ERSE
ENTIDADE REGULADORA
DOS SERVIÇOS ENERGÉTICOS

PUBLIC CONSULTATION

Nº 66

IMPLEMENTATION OF THE NETWORK CODE ON HARMONISED TRANSMISSION TARIFF STRUCTURES FOR GAS

august 2018

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1 DESCRIPTION OF THE PUBLIC CONSULTATION

WHAT IS THIS DOCUMENT ABOUT?

Regulation (EU) 2017/460, of 16 March 2017, establishes a network code on harmonized transmission tariff structures for gas, including rules on the application of a reference price methodology, publication and consultation requirements, as well as the calculation of reserve prices for standardized capacity products. This Regulation (hereafter gas tariff network code) is binding in its entirety and directly applicable in all EU Member States since April 2017, without prejudice to the different deadlines for entry into force for certain matters.[1]

One of the key objectives to be achieved by the Regulation is to increase the transparency of tariff structures for the transmission of natural gas and of the procedures for their definition. In this context, the publication of information related to the determination of allowed revenues for transmission system operators and the calculation of the different tariffs for the use of the transmission system are mandatory. These requirements should enable network users to understand the tariffs established for transmission services and other regulated non-transmission services provided by the transmission system operator, as well as the manner in which tariffs are defined, their historical and future changes. In addition, network users should be able to identify and know the costs underlying transmission tariffs and to forecast them.

The structure of this public consultation reflects the structure of the public consultation requirements set out in Article 26(1) of the gas tariff network code (TAR NC). The public consultation is accompanied by additional documentation, namely:

- Supporting document entitled "Annex – Comparison of reference price methodologies".
- Summary in English of the subjects included in the public consultation, presented in a format pre-established by the Agency for the Cooperation of Energy Regulators (ACER).
- Files in Excel format with the application of the reference price methodologies.

TARGET AUDIENCE OF THIS PUBLIC CONSULTATION

The target audience of this public consultation are all agents of the natural gas sector, in particular:

- Consumers and consumer associations.
- Traders.

[1] In addition to the tariff network code ('TAR NC') there are three further EU network codes, namely for 'capacity allocation mechanisms' ('CAM NC'), for 'gas balancing of transmission networks' ('BAL NC') and for 'interoperability and data exchange rules' ('INT NC'). The CAM NC has been revised and entered into force on 6 April 2017, on the same date as the TAR NC.

- Operators of high pressure gas infrastructure: transmission network, LNG terminal and underground storage.
- Distribution network operators.
- National regulatory authority for the natural gas sector in Spain.[2]

WHAT IS THE DURATION OF THE CONSULTATION?

The Statutes of ERSE, approved by Decree-Law 97/2002, of 12 April, in the wording given by Decree-Law 57-A / 2018, of July 13, establish in Article 10, paragraph 2, the requirement of a 30-day period during which interested parties can provide their comments and make suggestions regarding ERSE's public consultations. On the other hand, the gas tariff network code requires a minimum period of two months during which the public consultation must take place. In order to comply with both time requirements, the present public consultation will run from 17 August 2018 to 17 October 2018.

HOW TO PARTICIPATE IN THIS CONSULTATION?

Comments on the questions put to public consultation at the end of chapters 3 to 7, and summarized in chapter 8 of this document, should be sent to ERSE by 17 October 2018, by post, fax or, preferably, electronic mail, to the following addresses:

- Postal address: Rua D. Cristóvão da Gama nº 1, 3rd floor, 1400-113 Lisbon.
- Fax: 213 033 201
- E-mail: tarifastransporte@erse.pt

Comments received will be considered public, unless the author explicitly requests confidentiality. In the latter case, a non-confidential version must also be submitted.

WHAT HAPPENS TO COMMENTS RECEIVED BY ERSE?

Contributions sent to ERSE will be analysed in a public document that will be made available to all participants in the consultation. This document will contain the non-confidential comments received, ERSE's comments and justification of the decisions taken.

Pursuant to Article 26(3) of the gas tariff network code, ERSE shall publish the responses to the public consultation and their summary, including a summary in English, within one month following the end of the consultation process.

[2] The need to consult the national regulatory authority in Spain on matters covered by chapter 7 results from Article 28(1) of the gas tariff network code. Regulation of the natural gas sector in Spain lies with the '*Comisión Nacional de los Mercados y la Competencia*' (CNMC).

2 CURRENT STRUCTURE OF THE TARIFFS FOR THE USE OF THE TRANSMISSION NETWORK

Since the gas year 2010-2011, ERSE applies an 'entry-exit' methodology in the calculation of the tariffs for the use of the gas transmission network.[3] The methodology uses a matrix approach to determine the incremental costs of using the transmission network based on information on the distances between the points of entry and exit of the transmission network, the investments made and the forecasted natural gas capacities.[4]

ERSE has maintained the incremental costs determined for the gas year 2010-2011 to define the pricing structure of transmission network tariffs and has applied multiplicative factors (scaling) to adjust prices at entry and exit points in order to recover the allowed revenues of the natural gas transmission system operator.

Table 2-1 - Entry and exit points of the gas transmission network

Type of point	Infrastructure	Billing variables of transmission tariffs
Entry	VIP (Campo Maior + Valença do Minho)	• Contracted capacity
	LNG terminal (Sines)	• Contracted capacity
	Underground storage (Carriço)	• Contracted capacity
Exit	VIP (Campo Maior + Valença do Minho)	• Contracted capacity • Commodity
	LNG terminal (Sines)	• Contracted capacity • Commodity
	Underground storage (Carriço)	*Not applicable*
	Customers in High Pressure (HP)	• Used capacity • Commodity
	Distribution networks	• Used capacity • Commodity
	Installations supplied by autonomous gas units (UAG)	• Commodity

Table 2-1 shows the billing variables applied in the context of transmission tariffs for natural gas, separated by point of entry and exit of the gas transmission network. The transmission tariffs for the entry points only present a contracted capacity term, while for the exit points they are billed through a capacity[5] term and a

[3] Before that ERSE applied a 'postage stamp' methodology.

[4] The detailed description of the methodology can be found in the ERSE document entitled 'Determinação da Estrutura Tarifária no ano gás 2010-2011' (only available in Portuguese), published in June 2010.

[5] In the case of the VIP and the LNG terminal the applicable capacity concept is 'contracted capacity'. In the case of customers in HP and distribution networks, the applicable capacity concept is 'used capacity'.

power term, except for the installations supplied by autonomous gas units (UAG), where billing includes only a commodity term. The billing variables are defined in the following table.

Table 2-2 - Definitions of the billing variables for gas transmission tariffs

Billing variables	Unit	Definition
Contracted capacity	kWh/day	Capacity contracted by the market agent in the capacity allocation processes, constituting a right of use of capacity, with a payment of a binding nature and regardless of the actual use, for various time horizons.
Used capacity	kWh/day	Maximum daily energy in the last 12 months, measured at the point of delivery of the transmission system. This daily maximum amount is paid during the following twelve months.
Commodity	kWh	Energy consumed and measured at the point of delivery of the transmission network.

Additional tariff options for customers in High Pressure (HP) are in force, namely a transmission tariff for short uses and several flexible tariffs. The tariff options available to customers in HP are summarized in the table below.

Table 2-3 - Tariff options for the gas transmission tariffs for customers in HP

Tariff options	Billing variables	Characteristics
Base tariff	• Used capacity • Commodity	The used capacity corresponds to the maximum daily energy in the last 12 months.
Short uses	• Used capacity • Commodity	The used capacity corresponds to the maximum daily energy in the last 12 months.
Flexible daily tariff	• Used capacity • Commodity	Payment of the capacity term on a daily basis. The daily capacity corresponds to the daily consumption.
Flexible monthly tariff	• Used capacity • Commodity	Payment of the capacity term on a monthly basis. The monthly capacity term corresponds to the maximum daily consumption recorded in the month of the invoice.
Flexible annual tariff	• Annual base capacity • Monthly additional capacity • Commodity	Payment of the term of annual and monthly capacity - overlapping of capacities is allowed exclusively in the summer months (April to September). The annual base capacity must be greater than or equal to the maximum daily consumption recorded in the winter months (October to March) of the previous 12 months, including the month to which the invoice respects. The additional monthly capacity (summer months only) is the difference between the maximum monthly capacity determined in the billing month and the annual base capacity.

In the LNG terminal and in the international interconnections, zero exit tariffs apply.

3 REFERENCE PRICE METHODOLOGY

This section is intended to comply with Article 26(1)(a) of the gas tariff network code.

The Regulation provides for regular public consultations on the reference price methodology, which is defined as the methodology applied to the part of transmission service revenue to be recovered through capacity-based transmission tariffs.

According to Article 3 of the gas tariff network code, the 'reference price' is a "*price for a capacity product for firm capacity with a duration of one year, which is applicable at entry and exit points and which is used to set capacity-based transmission tariffs*". The 'reference price methodology' is intended to determine the reference prices for the various points of entry and exit.

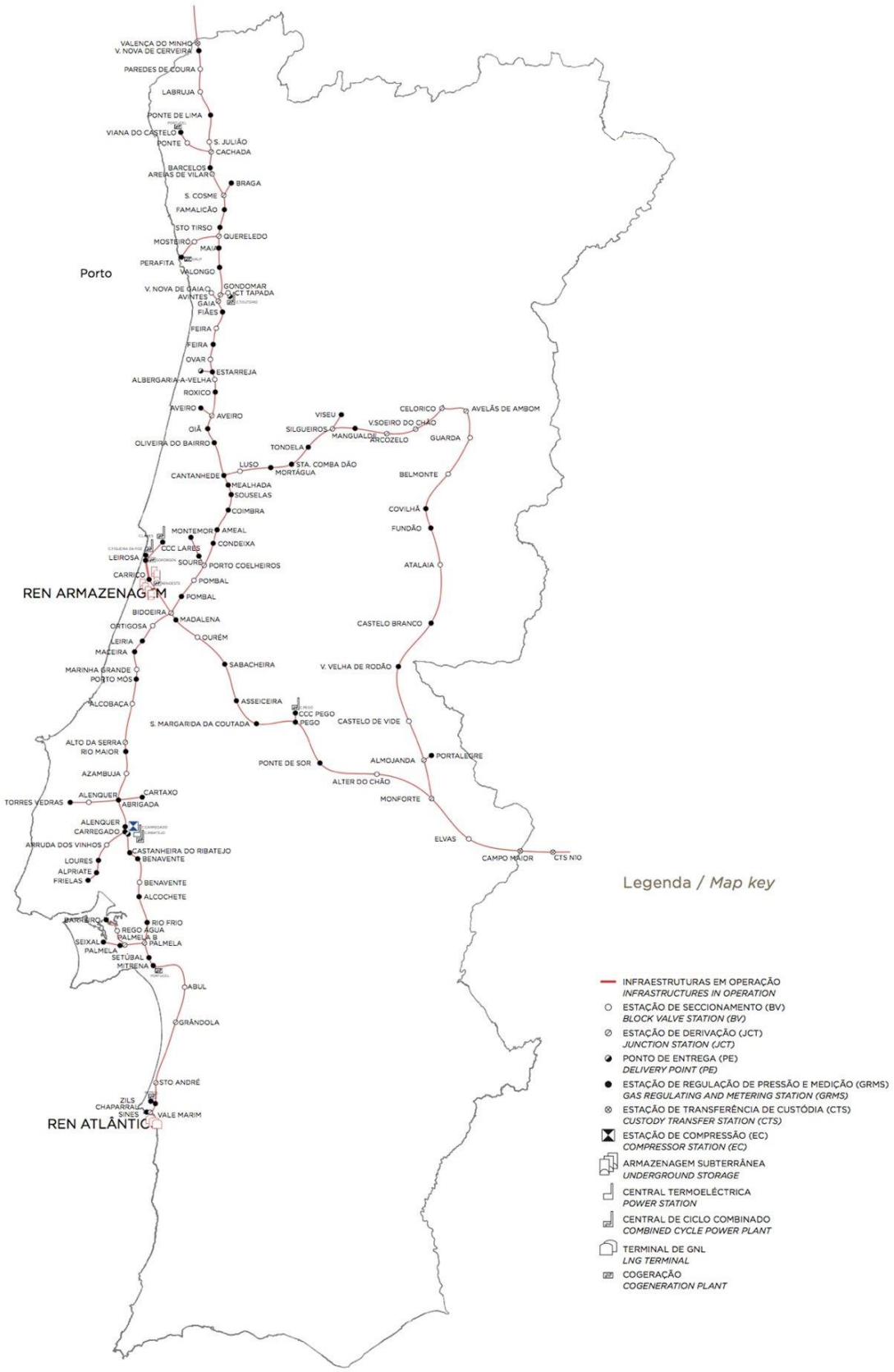
3.1 DESCRIPTION OF THE NATIONAL TRANSMISSION NETWORK

This section briefly describes the national gas transmission network, namely to understand the simplified transmission network diagram that is adopted for the application of the reference price methodology.

The national natural gas transmission network, shown in Figure 3-1, consists of two axes: a north-south axis connecting the interconnection point at Valença do Minho and the LNG terminal in Sines, and an east-west axis, which connects the interconnection point in Campo Maior with the west coast, passing close to the underground storage in Carriço. In 2013 the connection between two sections ending in Mangualde and Guarda was completed, resulting in a circular section linking these two points. The national natural gas transmission network currently has a length of 1 375 km, has transmission pipeline diameters between 150 and 800 mm and includes 85 gas regulation and metering stations (GRMS) at the delivery points.[6]

[6] Data referring to the end of 2016, presented in the Ten Year Network Development Plan of the National Gas Transmission Network, Storage Infrastructures and LNG Terminals for the period 2018-2027.

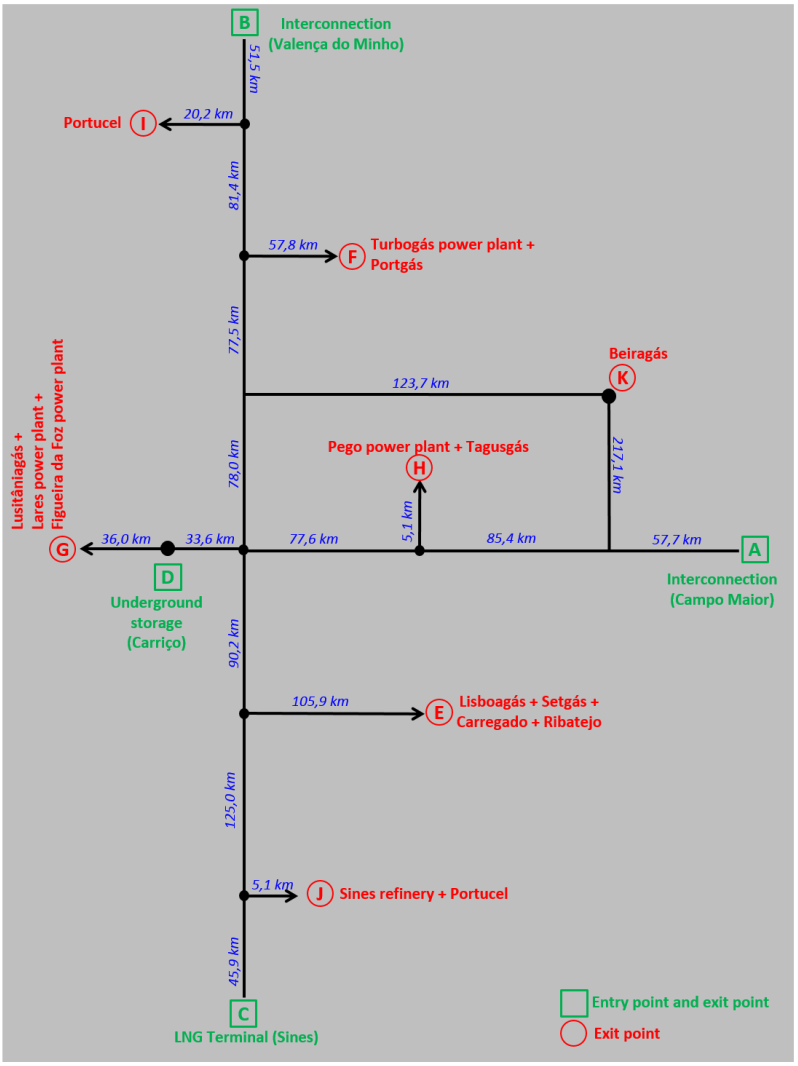
Figure 3-1 - National transmission network for natural gas



Source: Based on the map of the transmission network by 'REN Gasodutos'.

The following figure shows the simplified national transmission network diagram used in the reference price methodology to determine the distances between entry points and exit points.[7]

Figure 3-2 - Simplified diagram of the gas transmission network



The national gas transmission network includes four entry points, namely two interconnection points with Spain (Campo Maior and Valença do Minho), the LNG terminal at Sines and the underground storage at Carriço. These four entry points are also considered as exit points of the transmission network. In the case of the interconnections and the underground storage, the infrastructure is effectively bidirectional, allowing gas to flow in both directions. In the case of the LNG terminal, although the flow of natural gas is

[7] It should be noted that this diagram represents an update of the simplified network diagram presented in the document "Natural Gas Transmission Tariffs Summary - Portugal 2018-2019", published in June 2018 and made available on the ERSE website.

unidirectional, consubstantiating an entry point of the transmission network, the agents can, through a contract, place gas in the terminal by reducing the physical flow of gas leaving the terminal, implying that this facility is also considered as an exit point.

The remaining exit points of the transmission network, represented by the gas regulation and metering stations at the delivery points, were grouped into a total of seven exit zones, and are indicated by the letters E to K in Figure 3-2. The distances to these exit zones were determined by taking the most significant point within each group as the reference point.

3.2 REFERENCE PRICE METHODOLOGY

The reference price methodology proposed in this public consultation will be referred to as the **modified capacity-weighted distance (modified CWD)[8] methodology** and uses the forecasted natural gas capacities, the distances between the relevant points and the unit costs of the transmission system as allocation factors to define the tariffs for the use of the transmission network. The methodology's designation reflects its proximity to the capacity-weighted distance (CWD) methodology, defined in Article 8 of the gas tariff network code, whose application is optional, but integrates in addition the unit costs of the network sections.

The table below summarizes the main features of the modified CWD methodology. The methodology now proposed adopts from the current methodology the perspective of unit costs for the various sections that connect the entry points to the exit points of the transmission network. However, the present methodology proposal introduces some simplifications that approximate it to the methodology defined in the gas tariff network code, called the capacity-weighted distance methodology.

[8] The acronym 'CWD' stands for the abbreviation of the capacity-weighted distance methodology defined in Article 8 of the tariff network code.

Table 3-1 - Summary of the reference price methodology

Methodology	Modified capacity-weighted distance (modified CWD) methodology
Allocation factors	Distance, capacity, cost of transmission network
Parameters	• Distance: matrix of distances between points of entry and exit. • Capacity: capacities contracted/used at points of entry and exit. • Cost of transmission network: CAPEX in transmission network. • Entry-exit split. Other parameters are also used for reconciliation with the allowed revenues for the transmission system operator, namely the detailed demand forecast, tariff options applicable to exits to domestic consumption and the discounts provided for in Article 9 of the gas tariff network code.
Steps	1. Determination of the cost matrix – Distribution of costs taking into account the allocation factors. 2. Calculation of reference prices (pre-adjustment) – Calculation of the pre-adjustment reference prices for the entry and exit points based on the cost matrix and the 'entry-exit' split, together with price equalization in the domestic exit points and at the VIP. 3. Calculation of reference prices (post-adjustment) – Calculation of the post-adjustment reference prices by applying the discounts of Article 9 and ensuring reconciliation with the allowed revenue.
Additional note	The reference price methodology results in zero prices for the points whose use does not entail costs for the system (for example, where the use is predominantly in reverse flow).

The choice of this new reference price methodology allows combining the virtues of the matrix model currently in force and of the capacity-weighted distance methodology provided in the gas tariff network code. On the side of the model currently in force, the inclusion of the concept of unit costs allows reflection in the transmission tariffs of the costs of capacity for the use of the transmission network. In particular it is possible to reflect the fact that for some network segments with permanent flows always in the same direction, the contracting of capacity in reverse flow does not represent an additional cost for the network. On the side of the capacity-weighted distance methodology, to be considered as a comparison term under the terms of the gas tariff network code, the new methodology uses a weighted average of the capacities and distances to allocate the allowed revenues at the points of entry and exit of the transmission network.

Compared to the current methodology, the modified CWD methodology is based on greater simplicity and promotes transparency for the stakeholders of the sector. This simplicity is justified by the structure of the natural gas transmission network in Portugal, which is less complex compared to transmission networks in other countries. The decision to adopt a simpler model is also explained by the need to preserve the tariff uniformity at the exit points to customers and distribution networks, a principle foreseen in the general legal

framework[9] and in the national tariff code of the natural gas sector, which limits the advantages of adopting more complex methodologies.

The gas tariff network code indicates in Article 6(4) the possibility of introducing price adjustments after the application of the reference price methodology. The allowable adjustments to the methodology of the reference price are the discounts[10] indicated in Article 9, adjustments based on criteria of price competitiveness, the equalization of prices in points belonging to a homogeneous group of points and the scaling of prices by multiplicative or additive factors. The reference price methodology proposed by ERSE applies all these adjustments, except for the adjustment based on competitiveness criteria. In particular, discounts are applied under Article 9 of the gas tariff network code at the entry point to and exit point from the underground storage, as presented in chapter 7 of this document.

In the reference price methodology, the first stage corresponds to the construction of the cost matrix, which weights the different allocation factors, namely the distances, contracted and used capacities at the relevant points and the unit investment costs. Subsequently, the adjustments referred to in the second and third stages are applied (see Table 3-1). The second step incorporates the adjustment of the reference price equalization to points belonging to a homogeneous group of points.[11] The price equalization applied results in a single price for the virtual interconnection point (VIP), by grouping the two interconnection points with Spain, and in a single price at the points of exit to customers (customers in HP and distribution networks). The equalization of prices at exit points to customers results from the tariff uniformity principle already mentioned. In the third step, Article 9 discounts and multiplicative scaling of prices at entry points and exit points are included to recover allowed revenues taking into account the forecasted capacity levels.

The entry-exit split is an important parameter, since it determines the proportion of revenue to be recovered at the entry and exit points. As a result of the evaluation of the investments in the national transmission network, it is considered that the entry-exit split should be 40%-60%, meaning the proportion of transmission service revenues to be recovered from capacity-based transmission tariffs at all points of entry should be 40%, with the remaining 60% to be recovered at all exit points. Table 3-2 compares the proposed value in the scope of this public consultation with the present tariff division for the gas year 2018-2019.

[9] Decree-Law no. 30/2006, of February 15, in the wording of Decree-Law no. 230/2012, of October 26, establishes in Article 55 that the calculation and setting of regulated tariffs obey the principle of tariff uniformity, so that the tariff system applies universally to all customers.

[10] Article 9 discounts shall apply at entry points from and exit points to storage facilities and at entry points from LNG facilities and infrastructure ending isolation of Member States.

[11] Article 6(4)(b).

Table 3-2 - Entry-exit split for capacity-based tariffs

	Entry-exit
Tariffs for gas year 2018-2019	27% - 73%
Proposal for the entry-exit split	40% - 60%

It should be emphasized that up to now the entry-exit split was not an exogenous parameter imposed on the tariff model, but it was endogenous to the methodology used and the revenue reconciliation processes applied over time.[12] For the new methodology it is proposed to impose an entry-exit split that must be preserved.

The entry-exit split of 40%-60% was determined based on investments in the national transmission network since 1997, at current values, divided into central pipelines, connections to end-users and GRMS. In this context, it was considered that the central pipelines are used equally by the points of entry and exit, resulting in proportions of 50%-50% to allocate these costs to the points of entry and exit, respectively. In relation to connections to end-users and GRMS, it is considered that these investments must be exclusively allocated to the exit points, which results in proportions of 0%-100% for the entry-exit points. The series of investment, since 1997, for these two sets of investments results therefore in an entry-exit split of 40%-60%.

A more detailed description of the reference price methodology can be found in the supporting document "Annex - Comparison of Reference Price Methodologies". That document presents three methodologies, namely: (i) modified CWD methodology proposed in this public consultation, representing the reference price methodology to be adopted using forecasted gas capacities, the distances between points of entry and exit and unit costs of the transmission network; (ii) capacity-weighted distance methodology as established in Article 8 of the gas tariff network code to be presented for comparison purposes; and (iii) matrix methodology used to define the current transmission tariff structure.[13] The results obtained with these three methodologies are compared and discussed in the supporting document.

3.3 INDICATIVE REFERENCE PRICES

This section presents the indicative reference prices of the new reference price methodology. These prices are based on the values set in the tariffs for the gas year 2018-2019 as the best estimate for the gas year

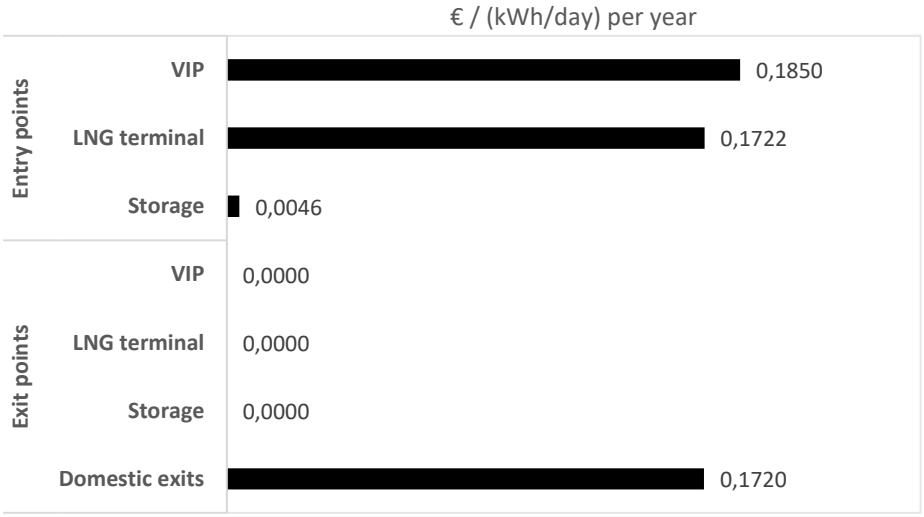
[12] For example, the ERSE document '[Determinação da Estrutura Tarifária no ano gás 2010-2011]' (only available in Portuguese), published in June 2010, showed that the optimization model pointed to an entry-exit split of total revenues of 44% at entry points and 56% at exit points. These values resulted endogenously from the model.

[13] The detailed description of the matrix methodology is found in the ERSE document entitled '[Determinação da Estrutura Tarifária no ano gás 2010-2011]', published in June 2010.

2019-2020, namely in terms of allowed revenues and quantities forecasted for the various capacity products.

These figures already include the application of discounts to the prices of storage facilities[14] (Article 9(1)), the equalization of prices at points belonging to a homogeneous group of points (Article 6(4)(b)) and multiplicative scaling by a constant (Article 6(4)(c)) in order to recover the allowed revenue.

Figure 3-3 - Indicative reference prices



Chapter 6 presents all tariffs for the use of the transmission network, namely the different tariff options applied to customers connected directly to the transmission network in High Pressure.

It is recalled that a zero price at the exit point of the VIP reflects the fact that the interconnection points in the direction Portugal-Spain are used predominantly in reverse flow[15], reason why their use does not represent a cost for the gas transmission network. In fact, any contracting of capacity in the Portugal-Spain direction, as it is satisfied by reduction of the physical flow in the Spain-Portugal direction, does not give rise to capacity costs in the transmission network. Likewise, the contracting of transmission network capacity for underground storage in backpressure is conditioned by the capacity of the underground storage compressors (active restriction) and not by the exit capacity of the transmission network.[16] The reference price methodology adopted, incorporating the unit cost function in its analysis, allows integration of this economic dimension into the entry-exit tariffs, of particular relevance for the promotion of an efficient use

[14] The 95% discounts applied to the entry points from and exit points to storage facilities are presented in section 7.3.

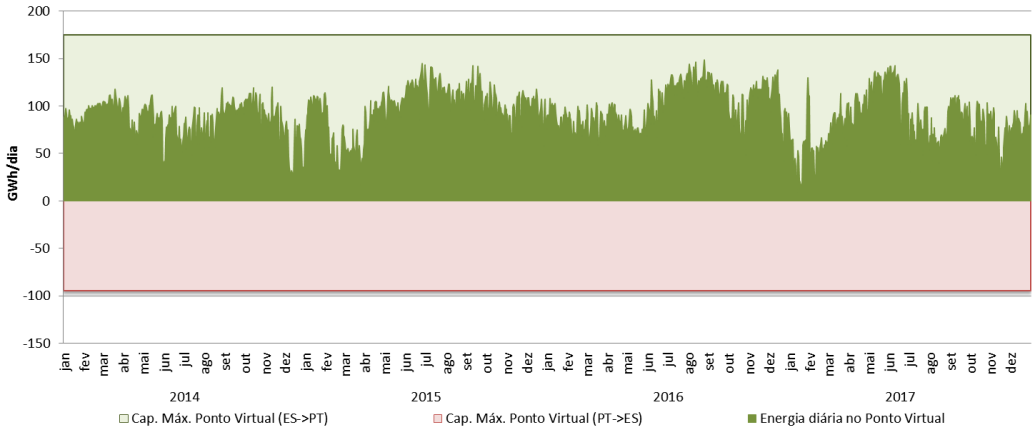
[15] Historically, there have been no physical gas flows in the Portugal-Spain direction.

[16] In fact, since the latter is much higher than the capacity of the compressors, an incremental cost of zero capacity at the exit of the transmission network is justified (the underground storage compressors are not an asset of the national transmission network).

of the transmission network. The following two figures illustrate the reverse flow situation in the VIP and backpressure in the underground storage.

Figure 3-4 shows the daily flow of natural gas at the virtual interconnection point (VIP) in the years 2014 to 2017 and illustrates that the flow of natural gas in the VIP is permanently in the Spain-Portugal direction, corroborating the previous argument regarding the use in reverse flow of the VIP as an exit point of the national natural gas transmission network.

Figure 3-4 - Daily flow of natural gas at the virtual interconnection point, from 2014 to 2017

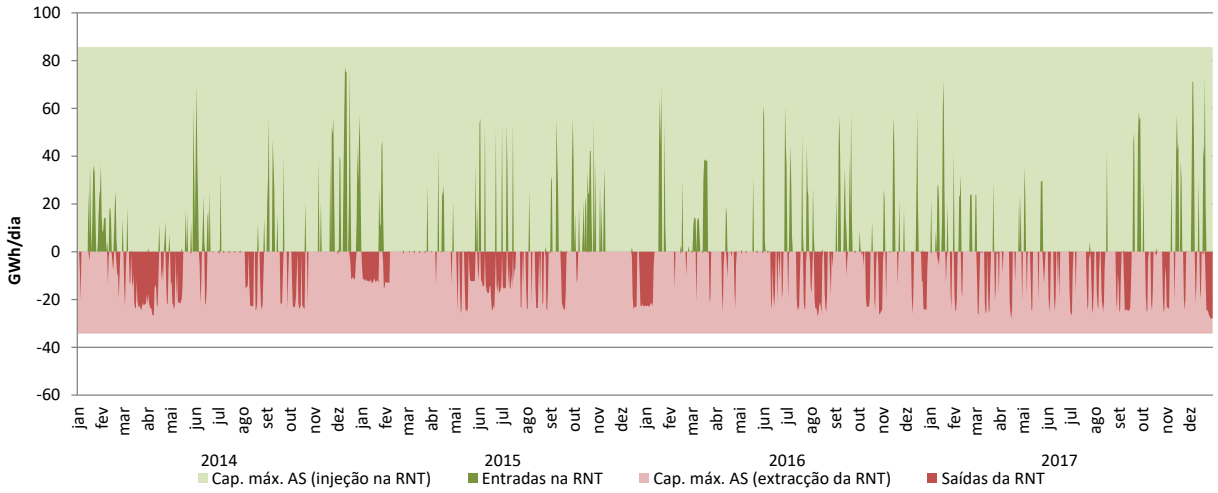


Note: Positive values represent flows in the Spain-Portugal direction. Graph from Chapter 5 of the document "Caracterização da Procura de Gás Natural no ano gás 2018-2019" (only available in Portuguese), published by ERSE in June 2018.

Similarly, Figure 3-5 shows the daily flow of natural gas at the connection with the underground storage. The maximum underground storage capacity indicated in the figure for the extraction from the transmission network (transmission exit point) corresponds to the maximum capacity of the underground storage compressors, which are not assets of the natural gas transmission network. From the perspective of the transmission network, the maximum capacity for underground storage as an exit point is equal to the maximum capacity of underground storage as an entry point.[17] Therefore, this evidence illustrates the use in backpressure of the underground storage as an exit point from the transmission network.

[17] Figure 3-5 indicates that this limit is greater than 80 GWh/day.

Figure 3-5 - Daily natural gas flow from and to the underground storage, from 2014 to 2017



Note: Positive values represent flows entering the transmission network from the underground storage. Chart of Chapter 5 of the document "Caracterização da Procura de Gás Natural no ano gás 2018-2019" (only available in Portuguese), published by ERSE in June 2018.

3.4 COST ALLOCATION ASSESSMENTS

According to Article 5 of the gas tariff network code, two cost allocation assessments must be carried out, in particular to assess whether there is cross-subsidization between the use of the network at a cross-system level (transit of natural gas crossing the country) and at an intra-system level (flows of natural gas that are destined for domestic consumption).

Article 5 requires the calculation of two indicators, one for revenue from capacity-based tariffs and another for commodity-based tariffs, to assess whether the recovery of revenue from cross-system and intra-system uses is proportional to the cost drivers. The indicator for the presence of cross-subsidization varies between 0% and 200%, where 0% indicates the absence of cross-subsidization and 200% indicates the situation of maximum cross-subsidization. Article 5(6) states that in the case of indicators exceeding 10%, the national regulatory authority shall justify those results in its final decision referred to in Article 27(4).

Given the predictions of no contracted capacity at the exit point to the VIP, there is no forecast for the occurrence of cross-border flows in the national gas transmission network. The cost allocation evaluations produced the following results[18]:

[18] In the absence of a cross-system use, the cost allocation comparison index (CACI) results in a mathematical impossibility (division by zero). For these situations, it is considered that the CACI should be zero, since cross-subsidization cannot exist.

- The capacity cost allocation comparison index results in a value of 0%, which does not exceed the indicative value of 10%.
- The commodity cost allocation comparison index results in a value of 0%, which does not exceed the indicative value of 10%.

Chapter 9 presents the detailed calculations for the cost allocation assessments, including the results for a second scenario with a cross-system use of the transmission network.

3.5 EVALUATION OF THE PROPOSED REFERENCE PRICE METHODOLOGY

This section assesses whether the new reference price methodology to be applied in the calculation of tariffs for use of the transmission network in Portugal complies with the requirements of Article 7 of the gas tariff network code and Article 13 of EC Regulation 715/2009.

According to Article 7 of the gas tariff network code, a set of requirements must be respected, namely: (i) allow network users to reproduce the calculation of reference prices; (ii) take into account the actual costs of the service (in view of the complexity of the transmission network); (iii) ensure non-discrimination and avoid cross-subsidization; (iv) avoid risk assignment of gas transits to final consumers; and (v) ensure that reference prices promote cross-border trade.

Pursuant to Article 13 of EC Regulation 715/2009, which refers to tariffs for access to networks in the natural gas sector, i.e. tariffs for the use of the transmission system, tariffs (or the methodology for calculating them): should be "transparent, take into account the need for system integrity and its improvement and reflect the actual costs incurred"; should be "applied in a non-discriminatory manner"; "shall facilitate efficient gas trade and competition, while at the same time avoiding cross-subsidies between network users and providing incentives for investment and maintaining or creating interoperability for transmission networks"; and "shall neither restrict market liquidity nor distort trade across borders".

In ERSE's understanding, the reference price methodology proposed in this public consultation meets the requirements above. On the one hand, the reference price methodology is sufficiently simple and well-documented to be transparent, allowing for calculation reproduction by the users of the national natural gas transmission network. On the other hand, the methodology includes the main allocation factors in the use of the transmission network, as well as the distances between the relevant points in the network, the natural gas capacities in the points of entry and exit, as well as the unit costs of the network.

Finally, the resulting prices promote the efficient use of transmission networks, including the promotion of cross-border trade. This latter aspect would be strongly compromised with the adoption of the CWD methodology defined in Article 8 of the gas tariff network code, as a result of the application of a positive price at the exit point of the VIP.

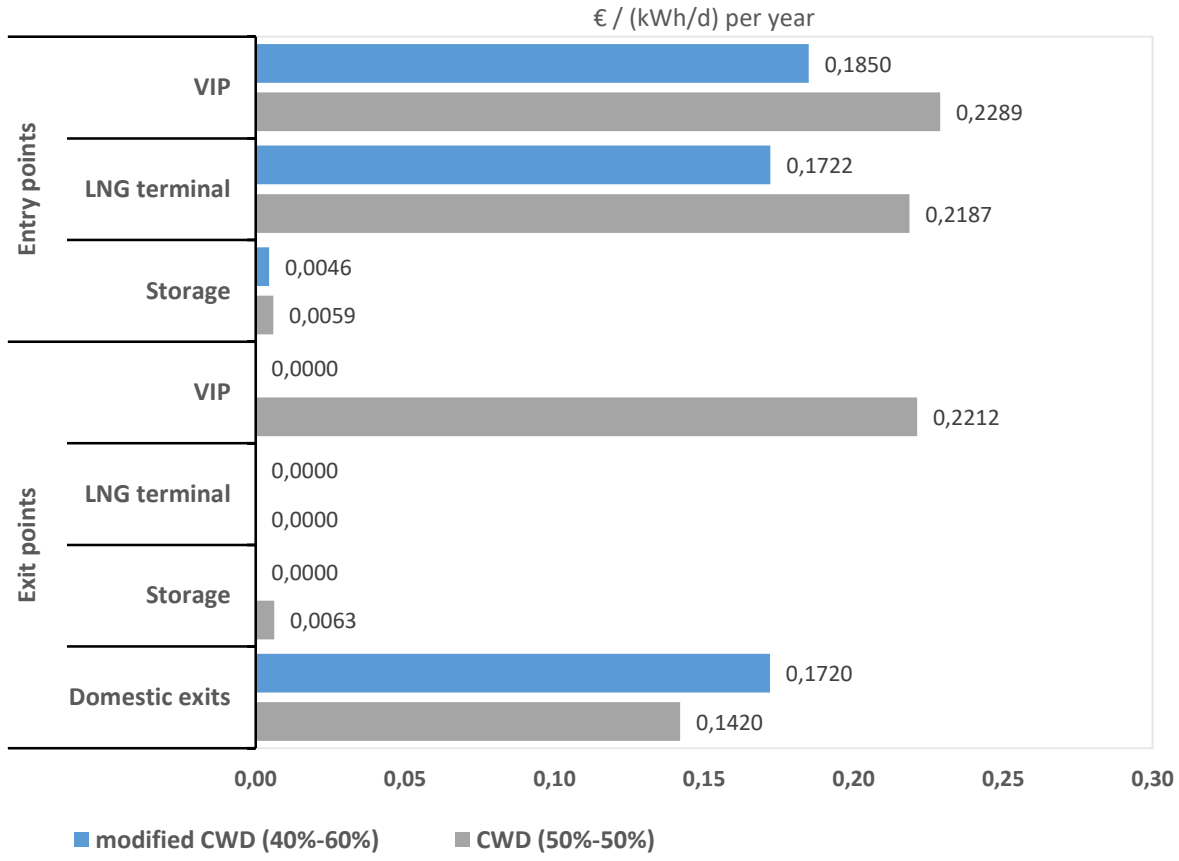
3.6 COMPARISON OF THE REFERENCE PRICE METHODOLOGY WITH THE CAPACITY-WEIGHTED DISTANCE METHODOLOGY

Where the methodology of the reference price differs from the methodology of the capacity-weighted distance defined in Article 8 of the gas tariff network code, it is obligatory to compare it with the latter.

In this sense, it is important to underline some differences between the reference price methodology proposed (modified CWD) in this public consultation and the capacity-weighted distance (CWD) methodology. Firstly, the modified CWD methodology allows the identification of reverse flow scenarios, as these situations do not contribute to the need for network expansion investments, allowing new investments to be postponed by contributing to a more efficient use of installed assets (for instance, by mitigating congestion problems at interconnection points). In the CWD methodology, the occurrence of reduced gas flows, even when they occur in reverse flow, is translated into the application of significant transmission tariffs, which does not promote an efficient use of the transmission network. Secondly, the proposed methodology allows inclusion of the cost of the network as a determining factor for the tariff structure, while the methodology presented in the gas tariff network code only considers distances and contracted capacities as relevant factors. This feature allows reflection of the structural differences in the cost allocation that are not captured by the distances between the points in the network or by the gas capacities.[19] The following figure shows the reference prices for the two methodologies.

[19] In addition to the reverse flow situation mentioned above, another example of possible application would be transmission networks with subsea pipelines, which entail higher costs (not being the situation in Portugal, this distinction would be relevant for countries such as the Republic of Ireland).

Figure 3-6 - Comparison of indicative reference prices between the modified CWD and the CWD methodology



The direct comparison of the reference prices highlights the different assumptions in terms of the entry-exit split. In the case of the CWD methodology, the gas tariff network code establishes a 50%-50% division between entry and exit points, respectively. In ERSE´s proposed methodology a 40%-60% division between entry and exit points was used, so that, on the one hand, a separation is maintained close to the current situation and, on the other hand, a more adequate sharing of investment costs between entry points and exit points. Investments in central pipelines of the transmission network are shared equally between users at entry points and exit points. On the other hand, the investments in connections to end users and GRMS are allocated exclusively to the exit points. These considerations result in an entry-exit split of 40%-60%, respectively.

These different assumptions mean that reference prices at entry points are generally higher in the CWD methodology when compared to the modified CWD methodology, with the opposite situation being observed in the exit points to customers.

Regarding the remaining prices at the exit points, namely at the VIP and the underground storage, the CWD methodology sets positive prices in both points, while in the modified CWD methodology, zero prices exist in these two exits. This last result derives directly from the assumptions used in the modified CWD methodology, namely the consideration of zero capacity unit costs in the gas flows towards the exit point to the VIP.[20] This option promotes economic efficiency in the transmission network, inasmuch as the contracting of capacity for these exits is carried out permanently against the gas flow, being satisfied through nominations that contribute to the reduction of the dominant flow in the Spain-Portugal direction and, consequently, dispensing with the need for new investments, a situation that justifies the adoption of zero exit prices.

A similar situation applies at the exit point to the underground storage. Since underground storage is carried out in backpressure (pressure in the transmission network is lower than the underground storage pressure) a capacity limitation is imposed by the underground storage compression facilities and not by the capacity of the transmission exit point. For these reasons, the modified CWD methodology considers a zero unit cost at the exit point to the underground storage. An opposite situation is observed at the entry point from the underground storage. In this case, as the unloading of underground storage is carried out in favor of the pressure profile, it is considered that the capacity restriction is imposed by the transmission network. Thus, a unit cost value is adopted for the entry point from the underground storage, identical to that of the other exit points and entry points.

3.7 CONSULTATION QUESTIONS

Question 1 – Given the reference price methodology presented in section 3.2, do you consider that this methodology is adequate to properly reflect the costs of the natural gas transmission network?

Question 2 – Considering the results of the cost allocation assessments in section 3.4, do you consider that the allocation of costs between cross-system (cross-border) flows and intra-system flows (for domestic exits) is appropriate?

Question 3 – Based on the analysis presented in section 3.5, do you consider that the reference price methodology meets the requirements of Article 7 of the gas tariff network code and Article 13 of EC Regulation 715/2009?

Question 4 – Given the comparison of the results of the reference price methodologies in section 3.6, how do you evaluate the adequacy of each methodology for determining reference prices for the natural gas transmission network in Portugal?

[20] See summary of the modified CWD methodology in Table 3-1.

4 REVENUE STRUCTURE OF THE TRANSMISSION SYSTEM OPERATOR

This section complies with Article 26(1)(b) of the gas tariff network code in order to provide the indicative information set out in Article 30(1)(b), subsections (i), (iv) and (v), concerning the revenue and earnings of the transmission system operator.

4.1 INDICATIVE INFORMATION

The indicative information on the revenue structure of the transmission system operator is provided in the following table.

Table 4-1 - Indicative information about the revenue structure of the transmission system operator

Article of network code	Description	Information		
Art. 30 (1)(b)(i)	Allowed revenues		92.840	thousand €
Art. 30 (1)(b)(iv)	Transmission service revenues		92.840	thousand €
Art. 30 (1)(b)(v)(1)	Capacity-commodity split of the transmission services revenue	Capacity	98,6%	
		Commodity	1,4%	
Art. 30 (1)(b)(v)(2)	Entry-exit split of the transmission services revenue (capacity-based tariffs)	Entry	40,6%	
		Exit	59,4%	
Art. 30 (1)(b)(v)(3)	Cross-system/ Intra-system split of the transmission services revenue (calculated as set out in Article 5)	Cross-system	0,0%	
		Intra-system	100,0%	

These prices are based on the values assumed in the tariffs for the 2018-2019 gas year, namely in terms of allowed revenues[21] and forecasted quantities for the various capacity products, which are considered as the best forecast for the future, and result from the new reference price methodology.[22]

4.2 CONSULTATION QUESTIONS

Question 5 – Given the indicative information on the allowed revenues of the transmission system operator in section 4.1, how do you assess the breakdown of these revenues by the dimensions given in Table 4-1?

[21] This amount is the result of the application of a "demand volatility mechanism" that defers the adjustments of revenues related to demand forecast deviations. The revenue recovered by the Transmission System Operator is 53 155 thousand euros.

[22] The entry-exit split diverges from the 40%-60% division presented in section 3.2 due to the reconciliation process for the allowed revenues, implemented in order to reach the 40%-60% division for the total allowed revenues (aggregating capacity-based and commodity-based tariffs). Therefore, the entry-exit split of 40%-60% is imposed on the reference price methodology, at the pre-adjustment price level, and on the total allowed revenues of the transmission system operator. The value shown in Table 4-1 refers to post-adjustment reference prices (capacity-based tariffs only).

5 COMMODITY-BASED TRANSMISSION TARIFFS

This section complies with Article 26(1)(c) of the gas tariff network code for commodity-based tariffs.

Article 4(3) states that revenue from transmission services must be recovered through capacity-based transmission tariffs but that, on an exceptional basis, they can be recovered through commodity-based transmission tariffs. The same number foresees the existence of two different modalities, namely a (i) flow-based charge and a (ii) complementary revenue recovery charge.

5.1 COMMODITY-BASED TRANSMISSION TARIFFS

ERSE proposes to maintain the presence of commodity-based charges in the tariff structure for the use of the transmission network, which are classified as a flow-based charge, in the unit €/kWh. This price will apply only to the exit points of the transmission network, complementing the capacity-based prices at the various exit points, maintaining commodity-based charges absent from the entry points.

According to Article 4(3)(a), a flow-based charge must meet the following criteria:

a) Levied for the purpose of covering the costs mainly driven by the quantity of the gas flow;

b) Be the same at all entry points and the same at all exit points; and

c) Expressed in monetary terms or in kind.

ERSE proposes to determine the flow-based charge from the OPEX costs in relation to the gas leaving the national transmission network, determining a marginal cost for the flow-based charge. This marginal cost measured in €/kWh is determined by the division of OPEX costs, corresponding to 1,4% of the CAPEX, by the gas quantity delivered at the exit points. This marginal cost, measured in €/kWh, is subject to the application of the multiplicative scaling for the purposes of recovering the allowed revenues of the transmission system operator, provided for in Article 6(4)(c), in line with that applicable to the capacity-based prices. The flow-based charge thus obtained will be applicable to all points of exit, including interconnection points with Spain, the LNG terminal, underground storage, customers connected in HP and distribution networks.

The requirement of the network code to apply the same flow-based charge at all exit points resulted in ERSE's decision to abandon the existence of zero commodity-based prices at the exit points to the VIP and to the LNG terminal.

It is also worth mentioning two aspects of the tariff structure in Portugal at the exit points to customers connected to HP that should be analyzed separately, namely the existence of consumption thresholds for commodity-based charges, applicable in some tariff options, and the tariff option for "short uses".

With regard to the tariff options with consumption thresholds, these have different commodity-based prices depending on the annual consumption of the user, differentiating users with an annual consumption of less than 10 million m^3 from users with a consumption equal to or greater than this value. The introduction of this differentiation represents a necessary regulatory remedy to mitigate problems of discontinuity in the tariff curve of the transmission tariffs according to the consumption and capacity utilization by each customer. This remedy identified by various stakeholders as necessary to promote an efficient consumption of natural gas was approved by ERSE in June 2016[23] and at that time various consumption thresholds were introduced at different pressure levels. As a necessary regulatory remedy, ERSE proposes to maintain this differentiation by consumption thresholds in the cases currently in force.

Regarding the tariff option for "short uses", it is available to customers directly connected to the High Pressure transmission network and allows greater flexibility to consumers with reduced capacity utilization values – the ratio between annual consumption and the maximum daily consumption registered in the last twelve months. In view of the basic tariff option, the "short uses" option has a lower capacity price and a higher commodity price.

More specifically, in the capacity price, users of this option only support the incremental cost related to the peripheral sections of the transmission system (used by a small number of customers), while being exempted from contributing to the central sections (used by most users).[24] The commodity-based charge of the “short uses” tariff option is then determined in order to leave a user with a reduced utilization (modulation of 90 days) indifferent between the "short uses" option and the basic tariff option.

It should be noted that the tariff option for "short uses" also corresponds to a regulatory remedy aimed at introducing more flexible capacity products at the exit points, fulfilling a function similar to the short-term products available at entry points - capacity products for quarterly, monthly and daily horizons with higher capacity prices compared to the annual capacity product by applying multipliers above the unit. It should also be noted that the tariff option for "short uses" has the characteristics of an interruptible product, since the delivery of natural gas under this tariff option is dependent on the absence of congestion in the national transmission network.

[23] The new consumption thresholds were approved for the network tariffs in force as of July 2016. The documents “Tarifas e preços de gás natural para o ano gás 2016-2017 e parâmetros para o período de regulação 2016-2019” and “Estrutura tarifária no ano gás 2016-2017” (both documents are only available in Portuguese) justify the decisions taken.

[24] In the scope of the national transmission network in Portugal, the connections to end-users connected at High Pressure and GRMS are classified as peripheral sections. Taking into account the analysis that led to the entry-exit split of 40%-60%, it can be concluded that at the exit points the common sections (central pipelines) represent a 40% share and that the peripheral sections (connections to end-users and GRMS) the remaining 20%. This determines that the incremental capacity costs to be applied in the "short uses" tariff option should represent one third (= 20% / 60%) of the incremental cost of capacity in the basic tariff option.

5.2 CONSULTATION QUESTIONS

Question 6 – In view of the justification for commodity-based transmission tariffs in section 5.1, do you agree with the definition of the flow-based charge applicable at exit points, namely exit points to the VIP (virtual interconnection point with Spain), to the LNG terminal, to the underground storage, to customers connected to HP and to distribution networks?

Question 7 – In view of the justification for the application of the two regulatory remedies referred to in section 5.1, do you agree with maintaining the consumption thresholds and the tariff option for "short uses"?

6 ADDITIONAL INFORMATION ON TRANSMISSION TARIFFS

This section complies with Article 26(1)(d) of the gas tariff network code.[25]

6.1 INDICATIVE INFORMATION

The following tables compare the tariffs for the use of the transmission system in force for the gas year 2018-2019, with the values obtained from the new reference price methodology and the other changes proposed in public consultation.

Table 6-1 - Transmission tariffs for the entry points

	Unit	Tariffs 2018-19	New methodology	Δ%
VIP (Campo Maior and Valença do Minho)				
Annual - Contracted capacity	€/(kWh/d) per day	0,00033369	0,00050684	52%
Quarterly - Contracted capacity	€/(kWh/d) per day	0,00043379	0,0006589	52%
Monthly - Contracted capacity	€/(kWh/d) per day	0,00050053	0,00076026	52%
Daily - Contracted capacity	€/(kWh/d) per day	0,00066738	0,00101369	52%
Within-day - Contracted capacity	€/(kWh/d) per day	0,00073411	0,00111506	52%
LNG Terminal				
Annual - Contracted capacity	€/(kWh/d) per day	0,00033369	0,00047175	41%
Quarterly - Contracted capacity	€/(kWh/d) per day	0,00043379	0,00061328	41%
Monthly - Contracted capacity	€/(kWh/d) per day	0,00050053	0,00070763	41%
Daily - Contracted capacity	€/(kWh/d) per day	0,00066738	0,00094351	41%
Within-day - Contracted capacity	€/(kWh/d) per day	0,00073411	0,00103786	41%
Underground storage				
Daily - Contracted capacity	€/(kWh/d) per day	0,00000936	0,00001253	34%
Within-day - Contracted capacity	€/(kWh/d) per day	0,0000103	0,00001378	34%

Table 6-1 shows the tariffs for the use of the transmission network at entry points. In the case of the VIP and the LNG terminal, price increases are mainly explained by the entry-exit split of 40%-60%, which implies a higher allocation of revenues to be recovered at entry points.[26] In the case of underground storage, the increase reflects, on the one hand, the structural difference of the new methodology, which attributes a greater use of the transmission network by the underground storage when compared to the matrix model currently in force and, on the other hand, the adoption of the discounts provided for in Article 9 of the gas

[25] This paragraph refers to the indicative information referred to in Article 30(2). In this context, it should be clarified that the comparison with the other years of the regulatory period referred to in sub-paragraph (a)(ii) translates into the presentation of additional information since the gas year 2018-2019 corresponds to the last year of the current regulatory period (period 2016-2017 until 2018-2019).

[26] It is recalled that gas tariffs for the 2018-2019 year show an overall entry-exit split of 27%-73%. Therefore, the change to a 40-60% split explains the average increase of capacity prices at points of entry by approximately 48% [= (40% – 27%) / 27%].

tariff network code. However, it should be noted that the entry and exit prices at the underground storage even without discounts are lower than the prices applicable at the VIP and the LNG terminal, which reflects the central position that the underground storage occupies, contributing for a more efficient use of the transmission network.[27]

Table 6-2 shows the tariffs for the use of the transmission network at exit points, including the different tariff options applicable to customers connected to HP. In the case of the first part of the table, which relates to the VIP and the LNG terminal, the zero prices in the capacity-based price are justified by the permanent use in reverse flow of these infrastructures and consequently the adoption of zero unit costs for capacity. In addition, as regards the exit point to the underground storage, a zero price is also adopted because the unit cost of capacity is zero, since the capacity constraint is imposed by the compressors of the underground storage facility and not by the capacity of the transmission network. Another point to note is the introduction of a non-zero commodity-based price at the exit points to these infrastructures. This introduction derives from an imposition of the gas tariff network code which requires that the flow-based charge is equal at all exit points.[28]

The second part of Table 6-2 shows the tariffs applicable to distribution networks and customers connected in HP. In this context, there are essentially two developments to be highlighted. On the one hand, there is a reduction of approximately 18,5% in capacity prices[29], due to the change in the entry-exit split, resulting in lower prices at the points of exit.[30] On the other hand, there is an increase in the price of energy, due to the new approach for determining the flow-based charge.[31] Although there are significant percentage increases in the energy term, it should be pointed out that the energy term represents a reduced weight in the total amount recovered by the use of the transmission network.

[27] The relative difference in the price of underground storage compared to the other entry prices in the methodology proposed by ERSE is relatively close to the relative difference in prices resulting from the CWD methodology.

[28] Article 4(3)(a)(ii) of the tariff network code.

[29] Except for the "short uses" tariff option, referred to in greater detail in 5.1.

[30] The change in the entry-exit split from 27%-73% to 40%-60% explains the average decrease of capacity prices at exit points by approximately 18% [= (73% – 60%)/73%].

[31] See section 5.1.

Table 6-2 - Transmission tariffs for the exit points

	Unit	Tariffs 2018-19	New methodology	Δ%
VIP (Campo Maior and Valença do Minho)				
Annual - Contracted capacity	€/(kWh/d) per day	0	0	-
Quarterly - Contracted capacity	€/(kWh/d) per day	0	0	-
Monthly - Contracted capacity	€/(kWh/d) per day	0	0	-
Daily - Contracted capacity	€/(kWh/d) per day	0	0	-
Within-day - Contracted capacity	€/(kWh/d) per day	0	0	-
LNG Terminal				
Annual - Contracted capacity	€/(kWh/d) per day	0	0	-
Quarterly - Contracted capacity	€/(kWh/d) per day	0	0	-
Monthly - Contracted capacity	€/(kWh/d) per day	0	0	-
Daily - Contracted capacity	€/(kWh/d) per day	0	0	-
Within-day - Contracted capacity	€/(kWh/d) per day	0	0	-
Underground storage				
Daily - Contracted capacity	€/(kWh/d) per day	0	0	-
Within-day - Contracted capacity	€/(kWh/d) per day	0	0	-
VIP (Campo Maior and Valença do Minho), LNG Terminal, Underground storage				
Commodity	€/kWh	0	0,00001964	-
	Unit	**Tariffs 2018-19**	**New methodology**	**Δ%**
Base tariff (Distribution networks and Customers connected to HP)				
Used capacity (< 10 000 000 m3/year)	€/(kWh/d) per month	0,017581	0,0143345	-18,5%
Used capacity (≥ 10 000 000 m3/year)	€/(kWh/d) per month	0,017581	0,0143345	-18,5%
Commodity (< 10 000 000 m3/year)	€/kWh	0,00035757	0,000491	37,3%
Commodity (≥ 10 000 000 m3/year)	€/kWh	0,0000143	0,00001964	37,3%
Short uses (Customers connected to HP)				
Used capacity (< 10 000 000 m3/year)	€/(kWh/d) per month	0,00545	0,00477817	-12,3%
Used capacity (≥ 10 000 000 m3/year)	€/(kWh/d) per month	0,00545	0,00477817	-12,3%
Commodity (< 10 000 000 m3/year)	€/kWh	0,00199078	0,00176518	-11,3%
Commodity (≥ 10 000 000 m3/year)	€/kWh	0,00163178	0,00129381	-20,7%
Annual flexible tariff (Customers connected to HP)				
Annual base capacity	€/(kWh/d) per month	0,017581	0,0143345	-18,5%
Monthly additional capacity (April to September)	€/(kWh/d) per month	0,026371	0,02150176	-18,5%
Commodity	€/kWh	0,0000143	0,00001964	37,3%
Monthly flexible tariff (Customers connected to HP)				
Monthly capacity (April to September)	€/(kWh/d) per month	0,026371	0,02150176	-18,5%
Monthly capacity (October to March)	€/(kWh/d) per month	0,052742	0,04300351	-18,5%
Commodity	€/kWh	0,0000143	0,00001964	37,3%
Daily flexible tariff (Customers connected to HP)				
Daily capacity (April to September)	€/(kWh/d) per day	0,003468	0,00282763	-18,5%
Daily capacity (October to March)	€/(kWh/d) per day	0,00578	0,00471271	-18,5%
Commodity	€/kWh	0,0000143	0,00001964	37,3%

6.2 CONSULTATION QUESTIONS

Question 8 – Given the tariff variations presented in section 6.1, how do you evaluate these changes?

7 DISCOUNTS, MULTIPLIERS AND SEASONAL FACTORS

This section complies with Article 28(1) of the gas tariff network code, which establishes the need to consult, on the one hand, the national regulatory authorities of all directly linked Member States and, on the other hand, the relevant stakeholders, on the level of the multipliers, the level of seasonal factors and the discounts provided for in Articles 9 and 16.

7.1 MULTIPLIERS

The gas tariff network code sets out rules for multiplier levels in Article 13, which apply to standardized capacity products at interconnection points. The multipliers, after being applied to the annual reserve prices, determine the non-annual reserve prices, namely in the quarterly, monthly, daily and within-day horizons.

In accordance with Article 13(1), the multiplier shall not be less than 1 nor more than 1,5 for standardized quarterly and monthly capacity products. For standard daily and within-day capacity products, the level of their multiplier shall not be less than 1 nor more than 3, but in duly justified cases it may exceed 3 and be less than 1 but greater than zero.

Table 7-1 shows the list of multipliers applicable to the VIP, the LNG terminal and the underground storage. The multipliers presented in this table comply with the limits laid down in Article 13(1).

Table 7-1 - Level of multipliers

Non-yearly standard capacity product	VIP	LNG Terminal	Storage
Quarterly	1,3	1,3	-
Monthly	1,5	1,5	-
Daily	2,0	2,0	1,0
Within-day	2,2	2,2	1,1

Note: Multipliers applicable at the VIP pursuant to Article 13(1) of the gas tariff network code.

7.2 SEASONAL FACTORS

The gas tariff network code also establishes rules for seasonal factors levels in Article 13(2), applicable on an optional basis to products of standard capacity at interconnection points. ERSE reports that it currently does not apply seasonal factors to standardized capacity products at interconnection points.[32]

[32] It should be noted that there are monthly seasonal factors, applicable to the flexible tariff options, which are exclusively destined to the exit points to customers connected in HP. As these seasonal factors do not apply at interconnection points with Spain, they are outside the scope of the public consultation provided for in Article 28(1).

7.3 DISCOUNTS OF ARTICLES 9 AND 16

The gas tariff network code provides for the application of two sets of discounts to transmission tariffs.

Firstly, Article 9 establishes the application of discounts to reference prices resulting from the reference price methodology, in particular at entry points from and exit points to storage facilities and at entry points from LNG facilities and infrastructure ending isolation of Member States.

Secondly, Article 16 provides for the application of discounts to standard capacity products for interruptible capacity, which may be applied through an *ex-ante* discount on the basis of the probability of interruption (before the interruption occurs) or through an *ex-post* discount (after the occurrence of the interruption) which constitutes a compensation paid to network users due to the interruption.

With regard to discounts under Article 9, the gas tariff network code provides in the first paragraph for a minimum discount of 50% at the entry points from and exit points to storage facilities, which in the Portuguese case corresponds to the underground storage at Carriço. Regarding entry points from LNG facilities, only the possibility of applying discounts is indicated, without indicating minimum or maximum values. In order to comply with Article 9, ERSE proposes to apply a 95% discount on the entry points from and exit points to storage facilities and proposes not to apply discounts to entry points from LNG facilities. The proposed discounts are summarized in Table 7-2. The discounts are justified by the fact that underground storage is a structural infrastructure to provide flexibility to the system and in particular for market players, facilitating the entry of smaller agents into the market and thereby contributing to the reduction of entry barriers to the natural gas market. It should be added that by applying the indicated discounts, transmission tariffs at entry and exit points are obtained for underground storage in line with those determined by the matrix methodology currently in force. Under these circumstances and based on the results of the matrix methodology, it could be stated that the adoption of lower prices at the entry point from and exit point to the underground storage could be justified by reasons of efficient allocation of costs.

Table 7-2 - Discounts for tariff adjustments under Article 9

Relevant points	Discount
Entry point from storage facilities	95%
Exit point to storage facilities	95%

With regard to the discount to be applied to standard capacity products for interruptible capacity pursuant to Article 16, ERSE requested the transmission system operator to assess the likelihood of interruption,

and concluded on the basis of that assessment[33] that at the relevant points of the transmission network, there has been no interruption to date following physical congestion. For this reason, given the absence of historical data usable for the calculation of probability values with adherence to practical scenarios, it is considered that the probability of interruption assumes an infinitesimal value, whatever the standard capacity products for interruptible capacity.

Considering the information sent by the transmission system operator and the forecasted demand scenarios, ERSE considers that an *ex-post* discount should be applied.[34] Thus, the prices of interruptible capacity products are equal to the prices of firm capacity products and, in the event of an interruption, the discount will be applied in accordance with Article 16(4), i.e. the discount to be applied shall be equal to three times the reserve price for the daily standardized capacity products applied over the actual duration of the interruption.

In ERSE's understanding, the subsequent discount must be proportional to the amount of non-served energy, guaranteeing proportionality to the interruption that affected the user. The expression for the calculation of the subsequent discount is shown in the table below.

Table 7-3 - Formula for calculating the ex-post discount according to Article 16

$$\underbrace{Ex\text{-}post\ discount}_{€} = 3 \cdot \underbrace{Reserve\ price\ (firm\ daily\ product)}_{€/(kWh/h)} \cdot \underbrace{Non\text{-}served\ energy}_{kWh} \cdot \underbrace{\frac{1}{24}}_{hours}$$

The amount of non-served energy shall be calculated on the basis of interrupted capacity and hours of interruption.[35] ERSE's interpretation of the *ex-post* discount is consistent with the definitions in paragraphs 2 and 3 of Article 16, which use concepts of interrupted capacity and duration of interruptions to determine the ex-ante discount.

The application of this discount will be made during the monthly settlement of the transmission tariffs of each market agent. The application of the discount, with respect to daily and intraday horizons, affects and is confined to the aggregate monthly amount of interruptible capacity contracted in these horizons, by the respective market agent.

[33] See "Avaliação da probabilidade de interrupção nos termos previstos pelo Regulamento (UE) 2017/460 da Comissão, de 16 de março - Período tarifário de 2018/2019" (only available in Portuguese).

[34] According to Article 16(4), "Such *ex-post* discount may only be used at interconnection points where there was no interruption of capacity due to physical congestion in the preceding gas year.".

[35] Non-served energy can be calculated using the following expression:

Non-served energy [kWh] = Interrupted capacity [kWh/h] x Hours of interruption [h]

7.4 CONSULTATION QUESTIONS

Question 9 – Given the information in section 7.1 on multipliers defined under Article 13 of the gas tariff network code, how do you assess the suitability of these multipliers for the integration of the Iberian natural gas market?

Question 10 – Regarding the discounts presented in section 7.3, referring to Article 9 of the gas tariff network code, how do you assess the suitability of these discounts?

Question 11 – In relation to the subsequent discount defined in section 7.3, referring to Article 16 of the gas tariff network code, how do you evaluate the adequacy of this discount?

8 RECAP OF PUBLIC CONSULTATIONS QUESTIONS

For convenience, this chapter brings together the various questions in this public consultation.

3 Reference price methodology
Question 1 – Given the reference price methodology presented in section 3.2, do you consider that this methodology is adequate to properly reflect the costs of the natural gas transmission network? **Question 2** – Considering the results of the cost allocation assessments in section 3.4, do you consider that the allocation of costs between cross-system (cross-border) flows and intra-system flows (for domestic exits) is appropriate? **Question 3** – Based on the analysis presented in section 3.5, do you consider that the reference price methodology meets the requirements of Article 7 of the gas tariff network code and Article 13 of EC Regulation 715/2009? **Question 4** – Given the comparison of the results of the reference price methodologies in section 3.6, how do you evaluate the adequacy of each methodology for determining reference prices for the natural gas transmission network in Portugal?
4 Revenue structure of the transmission system operator
Question 5 – Given the indicative information on the allowed revenues of the transmission system operator in section 4.1, how do you assess the breakdown of these revenues by the dimensions given in Table 4-1?
5 Commodity-based transmission tariffs
Question 6 – In view of the justification for commodity-based transmission tariffs in section 5.1, do you agree with the definition of the flow-based charge applicable at exit points, namely exit points to the VIP (virtual interconnection point with Spain), to the LNG terminal, to the underground storage, to customers connected to HP and to distribution networks? **Question 7 –** In view of the justification for the application of the two regulatory remedies referred to in section 5.1, do you agree with maintaining the consumption thresholds and the tariff option for "short uses"?
6 Additional information on transmission tariffs
Question 8 – Given the tariff variations presented in section 6.1, how do you evaluate these changes?

7 Discounts, multipliers and seasonal factors

Question 9 – Given the information in section 7.1 on multipliers defined under Article 13 of the gas tariff network code, how do you assess the suitability of these multipliers for the integration of the Iberian natural gas market?

Question 10 – Regarding the discounts presented in section 7.3, referring to Article 9 of the gas tariff network code, how do you assess the suitability of these discounts?

Question 11 – In relation to the subsequent discount defined in section 7.3, referring to Article 16 of the gas tariff network code, how do you evaluate the adequacy of this discount?

9 ADDITIONAL INFORMATION ABOUT COST ALLOCATION ASSESSMENTS

This chapter presents in greater detail the calculations underlying the cost allocation assessments in accordance with Article 5 of the gas tariff network code.[36]

The starting point for the cost allocation assessments is the determination of ratios ($Ratio^x$) between transmission tariff revenues ($Revenue^x$) and a given cost driver[37] ($Driver^x$):

$$Ratio^x = \frac{Revenue^x}{Driver^x} \qquad ,with\ x = intra, cross$$

This ratio is determined separately for intra-system use ($x = intra$) and for cross-system use ($x = cross$).[38] Having determined the values of $Ratio^{intra}$ and $Ratio^{cross}$, the cost allocation comparison index ($CACI$) is determined by the following expression:

$$CACI = \frac{2 \times \left|Ratio^{intra} - Ratio^{cross}\right|}{Ratio^{intra} + Ratio^{cross}} \times 100\%$$

As already mentioned in section 3.4, this indicator varies between 0% and 200%, where 0% indicates the absence of cross-subsidization and 200% indicates the situation of maximum cross-subsidization.[39] It should be noted that the cost allocation comparison index is calculated separately for capacity-based and for commodity-based tariffs.

An important element for calculating the cost allocation indicator is the wording of Article 5(5), which sets out the assumptions applicable to the cross-system use of entry points. In accordance with paragraph 5, an amount of capacity or energy equal to the amount of capacity or energy at the exit points, respectively, shall be considered at entry points for cross-system use (cross-border flow). This hypothesis reflects the idea that the cross-border flow leaving the system also had to enter the system in advance, thereby paying tariffs at entry points.[40] The intra-system use is then calculated as the difference compared to the aggregate use of the transmission system.

[36] The results of the cost allocation assessments were presented in section 3.4.

[37] Article 5 of the network code defines in paragraph 1 the variables that can be used as a cost driver for the cost allocation assessments.

[38] The use of the grid at an intra-system level refers to the flows of natural gas that are destined for national consumption. The use of the network at a cross-system level refers to natural gas transits passing through the transmission network.

[39] The situation of maximum cross-subsidization (200%) occurs when an intra-system use or a cross-system use does not contribute to transmission tariff revenues.

[40] This is the case of a system without domestic production of natural gas, as is the case in Portugal.

It should be noted that the cost allocation assessments presented here use the post-adjustment reference prices as they reflect the prices paid by the users of the transmission system.[41]

9.1 CAPACITY COST ALLOCATION COMPARISON INDEX

In order to determine the capacity CACI, two demand scenarios were considered to derive the indicative reference prices resulting from the reference price methodology.

Article 5(1)(a) establishes that the forecasted contracted capacity can be used as a cost driver in the calculation of the capacity CACI. Given the scenario of forecasted contracted capacity that was used in the reference price methodology, no cross-border flows are expected to occur in the transmission network, which implies, by definition, the lack of cross-subsidization between intra-system and cross-system use.

In order to make the analysis more robust, the capacity CACI was also determined for an alternative scenario where there is cross-border use at the exit point to the VIP. Analyzing the most recent and complete capacity year, the exit point to the VIP with Spain presented contracted capacity during a single day.[42] Thus, to determine the alternative scenario, an amount of daily contracted capacity at the exit point to the VIP was added to the base scenario, with a value equal to the one registered in the capacity year 2016-2017. In addition, and taking into account article 5(5), this value of contracted capacity was also added to the entry points, also in the format of a daily product.[43]

Table 9-1 shows the capacity CACI for the two scenarios mentioned. In the base scenario, without cross-border flows, and therefore without cross-system use, the capacity CACI will be null. In the case of the alternative scenario, which included the contracting of a daily product at the exit point to the VIP, there is a value of 6,7% for the capacity CACI. Therefore, in both scenarios presented, the maximum indicative value of 10% is not exceeded, leading to the conclusion that there is no cross-subsidization between cross-system and intra-system use.

The lack of cross-subsidization in the alternative scenario can be interpreted as follows: although the capacity price applied at the exit point to the VIP is null, it is important to take into account that the use of this exit point currently has an infrequent pattern, in the form of daily or within-day products. Taking into account the assumption that this amount of capacity will also have to be contracted at entry points, with the

[41] Post-adjustment reference prices include the following adjustments to prices resulting from the reference price methodology: application of Article 9 discounts, price equalization (exit points to domestic consumption and VIP) and multiplicative scaling for reconciliation with allowed revenues subject to the entry-exit split.

[42] Data for the period from 1 October 2016 to 30 September 2017 (information available on the transmission system operator's webpage).

[43] The capacity value was attributed to the entry point from the LNG terminal as it is the most plausible entry point for cross-border flows, taking advantage of the terminal in Sines as the LNG gateway to Europe.

same maturity, multipliers greater than 1 applicable to daily and intraday products will compensate for the lack of revenue at the exit point to the VIP.

Table 9-1 - Capacity cost allocation comparison index

	Base scenario	Alternative scenario
Revenues (% of aggregate)		
Intra-system	100,000%	99,997%
Cross-system	0,000%	0,003%
Driver (Forecasted contracted capacity in GWh/day)		
Intra-system	248,559	248,559
Cross-system	0,000	0,008
Ratio (Revenues/Driver)		
Intra-system	0,00402	0,00402
Cross-system	-	0,00376
Capacity cost allocation comparison index (in %)	**0,0%**	**6,7%**

Finally, it is important to note that the capacity CACI is very volatile for situations where the cross-system use has a residual character, as in the Portuguese case. A marginal change in revenues from cross-system use, while keeping cost drivers constant, translates into a significant change in the capacity CACI, which substantially influences the conclusion on the existence of cross-subsidization.

It is also recalled that in ERSE's perspective the contracted capacity in reverse flow at the exit point of the VIP does not induce costs for the transmission system.[44]

9.2 COMMODITY COST ALLOCATION COMPARISON INDEX

In order to determine the commodity cost allocation comparison index, the two demand scenarios mentioned in section 9.1 were used to derive the indicative reference prices resulting from the reference price methodology. The base scenario uses the gas flow quantities used to determine the indicative reference prices presented in Chapter 6. The alternative scenario adds to these data a cross-border gas flow based on information from the most recent and complete capacity year.[45]

Table 9-2 shows the commodity CACI for the two demand scenarios. In the base scenario, without cross-border flows, and therefore without cross-system use, the commodity CACI is null. In the case of the alternative scenario, where a cross-border flow was included, the index takes a value of 8,4%. Therefore,

[44] See justification in section 3.3.

[45] During the period from 1 October 2016 to 30 September 2017, the exit point to the VIP registered contracted capacity during one single day (information available on the transmission system operator's webpage). This daily capacity value has been transformed into an energy flow assuming full utilization of the contracted capacity.

in both scenarios presented, the maximum indicative value of 10% is not exceeded, leading to the conclusion that there is no cross-subsidization between cross-system and intra-system use.

Table 9-2 - Commodity cost allocation comparison index

	Base scenario	Alternative scenario
Revenues (% of aggregate)		
Intra-system	100,000%	99,995%
Cross-system	0,000%	0,005%
Driver (Energy in GWh)		
Intra-system	59.220,69	59.217,68
Cross-system	0,00	3,01
Ratio (Revenues/Driver)		
Intra-system	0,00002	0,00002
Cross-system	-	0,00002
Commodity cost allocation comparison index (in %)	**0,0%**	**8,4%**

The lack of cross-subsidization in the alternative scenario can be interpreted as follows: with the application of a commodity price equal at all entry points and equal at all exit points[46], there is no cross-subsidization between cross-system and intra-system uses. However, the alternative scenario presents a non-zero value for the commodity CACI due to the existence of regulatory remedies at the exit points to customers connected to HP, namely the tariff option for "short uses" and the consumption thresholds.[47]

[46] In accordance with Article 4(3)(a)(ii).

[47] See justification in section 5.1.

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