholder Joint Working Sessions ('SJWS') scheduled for the period from February to April 2014[3]. The sections 'ENTSOG's view' capture the preliminary observations and do not prevent the further development of the respective topic.

For the avoidance of doubt, this LD shall not be construed as part of the future TAR NC to be submitted to ACER by the 31st of December 2014. This LD is publicly disclosed to the market for information purposes only and without any commitment whatsoever from ENTSOG as to the final content of the TAR NC. The final content of the TAR NC shall be subject to the outcome of the Committee procedure according to Article 5a(1) to (4) and Article 7 of Council Decision 1999/468/EC[4], as foreseen by Article 28(2) of the Gas Regulation.[5]

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[1] Rules of Procedure of the International Non-Profit Association (AISBL) European Network of Transmission System Operators for Gas (ENTSOG) // Published on ENTSOG's website: http://www.entsog.eu/public/uploads/files/publications/Statutes/2012/LGT0105-12_Rev_1_23%2011%202012_ENTSOG_RoP_Amendment_GA(131212)clean.pdf.

[2] Published on ENTSOG's website: http://www.entsog.eu/public/uploads/files/publications/Tariffs/2013/20131217%20Invitation%20ENTSOG%20draft%20NC%20TAR.pdf.

[3] The dates and the topics of SJWSs will be available within the Final Project Plan to be published on ENTSOG's website at the end of January.

[4] Council Decision 1999/468/EC of 28 June 1999 laying down the procedures for the exercise of implementing powers conferred on the European Commission as amended by Council Decision 2006/512/EC of 17 July 2006.

Additionally, the information contained in this LD shall not be construed as giving rise to any specific right or obligation whatsoever to ENTSOG or any of its Members as to any user of this LD. The LD does not constitute a legally binding document.

Background

To begin the process of the TAR NC establishment, on the 29th of June 2012, the EC sent a letter to ACER inviting them to start the procedure on the TAR FG. In the letter, the EC requested at least the formulation of principles with regards to 'General cost allocation aspects such as the split of revenues between entry and exit points', 'Reserve price, revenue recovery and payable price' and 'Transparency'. The letter also requested consideration of the three additional items: 'Incremental Capacity', 'Use of locational Signals' and 'Effects Entry-Exit Zone mergers'. Following receipt of this letter, ACER worked on developing the TAR FG with a deadline of the 31st of December 2012 for its submission to the EC. As a result of the work needed to consider the additional items, ACER requested an extension to this deadline and subsequently, the EC granted an extension until the 31st of March 2013.

On the 15th of March 2013, the EC sent a letter to ACER expressing concern about the fact that the cost allocation methodologies were being addressed through the application of a 'top down' test and not a 'bottom up' approach. The EC requested a bottom up approach and stipulated certain points such as the following:

- a limited number of cost allocation methodologies;
- descriptions of the cost allocation methodologies;
- providing rules on the appropriate Entry-Exit split;
- identifying the input parameters and cost drivers that are used;
- specifying what the cost drivers refer to e.g. the level of capacity, flows, direction;
- description of the circumstances under which the methodologies can be used.

On the 10th of June 2013, the EC sent a letter to ACER agreeing to an extension of the deadline to submit the final TAR FG by the 30th of November 2013. During this period ACER worked on the further development of the TAR FG, including holding a public consultation primarily focussed on the proposals for the cost allocation and determination of the reference price Chapter. ACER submitted the TAR FG to the EC on the 30th of November 2013.

[5] Currently the Gas Regulation provides for the application of the regulatory procedure with scrutiny. In case of the change of the applicable procedure due to the Lisbon Treaty, the new procedure will apply accordingly. See also Chapter 2 of this LD, additional consideration for the implementation timeline.

The invitation letter received by ENTSOG from the EC states that the TAR NC 'should be sufficiently specific for immediate application upon its entry into force' and 'where relevant, […] developed in coordination with the work on the amendment of the Network Code on Capacity Allocation Mechanisms on the matter of incremental and new capacity'. The EC invitation letter invites ENTSOG to prepare an assessment of the policy choices made in the development process of the network code.

TAR NC Launch Documentation

The LD is not intended to provide an examination of each issue within the TAR FG, but rather focuses on the key issues for addressing within the TAR NC development process. The aim of the LD is to set the basis and to trigger the stakeholders' consideration and discussion of: (1) the options proposed by ENTSOG to address the respective TAR FG requirements; and (2) the associated questions, where necessary. Stakeholder feedback, which will be taken into consideration during ENTSOG's development of the TAR NC, is planned to be gathered at the forthcoming SJWSs.

The Chapters of the LD are structured as follows:

- 'Introduction' elaborates on the concept to be dealt with in the respective LD Chapter.
- 'Rules envisaged by the TAR FG' enlists all the relevant rules foreseen by the respective TAR FG Chapter.
- 'Tasks from the TAR FG for development within the TAR NC' outlines the TAR FG provisions that explicitly give ENTSOG a mandate to elaborate them in the TAR NC. Where no 'tasks' are envisaged, this portion is omitted.

For each 'task', if any, within the list from the previous portion, the rest of the respective LD Chapter is structured as follows:

- 'TAR FG requirements' with exact wording from the relevant TAR FG provision.
- 'ENTSOG's view' provides ENTSOG's initial consideration of how the TAR FG requirement is to be treated within the TAR NC. Where not relevant, this portion is omitted.
- 'Policy proposal' envisages one or more options to address the relevant TAR FG requirement for consideration by, and discussion with, stakeholders.
- 'Questions for stakeholders' posed by ENTSOG in relation to the specific topic under discussion within some TAR FG Chapters. Where not necessary, this portion is omitted.

Where the TAR FG does not envisage any 'task' for ENTSOG to fulfil within the process of the TAR NC development but ENTSOG still deems it necessary to include its remarks in the LD, they are placed under the portion 'Additional consideration'.

In parallel to the development of the TAR NC, the CAM NC will be amended to include provisions for incremental and new capacity. Chapters 2 and 3 of the TAR FG contain sections related to incremental and new capacity. These sections cover topics such as the economic test, tariff issues related to incremental capacity and relevant information provisions. The TAR NC LD will not cover these topics but they will instead be covered in the Launch Documentation for the Incremental Proposal.

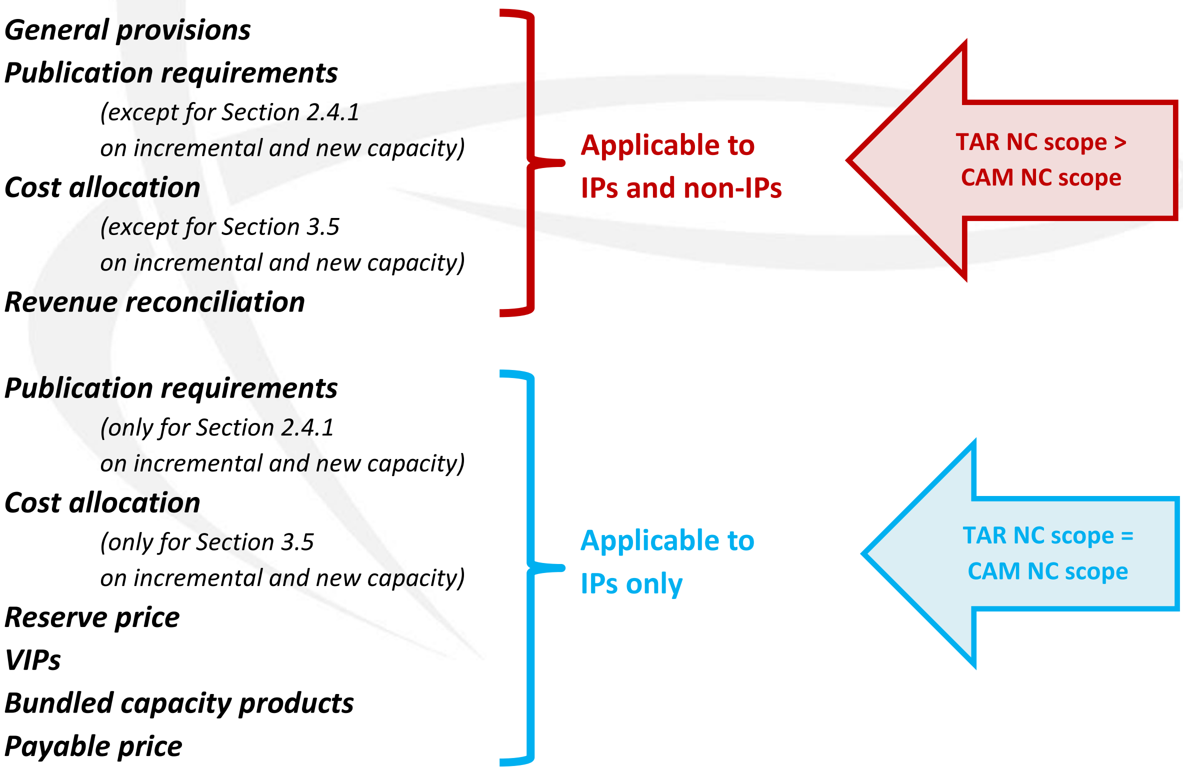
2. GENERAL PROVISIONS

Introduction

The TAR FG Chapter 1 'General Provisions' covers the scope and objectives, the definitions and the implementation (including some monitoring provisions).

The scope of the LD is guided by the TAR FG. As stated in the TAR FG, the TAR NC 'will apply to the transmission services offered at all entry and exit points' – 'irrespective of whether they are physical or virtual' – on the TSOs' transmission systems. Chapters 1 to 4 of the TAR FG apply to all points on the transmission system (except for Sections 2.4.1 and 3.5 which have the same scope as the CAM NC) while Chapters 5 to 8 are applicable only to the points under the scope of the CAM NC. For the latter case, it is to be noted that the scope of the CAM NC is limited to IPs defined in its Article 3(10) as 'a physical or virtual point connecting adjacent entry-exit systems or connecting an entry-exit system with an interconnector, in so far as these points are subject to booking procedures by network users;'.

Figure 1. Application of the TAR FG chapters to different points on the system



The objective of the TAR FG is 'to lay down clear and objective requirements for harmonising the gas transmission tariff structures across the EU'. This should be done to the extent necessary to contribute to non-discrimination, effective competition and the efficient functioning of the market.

Rules Envisaged by the TAR FG

- Tariff structures developed on the basis of the TAR NC shall not disincentive entry-exit zone mergers but should, in case such a merger is considered economically efficient, facilitate it.
- The TAR NC shall apply to all contracts, both new and existing, at the latest from the 1st of October 2017.
- NRAs may apply mitigating measures before the 1st of October 2017, to prevent or limit undue negative impacts upon implementation of the TAR NC.
- In the case of exceptional circumstances such measures may be extended beyond the 1st of October 2017, by a period not exceeding a total of twenty four months.
- The exceptional circumstances may include: (1) if the application of TAR NC provisions affect the execution of specific contracts; (2) if the application of the TAR NC does not coincide with the commencement of the gas year, tariff setting cycle or regulatory period; or (3) 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 TAR NC.
- The TAR NC shall specify, that all information relevant to implementation monitoring shall be communicated by ENTSOG to ACER pursuant to Articles 8(8) and 8(9) of the Gas Regulation.
- 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 TAR NC, in a qualitative and quantitative manner.

Tasks from the TAR FG for Development within the TAR NC

1. To propose and justify a consistent definition for transmission services in line with Section 1.3.
2. To carry out an impact assessment on the harmonisation of the tariff setting year and consider whether provisions addressing this issue could be included in the TAR NC.

TASK 1: 'Transmission Service' Definition

The definitions from the Gas Directive and the Gas Regulation apply to the TAR FG. The TAR FG also defines additional definitions and these are included in the glossary which can be found in Appendix 1. Among such additional definitions, there is the one for 'transmission service' the elaboration of which is explicitly mandated by the TAR FG.

TAR FG Requirements[6]

The Network Code on Tariffs shall propose and justify a **consistent definition for transmission services** in line with Section 1.3.

ENTSOG's View

ACER's proposed definition is aimed at the identification of those transmission services needed for the transmission of natural gas with the exception of those activities which may be linked to local requirements (e.g. regional and local transmission activities, flexibility services, metering, depressurisation, ballasting, quality conversion, biogas related services, odorisation and any other specific service). The final section of this definition is relatively open and might be better outlined without losing the appropriate degree of latitude.

One should also keep in mind that the definition of 'transmission service' is closely related with the 'cost allocation methodology' (which part of the allowed revenue of the TSO is part of the cost allocation methodology described in the FG and which part is outside of it)[7].

Policy Proposal

ACER has defined transmission service as '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.' ACER has requested that ENTSOG propose and justify a consistent definition of transmission services in line with Section 1.3.

In view of this and building upon the ACER definition, ENTSOG's initial proposal is the following refined Transmission Service definition:

[6] Ref. page 5 of the TAR FG. Section 1.2 'Scope and objectives', paragraph 1.
[7] Please see figure 7a and figure 7b on page 29 of this document.

'Transmission Service: any service necessary to transport natural gas through a transmission system, excluding those activities which may be linked to local requirements, depending on national circumstances, (e.g. regional and local transmission activities, flexibility services, metering, depressurisation, ballasting, quality conversion, biogas related services, odorisation and any other specific service)'.

Some of the items mentioned above in brackets could be considered as part of transmission services depending on the national circumstances. Balancing costs should be covered separately because under the BAL NC a neutrality mechanism will apply.

This topic will be further discussed and developed during the SJWSs with stakeholders and regulators.

TASK 2: Impact Assessment

TAR FG Requirements[8]

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.

Policy Proposal

An impact assessment is a tool used for the structured exploration of different options to address particular policy issues. It is used where one or more options are available and is aimed at facilitating the active consideration of alternatives. This process: (1) identifies and assesses the issue to be addressed; (2) considers the objectives to be pursued; (3) identifies the main options for achieving the objective; (4) assesses their likely impacts; (5) outlines advantages and disadvantages of each option; and (6) examines possible trade-offs. Thus, it is suggested that the impact assessment should be structured as follows:

Issue Identification

The issue that has been identified is that currently, there are different tariff setting years across the EU, i.e. the annual tariffs are applicable from different dates. For a network user operating in different countries they must be mindful of the different dates when the tariffs

[8] Ref. page 8 of the TAR FG. Section 1.4 'Implementation', paragraph 6.

change. ENTSOG has identified that there are currently four different tariff setting years in use as outlined in the table below:

Table 1. Usage of different tariff setting periods by a sample of Member States

Tariff Setting Year	Applicable tariff period for a sample of 20 Member States
1st January to 31st December	14
1st October to 30th September	4
1st April to 31st March	1
1st July to 30th of June	1

<u>Pursuit of Identified Objectives</u>

The objective to be pursued is to assess the impact of the possible harmonisation of the transmission tariff setting year, taking into account downstream impacts, across all Member States.

<u>Identification of Main Options</u>

The main options have been identified as follows:

1. Harmonisation of the tariff setting year so that the tariffs apply from the 1st January to the 31st of December;
2. Harmonisation of the tariff setting year so that the tariffs apply from the 1st October to the 30th of September;
3. Status quo – no harmonisation of the tariff setting year.

<u>Identification of Likely Impacts of Main Options</u>

If the tariff setting year is harmonised (to either option one or option two above) then the impact on TSOs and stakeholders will vary depending on their current tariff setting year. Some of the expected changes that would need to be made to facilitate such harmonisation could be:

- ✓ Adjustment and enhancement of Cost control/Accounting systems, dual monitoring of (financial) data if there is a deviation from the given financial year
- ✓ Any cost control/accounting adjustments will need IT resources to facilitate them
- ✓ Updated billing and invoicing with associated IT costs

- ✓ Updating tariff calculation models and reporting schedules/formats with associated costs
- ✓ New regulatory rules and rules adopted at the national level (national law and administrative acts)may need to be updated
- ✓ Personnel costs related to above mentioned points
- ✓ In some MS any change to the tariff setting year has to be done in coordination with the electricity sector (i.e. where NRA´s apply the same tariff setting year for the whole energy sector).

Consequences of the Options

Option 1: The tariff setting year from the 1st of January to the 31st of December

- The tariff setting year would be aligned with the calendar year which could be advantageous for reporting and accounting purposes, e.g. could avoid double reporting for calendar year and gas year;
- The tariffs are published prior to the start of the capacity auctions in March, allowing a network user to purchase capacity and know the price of that capacity for at least three months (i.e. Oct to Dec) of the gas year, depending on how long the tariffs are applicable for e.g. one year or for multiple years.

Option 2: The tariff setting year from the 1st of October to the 30th of September

- The tariff setting year would be aligned with the timing for the yearly standard capacity products as defined in the CAM NC;
- A network user would not know the tariff for capacity purchased in the yearly auctions in March because the tariffs would not be published until e.g. 1st of September where the minimum notice period is 30 days.

Option 3: Status quo

- The ‘no change’ option would be a neutral option in terms of system changes;
- Network users would still experience different tariff setting years as occurs today. This might create additional complexity in transportation cost determination. In case of misalignment at the border, the bundled tariff could be subject to a double change during the year.

Identification of Possible Trade-offs

There is a trade-off between the costs necessary for harmonisation of the tariff setting year and the benefits that harmonisation may bring for network users. The CAM NC only applies to IPs whereas the TAR NC will apply to all entry and exit points. In countries with only a few

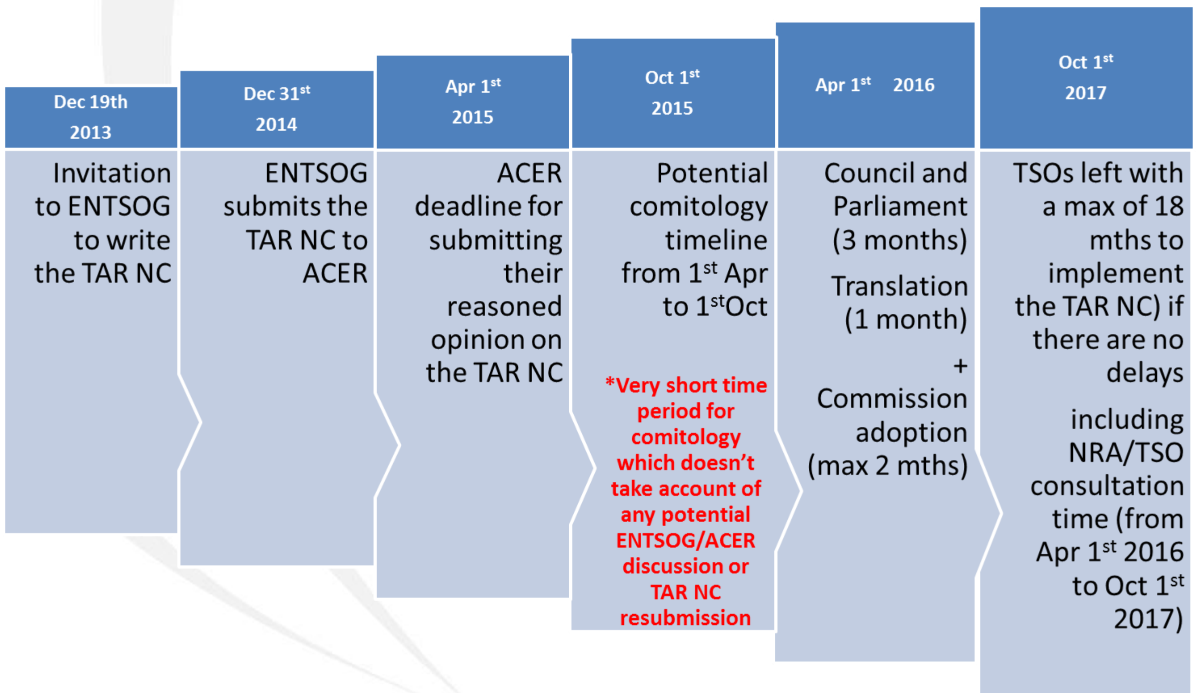
IPs but a lot of other points (non-IPs) a change of the tariff setting year to be in line with the CAM auctions might create unnecessary problems for the system as a whole.

Additional Consideration: Implementation Timeline

The TAR FG stipulates that the provisions of the TAR NC shall apply to all contracts by the 1st of October 2017. There is no set implementation time period for the TSOs to comply with the TAR NC provisions as from its entry into force. The time that they have to implement the TAR NC depends on and may be significantly shortened by the timing of the processes within the TAR NC establishment, in particular the phase between its submission for ACER reasoned opinion and the phase of its adoption procedure.

Figure 2 shows the indicative timeline for the establishment of the TAR NC on the assumption that it will be adopted via the regulatory procedure with scrutiny ('comitology'), as currently foreseen by Article 6(11) of the Gas Regulation.[9]

Figure 2. Potential timeline to drop dead implementation date for the TAR NC



[9] In case of the change of the applicable procedure due to the Lisbon Treaty, the new procedure will apply accordingly.

Figure 2 above is based on the assumption that the time period from ENTSOG's submission of the network code for ACER reasoned opinion until the delivery of the Gas Committee opinion at the comitology meeting would be equal to six months (from the 1st of April to the 1st of October). However, the CAM NC and the BAL NC experience showed that this stage of the process lasts much longer. In particular, quite a significant time period falls on the work done by ENTSOG to resubmit the amended network code to ACER. Hence, the drop dead date of the 1st of October 2017 means that the time for the TSO to implement the TAR NC could easily be shortened due to potential delays to the comitology process. Therefore, it is quite likely that a significant number of TSO would have to avail of implementing the mitigating measures so that they could have an extension beyond the 1st of October 2017.

The fixed implementation date follows the precedents of the CAM NC and the BAL NC. However, due to the complexity associated with the TAR NC implementation, this doesn't seem feasible. Instead, it is suggested that the application date should be calculated as [18] months as from the date of the TAR NC entry into force. This would avoid the potential 'shrinking' of the TAR NC implementation time due to the procedural aspects of its adoption.

3. PUBLICATION REQUIREMENTS

Introduction

Article 13(1) and Article 18(2) of the Gas Regulation envisage the following set of requirements to be met by the tariffs or the methodologies used to calculate them: (1) be transparent; (2) be objective; (3) be applied in a non-discriminatory manner; (4) take into account the need for system integrity and its improvement; (5) reflect the actual costs incurred which must: (i) be transparent; (ii) correspond to those of an efficient and structurally comparable network operator; (iii) include an appropriate return on investments; (iv) where appropriate, take account of the benchmarking of tariffs by the NRAs; (6) facilitate efficient gas trade and competition; (7) avoid cross-subsidies between network users; (8) provide incentives for investment; (9) maintain or create interoperability for transmission networks.

Article 18(2) foresees that TSOs or NRAs must publish the information on tariff derivation, tariff methodology and tariff structure. Also, it indicates the respective limits of the contents of the information that is to be published – such information should be 'reasonably and sufficiently detailed'. The purpose of publishing this information is: first, to secure the tariffs that meet the aforementioned requirements (such as 'transparent, objective and non-discriminatory'); and second, to facilitate efficient utilisation of the transmission network.

The TAR FG further elaborates on the reasons for introducing the publication requirements. Meeting such requirements is aimed at fulfilling the following objectives:

- to enable tariff predictability for the third parties – so that they are able to estimate the value of the current reference price as well as for the subsequent year(s) within the rest of the current regulatory period;
- to ensure tariff comprehensibility for the third parties – so that they are able to understand: (1) the costs underlying the transmission services; (2) all the services offered by the TSO; (3) transmission tariffs; (4) how individual transmission tariffs are derived; (5) the reasons for the difference, if any, between the individual transmission tariffs.

Rules Envisaged by the TAR FG

The set of rules foreseen by the TAR FG can be split into three categories: (1) related to the choice and the review of the chosen cost allocation methodology; (2) related to the publication of the minimum set of the information; and (3) related to the notice period for the changes in the reference prices.

Choice and review of the cost allocation methodology

- The public consultation shall be launched by the NRA or, where appropriate, by the TSO once the Tariff NC enters into force.
- The documentation relevant for the public consultation shall be detailed.
- This documentation shall be published in the official language(s) of the Member State and in English.
- This documentation shall consist of:
    - the assessment of the proposed cost allocation methodology against the specified circumstances influencing its choice;
    - the relevant input data necessary for the calculation of tariffs pursuant to the proposed methodology;
    - the results of the application of the cost allocation test, including, in case of the deviation between the two cost allocation ratios, its extent as well as the explanation and justification for this extent;
    - at least one methodology counterfactual accompanied by the same information as foreseen for the chosen cost allocation methodology in points (1) to (3) above.
- After the close of the public consultation the NRA shall fix or approve the proposed cost allocation methodology.
- The decision of the NRA shall be accompanied by the detailed explanation and the reasoned justification for the choice of the cost allocation methodology.
- Such detailed explanation and reasoned justification shall take account of the information foreseen in points (1), (3) and (4) above as well as of the responses to the public consultation.
- The NRA shall review and update the detailed explanation and the reasoned justification for the choice of the cost allocation methodology at least every 4 years.
- The NRA shall conduct the public consultation on any changes proposed as a result of such review.
- The NRA shall approve the proposed changes after the close of the public consultation.

Publication of the minimum set of the information

- The set of information shall be published by the TSO or, where relevant, by the NRA once the TAR NC enters into force.
- This set of information shall be published in the official language(s) of the Member State and in English.
- The NRA shall review and update this set of information at least every 4 years.

- The changes made to the set of information as a result of such review and update shall be published.
- The set of the information which is envisaged by the TAR FG to be published is only a minimum one.
- This set may be further defined in the Tariff NC.
- Publication of this information is aimed at fulfilling the objectives of ensuring the tariff predictability and comprehensibility for the third parties.
- The minimum set of the information includes: (1) inputs for the applied cost allocation methodology; (2) rules and amounts on the reconciliation of the regulatory account, including the treatment of the auction revenues; (3) information on the reserve prices and formulas to calculate discounts/reserve prices for interruptible products.
- The inputs for the applied cost allocation methodology may be adjusted to the level necessary to run this methodology.
- In the situation with multiple TSOs in one entry-exit system, the required information shall be published on an entry-exit zone level.
- The peak conditions used as the reference conditions for determination of the technical capacity and flows shall be assessed against the relevant supply standard for the system.
- The observed costs shall be either recorded in the audited financial statements or, if the regulatory accounting rules are different from the commercial accounting rules, shall be approved by the NRA.

Notice period for the changes in the reference prices

- The NRA or, where appropriate, the TSO, shall publish the updated reference prices at least 30 days prior to the beginning of the next gas year / the next tariff setting period / the next regulatory period.
- Where the updated reference price is expected to increase by more than 20% of the previously applicable reference price, such notice period shall constitute 60 days prior to the beginning of the next gas year / the next tariff setting period / the next regulatory period.

Tasks from the TAR FG for Development within the TAR NC

1. To define possible approaches to distance and average distance and give guidance on how to simplify a network representation.
2. To develop a standardised format for publishing the information contained in Section 2.3 of the FG (e.g. by integrating it into the EU-wide ENTSOG Transparency platform).

TASK 1: Transmission Network Characteristics: Distance, Average Distance and Network Representation

TAR FG Requirements[10]

The Network Code 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.

Policy Proposal

Point to Point Distance in a Network

ENTSOG has identified two ways to calculate point-to-point distances in a network: (1) Euclidean approach (airline); (2) Path (pipeline) approach. The explanation of such approaches is outlined below.

Euclidean distance between two points (airline distance)

The calculation of distance as the Euclidean or shortest airline distance is based on the coordinates from each point in the projected coordinate system. Euclidean distance is based on the rectangular computation (Pythagoras) and provides a measure as if one would use a ruler to measure the air-distance between two points.

The logic of the calculation is: (a) to determine the coordinates for each point: easting and northing; (b) to calculate the distance between these two points (Euclidean distance) using the following formula:

Distance (En;Ex)=√((East En-East Ex)^2+(North En-North Ex)^2)

where:

Distance (En; Ex) – Distance between the entry point and the exit point in km
East En, East Ex – easting of the entry or, respectively, exit point according to the projected coordinate system
North En, North Ex – northing of the entry or, respectively, exit point according to the projected coordinate system

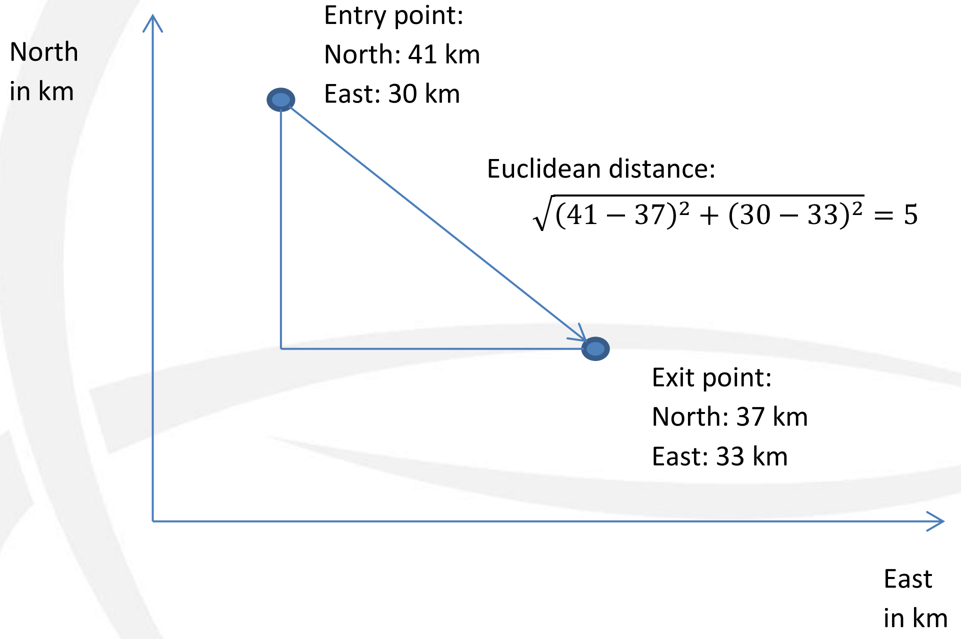
[10] Ref. page 11 of the TAR FG. Section 2.3 'General publication requirements', Point B 'Transmission system characteristics', paragraph 8.

One should take into account that the Euclidean distance is projected on the flat surface and thus, this calculation leads to an insignificant inexactness.

There are two means allowing for the calculation of the Euclidean distance:

- The Universal Transverse Mercator projected coordinate system (UTM), an orthogonal system introduced across Europe.
- Geo Information System (GIS), software normally available to TSOs which allows for the calculation of the Euclidean distance independent from the coordinate system used.

Figure 3. Simple example of distance calculation using the Euclidian approach



<u>Path distance</u>

Path distance is the distance along a defined path, if detailed information for the pipelines are available then the pipe length between two points can be easily estimated. If there are two different pipeline-paths with different lengths connecting entry and exit point, the minimum, (determined in distance or economical terms) can be used or the average of the two path distances can be calculated.

Average Distance

The average distance can be calculated based on the distance matrix from each (clustered) entry point to each (clustered) exit point, using either the Euclidean or Path approach. In both cases the most obvious choice would be to use the weighted average approach, where the weight used would be the capacity.

$$\text{Average distance for domestic exit points} = \frac{\sum_{\text{j=all domestic exit points}} \text{Distance of domestic exit point}_\text{j} \,.\, \text{Capacity of domestic exit point}_\text{j}}{\sum_{\text{j=all domestic exit points}} \text{Capacity of domestic exit point}_\text{j}}$$

With $\text{Distance domestic exit point}_\text{j} = \frac{\sum_\text{i}(\text{Capacity of entry point}_\text{i}).(\text{distance between entry point}_\text{i} \text{ and domestic exit point}_\text{j})}{\sum_\text{i} \text{Capacity of entry point}_\text{i}}$

The distance between an entry point and an exit point can be based on one of the two approaches to the calculation of the distance explained above.

The calculation of the average distance based on the above formula would require a huge amount of data, since TSO's networks usually contains thousands of entry and exit points. Therefore, a simplification of the network representation, for the purpose of the calculation of average distances, can be carried out.

Network Representation

Simplification of the network representation can be achieved by carrying out the following steps.

1. Aggregating exit points into clusters (based on a clustering methodology defined at national level), making the calculation easier and more transparent. A trade-off between cost-reflectivity and transparency of the methodology should drive the choice of the level of aggregation (one extreme would be to aggregate all (domestic) exit points, the other would be to treat each exit point individually).
2. The same can be applied for entry points, where a high number of entry points would require aggregation e.g. all points of production.
3. Simplification of network representation can also be achieved via a segment & node system to reduce the complexity of the transmission system. Where Euclidian distance has been chosen, the network could be represented via a table, summarising all entry and exit points with their geographical and capacity data.

ENTSOG proposes that due to the different specifications of the different networks, the level of simplification should be decided at the national level. The TSO would propose a simplified network representation which is subject to NRA approval.

TASK 2: Standardised Format for Information Publication

TAR FG Requirements[11]

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 ENTSO-G Transparency platform).

Policy Proposal

ENTSOG notes that the confidentiality of commercially sensitive information is to be preserved.[12] As for the standardised format in which the information is to be published, one can conclude that effectively, the TAR FG requirements call for the consideration of 'how to publish' the information (i.e. what the standardised format looks like) and 'where to publish' it (on ENTSOG Transparency platform or another source).

How to publish

The TAR FG foresees the necessity of elaborating the standardised format for publishing the minimum set of information enlisted within its Section 2.3. A certain 'hint' of what such 'standardised format' would look like might be derived from the wording of Article 18(5) of the Gas Regulation. It specifies the requirements for how the information required by the Gas Regulation is to be disclosed, namely: on a non-discriminatory basis; and in a meaningful, quantifiably clear and easily accessible manner. Also, in order to demonstrate the difference between the concept of the 'format' and the 'form', one could revert to the Transparency Guidelines which foresee that the 'format' is one of the characteristics of the 'form of the publication'. Specifically, it is envisaged that such format should be 'downloadable' and allow for 'quantitative analysis'.

The proposed common template to be used as a 'standardised format' could be described as follows:

- The first thing in the common template that should be easily identifiable is the indication of: (1) the period within which the published information is applicable; (2) the date of publication of such information.
- The common template should be designed in such a way that it would allow its use by any TSO, regardless of the regulatory regime or the currently applied cost allocation

[11] Ref. page 12 of the TAR FG. Section 2.3 'General publication requirements', last paragraph.
[12] Articles 16(1) and 41(16) of the Gas Directive.

methodology. Thus, in order to limit the number of fields that should be completed to the ones that are relevant to the applicable cost allocation methodology, it is suggested that the regulatory regime as well as the applied cost allocation methodology should be identified upfront, at the very top rows of the template.

- The columns of the common template should contain the following information:
  (1) The requirements from the set of the minimum information envisaged by the TAR FG should be grouped in the 1st column in the easily identifiable groups and sub-groups.
  (2) The respective figures should be placed in the 2nd column near the relevant 'input' row.
  (3) To maximise the user-friendliness and to facilitate the TSOs' filling in the relevant information in the template, the 3rd column should indicate the applicable units to be filled in by each TSO.
  (4) As for the 4th column, it is suggested that the standardised template provides for a possibility to indicate the relevant comments and remarks where it is deemed necessary by the TSO concerned.

The template should be completed in the following manner:

- The template is supposed to be filled in only when the tariffs are updated.
- Where relevant to the applicable cost allocation methodology, the cells in the column next to the list of the publication requirements should be filled in with the specific data. Where not relevant, the cell will indicate 'n/a'. This approach suggests that one and the same template should be used rather than using different varieties customised according to the specificities of the regulatory regime and/or the applied cost allocation methodology.
- Where it is difficult to fill in the cell due to its limited 'space', it is suggested that only 'yes' and 'no' should be typed in the cell of the 2nd column and that the relevant input from the 1st column should be converted in a hyperlink that will lead to another webpage of the TSO. For instance, this is applicable for the input 'network representation': since it is difficult to put this representation in the cell of the standardised template, it is suggested making the words 'network representation' a hyperlink by clicking on which it would be possible to access another webpage with the proper description.
- Since the information specified in the TAR FG represents only the non-exhaustive list and hence, could be voluntarily complemented by any additional information as deemed necessary by the concerned TSO. In such case, it is suggested that the concerned NRA/TSO would add extra rows within the template and would indent them in such a way that would show that this information is additional as compared to the minimum required information.

Based on the description above, below is an illustration of how the standardised template could look:

Figure 4. Illustration of the standardised format for publishing the information

RELEVANT DATES			
• time period for which the tariffs are applicable	xx		
• date of publication	xx		
GENERAL INFORMATION			
• cost allocation methodology	xx		
• regulatory regime	xx		
REQUIREMENTS (1,2)	**FIGURES**	**UNITS**	**COMMENTS / REMARKS (3)**
INPUTS FOR THE COST ALLOCATION METHODOLOGY			
Inputs on the allowed / expected revenue			
• splits of revenue			
* capacity / commodity split	xx	xx	xx
* entry / exit split	xx	xx	xx
* cross-border / domestic split	xx	xx	xx
Transmission system characteristics			
• technical capacity			
* for all entry points	xx	xx	xx
* for all exit points	xx	xx	xx
• booked capacity			
* for all entry points	xx	xx	xx
* for all exit points	xx	xx	xx

1 Only the cells that will provide the information relevant to the particular cost allocation methodology are to be filled in. Where some information is not relevant, the cell should indicate 'n/a'.
2 Where – due to the specificity of the requirement in the 1st column – it is difficult to fill in the 2nd column, the input in the 1st column should be converted in a hyperlink that will lead to another webpage of the TSO with a proper description. The 2nd column should then indicate 'yes' or 'no'.
3 To be filled in where it is deemed necessary.

Where to publish

The required information shall be published on the individual TSO webpages with the information structured in the same, standardised way. It is suggested that the hyperlinks to these webpages should be placed on ENTSOG Transparency Platform.[13] Each link should lead to the relevant webpage of the respective TSO website with the required information structured in the above mentioned 'standardised format'. The hyperlinks are effectively the 'doors' leading to the regularly updated websites of the TSOs.

13 http://www.gas-roads.eu/

Having the hyperlinks put on the Transparency Platform – instead of the respective sets of the required information – would prevent duplication of the information published on each TSO website. The maintenance of two sets of data might lead to potential inconsistencies and doubts as to which source should be trusted. ENTSOG's Transparency Platform should represent the 'one stop shop' which the stakeholders would use to get access to the most reliable source of information – the individual TSO's webpages with the information structured in the same, standardised way. However, it should be ensured that the necessary IT tool is used so that all the links work appropriately.

Below is an illustration how such suggested hyperlinks could look and where exactly they could be placed on the Transparency Platform.

Figure 5. Example of having a link on ENTSOG Transparency Platform

4. COST ALLOCATION AND DETERMINATION OF THE REFERENCE PRICE

Introduction

In an entry-exit tariff system each network point is priced by an individual tariff 'set separately', as foreseen by the Gas Regulation.[14] The TSO must employ methods to calculate the individual tariffs. TSOs use tariffication as a means of allocating their allowed/expected revenues among entry and exit points to cover the costs incurred in order to provide transmission services. Cost allocation can be defined as the process of allocating revenues that must be recovered from entry and exit tariffs.

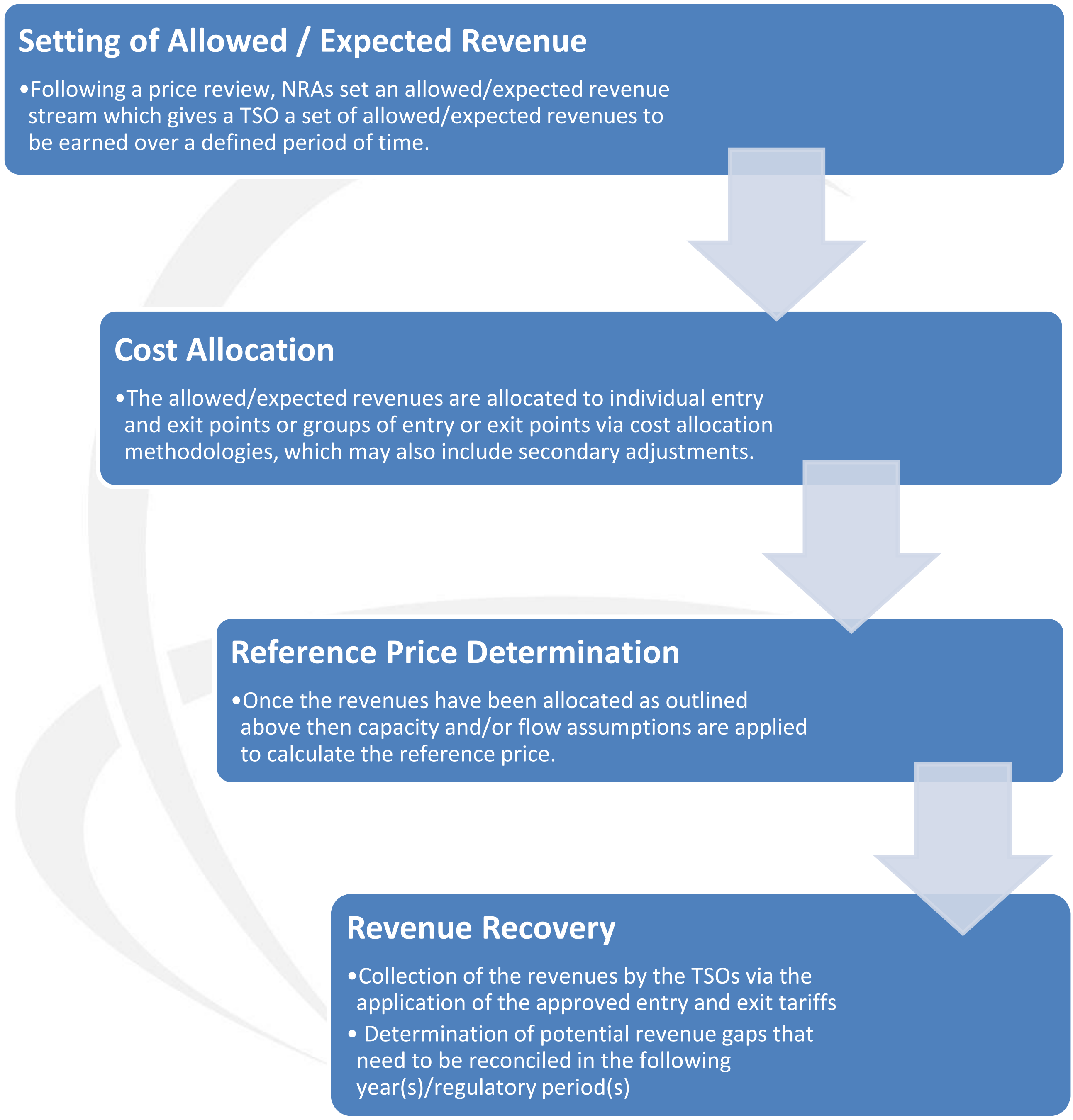
There are a number of aspects to consider when allocating costs, such as: (1) whether to choose marginal versus average cost pricing; (2) which cost drivers to choose; and (3) the choice of applying geographically differentiated tariffs. The TAR FG defines cost allocation methodology as 'the methodology 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'.[15]

Rules Envisaged by the TAR FG

- The choice of methodology shall reflect system characteristics in order to best achieve the objectives of the TAR FG.
- 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.
- Collection of revenue shall be based on capacity charges. In addition, a specific charge (expressed in monetary terms or in kind), related to the volume actually flowed could be established to cover costs that are mainly driven by the volume actually flowed, if approved or determined by the NRA.
- For points not under the scope of CAM alternative methodologies to collect revenues can be applied.
- The revenue collected from specific charges for dedicated services and/or dedicated infrastructure on aggregate will be limited to a maximum of 5% of total (allowed) revenues.
- The TAR NC 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.

[14] Article 13(1), paragraph 4 of the Gas Regulation.
[15] See Figure 6 below.

Figure 6. Illustration of a generic process for allocating costs, determining a reference price and recovering revenue



- Subject to the procedures specified in Section 2.1 of the TAR FG,[16] a cost allocation methodology will be consulted on and approved by NRAs.
- The TAR NC shall specify that the choice of a cost allocation methodology is limited to the 4 generic primary cost allocation methodologies described in Section 3.3 (postage stamp, capacity weighted distance, distance to the virtual point approach and matrix) of the TAR FG.
- The choice will be determined by the following parameters: circumstances criteria, a cost allocation test and a methodology counterfactual.
- The capacity assumption used in the cost allocation methodology shall be consistent with the economic signals expected from the chosen methodology.
- A cost allocation test shall be carried out comparing expected revenues and cost drivers of domestic and cross-border points.
- With regards to the results of the cost allocation test, 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 of the TAR FG, 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.
- A methodology counterfactual shall be developed consisting in providing all the information listed in Section 2.1 of the TAR FG, for at least one other of the cost allocation methodologies specified in Chapter 3.
- 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.
- Nothing in the TAR NC 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.
- Where secondary adjustments are used, only the three listed (rescaling, equalisation and benchmarking) shall be allowed.
- Rescaling shall be performed either by topping up the calculated charge with a constant or by multiplying it by a constant.

[16] 'Initial publication requirements'.

- Each set of points subject to equalisation can only include either domestic or cross-border points.
- Benchmarking shall be limited to the point, where the TSO faces effective competition from other TSOs' point or route.
- In the application of benchmarking, 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.
- In setting or approving tariffs for entry and exit points from and to gas storage facilities, NRAs shall consider the following aspects, i.e. the benefits which storage facilities may provide to the transmission system and the need to promote efficient investments in networks. NRAs shall also minimise any adverse effect on cross-border flows.

Tasks from the TAR FG for Development within the TAR NC

1. To develop appropriate forecasting models.
2. To provide a list of services that could be covered by charges for dedicated services/infrastructure.
3. To elaborate on the circumstances for selecting primary methodologies and applying secondary adjustments.
4. To consider input criteria with regards to unstable flow patterns and provide proxies.
5. To elaborate on the cost allocation test, including a rule for determining average distance for cross border and domestic system use and provide a mathematical formula for the two ratios.
6. In developing the TAR NC, to 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 TAR FG objectives.

Figures 7a and 7b below illustrate the two extreme situations of the interaction between the allowed/expected regulated revenues and the cost allocation methodology and hence, are not exhaustive. The revenue from transmission services could be made up of capacity charges only or a combination of capacity and one or more of the types of other charges. Please note that the proportions in the two figures below are for illustrative purposes only and are not representative of actual size.

Figure 7a. Illustration of the interaction between allowed/expected revenues and the cost allocation methodology with capacity based charges only

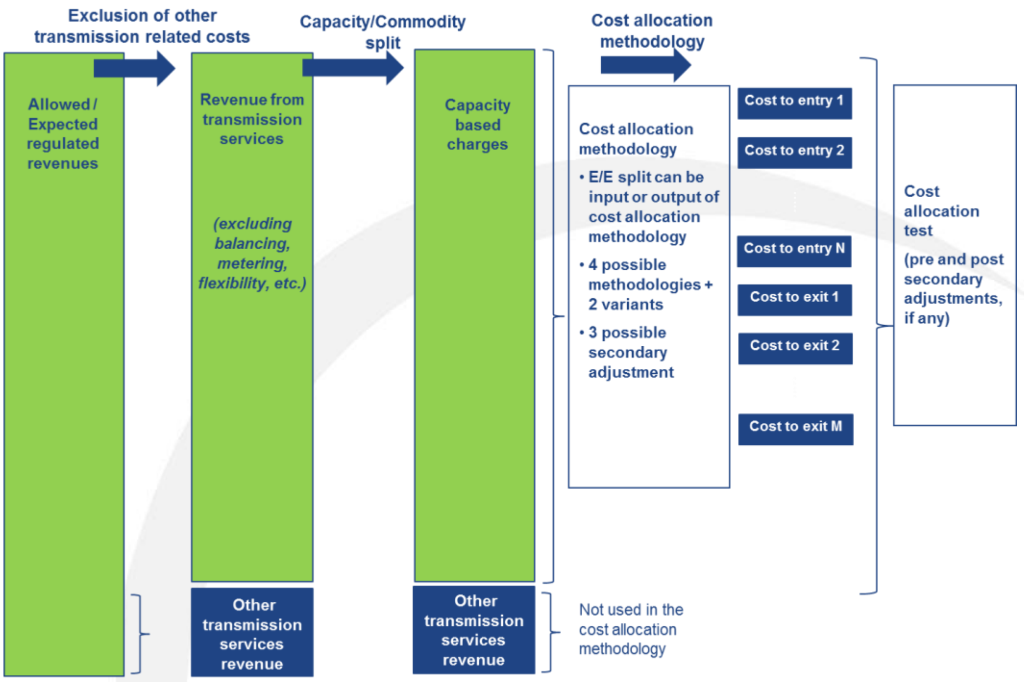
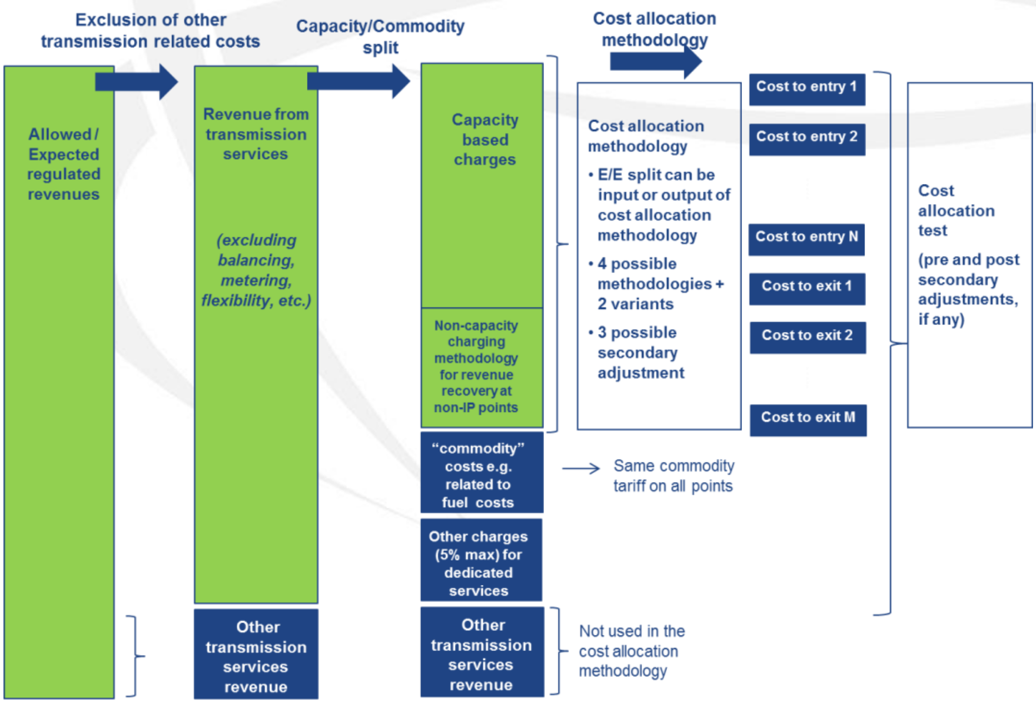


Figure 7b. Illustration of the interaction between allowed/expected revenues and the cost allocation methodology with capacity based charges and other charges



TASK 1: Forecasting Models

TAR FG Requirements[17]

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

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

ENTSOG's View

Forecasting capacity is the process of estimating what capacity will be available or booked for a particular time period when you don't know what capacity will actually be booked. Uncertainty is an integral part of forecasting capacity. Quantitative forecasting models based on past data can be used where the demand for capacity is stable. These methods are usually applied to short- or intermediate-range decisions. Developing forecasting models is a technical activity that requires tools and resources. It is not something that can be determined in a network code. In order to be in line with the TAR FG, ENTSOG proposes to develop guidelines or broad criteria for forecasting technical capacity, booked capacity and flows. This will help network users to understand how the forecasts are created and what they are based on.

Policy Proposal

Technical Capacity

If a TSO uses technical capacity as an input for their cost allocation methodology then the data from the latest non-binding Ten Year Network Development Plan (TYNDP) should be used as a basis for this input parameter. The data from the TYNDP takes account of Article 6 of the CAM NC. Article 6(1)(a)(1) on capacity calculation and maximisation states that 'this in-depth analysis[18] should take into account assumptions made in the Union-wide ten-year network development plan pursuant to Article 8 of the Gas Regulation, national investment plans, relevant obligations under the applicable national laws and any relevant contractual obligations'. A TSO may also refer to their National Development Plan (NDP) as a basis for

[17] Ref. page 13 of the TAR FG. Chapter 3 'Cost allocation and determination of the reference price', paragraph three.
[18] The analysis refers to an in-depth analysis of technical capacities.

calculating or forecasting the technical capacity. Any differences between the TYNDP and the tariff input parameter or the NDP and the tariff input parameter must be justified by the TSOs to the NRA's based on projected investments/decommissioning/etc. which had not previously been taken into account. This may be particularly true in terms of the TYNDP which is published every two years.

Booked Capacity

If a TSO uses forecasted or actual booked capacities as an input for the cost allocation methodology, then the forecasting model for the tariff period could be based on:

- Existing bookings at the time of the tariff calculation;
- Assumptions of new capacity bookings that will occur during the applicable tariff period. These assumptions shall be proposed by the TSO and approved by NRA's and could be based on:
  - Expected gas consumption by domestic consumers;
  - Expected gas consumption in neighbouring TSO's areas (cross border gas flows);
  - Peak capacity requirement for a 1/20 years conditions;
  - Historical capacity bookings, etc.

Flows

If a TSO uses flows as an input for the cost allocation methodology, then the forecasting model for the tariff period could be based on one of the following:

- Estimates provided by network user, where they are available and considered to be of appropriate quality.
- An official demand forecast, where one is made available by e.g. a national energy agency or ministry.
- Future bookings, using long term capacity (where available and sufficient) and load factor assumptions.
- Future bookings and forecast demand. Where future bookings are not enough to cover future demand, the gap would be made up by forecast demand up to the total expected demand expected for that year.
- Flows proportional to the technical capacity. In systems that are congested or close to congestion, flows could be forecasted proportionally to the technical capacity at each entry point.

TASK 2: List of Services Covered by Charges for Dedicated Services / Dedicated Infrastructure

TAR FG Requirements[19]

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

- 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 shall provide for a list of TSO services that could be covered by the provision.**

Policy Proposal

TSOs services that could be covered by the provision related to dedicated services and/or dedicated infrastructure are outlined below and should be considered as a non-exhaustive list. Some of the items listed below could form part of the transmission services and would not be considered as dedicated services depending on the national circumstances.

Dedicated Services

1. Metering services;
2. Maintenance of technical devices which are owned by a third party;
3. Matching in case a smaller provider of storage capacity does not have the technical capacity or manpower to do so;
4. Data management, e. g. technical volume determination or communication with other market participants;
5. Odourisation;
6. Invoicing;
7. Title Transfer Fees[20].

Dedicated Infrastructure

1. Metering stations;

[19] Ref. page 13 of the TAR FG. Section 3.1.1 'The capacity-commodity split', paragraph 2.
[20] Title transfers fees are transaction fees for secondary capacity market and for commodity.

2. Add-on assets that benefit a specific point or type of customer e.g. odourisation equipment, a specifically dedicated depressurising station;

This topic will be further discussed and developed during the SJWSs with stakeholders and regulators including the link with the definition of transmission services.

TASK 3(a): Circumstances Influencing the Choice of a Cost-Allocation Methodology: Use of a Postage Stamp Methodology

TAR FG Requirements[21]

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 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.**

Policy Proposal

1. The proposal is to specify that if two thirds of the transmission capacity is dedicated to serve domestic gas consumption or for cross border flows, then the postage stamp methodology may be applied. This proposal is in line with the TAR FG.

2. The calculation of 'the difference between the average distance travelled by cross border and domestic flows' could be expressed as a percentage calculated as follows:

$$\% = \frac{(average\ distance\ of\ cross\ border\ gas\ flows) - (average\ distance\ of\ domestic\ gas\ flows)}{(average\ distance\ of\ cross\ border\ and\ domestic\ gas\ flows}$$

ENTSOG will look at the issue of determining a threshold for the difference between the average distance travelled by cross-border flows and the average distance travelled by domestic flows. As part of its consideration of this topic, ENTSOG may carry out some analysis to help identify a threshold.

[21] Ref. page 14 of the TAR FG. Section 3.2.1.1 'Methodology criteria', paragraphs 2 and 3.

Question for Stakeholders

Question: Could stakeholders suggest a justifiable threshold for the difference between average distance of cross border and average distance of domestic gas flows?

TASK 3(b): Circumstances Influencing the Choice of a Cost-Allocation Methodology: Further Specification

TAR FG Requirements[22]

In determining the Network Code, **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/Transit/Consumption)
- **Dynamics of demand** (congestion in the system)
- **Topological considerations** (age of the network, length of the pipeline)

ENTSOG's View

EU gas transportation systems have been through many changes over the past 20-30 years. A significant change has been the move from point-to-point systems to entry-exit systems. Tariff mechanisms have also evolved to keep step with changes to the systems. Each gas transportation system is different, with different characteristics and no two systems can be considered as being identical. In relation to the four cost allocation methodologies specified in the TAR FG, many systems could equally apply more than one of the methodologies. However, the diversity of these systems makes it extremely difficult to elaborate on the circumstances provided in the TAR FG. ENTSOG questions the necessity for such elaboration given that the TAR FG limits the number of methodologies and requires considerable transparency and justification for any choice through the counterfactual, cost allocation test and public consultation. ENTSOG is concerned about the inclusion of arbitrary circumstances that may prevent the most appropriate cost allocation methodology being chosen for a particular system.

[22] Ref. page 15 of the TAR FG. Section 3.2.1.3 'Further specification', all paragraphs.

Policy Proposal

ENTSOG has carried out a high level assessment of the advantages and the disadvantages of the four cost allocation methodologies set out in the TAR FG. The application of any cost allocation methodology involves trade-offs based on the national energy priorities and polices.

Table 2. Pros and Cons of the four cost allocation methodologies

Methodology	Pros	Cons
Postage Stamp Approach	1. Clear and easy to understand as well as easy to apply and the calculation should be easy for market players to follow.	1. Could be less cost reflective than other methodologies*
	2. This methodology ensures that network users have access to capacity at the same price regardless of where they enter or exit the system.	2. This approach does not provide locational signals
	3. Provides good stability and visibility for market players	

*Does not specifically take account of cost reflectivity but could be cost reflective in certain systems

Methodology	Pros	Cons
Capacity Weighted Distance Approach	1. Easy to understand, the calculation should be easy for market players to follow and for TSOs to apply.	1. Costs for compressors and cost differences for different pipeline diameter cannot be fully considered.
	2. Broadly cost reflective in systems where the flow direction is not a cost driver.	2. Does not take into account the flow direction, for counter flow capacity bookings (in systems with predictable flows) this methodology may be less cost-reflective than other methodologies.
	3. Provides stability (dependent on the capacity used in the cost allocation methodology).	

Methodology	Pros	Cons
Virtual Point Based Approach	1. Helps to provide tariff stability and predictability	1. Complex modelling required to implement
	2. Clear & stable locational signals - could lead to expansion of certain points	2. Requires secondary adjustments to calculate the tariffs in Variant A of the cost allocation methodology
	3. Is cost reflective, especially when Variant A is used with incremental costs and when the flow direction is stable	3. Result of methodology is very sensitive to flow pattern changes in system.

Methodology	Pros	Cons
Matrix Approach	1. Cost reflectivity: matrix considers several elements (e.g. distances, capacities, costs of pipelines typologies, network structure, gas flows) and together with their yearly updating, it includes the key cost drivers which can affect tariffs in terms of cost reflectivity	1. Depending on the network complexity, additional TSOs' resource requirements will be necessary for the initial implementation. Once the methodology is up and running the computational burden would not be too great.
	2. Stability: reflects in the tariffs the main grid evolutions and related allowed/expected revenues changes, without overturning tariff levels unless justified by substantial changes in the system (e.g. prevailing flows).	2. Stakeholders may also need time to become familiar with the methodology.
	3. Flexibility (in terms of ability to reflect changes in gas grid elements).	

Questions for Stakeholders

1. Do you think that the TAR NC merits an elaboration of the circumstances set out in the TAR FG?
2. What circumstances do you think could be applicable for the different cost allocation methodologies?

TASK 4: Inputs Criteria for Unstable Flow Patterns

TAR FG Requirements[23]

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 shall define in relation to unstable flow patterns what forecast quality cannot be used and provide appropriate proxies instead.**

ENTSOG's View

The EU has become a bigger natural gas consumer and importer over the past number of decades as its own natural gas production has declined in recent years, its dependence on imported natural gas has increased. Natural gas is a regional commodity to a certain extent and therefore regional buyers and sellers exert more influence. In response to decreasing EU gas production and to mitigate against potential future energy supply interruptions, the EU has sought to increase their energy security by exploring supply diversification options. Many TSOs have invested in additional pipelines and LNG terminals to ensure such diversity of supply. The more IPs a TSO has, the more choice there is in terms of where gas could flow which makes it more difficult to predict the flow pattern for a given time period.

Policy Proposal

TSOs typically forecast flow patterns using historical flows. The number of years of historical data used for the forecast can vary. Where there is uncertainty in the gas market, a low number of historical years may be considered e.g. the last year or two of data. If there are spikes in the historical demand data these may be assessed on a case by case basis to see if such spikes are likely to occur in the future and if so, they can be built into the forecast. Where there is more stability in a gas market, a data set of historical flows spanning a longer time period may be used. The stability or predictability of flow patterns may depend on the number of possible flow directions within a particular system. In terms of using a proxy instead of historical flows, a TSO could use an independent report by a national agency or governmental energy department but it is unlikely that such estimates would be more valid or more accurate than historical flow based forecasts. From a European perspective, while flows are provided as an output of the model used for the TYNDP, the TYNDP explicitly states that 'the output represents one of possibly many flow patterns respecting all boundary

[23] Ref. page 15 of the TAR FG. Section 3.2.1.2 'Inputs criteria', paragraph 2.

conditions'.[24] It also states that 'As a result, modelled flows should not be considered to be a forecast of flow patterns to be expected'.[25]

TASK 5: Cost Allocation Test

TAR FG Requirements[26]

The Network Code on Tariffs shall develop a detailed test comparing expected revenues and cost drivers of domestic and cross-border points[11].

[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 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 shall define a rule to determine the average distance used by cross-border and domestic uses.**

The **Network Code 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.

Policy Proposal

A cost allocation test that compares the expected revenues and cost drivers of domestic and cross-border points will be developed in the TAR NC. There are a number of elements to the test:

1. **Calculate the total revenue from cross border entry and exit points**

The first step is to calculate the total cross border entry revenue because although you will know the total entry revenue, you may not know the split between cross border and domestic entry revenue. The assumption required for this calculation is that cross border exit capacity is equivalent to cross border entry capacity.

[24] P. 30 of TYNDP 2013-2022 'Main report'. Published on ENTSOG's website: http://www.entsog.eu/publications/tyndp#ENTSOG-TEN-YEAR-NETWORK-DEVELOPMENT-PLAN-2013-2022
[25] Idem.
[26] Ref. page 15 and 16 of the TAR FG. Section 3.2.2 'Cost allocation test', paragraph 2 on page 15 and two last paragraphs on page 16.

- Cross border entry revenue = (total entry revenue) x (share of cross border exit capacity compared with total exit capacity)
- Cross border exit revenue = cross border exit capacity x exit tariff
- Total cross border revenue = cross border entry revenue + cross border exit revenue

2. Calculate the total revenue from domestic entry and exit points

The second step is to calculate the total domestic entry revenue because this may not be known. The total cross border exit revenue is known, total entry revenue is known and total domestic exit revenue is known.

The assumption required for the calculation of total domestic entry revenue is that cross border exit capacity is equivalent to cross border entry capacity.[27] Therefore subtracting the cross border entry revenue from the total entry revenue gives the domestic entry revenue.

Total Domestic Entry Revenue = Total Entry Revenue – Total Cross Border Entry Revenue

3. Identify physical cost drivers and their relative importance

Physical cost drivers are:

a) Capacity – technical capacity, forecasted booked capacity, historical booked capacity data, flows, in line with the capacity concept used in the cost allocation methodology;
b) Distance – average distance, weighted average distance, if applicable, in line with the distance concept used in the cost allocation methodology;
c) Other.

Where multiple cost drivers are used, the primary cost driver could be identified and then the secondary cost drivers could be weighted against the primary cost driver.

4. Insert the relevant revenue and cost drivers into the mathematical formula for the two ratios:

$$Ratio\ 1 = \frac{total\ revenue\ from\ entry\ and\ exit\ points\ for\ domestic\ customers}{cost\ drivers\ for\ domestic\ customers}$$

[27] 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.

$$Ratio\ 2 = \frac{total\ revenue\ from\ entry\ and\ exit\ points\ for\ cross\ border\ customers}{cost\ drivers\ for\ cross\ border\ customers}$$

TASK 6: Description of a Two-Variant Methodology as a Single One

TAR FG Requirements[28]

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.

Policy Proposal

ENTSOG will review the cost allocation methodologies that have variants to assess whether it is possible, due to a level of commonality, to assimilate one variant into the other in order to have one methodology.

Additional Consideration: Storage

The TAR FG does not require ENTSOG to consider policy options on the topic of storage. Instead, the TAR FG foresees that NRAs will consider certain aspects when setting or approving tariffs at entry and exit points from and to storage facilities.

Consideration shall be given to:

1. The benefits which storage facilities may provide to the transmission system.
2. The need to promote efficient investments in networks.
3. The minimisation of any adverse effect on cross-border flows.

[28] Ref. page 17 of the TAR FG. Section 3.3 'Main cost allocation methodologies', paragraph 2.

5. REVENUE RECONCILIATION

Introduction

The TSO shall have a regulatory account which records under- and over-recovery to ensure the revenues it is entitled to obtain over a period of time are recovered in a timely manner.

A regulatory account records at least:

- under-recovery of revenue (allowed revenue < actual revenue ⇨ results in the shortfall of allowed revenue); or
- over-recovery of revenue (allowed revenue > actual revenue ⇨ results in the excess of allowed revenue).

Incentive mechanisms can be put in place by the NRA whereby only a part of the under-/over-recovery is logged on to the regulatory account. In some systems, the regulatory account can also be used to log (some parts of) the differences between the expected costs and the realised costs (e.g. the differences in interest rate of debt, difference in fuel gas cost, costs and revenue sharing for oversubscription and buy-back).

Any difference between the allowed revenue and the collected (actual) revenue is reconciled by including the resulting balance in the allowed revenues of the next relevant tariff calculation or in the following regulatory period.

Typically, a regulatory account is not used in the context of price cap regulatory regime since, as mentioned in the TAR FG, the terms 'allowed revenue', 'under-recovery' and 'over-recovery' are not usually applied under this regime. However, where, irrespective of the regulatory regime, the TSO earns auction premia, it can be: (1) attributed to a regulatory account to ensure that these earnings are returned to network users; or (2) it can be used for the purpose of an investment to reduce physical congestion.

Rules Envisaged by the TAR FG

- The TSO uses a single regulatory account.
- The NRA determines or approves 'how often and how fast' the regulatory account has to be reconciled.
- The NRA decides which percentage of the under-/over-recovery will be logged on to the regulatory account and which percentage should be met by the TSO(s) in line with incentive efficiency targets.

- The NRA decides whether a specific account for any over-recovery resulting from the earned auction premia will be used to reduce physical congestion.
- Revenue recovery at IPs primarily by use of capacity charges.
- Revenue recovery at other points by use of alternative methodologies, while respecting the principle of avoiding cross subsidies between cross-border and domestic flows.
- Where at such other points a flow-based charge is used to recover the revenue, the NRA may decide that under-/over-recovery is to be covered by making ex-post changes to this charge.

Figure 8 below illustrates the algorithm of the TAR FG requirements for the TSO's reconciliation of the regulatory account.

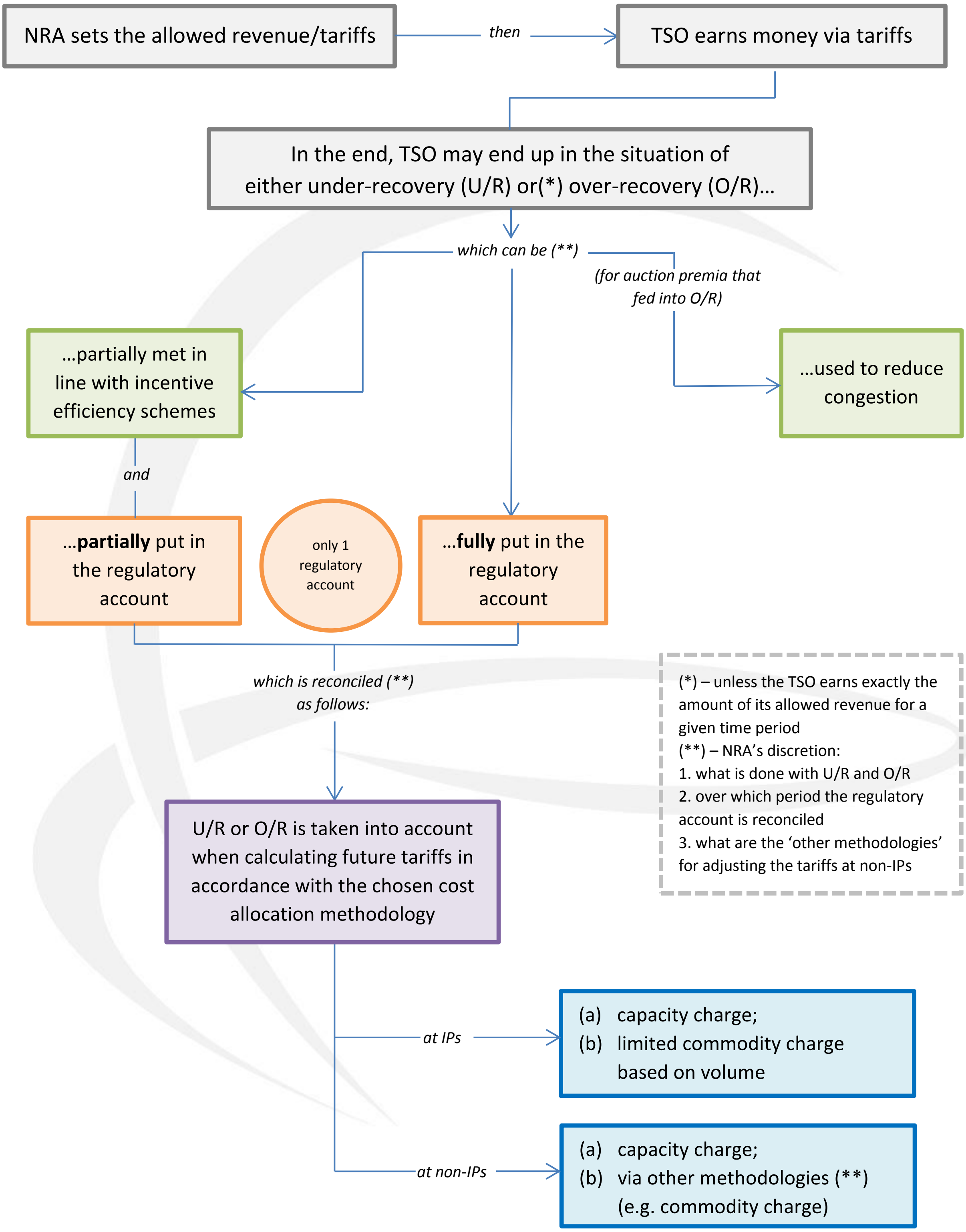
Additional Consideration: Regulatory Account

Most TSOs use only one regulatory account but there are some TSOs that have more than one regulatory account. The use of multiple regulatory accounts ensures that the tariffs are set on the basis of the information on under-/over-recovery that is contained only in these distinct regulatory accounts. As opposed to this, the use of just one regulatory account provides for the under-/over-recovery from all the points to be aggregated. As a second step, this summed up under-/over-recovery is taken into account when calculating the tariffs for all the points. Hence, the targeting of under-/over-recovery to a particular group of points is not possible.

One could suggest that the attribution of under-recovered revenue to the points that initially did not contribute to such under-recovery should undermine the principle of cost reflectivity. However, should the under-recovered revenue be attributed to a particular point and the tariff at that point increased, it is highly likely that lack of capacity bookings due to a higher price will lead to further under-recovery. The approach foreseen by the TAR FG (attribution of revenue to all the points regardless of the fact whether they caused the under-/over-recovery or not) is aimed at avoiding the 'vicious circle'[29] of under-recovery and tariff increase at particular points thus exacerbating the problem.

[29] Where there is a limited number of points, e.g. in the case with interconnectors, it is unlikely to prevent the situation of 'vicious circle'.

Figure 8. Revenue recovery[30]



[30] Revenue recovery related to the revenue from the cost allocation methodology.

6. RESERVE PRICE

Introduction

The Gas Regulation sets out that TSOs shall offer to network users both long- and short-term services. Short-term services are defined as services offered by the TSO 'with a duration of less than one year'[31]. As for the pricing of short-term capacity, Article 14(2) of the Gas Regulation states that 'Transportation contracts signed with non-standard start dates or with a shorter duration than a standard annual transportation contract shall not result in arbitrarily higher or lower tariffs not reflecting the market value of the service, in accordance with the principles laid down in Article 13(1)'.

Interruptible capacity is defined as 'gas transmission capacity that may be interrupted by the transmission system operator in accordance with the conditions stipulated in the transport contract'.[32] As for the pricing of interruptible capacity, Article 14(1)(b) of the Gas Regulation states that TSOs shall 'provide both firm and interruptible third-party access services. The price of interruptible capacity shall reflect the probability of interruption.'

This Chapter of the LD deals with the pricing of short-term standard capacity products (quarterly, monthly, daily and within-day capacity products) and interruptible capacity. The pricing of short-term products may include seasonal factors. For interruptible products they are divided into subsets containing: (i) bidirectional; and (ii) unidirectional interruptible capacity products.

Rules Envisaged by the TAR FG

- 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.

[31] Article 2(1)(15) of the Gas Regulation.
[32] Article 2(1)(13) of the Gas Regulation.

- NRAs may decide to apply multipliers. Before NRAs adopt 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 TAR NC 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 x (p_y/365) x d
- For these products, in the absence of congestion, the FGs allow for the application of 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.
- The TAR NC 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 formulae: P_{st} = m x (p_y/365) or P_{st} = m x (p_y/8760) x h
- For these products, 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.

Table 3. Multiplier ranges for short-term capacity products

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

- 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.
- 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.
- Reserve prices for interruptible capacity shall be set at a discount to the reserve price of the firm standard capacity product with equivalent duration.

- Reserve prices for non-physical backhaul capacity shall be set to reflect the actual marginal (additional) costs that the TSO incurs to provide this service and shall not be below zero.
- TSOs shall publish their assessment of the risks of interruption.
- The discount is to be recalculated at least once a year.

Tasks from the TAR FG for Development within the TAR NC

1. To include mathematical formulations where relevant for the underlying provisions.
2. To develop a methodology for determining seasonal factors.
3. To set out a methodology for determining reserve prices for interruptible capacity.

TASK 1: Mathematical Formulations

TAR FG Requirements[33]

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

Policy Proposal

Firm standard capacity products

Formulas of the pricing of short-term products are included in the TAR FG. ENTSOG has incorporated some small refinements with the aim of making them clearer.

For quarterly and monthly firm standard capacity products[34], respectively:

$P_{st} = m_i \times (p_y/365) \times d$

where:

i represents the short-term product: quarterly or monthly capacity,

P_{st} is price of a short-term product of a duration of 'd' days,

m_i is the multiplier corresponding to the standard product (m_Q or m_m),

p_y is price of yearly product,

d is duration of short-term product in days,

For leap years, $P_{st} = m_i \times (p_y/366) \times d$.

[33] Ref. page 31 of the TAR FG. Chapter 5 'Reserve price', last paragraph.

[34] Please see Appendix 3A for simple examples on how the formula for short-term pricing works.

For daily firm standard capacity products:

$P_{st} = m_D$ x $(p_y/365)$

where:

P_{st} is price of a short-term daily product,

m_D is the multiplier corresponding to daily products,

p_y is price of yearly product,

For leap years, $P_{st} = m_D$ x $(p_y/366)$

For within-day firm standard capacity products:

$P_{st} = m_{WD}$ x $(p_y/8760)$ x h

where:

P_{st} is price of a short-term product of a duration of 'h' hours,

m_{WD} is the multiplier corresponding to within-day products,

p_y is price of yearly product,

h is duration in remaining hours of the gas day

For leap years, $P_{st} = m_{WD}$ x $(p_y/8784)$ x h.

One of the components of the mathematical formula is 'd' for the duration of the different short-term products in days. The table below shows the number of days that make up the yearly, quarterly and monthly products.

Table 4. Number of days for the standard capacity products

Yearly	Quarterly	Monthly
365 (or 366)*	Q1 = Oct – Dec = 92	Oct = 31
		Nov = 30
		Dec = 31
	Q2 = Jan – Mar = 90 (or 91)*	Jan = 31
		Feb = 28 (or 29)*
		Mar = 31
	Q3 = Apr – Jun = 91	Apr = 30
		May = 31
		Jun = 30
	Q4 = Jul – Sep = 92	Jul = 31
		Aug = 31
		Sep = 30

* 29 days in February and 366 days for a leap year

Seasonal factors

Reserve prices for short-term products may be calculated using seasonal factors applied on top of the designated multiplier. The mathematical formulation for short-term reserve prices with seasonal factors could be similar to the previous formulas, including the seasonal factor (sf), as set out below[35]:

For quarterly and monthly firm standard capacity products:

$P_{st} = (m_i \times sf_i) \times (p_y/365) \times d$

where:

sf_i is the seasonal factor corresponding to the given quarter or month(sf_Q or sf_M),

For leap years, $P_{st} = (m_i \times sf_i) \times (p_y/366) \times d$.

For daily firm standard capacity products:

$P_{st} = (m_D \times sf_D) \times (p_y/365)$

where:

sf_D is the seasonal factor corresponding to the period of the year in which the daily product is booked,

For leap years, $P_{st} = (m_D \times sf_D) \times (p_y/366)$.

For within-day firm standard capacity products:

$P_{st} = (m_{WD} \times sf_{WD}) \times (p_y/8760) \times h$

where:

sf_{WD} is the seasonal factor corresponding to the period of the year in which the within-day product is booked,

For leap years, $P_{st} = (m_{WD} \times sf_{WD}) \times (p_y/8784) \times h$.

[35] Please see Appendix 3B for simple examples of how the formula for short-term pricing with seasonal factors works.

TASK 2: Methodology for Determining Seasonal Factors

TAR FG Requirements[36]

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

ENTSOG's View

Seasonality refers to the application of a seasonal factor to the short-term multiplier which results in the quarterly, monthly, daily or within-day reserve prices rising or falling in line with the utilisation rate of the transmission network. When seasonal factors are applied on top of the designated multiplier, the overall multiplier may be higher or lower than one, resulting in reserve prices for short-term products that may be higher or lower than the regulated tariff.

The purpose of seasonal factors is to have reserve prices that increase proportionally to the rate of transmission infrastructure usage, i.e. high factors applied to seasons with high flow probability and low factors applied in seasons with low flow probability. The application of seasonal factors is beneficial in two ways: (1) they provide incentives to shippers to use capacity efficiently; and (2) they reduce the negative impact that profiled capacity bookings may have on revenue and tariff stability.

Seasonal factors can be applied in order to incentivise flatter gas flows. This increases efficiency as gas pipelines are built to cover peak demand. Through a range of seasonal factors, incentives are provided that may encourage a change in gas flows from high demand periods to lower ones, where possible. Thus, the use of capacity products becomes more efficient.

Policy Proposal

Seasonal factors shall be proposed by TSOs to NRAs if they improve the efficient use of the transmission system and cost reflectivity of reserve prices.

This methodology should be based on system usage profiling:

- Flow profiles: historic flow profile or forecast of flow profile; or
- Booking profiles: historic booking profile or forecast of booking profile.

[36] Ref. page 33 of the TAR FG. Section 5.1.3 'Seasonal factors', last paragraph.

ENTSOG suggests that the seasonal factors are based on months (i.e. having one seasonal factor per calendar month). Other seasonal factors such as quarterly, daily or within-day could be derived from the monthly values.

A proposal to calculate seasonal factors could be as follows:

1. Divide the year in 'n' periods (e.g. 12 months).
2. Calculate the system usage (flow or bookings) for each of these periods;
3. Sum up all system usage (flow or bookings) over one year;
4. Divide the system usage (flow of bookings) of each period by the sum of the year to get the usage rate;
5. To calculate the seasonal factor to be applied for each period, multiply the usage rate by 'n' (or divide by '1/n').

Example

Month	**System Usage Input: flow / booking profiles** [37]	**Usage rate**	**Relative factor 1/n**	**Seasonal factor sf**	**Rounded Seasonal factor sf** (optional)[38]
October	100.00	0.07	0.083	84%	80%
November	157.14	0.11	0.083	132%	130%
December	200.00	0.14	0.083	168%	170%
January	214.29	0.15	0.083	180%	180%
February	185.71	0.13	0.083	156%	160%
March	185.71	0.13	0.083	156%	160%
April	114.29	0.08	0.083	96%	100%
May	71.43	0.05	0.083	60%	60%
June	57.14	0.04	0.083	48%	50%
July	42.86	0.03	0.083	36%	40%
August	42.86	0.03	0.083	36%	40%
September	57.14	0.04	0.083	48%	50%
∑	**1428.57**	**1**			

[37] Average flow/booking profiles when taking into account a group of IPs.
[38] Rounding of the seasonal factors obtained might be applied.

There are different options on the applicability of seasonal factors: TSOs can apply the same set of seasonal factors to all IPs, to a group of IPs[39] or a different set of seasonal factors per IP. TSOs will evaluate which approach is more appropriate to promote efficient use of the system. When applying the same seasonal factors to all IPs (or a group of IPs), the methodology would be based on average flow/booking profile of the network (group of points). When applying seasonal factors per IP, the methodology would be based on profiles per IP.

TASK 3: Methodology for Determining Reserve Prices for Interruptible Capacity

TAR FG Requirements[40]

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.

[39] For example, to apply the same seasonal factor for all entry IPs and same factors for all exit IPs.
[40] Ref. page 33 of the TAR FG. Section 5.2 'Reserve prices for interruptible capacity', paragraphs 2 to 5,

ENTSOG's View

Below are some clarifications relating to the concepts dealt with within this Chapter of the LD.

Figure 9. Definitions of the firm capacity, interruptible capacity and non-physical backhaul

Firm

- 'Firm capacity' means gas transmission capacity contractually guaranteed as uninterruptible by the transmission system operator.*
- In some MSs, the conditions for firm/interruptible capacity are specified in the general terms and conditions for access to the transmission network of TSOs.

Inter-ruptible

- 'Interruptible capacity' means gas transmission capacity that may be interrupted by the transmission system operator in accordance with the conditions stipulated in the transport contract.**

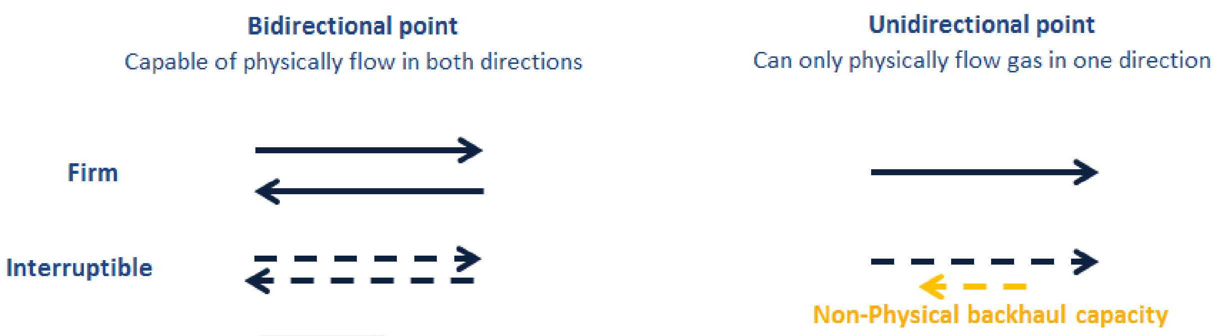
Non-physical backhaul

- 'Non-physical backhaul flows' means that at unidirectional entry or exit points, the volume of gas is nominated to flow in the opposite direction to the physical flow. ***
- Non-physical backhaul is by definition interruptible, since it requires a forward flow nomination to occur. It can only be provided if there are nominations for gas to flow in the opposite direction.

The methodology proposed in the following section is based on the provisions for the offer and the allocation of interruptible capacity products set out in the CAM NC[41].

* Article 2(1)(16) of the Gas Regulation
** Article 2(1)(13) of the Gas Regulation
*** Definition from the TAR FGs.
[41] Article 21 'Allocation of interruptible services', Article 22 'Minimum interruption lead time', Article 23 'Coordination of interruption process', Article 24 'Defined sequence of interruptions' Article 25 'Reasons for interruptions'.

Figure 10. Offer of capacity products at bidirectional and unidirectional points



Under the CAM NC, interruptible capacity is not required to be bundled. However, it may be bundled if there is agreement between TSOs. As a principle, the discounts for interruptible capacity will be calculated by the individual TSOs on either side of the IP and applied to their corresponding reserve prices. If the interruptible product is bundled then the reserve prices, including discounts, would be added together in the same way as for firm bundled capacity.

Policy Proposal

Interruptible capacity at bidirectional points[42]

Description of the Discounts

TSOs will have the following alternatives for the discount[43]:

(1) an ex-ante discount only, Di_I;
(2) an ex-post discount only, Di_{II};
(3) combination of an ex-ante discount and an ex-post discount.

Evaluation of the Risk of Interruption

ENTSOG proposes two approaches to calculate the risk of interruption. The first approach calculates the risk of interruption based on separate parameters for the likelihood and the duration as clearly indicated by the TAR FG. The other approach calculates the risk based on three parameters.

[42] For interruptible capacity products offered at unidirectional points in the same direction of the physical flow, the methodology described in this section shall also apply.
[43] The discount will never reflect the real risk correctly. Therefore, an ex-ante discount calculated reflecting the risk of interruption shall not cause any liability for the TSOs.

Approach 1: Risk of interruption with separate parameters for the likelihood and duration of interruptions

- Likelihood of interruption, L (%)

In calculating the likelihood of interruption TSOs may use historical data, forward-looking projections or a combination of both.

The following information could be used for its calculation:

- The interruptions that occurred in the past for the same type of interruptible product.
- Bookings and flows information of the past years.
- Any relevant future information on forecast on flows or bookings.

For forward looking projections, the level of the parameter is derived from scenario analysis and grid verification related outcomes. This would capture the probability of interruption in those systems subject to changes in their assets and flow patterns.

- Duration, Du (%)

This parameter represents the estimated duration of interruptions, which could be based on historical data or forecasts. It is expressed as the ratio between the number of interrupted days and the total duration of the product[44].

$$\text{Du (\%)} = \frac{\text{estimated duration of interruptions (d)}}{\text{total duration of the product (d)}}$$

Approach 2: Risk of interruption taking account of three parameters

N: statistical expectation of number of interruptions over the whole duration of the product
d: average duration of each interruption
C: average interrupted capacity of each interruption

$$\text{Risk (\%)} = N \times \frac{d}{\text{total duration of the product}} \times \frac{C}{\text{total capacity of the product}}$$

[44] For daily and within-day interruptible products, the formula will be expressed in hours: Du (%) = estimated duration of interruptions (h)/duration of the product (h).

For this approach, the discount can be based on the level of the parameter Risk (%).

Alternative 1: Ex-ante Discount, Di_{I}

The discount Di_{I} will be applied to the reserve price of the equivalent firm standard product. The way to calculate the discount varies according to the different approaches to calculate the risk described above.

<u>Approach 1: Risk of interruption with separate parameters for the likelihood and duration of interruptions</u>

The discount takes into account the likelihood of interruption and the estimated duration of the interruption.

$$\mathrm{Di}_{\mathrm{I}}\ (\%) = L \times Du$$

In the following table the ex-ante discount is calculated in the cells as results of the risk i.e. the multiplication of the likelihood and the duration of the interruption for different standard interruptible capacity products[45]. This shows the different discounts given different values of L and Du as the result of applying the proposed methodology.

Table 5. Example 1 of the calculation of the ex-ante discount for a daily interruptible standard capacity product

Daily product	**0 h**	**6h**	**12**	**18**	**24 h**	**Du**
	0%	25%	50%	75%	100%	*hours of interr / tot hours of the prod.*
0%	*0%*	*0%*	*0%*	*0%*	*0%*	
10%	*0%*	*3%*	*5%*	*8%*	*10%*	
20%	*0%*	*5%*	*10%*	*15%*	*20%*	
30%	*0%*	*8%*	*15%*	*23%*	*30%*	
40%	*0%*	*10%*	*20%*	*30%*	*40%*	
50%	*0%*	*13%*	*25%*	*38%*	*50%*	
60%	*0%*	*15%*	*30%*	*45%*	*60%*	
70%	*0%*	*18%*	*35%*	*53%*	*70%*	
80%	*0%*	*20%*	*40%*	*60%*	*80%*	
90%	*0%*	*23%*	*45%*	*68%*	*90%*	
100%	*0%*	*25%*	*50%*	*75%*	*100%*	
L *Probability of interruption*	***Discount = L x Du***					

[45] Equivalent tables can be found in the Appendix 4A for other interruptible standard capacity products.

To improve the attractiveness of the product and the real value of the interruption (usually more probable during periods in which users most need the capacity), the factor 'a' can be introduced in the formula. The factor of proportionality 'a' will be discussed at national level and is subject to the NRA approval:

$$Di_I \text{ (\%)} = [\ (\text{L x Du}) \text{ x a}; 100\%\ ]$$

The appropriate level of the parameter 'a' depends on the specificities of each system. The level of 'a' could be different for different interruptible standard capacity products.

When introducing the 'a' factor, the following table is obtained:

Table 6. Example 2 of the calculation of the ex-ante discount for a daily interruptible standard capacity product

Daily product	***0 h***	***6h***	***12***	***18***	***24 h***	**Du**
	0%	25%	50%	75%	100%	*hours of interr / tot hours of the prod.*
0%	*0%*	*0%*	*0%*	*0%*	*0%*	
10%	*0%*	*8%*	*15%*	*23%*	*30%*	
20%	*0%*	*15%*	*30%*	*45%*	*60%*	***a = 3***
30%	*0%*	*23%*	*45%*	*68%*	*90%*	
40%	*0%*	*30%*	*60%*	*90%*	*100%*	
50%	*0%*	*38%*	*75%*	*100%*	*100%*	
60%	*0%*	*45%*	*90%*	*100%*	*100%*	
70%	*0%*	*53%*	*100%*	*100%*	*100%*	
80%	*0%*	*60%*	*100%*	*100%*	*100%*	
90%	*0%*	*68%*	*100%*	*100%*	*100%*	
100%	*0%*	*75%*	*100%*	*100%*	*100%*	
L *Probability of interruption*	***Discount = min (L x Du x a ; 100%)***					

Approach 2: Risk of interruption calculated with three parameters

The discount is based on the level of the parameter Risk (%) and could be calculated as set out below:

$$Di_I\ (\%) = \text{Risk}\ (\%) \times a = N \times \frac{d}{\text{total duration of the product}} \times \frac{C}{\text{total capacity of the product}} \times a$$

The appropriate level of 'a' depends on the specificities of each system. It could be different for different interruptible standard capacity products.

Alternative 2: Ex-Post Discount, Di_{II}

In this case, the reserve price of the interruptible product is set to the same level as the equivalent firm product, with a reimbursement to the network user in case of interruptions. The reimbursement will be calculated applying the ex-post discount Di_{II} to the reserve price of the interruptible product.

The ex-post discount will be calculated by the following formula, taking into account the fraction of the capacity that was actually interrupted[46]:

$$Di_{II}\ (\%) = \min\left[\ f_{ex-p} \cdot \frac{\Sigma\ interrupted\ cap\ for\ the\ product\ duration}{\Sigma\ nominated\ cap\ for\ the\ product\ duration}; 100\%\ \right]$$

The default value for the factor 'f_{ex-p}' shall be 1. Other values shall also be possible, subject to the NRA approval, in order to find the appropriate level for the ex-post discount, depending on the characteristics of each system or its circumstances.

Alternative 3: Combination of an ex-ante discount and an ex-post discount

TSOs could decide to apply both an ex-ante discount to the reserve price and an ex-post discount in case of interruptions. The ex-ante discount Di_I will be applied to the reserve price of the equivalent firm standard product. The reimbursement will be calculated applying the ex-post discount Di_{II} to the reserve price of the interruptible product.

The TAR FG requires the publication by TSOs of the assessment of the risk of interruptions. To inform all stakeholders in due time, it is suggested that the assessment report will be published at the same time as tariffs. The report will include an analysis of the risk of interruptions, taking into account the specificities of each system. The assessment report of the risk of interruptions will include at least:

- Detailed explanation of the interruptible standard capacity products offered during the following year;
- Detailed explanation on how the risk of interruption is calculated

[46] The calculation would need to be carried out for each invoice period separately.

- An annex with a table for each IP and for each interruptible standard product offered that:
  - Classifies the different products offered per interruptible standard capacity product in a limited number of types.
  - Includes the value of L(%) and Du(%) or of Risk(%)[47] for each type offered.
  - Any other optional information such as the max. duration of each interruption or the max. duration of overall all interruptions over the whole duration of the product.
  - Specifies the level of the ex-ante discount Di_I, if applicable; and the formula for the calculation of the ex-post discount, Di_{II}, if applicable.

If a TSO offers more than one standard interruptible product, this estimation shall be made for all offered interruptible products.

Each table will have a format similar to this one below:

Table 7. Proposal for the format of publication of data for interruptible capacity products for the assessment report

	Year A – IP x, daily product		
	Type 1	Type 2	Type n
Description Brief description of the main characteristics of the product			
Risk of interruptions (L(%) and Du(%) or Risk(%))			
Other optional information e.g. • Max. allowed interruptions (e.g. for a yearly product) • Max. duration of each interruption • Max. duration of overall interruptions during the whole duration of the product			
Ex-ante Discount $Di_{d,I}$			
Ex-post Discount $Di_{d,II}$			

[47] The parameters L(%) and Du(%) correspond to Approach 1 and Risk(%) to Approach 2. Both approaches have been explained above.

Example

The products are classified linking the different types with the probability that congestion occurs (the probability that demand exceeds offer of capacity at the reserve price).

Table 8. Example 1 for classification of the interruptible capacity products for the assessment report

	Year 1 – IP x, interruptible daily products	
	Type 1	Type 2
Description Brief description of the main characteristics of the product	This product allows for an interruption if the IP is congested less than x days a year.	This product allows for an interruption if the IP is congested more than x days a year.
Risk of interruptions (L(%) and Du(%))	L = 15 %, Du = 4.2%	L = 25 %, Du = 12%
Ex-ante Discount $Di_{d,I}$	Di_I (%) = L x Du x a (10)	
	6.3%	30%
Ex-post Discount $Di_{d,II}$	No	

Example

Table 9. Example 2 for classification of the interruptible capacity products for the assessment report

	Year 1 – IP x, interruptible yearly products	
Description Brief description of the main characteristics of the product	Limited number of interruptions to 10 times	Limited number of interruptions to 20 times
Risk of interruptions	Risk (%) = 10 %	Risk (%) = 15 %
Ex-ante Discount $Di_{d,I}$	Di_I (%) = Risk x a (1)	
	Di_I =10 %	Di_I =15 %
Ex-post Discount $Di_{d,II}$	No	

Further examples of different classifications of interruptible products can be found on Appendix 4B.

How to calculate the price of each product

When the ex-ante discount is applied (alternatives 1 and 3), the reserve price of the interruptible capacity products on IPs will be calculated by applying the ex-ante discount to the reserve price of the equivalent firm capacity product. The following formulas will apply to calculate the reserve price of a standard interruptible product:

For yearly interruptible capacity products:

$P_{INT} = (1 – Di_I) \times p_y$

where:

P_{INT} is price of a yearly interruptible product

For quarterly and monthly interruptible standard capacity products:

$P_{INT} = (1 – Di_I) \times (m \times sf) \times (p_y/365) \times d$

where:

P_{INT} is price of a interruptible product of a duration of 'd' days,

d is duration of short-term product in days,

For leap years, $P_{INT} = (1 – Di_I) \times (m \times sf) \times (p_y/366) \times d$.

For daily interruptible standard capacity products:

$P_{INT} = (1 – Di_I) \times (m \times sf) \times (p_y/365)$

where:

P_{INT} is price of a daily interruptible product,

For leap years, $P_{INT} = (1 – Di_I) \times (m \times sf) \times (p_y/366)$.

For within-day interruptible standard capacity products:

$P_{INT} = (1 – Di_I) \times (m \times sf) \times (p_y/8760) \times h$

where:

P_{INT} is price of a within-day interruptible product,

h is duration in remaining hours of the gas day

For leap years, $P_{INT} = (1 – Di_I) \times (m \times sf) \times (p_y/8784) \times h$.

For all the formulas:

Di_I is the ex-ante discount of the product (%),

m is the multiplier corresponding to the standard product ,

sf is the corresponding seasonal factor,

p_y is price of the yearly firm product.

When the ex-post discount is applied (alternatives 2 and 3) and capacity has been actually interrupted, a reimbursement will be made to the network user. This reimbursement will be based on the reserve price of the interruptible product, multiplied by the ex-post discount Di_{II}.

$$\text{Reimbursement} = Di_{II} \times P_{INT}$$

$$\text{Final payable price by the shipper} = P_{INT} + \text{auction premium (if any)} - Di_{II} \times P_{INT}$$

where:
P_{INT} is the reserve price of an interruptible product,
Di_{II} is the ex-post discount of the product (%),

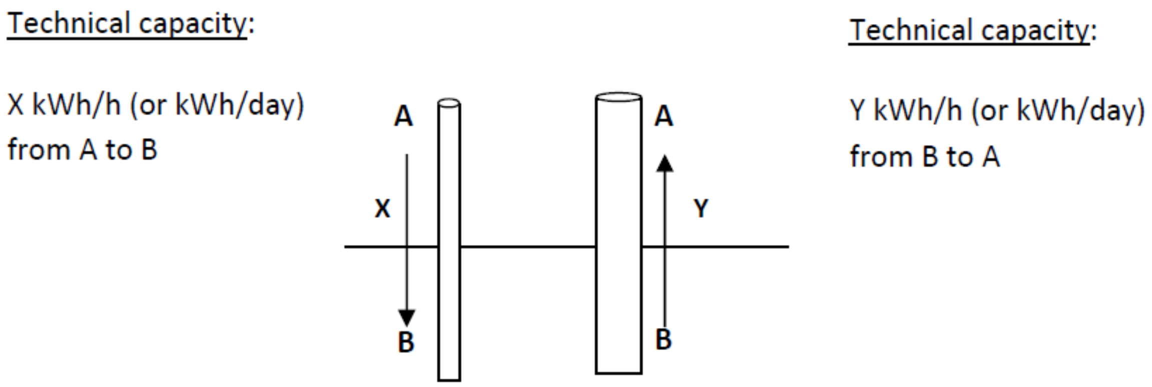
Non-physical backhaul at unidirectional points

ENTSOG believes that non-physical backhaul capacity is very similar to interruptible capacity at bi-directional points, in an entry/exit system, and that the pricing for both products could the similar i.e. with a discount reflecting the likelihood of interruption.

ENTSOG believes that treating the pricing for all interruptible capacity in the same way is a viable option to be considered. The marginal pricing of non-physical backhaul does not take account of the fact that the non-physical backhaul product only exists if there is forward flow and underlying infrastructure to facilitate such flow.

The reasons behind this are illustrated in the example below. Two different pipes are interconnecting system A with system B (i.e. two different IPs). One of the pipes has a physical capacity of X kWh/h (or kWh/d) in the direction A to B and the other pipe has a capacity of Y kWh/h (or kWh/d) in the direction B to A. Let's assume that Y > X.

Figure 11. Illustration of how firm and backhaul capacity products could be offered in parallel



The following capacities will be sold at the full price:

- X kWh/h (or kWh/d) firm capacity from A to B at the full price $P_{A\text{->}B}$
- Y kWh/h (or kWh/d) firm capacity from B to A at the full price $P_{B\text{->}A}$

In this case, backhaul capacity could be offered in both directions, with no obvious difference between the two options for the transmission of gas in each direction, a part of the interruptible nature of backhaul flows. Backhaul products could be used for gas transmission at very low prices, thus creating cross-subsidies between users.[48] This could create a detrimental situation for a TSO especially in cases where there are several TSOs competing in one system.[49]

Another concern with the pricing of non-physical backhaul using marginal costs concerns the provision of investment signals. The loss of potential revenue means the TSO may not see any incentive for an investment at this point. Furthermore, any potential investment for physical reverse flow could be hindered as the marginal pricing structure cannot reflect the capacity demand in the same way as the tariff level for physical flow can.

ENTSOG is of the opinion that marketing non-physical backhaul capacity at a tariff reflecting only marginal costs may lead to cross-subsidisation for transit flows.

[48] If non-physical backhaul capacity is priced at marginal cost and this is approximately 0 €, the TSO offering interruptible capacity at the bi-directional IP may end up with an under-recovery as bookings are likely to be shifted to the uni-directional IP.

[49] In the Appendix 5, further explanations about the potential impact of marginal pricing of non-physical backhaul are set out.

7. VIRTUAL INTERCONNECTION POINTS

Introduction

A virtual interconnection point ('VIP') is defined by Article 3(17) of the CAM NC as 'two or more interconnection points which connect the same two adjacent entry-exit systems, integrated together for the purposes of providing a single capacity service'. Article 3(10) defined 'interconnection point' as 'a physical or virtual point connecting adjacent entry-exit systems or connecting an entry-exit system with an interconnector, in so far as these points are subject to booking procedures by network users'. Article 19(9) sets out that it is one of the obligations of the adjacent TSOs with respect to the offer of the bundled capacity – to offer the available capacities at one established VIP rather than at the individual IPs contributing to it.

Furthermore, Article 19(9) provides for the deadline for the establishment of VIPs – no later than five years as from the entry into force of the CAM NC (i.e. 4 November 2018) – and foresees the following two conditions to be met for its establishment, irrespective of how many TSOs are involved in this process:

- total technical capacity at VIP ≥ sum of technical capacities at each of contributing IPs;
- VIP facilitates the economic and efficient use of the system (i.a. pursuant to Article 16 of the Gas Regulation[50]).

An illustration of a VIP is provided in Figures 14 and 15 below. They show two physical IPs connecting the transmission networks of the TSOs at different sides of the border. The available capacities of these two IPs (60 and 80 units for Green and Red IP respectively) are collected into one VIP. It is assumed that for both IPs the gas flow direction is from entry-exit system 1 to entry-exit system 2. Before the establishment of the VIP, the network user flowing gas through Green IP or through Red IP and using the capacity at both sides of the border (irrespective of it being bundled or unbundled) would pay the sum of the tariffs charged by the relevant TSO at each side of the border. In essence, the idea of the VIP is that in the described situation, this network user would pay the VIP tariff applicable at the established VIP.

Also, Article 19(9) of the CAM NC specifically deals with the case of more than one TSO at either/each side of the border. In this situation, the VIP is to include all of these TSOs 'to the extent possible'. Thus, ENTSOG deems it necessary to consider separately the two

[50] Principles of capacity-allocation mechanisms and congestion-management procedures concerning TSOs.

situations: (1) where there is only one TSO at each side of the border; and (2) where there are multiple TSOs at either/each side of the border.

Rules Envisaged by the TAR FG

The TAR FG makes a reference to the provisions of the CAM NC and partially quotes its Article 19(9). In addition to that, the TAR FG set forth the following:

- The reserve price at the VIP shall be based on the combination of the reserve prices of the points contributing to the VIP.
- The combination mechanism shall be consistent with the overall objectives of the TAR FG, in particular that of avoiding barriers to cross-border trade.

Tasks from the TAR FG for Development within the TAR NC

To elaborate the combination mechanism and to include a mathematical formulation for the reserve price at VIP.

TASK: Combination Mechanism and Mathematical Formulation for VIP Reserve Price

TAR FG Requirements[51]

> 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 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.**

ENTSOG's View

ENTSOG's view is that in addressing the TAR FG requirement for elaboration of the combination mechanism, the following approach could followed. Firstly, to determine the VIP tariff at each side of the border between the entry-exit systems; and secondly, to sum up

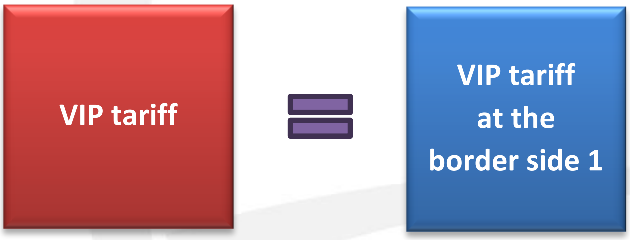
[51] Ref. page 33 and 34 of the TAR FG. Chapter 6 'Virtual interconnection points', paragraphs 2 and 3.

the two resulting values if bundled capacity is purchased. Based on this algorithm, below are the two Figures illustrating the two situations:

- when the bundled capacity is contracted;
- when the capacity is contracted at only one side of the border (in which case only the first step identified above should be fulfilled).

Figure 12. Components of the VIP tariff for bundled capacity

Figure 13. Components of the VIP tariff where the capacity is contracted at one side of the border



In essence, the first step of such approach, which needs to be fulfilled independently of whether the capacity is offered on both or only one side of the border, will ensure that the pricing methodology for VIPs is aligned with the chosen cost allocation methodology. Within this step, there are variations possible:

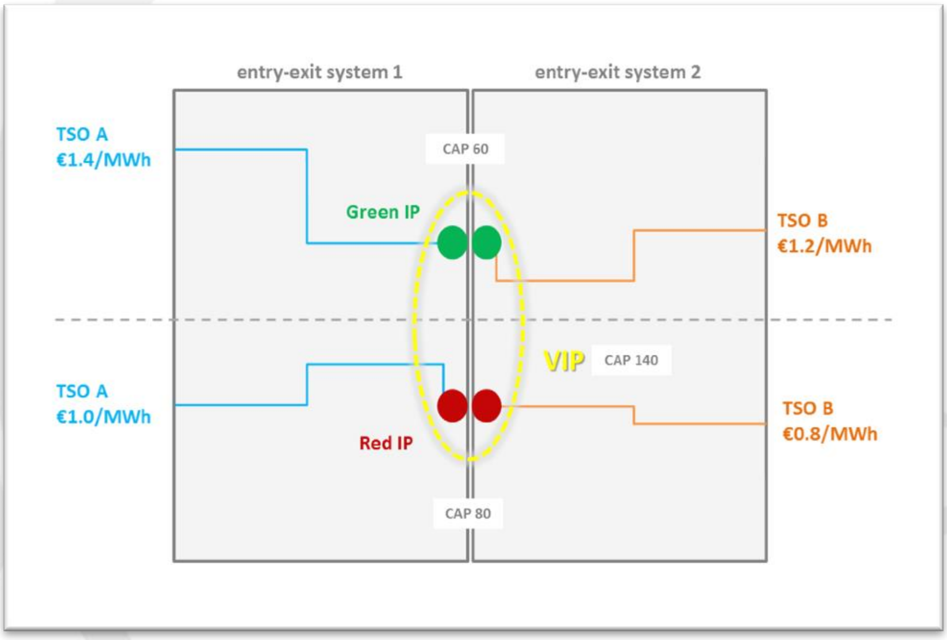
- The cost allocation methodology of each TSO should take account of the fact that the previous multiple IPs were 'merged into' one VIP and hence, the revenue that would be previously divided between those multiple IPs, will now be attributed only to this one VIP.
- Where it is not possible to incorporate the VIP into the applied cost allocation methodology, the separate tariffs for the physical IPs could be calculated. The VIP tariff on one side of the border could be then calculated using a simple average or a weighted average of the previously calculated separate tariffs.

Policy Proposal

One TSO at each side of the border

Figure 14 below illustrates the situation with only one TSO per each side of the border between the entry-exit systems. In the situation where the bundled capacity is contracted, the first step is to determine the VIP tariff charged by TSO A and the VIP tariff charged by TSO B. The second step – the calculation of the VIP tariff for bundled capacity – is done by calculating the sum of those two.

Figure 14. Illustration of the VIP with one TSO at each side of the border

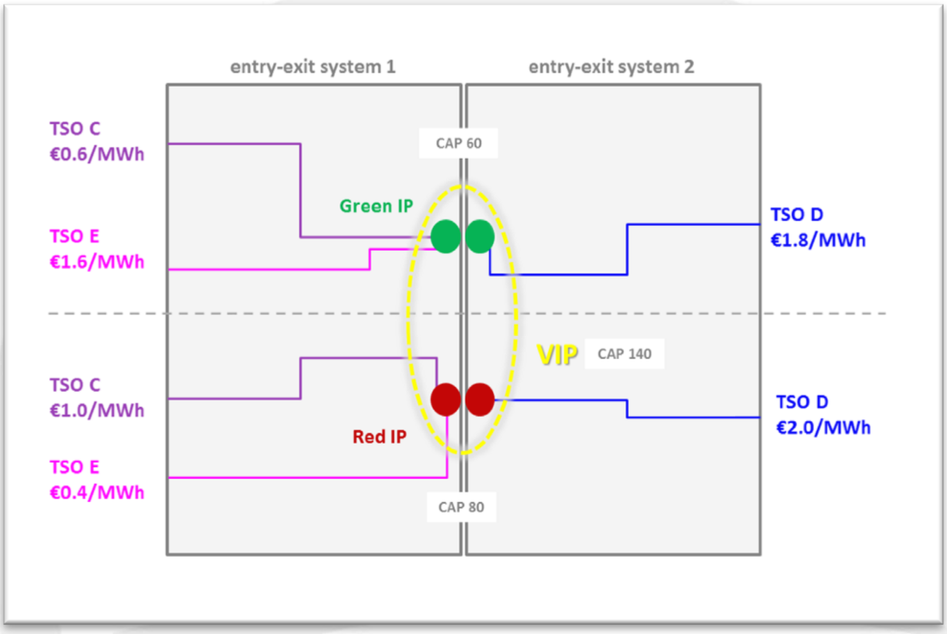


Multiple TSOs at either/each side of the border

Figure 15 below illustrates the simplest example of multiple TSOs at either/each side of the border between the entry-exit systems: two TSOs at only one side of the border. It is assumed that these two TSOs are within the same entry-exit zone.

In this situation, as opposed to the one above, the fulfilment of the first step by each TSO will not be sufficient for the purpose of arriving at one VIP tariff at the side of the border with two TSOs. Its results do not yet constitute the values that can be summed up in order to arrive at the VIP tariff for bundled capacity. An additional calculation is necessary for the side of the border where there is more than one TSO. In the example illustrated below, it is to be done by TSO C and TSO E: they should calculate an average of the respective values resulted from their fulfilment of the first step. It is suggested that this should be an average weighted against the key cost driver to be approved ex-ante by the NRA (e.g. technical capacity, forecasted bookings/use).

Figure 15. Illustration of the VIP with two TSOs at one side of the border



In addition to the description above, ENTSOG deems it necessary to indicate the consequences of pricing the capacity at the VIP in the situation of multiple TSOs within one entry-exit system at either/each side of the border between the entry-exit systems:

- As the tariff value at the border side 1 will be the result of the application of the individual cost allocation methodology by TSO C and TSO E and the application of a (weighted) average, how the tariff for the border side 1 will be like depends on the parameter to be weighted by.
- In terms of existing contracts in general and long-term contracts in particular, these tariffs will become equal. There will be no more tariff differences, some contracts will be cheaper but some contracts will also become more expensive. It is possible that these price arrangements between TSOs may be in contradiction with European competition law, e.g. in Germany, the German Federal Cartel Office is currently of the opinion that TSOs are competing at some IPs and price agreements between TSOs would infringe competition law.

- In terms of new capacity contracts, there will be two consequences for shippers. On the one hand, they will not have the possibility to optimise their transport capacity by prices in the entry-exit system 1 anymore since there is no more possibility to choose between different IPs. On the other hand, shippers will have equal conditions regarding tariffs at each VIP. Therefore, impacts on competition between shippers are unclear.
- Additionally, uncertainty arises with regards to the question of contractual partners both for existing and new capacity contracts and the allocation of the revenue gained from VIP contracts between the TSOs.

8. BUNDLED CAPACITY PRODUCTS

Introduction

The CAM NC defines 'bundled capacity' as 'a standard capacity product offered on a firm basis which consists of corresponding entry and exit capacity at both sides of every interconnection point'.[52] Furthermore, the CAM NC foresees a number of requirements regarding the bundled capacity, among which are the following ones:

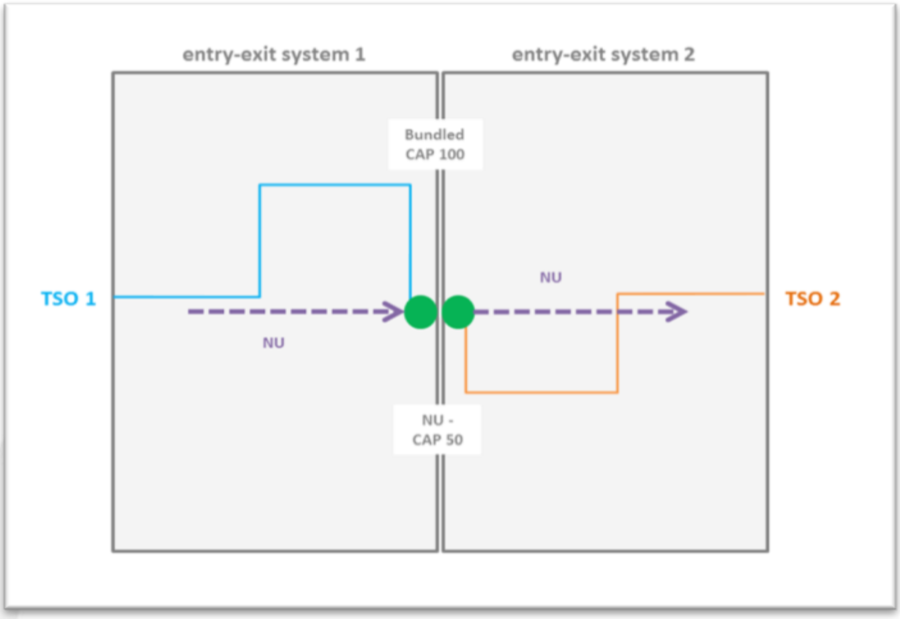
- Article 19(1) – the TSOs to offer all firm capacity on both sides of an IP as bundled capacity, in so far as there is available firm capacity on both sides of an IP;
- Article 19(3) – the bundled capacity to be contracted by a single allocation procedure;
- Article 19(7) – the adjacent TSOs to establish a joint nomination procedure for bundled capacity;
- Article 19(8) – capacity originally allocated as bundled to be resold as bundled on the secondary market;
- Article 20(1) – network users to aim to reach an agreement on the bundling of capacity via contractual arrangements;
- Article 20(5) – all capacity to be bundled at the earliest opportunity;
- Article 16(4) and (5) – the tariff arrangements related to the bundled capacity that are similar to the ones envisaged by the respective Chapter of the TAR FG.

A bundled capacity product is a corresponding firm entry and exit capacity at a specific IP. This means that at a given IP, the network user books and is allocated a bundled capacity product representing corresponding firm entry and exit capacity. Thus, the network user avoids two separate allocations on each side of the border, removing the risk of being allocated different capacities. The concept of bundling is underpinned by a two-contract model: the network user holds a separate capacity contract with each TSO at a specific IP.

With bundled capacity, a network user needs to be registered in both market areas to be able to book bundled capacity across an IP and have a valid contract with each of the adjacent TSOs. An illustration of the concept is provided in Figure 16 below. The Figure shows that 100 units of bundled capacity are offered at an IP between two entry-exit systems. On a given gas day, the network user identified in the Figure is the holder of 50 units of bundled capacity at this IP.

[52] Article 3(4) of the CAM NC.

Figure 16. Illustration of the concept of the bundled capacity



Rules Envisaged by the TAR FG

- For bundled capacity products, the sum of the reserve prices for capacity at entry and exit points (i.e. on both sides of the IP to be bundled) is used as the bundled reserve price.
- The revenues from the reserve price of bundled capacity products shall 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 ACER of the outcome of such an agreement. If no such agreement is concluded ahead of the auction, the TAR NC shall specify that any revenues from the auction premium be split equally between the relevant TSOs.

Additional Consideration: Single Price

Where a single price that would represent the bundled reserve price is required, the involved TSOs would need to reach an agreement on how to come up to it. This is relevant for the situations when the reserve prices applied by each TSO are expressed in different units. The difficulties associated with indicating the single price might be as follows: (1) difference in the applied currency – and hence, difficulties with the currency conversion; (2) difference in the capacity units used[53] – and hence, difficulties with 'switching' from one type of the units to another; (3) unclear situation with invoicing for the bundled capacity. It is suggested that this issue is to be dealt with in an agreement of adjacent TSOs and approved by the relevant NRAs.

The components of the bundled reserve price can be demonstrated as follows:

Figure 17. Components of the bundled reserve price

[53] Article 10 of the CAM NC provides for two alternatives – kWh/h or kWh/d.

9. PAYABLE PRICE

Introduction

As opposed to the requirements of the TAR FG, Article 26(2) of the CAM NC foresees two variants for the determination of the payable price:

- either a fixed price composed of: (1) the applicable tariff at the time of the auction; and (2) the auction premium;
- or a variable price composed of: (1) the applicable tariff at the time when the capacity can be used; and (2) the auction premium.

Essentially, the notions of 'variable price' used in the CAM NC and that of 'floating price' used by the TAR FG are the same. The key difference between the fixed price and the floating price is that the latter may differ with time whereas the former is stable. This is due to the fact that the component 'applicable tariff' in the variable price is dependent on the time when the capacity can be used which may be later than the time when it was auctioned. Hence, with time, the applicable tariff may change and most probably, be higher than the one at the time when the capacity was auctioned.

Rules Envisaged by the TAR FG

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

Tasks from the TAR FG for Development within the TAR NC

To include mathematical formulations for the payable price.

TASK: Mathematical Formulations for the Payable Price

TAR FG Requirements[54]

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

[54] Ref. page 34 of the TAR FG. Chapter 8 'Payable price', paragraph 2.

ENTSOG's View

Although the TAR FG provides for only 'floating price' possibility, there might be situations when the fixed price is a better alternative to it. The fixed price ensures that the shippers are aware in advance of the price to be paid. Thus, it encourages the capacity bookings and allows for TSO to secure its revenue and reduce the risk of under-recovery.

Policy Proposal

In the mathematical formulation required by the TAR FG, it is important to indicate that there might be the cases when the auction premium is not earned. This is why 'if any' is added for the auction premium component. The auction premium can represent either an absolute amount or a percentage. In the latter case, this percentage should be calculated on the basis of reserve price at the time of the auction but not at the time when the capacity can be used. The idea is that the auction premium is supposed to be fixed.

That said, there are the following three situations possible: (1) payable price is equal to the reserve price at the time when the capacity can be used; (2) payable price is equal to the sum of the reserve price at the time when the capacity can be used and the auction premium representing an absolute amount; (3) payable price is equal to the sum of the reserve price at the time when the capacity can be used and the auction premium calculated as a percentage of the reserve price at the time of the auction.

Figure 18. Components of the payable price

ENTSOG will consider alternative proposals that could include both fixed and floating prices for discussion in the SJWSs. These alternatives would need to consider interactions with revenue recovery mechanisms.

10. APPENDICES

Appendix 1: Glossary

Term	Definition	Source
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	TAR FG
ascending clock auction	an auction in which a network user places requested quantities against defined price steps, which are announced sequentially	CAM NC
auction calendar	a table displaying information relating to specific auctions which is published by ENTSOG by January of every calendar year for auctions taking place during the period of March until February of the following calendar year and consisting of all relevant timings for auctions, including starting dates and standard capacity products to which they apply	CAM NC
auction premium	the difference between the reserve price and the clearing price in an auction	TAR FG
available capacity	the part of the technical capacity that is not allocated and is still available to the system at that moment	Gas Directive Gas Regulation
bidding round	the period of time during which network users can submit, amend and withdraw bids	CAM NC
bundled capacity	a standard capacity product offered on a firm basis which consists of corresponding entry and exit capacity at both sides of every interconnection point	CAM NC
bundled reserve price	the reserve price applicable to a bundled capacity product offered at an auction	TAR FG
capacity	the maximum flow, expressed in normal cubic meters per time unit or in energy per time unit, to which the network user is entitled in accordance with the provisions of the transport contract	Gas Directive Gas Regulation
competing capacities	capacities for which the available capacity in one of the concerned auctions cannot be allocated without fully or partly reducing the available capacity in the other concerned	CAM NC

	auction	
contracted capacity	capacity that the transmission system operator has allocated to a network user by means of a transport contract	Gas Directive Gas Regulation
contractual congestion	a situation where the level of firm capacity demand exceeds the technical capacity	Gas Directive Gas Regulation
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	TAR FG
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	TAR FG
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	TAR FG
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	TAR FG
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	TAR FG
firm capacity	gas transmission capacity contractually guaranteed as uninterruptible by the transmission system operator	Gas Directive Gas Regulation
firm services	services offered by the transmission system operator in relation to firm capacity	Gas Directive Gas Regulation
first time undersell	an occurrence where the aggregate demand across all network users is less than the capacity offered at the end of the second bidding round or a subsequent bidding round	CAM NC

fixed costs	all costs that are not affected, in the short run, by the amount of transmitted natural gas	TAR FG
gas day	the period from 5:00 to 5:00 UTC the following day for winter time and from 4:00 to 4:00 UTC the following day when daylight saving is applied	CAM NC
implicit allocation method	an allocation method where, possibly by means of an auction, both transmission capacity and a corresponding quantity of gas are allocated at the same time	CAM NC
interconnection agreement	an agreement entered into by adjacent transmission system operators, whose systems are connected at a particular interconnection point, which specifies terms and conditions, operating procedures and provisions, in respect of delivery and/or withdrawal of gas at the interconnection point with the purpose of facilitating efficient interoperability of the interconnected transmission networks	CAM NC
interconnection point	a physical or virtual point connecting adjacent entry-exit systems or connecting an entry-exit system with an interconnector, in so far as these points are subject to booking procedures by network users	CAM NC
interruptible capacity	gas transmission capacity that may be interrupted by the transmission system operator in accordance with the conditions stipulated in the transport contract	Gas Directive Gas Regulation
interruptible services	services offered by the transmission system operator in relation to interruptible capacity	Gas Directive Gas Regulation
large price step	a fixed or variable amount that is defined per interconnection point and standard capacity product	CAM NC
linepack	the storage of gas by compression in gas transmission and distribution systems, but not including facilities reserved for transmission system operators carrying out their functions	Gas Directive Gas Regulation
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	TAR FG
multiplier	a factor to calculate reserve prices for non-	TAR FG

	yearly standard capacity products applied to the proportional yearly reference price, before the application of a seasonal factor, if any	
network user	a customer or a potential customer of a transmission system operator, and transmission system operators themselves in so far as it is necessary for them to carry out their functions in relation to transmission	Gas Directive Gas Regulation
nomination	the prior reporting by the network user to the transmission system operator of the actual flow that the network user wishes to inject into or withdraw from the system	Gas Directive Gas Regulation
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	TAR FG
over-nomination	the entitlement of network users who fulfil minimum requirements for submitting nominations to request interruptible capacity at any time within day by submitting a nomination which increases the total of their nominations to a level higher than their contracted capacity	CAM NC
payable price	the price to be paid, at the time of use, by the network user to the TSO, for capacity products	TAR FG
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	TAR FG
primary market	the market of the capacity traded directly by the transmission system operator	Gas Directive Gas Regulation
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	TAR FG
regulated price	the price of capacity products at points where the capacity allocation procedure is not an	TAR FG

	auction	
regulatory account	an account aggregating over- and under-recovery of the allowed revenues on an annual basis	TAR FG
regulatory period	the period during which a tariff structure or allowed revenue is valid	TAR FG
reserve price	the eligible floor price in the auction	CAM NC
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	TAR FG
revenue reconciliation	the reconciliation of the regulatory account following revenue collection	TAR FG
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	TAR FG
secondary market	the market of the capacity traded otherwise than on the primary market	Gas Directive Gas Regulation
short-term services	services offered by the transmission system operator with a duration of less than one year	Gas Directive Gas Regulation
small price step	a fixed or variable amount that is defined per interconnection point and standard capacity product which is smaller than the large price step	CAM NC
standard capacity product	a certain amount of transport capacity over a given period of time, at a specified interconnection point	CAM NC
system	any transmission networks, distribution networks, LNG facilities and/or storage facilities owned and/or operated by a natural gas undertaking, including linepack and its facilities supplying ancillary services and those of related undertakings necessary for providing access to transmission, distribution and LNG	Gas Directive Gas Regulation
system integrity	any situation in respect of a transmission network including necessary transmission facilities in which the pressure and the quality of the natural gas remain within the minimum and maximum limits laid down by the	Gas Directive Gas Regulation

	transmission system operator, so that the transmission of natural gas is guaranteed from a technical standpoint	
tariff structure	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	TAR FG
technical capacity	the maximum firm capacity that the transmission system operator can offer to the network users, taking account of system integrity and the operational requirements of the transmission network	Gas Directive Gas Regulation
transmission	the transport of natural gas through a network, which mainly contains high-pressure pipelines, other than an upstream pipeline network and other than the part of high-pressure pipelines primarily used in the context of local distribution of natural gas, with a view to its delivery to customers, but not including supply	Gas Directive Gas Regulation
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	TAR FG
transmission system operator	a natural or legal person who carries out the function of transmission and is responsible for operating, ensuring the maintenance of, and, if necessary, developing the transmission system in a given area and, where applicable, its interconnections with other systems, and for ensuring the long-term ability of the system to meet reasonable demands for the transport of gas	Gas Directive Gas Regulation
transmission tariffs (=transmission charges; network tariffs; network charges)	determine what network users have to pay for each transmission service	TAR FG
uniform-price auction	an auction in which the network user in a single bidding round bids price as well as quantity and	CAM NC

	all network users, who are successful in gaining capacity, pay the price of the lowest successful bid	
unused capacity	firm capacity which a network user has acquired under a transport contract but which that user has not nominated by the deadline specified in the contract	Gas Directive Gas Regulation
virtual interconnection point	two or more interconnection points which connect the same two adjacent entry-exit systems, integrated together for the purposes of providing a single capacity service	CAM NC
within-day capacity	capacity offered and allocated after the closure of the day-ahead capacity auctions with respect to that day	CAM NC

Appendix 2: Cost Allocation Test Example

Please note that the example below just a preliminary elaboration based on ENTSOG reading of the cost allocation section of the TAR FG. This is one possible way to develop the TAR FG requirement and further discussion will be needed in the SJWSs.

When carrying out the cost allocation test, assumptions must be made on the major cost drivers. In this example, the major cost drivers are distance and capacity. Aside from these cost drivers, other cost drivers are also possible depending on the characteristics of the system.

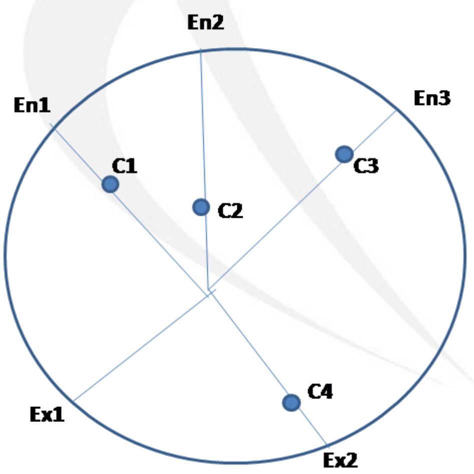
System description
This example has been carried out using a simplified network with the following components (below):

- 3 entry IPs (En)
- 2 exit IPs (Ex)
- 4 consumption points (C)

(See diagram below)

Each point can be physically localised and can be characterised by geographical coordinates (longitude; latitude).

Simplified network representation



Point's characteristics

	Longitude	Latitude	Capacity
En1	1	2,7	100
En2	2	3	80
En3	3,3	2,9	120
Ex1	1	1,2	70
Ex2	2,6	1	90
C1	1,5	2,5	50
C2	2	2,4	30
C3	3	2,6	40
C4	2,5	1,2	40

Step 1: Calculation of distances from entry to exit points[55]

Given those coordinates, it is possible to determine the distances from each entry point to each exit or consumption point. For this example, the Euclidean approach is chosen.

Distances from Entry to Exit points			Name	Ex1	Ex2	C1	C2	C3	C4
			Longitude	1	2.6	1.5	2	3	2.5
			Latitude	1.2	1	2.5	2.4	2.6	1.2
Name	Longitude	Latitude	Capacity	70	90	50	30	40	40
En1	1	2.7	100	1.5	2.33	0.54	1.04	2	2.12
En2	2	3	80	2.06	2.09	0.71	0.6	1.08	1.87
En3	3.3	2.9	120	2.86	2.02	1.84	1.39	0.42	1.88

For example, distance between Entry 1 and Exit 1 is calculated as following:

$$\sqrt{(1-1)^2+(2.7-1.2)^2}=1.5$$

Step 2: Calculation of average distance of domestic and cross-border exit points as cost driver through a weighted average approach

As an intermediate step, the average distance of each exit point has to be calculated by using the capacity of entry points as weight:

$$Distance\ exit\ point_{\ j} = \frac{\sum_i (Capacity\ of\ entry\ point_i) \times \left(distance\ between\ entry\ point_i\ and\ exit\ point_{\ j}\right)}{\sum_i Capacity\ of\ entry\ point_i}$$

The following table shows the average distances of each exit point.

Name	Average Distance	Capacity	domestic (d)/ cross-border (cb)
Ex1	2.19	70	cb
Ex2	2.14	90	cb
C1	1.11	50	d
C2	1.07	30	d
C3	1.12	40	d
C4	1.96	40	d

For example, average distance of Ex1 was calculated as following:

[55] Please note that the calculations for this example have been carried out in Excel without rounding of numbers. Rounding has been carried out only at the end of the calculation to ensure accuracy.

$$\frac{1.5 \times 100 + 2.06 \times 80 + 2.86 \times 120}{100 + 80 + 120} = 2.19$$

Next, the average distance of domestic and cross-border exit points are calculated by using the capacity of exit points as weight:

$$\text{Domestic distance} = \frac{\sum_j (Capacity\ of\ domestic\ exit\ point_j) \times (Average\ distance\ of\ domestic\ exit\ point_j)}{\sum_j Capacity\ of\ domestic\ exit\ point_j}$$

$$\text{cb distance} = \frac{\sum_j (Capacity\ of\ cb\ exit\ point_j) \times (Average\ distance\ of\ cb\ exit\ point_j)}{\sum_j Capacity\ of\ cb\ exit\ point_j}$$

In our example, the distances are as following:

$$Domestic\ distance = \frac{50 \times 1.11 + 30 \times 1.06 + 40 \times 1.12 + 40 \times 1.96}{50 + 30 + 40 + 40} = 1.32$$

$$cb\ distance = \frac{70 \times 2.19 + 90 \times 2.14}{70 + 90} = 2.17$$

Finally, the capacities provided for cross-border and domestic transmission have to be taken into account to calculate the cost driver:

$$Domestic\ cost\ driver = Domestic\ distance \times Domestic\ exit\ capacity$$
$$= 1.32 \times 160 = 210.48$$

$$cb\ cost\ driver = cb\ distance \times cb\ exit\ capacity$$
$$= 2.17\ \times 160 = 346.56$$

Step 3: Calculate the forecasted revenues for domestic and cross-border points

Following the FG, the ratio of cross-border and domestic entry revenues shall be taken from the ratio of cross-border and domestic exit capacities.

We assume the following forecasted revenues streams

Domestic exit capacity	160	50%
Cross-border exit capacity	160	50%
Entry points revenues in total	1,260	
Entry revenues dedicated for domestic	630	50%
Entry revenues dedicated for cross-border	630	50%

Exit revenues from domestic	350	28%
Exit revenues from cross-border	900	72%

Step 4: Calculate the ratios

$$Ratio\ 1 = \frac{revenues(domestic)}{costdrivers(domestic)} = \frac{350 + 630}{210.48} = 4.6559$$

$$Ratio\ 2 = \frac{revenues(cross - border)}{costdrivers(cross - border)} = \frac{900 + 630}{346.56} = 4.4148$$

$$\Delta_{rev} = \frac{|Ratio1 - Ratio2|}{(Ratio1 + Ratio2)/_2} = \frac{0.2411}{4.5354} = 5.3\% < \mathbf{10}\ \% \rightarrow \boldsymbol{test\ passed}\ \surd$$

Appendix 3A: Simple Examples of Short-Term Pricing Calculations

Quarterly and monthly firm standard capacity products

1. Example of pricing for a quarterly product:
   How much does it cost to book quarterly capacity from October to December if the annual tariff is 1 €/kWh/h/year and the corresponding quarterly multiplier is 1.4?
   P_{st} = m x (p_y / 365) x d
   P_{st} = 1.4 x (1 / 365) x 92
   Quarterly price = 0.3529 €/kWh/h

2. Example of pricing for a monthly product:
   How much does it cost to book monthly capacity for July if the annual tariff is 1 €/kWh/h/year and the corresponding monthly multiplier is 0.5?
   P_{st} = m x (p_y / 365) x d
   P_{st} = 0.5 x (1 / 365) x 31
   Monthly price = 0.0425 €/kWh/h

Daily and within-day firm standard capacity products

3. Example of pricing for a daily product:
   How much does it cost to book daily capacity for February if the annual tariff is 1 €/kWh/h/year and the daily multiplier is 1.3?
   P_{st} = m x (p_y / 365) x d
   P_{st} = 1.3 x (1/ 365) x 1
   Daily price = 0.0036 €/kWh/h

4. Example of pricing for a within-day product:
   How much does it cost to book within-day capacity for March if the annual tariff is 1 €/kWh/h/year and the within-day multiplier is 1.5? Please assume capacity is available for the rest of the day i.e. 18 hours.
   P_{st} = m x (p_y / 8760) x h
   P_{st} = 1.5 x (1 / 8760) x 18
   Within-day price = 0.0031 €/kWh/h

Appendix 3B: Simple Examples of Short-Term Pricing Calculations Including Seasonal Factors

Quarterly and monthly firm standard capacity products with seasonal factors

1. Example of pricing for a quarterly product with a seasonal factor applied:
   How much does it cost to book quarterly capacity from January to March if the annual tariff is 1 €/kWh/h/year, the corresponding quarterly multiplier is 1.5 and the corresponding seasonal factor for the months of January, February and March is 1.25?
   P_{st} = m x sf x (p_y / 365) x d
   P_{st} = 1.5 x 1.25 x (1 / 365) x 90
   Quarterly price = 0.4623 €/kWh/h

2. Example of pricing for a monthly product:
   How much does it cost to book monthly capacity for June if the annual tariff is 1 €/kWh/h/year, the corresponding monthly multiplier is 0.6 and the corresponding seasonal factor for the month of June is 0.7?
   P_{st} = mx sf x (p_y / 365) x d
   P_{st} = 0.6 x 0.7 x (1 / 365) x 30
   Monthly price = 0.0345 €/kWh/h

Daily and within-day firm standard capacity products with seasonal factors

3. Example of pricing for a daily product:
   How much does it cost to book daily capacity for April if the annual tariff is 1 €/kWh/h/year, the corresponding daily multiplier is 1 and the corresponding seasonal factor for the month of April is 1.1?
   P_{st} = m x sf x (p_y / 365) x d
   P_{st} = 1 x 1.1 x (1 / 365) x 1
   Daily price = 0.0030 €/kWh/h

4. Example of pricing for a within-day product:
   How much does it cost to book within-day capacity (rest of the day = 5 h) for September if the annual tariff is1 €/kWh/h/year, the corresponding within-day multiplier is 0.9 and the corresponding seasonal factor is 1.3 for the month of September? Please assume capacity is available for the rest of the day i.e. 5 hours.
   P_{st} = mx sf x (p_y / 8760) x h
   P_{st} = 0.9 x 1.3 x (1 / 8760) x 5
   Within-day price = 0.0007 €/kWh/h

Appendix 4A: Clarification on How to Calculate the Ex-Ante Discount for Standard Interruptible Capacity Products

In the following tables the discount is calculated in the cells as results of the multiplication between the likelihood of occurrence (in rows, expressed as probability) and the duration of the interruption (in columns, as ratio between the number of interrupted days and the total duration of the product).[56]

Yearly product	0 month	1 month	2 months	3 months	4 months	6 months	8 months	12 months	Du
	0%	8%	16%	25%	33%	49%	66%	100%	days of interr / tot days of the product
0%	0%	0%	0%	0%	0%	0%	0%	0%	
10%	0%	1%	2%	2%	3%	5%	7%	10%	
20%	0%	2%	3%	5%	7%	10%	13%	20%	
30%	0%	2%	5%	7%	10%	15%	20%	30%	
40%	0%	3%	7%	10%	13%	20%	26%	40%	
50%	0%	4%	8%	12%	16%	25%	33%	50%	
60%	0%	5%	10%	15%	20%	30%	39%	60%	
70%	0%	6%	12%	17%	23%	35%	46%	70%	
80%	0%	7%	13%	20%	26%	39%	53%	80%	
90%	0%	7%	15%	22%	30%	44%	59%	90%	
100%	0%	8%	16%	25%	33%	49%	66%	100%	
L Probability of interruption	Discount = L*Du								

Quarterly product	0 week	1 week	4 weeks	8 weeks	12 weeks	Du
	0%	8%	33%	67%	100%	days of interr / tot days of the product
0%	0%	0%	0%	0%	0%	
10%	0%	1%	3%	7%	10%	
20%	0%	2%	7%	13%	20%	
30%	0%	3%	10%	20%	30%	
40%	0%	3%	13%	27%	40%	
50%	0%	4%	17%	33%	50%	
60%	0%	5%	20%	40%	60%	
70%	0%	6%	23%	47%	70%	
80%	0%	7%	27%	53%	80%	
90%	0%	8%	30%	60%	90%	
100%	0%	8%	33%	67%	100%	

[56] For the within-day products, a similar table as for daily product applies, with the difference that to calculate Du (%), the actual duration of the product (in hours) has to be taken into account.

L Probability of interruption	Discount = L x Du

Monthly product	0 day	1 day	5 days	7 days	15 days	30 days	Du
	0%	3%	17%	23%	50%	100%	days of interr / tot days of the product
0%	0%	0%	0%	0%	0%	0%	
10%	0%	0%	2%	2%	5%	10%	
20%	0%	1%	3%	5%	10%	20%	
30%	0%	1%	5%	7%	15%	30%	
40%	0%	1%	7%	9%	20%	40%	
50%	0%	2%	8%	12%	25%	50%	
60%	0%	2%	10%	14%	30%	60%	
70%	0%	2%	12%	16%	35%	70%	
80%	0%	3%	13%	19%	40%	80%	
90%	0%	3%	15%	21%	45%	90%	
100%	0%	3%	17%	23%	50%	100%	
L Probability of interruption	**Discount = L x Du**						

For the following example, the 'a' parameter is introduced to improve the attractiveness of the product. The ex-ante discount is calculated as ***Discount = min (L x Du x 3 ; 100%)***

Yearly product	0 month	1 month	2 months	3 months	4 months	6 months	8 months	12 months	Du
	0%	8%	16%	25%	33%	49%	66%	100%	days of interr / tot days of the product
0%	0%	0%	0%	0%	0%	0%	0%	0%	
10%	0%	2%	5%	7%	10%	15%	20%	30%	i.e.
20%	0%	5%	10%	15%	20%	30%	39%	60%	a factor = 3
30%	0%	7%	15%	22%	30%	44%	59%	90%	
40%	0%	10%	20%	30%	39%	59%	79%	100%	
50%	0%	12%	25%	37%	49%	74%	99%	100%	
60%	0%	15%	30%	44%	59%	89%	100%	100%	
70%	0%	17%	35%	52%	69%	100%	100%	100%	
80%	0%	20%	39%	59%	79%	100%	100%	100%	
90%	0%	22%	44%	67%	89%	100%	100%	100%	
100%	0%	25%	49%	74%	99%	100%	100%	100%	
L Probability of interruption	**Discount = min (L*Du*a ; 100%)**								

Appendix 4B: Examples of Different Classifications of Interruptible Products

Example 1

The products are classified according to the max. duration of each interruption established in the contract.

The reserve price of the product will be calculated applying the discount $\mathrm{Di}_{\mathrm{d,I}}$ to the reserve price of the equivalent firm standard product (daily products). The reimbursement will be calculated applying the ex-post discount $\mathrm{Di}_{\mathrm{d,II}}$.

Table 10. Example for classification of interruptible capacity products for the assessment report

	Year 1 – IP x, daily product		
	Type 1	Type 2	Type 3
Description Brief description of the main characteristics of the product	This product allows for an interruption of max. 1 h.	This product allows for an interruption of max. 5 h.	This product allows for an interruption of max. 10h.
Max. duration of each interruption	1h.	5h.	10h.
Risk of interruptions (L(%) and Du(%))	L = 15 %, Du = 2.2%	L = 10 %, Du = 5%	L = 4 %, Du = 35%
Ex-ante Discount $\mathrm{Di}_{\mathrm{d,I}}$	Di_I (%) = min [(L x Du) x 3; 100 %]		
	1%	1.5%	4.2%
Ex-post Discount $\mathrm{Di}_{\mathrm{d,II}}$	$Di_{II} = \frac{\Sigma\ interrupted\ cap}{\Sigma\ nominated\ cap}$		

Example 2

The products are classified according to seasons.

The value of Risk (%) is calculated according to the formula in Approach 2:

$$\text{Risk (\%)} = N \times \frac{d}{\text{total duration of the product}} \times \frac{C}{\text{total capacity of the product}}$$

The value of 'N', 'd' and 'C' is calculated according to data of actual interruptions on the last three years. The reserve price of the interruptible monthly products is set in this case to the same level as the monthly firm product, as the Ex-ante Discount is not applied, with a reimbursement to the network user in case of interruptions.

Table 11. Example for classification of interruptible capacity products for the assessment report

	Year 1 – IP x, monthly product	
	Type 1	Type 2
Description Brief description of the main characteristics of the product	Monthly interruptible product offered in winter months	Monthly interruptible product offered in summer months
Season	Winter Season (Oct – March)	Summer Season (Apr – Sept)
Risk of interruptions (Risk (%))	Risk (%) = 15 %	Risk (%) = 2 %
Ex-ante Discount $Di_{m,I}$	No	
Ex-post Discount $Di_{m,II}$	$Di_{II} = \frac{\Sigma\, interrupted\ cap}{\Sigma\, nominated\ cap}$	

Appendix 5: Examples and Further Arguments against Marginal Pricing of Non-Physical Backhaul

In the corresponding section of Chapter 6 of this LD (Reserve Prices) ENTSOG's concerns about marginal pricing of non-physical backhaul are explained. The following table shows examples of TSOs and E/E points which are in competition e.g. where you can transport gas via firm forward flow at point A or non-physical backhaul at point B according to Figure 11:

Table 12. Examples of IPs where firm and backhaul capacity products could be offered in parallel

From	To	IP (ENTSOG Cap No.)	uni- / bi-directonal	Capacity GWh/d	Sum
SK	AT	Baumgarten 1 (46)	uni-directional	392	
SK	AT	Baumgarten 2 (46)	uni-directional	1436	2306
SK	AT	Baumgarten 3 (46)	bi-directional	478	
AT	SK	Baumgarten 3 (46)	bi-directional	248	248
BE	DE	Eynatten (6)	bi-directional [57]	NCG 162.7 Gaspool 136.5	
DE	BE	Eynatten (6)	bi-directional	NCG 341.5 Gaspool 85.9	
NL	DE	Bocholtz (11)	uni-directional	454.3	
NL	DE	Zevenaar (12)	uni-directional	487.2	
NL	DE	Winterwijk (13)	uni-directional	178.6	1427
NL	DE	Vlieghuis (14)	uni-directional	47.9	
NL	DE	Bunde (16)	uni-directional	254.1	
NL	DE	Haanrade (63)	uni-directional	4.9	
DE	NL	Bunde (16)	bi-directional	339.1	339.1
DE	CZ	Brandov (40)	uni-directional	283.4	1243.6
DE	CZ	Opal /Brandov (42)	uni-directional	960.2	
CZ	DE	Deutschneudorf (41)	bi-directional	242.9	242.9
CZ	DE	Brandov (40)	uni-directional	22.7	1033.1
CZ	DE	Waidhaus (43)	uni-directional	1010.4	
DE	CZ	Deutschneudorf (41)	bi-directional	48.9	48.9
NCG	GASPOOL	Reckrod (106)	uni-directional	2.2	2.2
GASPOOL	NCG	Bunder Tief (107)	bi-directional	5.1	71.7
GASPOOL	NCG	Stenitz (113)	bi-directional	66.6	

[57] Eynatten is a bi-directional IP for Fluxys Belgium, Fluxys TENP, OGE, Gascade. For Thyssengas it is an uni-directional point.

GASPOOL	NCG	Kienbaum (103)	uni-directional	66.6	
GASPOOL	NCG	Broichweiden Süd (104)	uni-directional	10.9	
GASPOOL	NCG	Lampertheim (IV)	uni-directional	45.5	238.2
GASPOOL	NCG	Drohne (108)	uni-directional	46.3	
GASPOOL	NCG	Emsbüren RG (110)	uni-directional	68.9	
NCG	GASPOOL	Stenitz (113)	bi-directional	34.4	34.4

The capacity refers to the technical capacity published at www.gas-roads.eu and/or ENTSOG Capacity Map.

Further concerns on the marginal cost pricing approach:

- Marginal cost pricing for interruptible capacity seems to undermine the choice of cost allocation methodology made by the TSO.
- The interruptible products whether physical or non-physical are the same; with the only difference that one product will be interrupted if there are too many nominations whereas the other one will be interrupted if there are not enough nominations.

Appendix 6: List of Figures, Tables and Abbreviations

Figures

Tables

Abbreviations

LD – this Launch Documentation setting the basis for the development of the future TAR NC
TAR FG – Framework Guidelines on rules regarding harmonised transmission tariff structures for gas, 29 November 2013
TAR NC – the Network Code on Harmonised Transmission Tariff Structures for gas
Gas Directive – Directive of the European Parliament and of the Council concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC, 13 July 2009
Gas Regulation – Regulation (EC) No 715/2009 of the European Parliament and of the Council on conditions for access to the natural gas transmission network and repealing Regulation (EC) No 1775/2007, 13 July 2009
CAM NC – Commission Regulation No 984/2013 establishing a Network Code on Capacity Allocation Mechanisms in Gas Transmission Systems and supplementing Regulation (EC) No 715/2009, 14 October 2013
BAL NC – Commission Regulation establishing a Network Code on Gas Balancing of Transmission Networks
ENTSOG – European Network of Transmission System Operators for Gas
TSO – transmission system operator for gas
ACER – Agency for the Cooperation of Energy Regulators established by Regulation (EC) No 713/2009 of the European Parliament and of the Council, 13 July 2009
EC – the European Commission
IP – interconnection point, as defined by Article 3(10) of the CAM NC