ERSE
ENTIDADE REGULADORA
DOS SERVIÇOS ENERGÉTICOS

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

Justification of the motivated decision

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1 INTRODUCTION

1. Regulation (EU) 2017/460, of 16 March 2017, establishes a network code on harmonised 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 standard capacity products. This Regulation, hereafter tariff network code (TAR NC), 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.

2. The rules on harmonised tariff structures for natural gas, in accordance with the deadlines established in the TAR NC, had to be subject to public consultation by all interested parties for a period of two months.[1] Subsequently, ERSE had one month to review the comments received and to publish a document summarizing these comments. The Agency for the Cooperation of Energy Regulators (ACER) subsequently had a month to review and submit non-binding comments on ERSE's proposal, incorporating in that decision the comments of the various participants of the public consultation. This was a consultation process with a duration of four months. Finally, within five months following the end of the public consultation, the national regulatory authority should approve and publish a motivated decision on all the elements provided for in Article 26(1) of the TAR NC.[2]

3. This document corresponds to the justification of the motivated decision mentioned in the previous paragraph. The following table indicates the paragraphs in this supporting document containing the information requirements referred to in Article 26(1).

[1] The 66th public consultation from ERSE ran from 17 August 2018 to 17 October 2018, receiving comments from 13 entities.

[2] Following publication of the motivated decision, the national regulatory authority shall send its decision to ACER and to the European Commission.

Articles	Information	Paragraphs
26(1)(a)	description of the proposed reference price methodology	9 – 22
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2 ACER'S ANALYSIS AND COMMENTS RECEIVED TO THE PUBLIC CONSULTATION

4. Pursuant to Article 27(2) and 27(3) of the Tariff Network Code, ACER examined the 66th public consultation[3] from ERSE on the "Implementation of the network code on harmonised transmission tariff structures for gas", regarding compliance with the requirements of Article 7 and Article 4, paragraphs 3 and 4.[4] On 14 December 2018, ACER published its analysis of the public consultation launched by ERSE. [5]

5. In its conclusions, ACER highlighted three aspects. First, ACER noted that ERSE published in the consultation published all information requirements, with the exception of tariff evolution forecasts until the end of the next regulatory period.[6] Secondly, ACER considered that the proposed reference price methodology was not in accordance with Article 7 of the Tariff Network Code, in particular because it considered that the zero tariffs applied at some exit points were not cost-reflective. In view of this lack of adherence, ACER concluded that there was a risk of cross-subsidization and possible distortion of cross-border trade. Thirdly, ACER concluded that energy-based transmission tariffs were not compliant with the Tariff Network Code since the Portuguese transmission network does not include costs related to the flow of natural gas.

6. In the light of its findings, ACER formulated a set of non-binding recommendations for ERSE to take into account in the publication of its reasoned decision:

   – publish the missing information requirements,

   – consider a simplification of the reference price methodology and reconsider the entry-exit split if zero tariffs apply at some exit points,

   – explain the volatility of the cost allocation comparison index for the Portuguese transmission network,

   – clarify the calculation methodology for commodity-based transmission tariffs,

[3] Documentation available here.

[4] Article 7 refers to the requirements concerning the reference price methodology. Paragraph 3 and 4 of Article 4 relate to the requirements for the setting of commodity-based transmission tariffs and the setting of non-transmission tariffs.

[5] Report available here.

[6] At the time of the publication of the motivated decision (18 March 2019) the next regulatory period was set to end with the tariff period 2021-2022. Following the recent regulatory revision process, the next regulatory period will end with year 2023.

- ensure that the existing tariff options and the consumption bands in the transmission tariffs comply with the provisions of the Tariff Network Code,
- ensure that the ex-post discount applicable to standard capacity products for interruptible capacity complies with the provisions of the Tariff Network Code,
- clarify whether the tariffs applicable to autonomous gas units owned by customers are set using the reference price methodology.

7. In addition to ACER's analysis, ERSE also received comments[7] from several participating entities. Their contributions can be summarized in the following points:
   - ERSE should ensure coordination with CNMC, the entity responsible for regulating natural gas in Spain, although at the date of launch of the public consultation by ERSE the timetable set by Spain for the analogue consultation process was unknown.[8]
   - The majority of the comments are favourable to the proposed reference price methodology, in particular as it is simpler and more transparent than the current matrix model.
   - Some comments consider it inappropriate to have a differentiation among the entry prices for the VIP[9] and for the LNG terminal, namely if the price is higher for the VIP.
   - A change in the entry-exit split should be introduced gradually, in coordination with Spain and accompanied by an impact assessment.
   - A change in the entry-exit split should lead ERSE to reconsider the communication of the tariff variations. In the case of an increase in the proportion of revenues recovered at entry points final consumers perceive a reduction in the transmission tariff paid at exit points, which is offset by an increase in the transmission tariff paid at entry points; market agents are expected to pass that increase to customers through a higher cost of natural gas.
   - The transmission system operator in Portugal considers zero capacity prices at exit points to the VIP, to the LNG terminal and to the underground storage as adequate; however, the

[7] You can find on ERSE's webpage the comments received to the public consultation and the summary prepared by ERSE summarizing the comments received.

[8] At the date of publication of this motivated decision ERSE has not yet been consulted by CNMC as part of its public consultation process

[9] Virtual point of interconnection.

transmission system operator in Spain (ENAGAS) questions the rationale for the application of zero capacity prices at the exit point to the VIP.

- Several participants point to the relevance of the problem of 'tariff pancaking'[10], and that the lack of coordination between Portugal and Spain may exacerbate this problem.

8. ERSE took good note of ACER's analysis and the comments received to the public consultation by all interested parties, incorporating in its motivated decision a number of amendments[11], namely:

   - adaptation of the reference price methodology to attain a simple methodology,
   - re-evaluation of the entry-exit split,
   - elimination of commodity prices and consumption bands in the transmission tariffs;
   - elimination of the tariff option for short uses.

[10] 'Tariff pancaking' refers to the accumulation of transmission tariffs paid by cross-border flows of natural gas: since gas flows pay entry and exit tariffs each time it moves across entry-exit systems, a cross-border flow has to pay entry and exit tariffs of the various transmission networks it crosses. Several market players consider this accumulation excessive.

[11] ERSE proposed the last two points in the 71st public consultation about the regulatory review of the natural gas sector.

3 REFERENCE PRICE METHODOLOGY

9. The reference price methodology adopted by ERSE will be referred to as **modified capacity weighted distance methodology** (modified CWD[12] methodology). The designation reflects the proximity to the capacity weighted distance methodology (CWD methodology), defined in Article 8 of the TAR NC, the application of which is optional although mandatory for comparative purposes.

10. There are two main reasons why ERSE has introduced modifications to the CWD methodology defined in the TAR NC. On the one hand, the CWD methodology is restrictive because it does not adequately reflect the economic value of the assets of the transmission network, as it uses mainly distance as cost driver. On the other hand, the use of contracted capacities does not account for the physical flows of gas in the network, hindering the definition of price signals for capacity scarcity.

11. In the light of ACER's comments on the modified CWD methodology proposed at the 66th public consultation, ERSE decided to make improvements to accommodate some of ACER's comments. ACER considered that the use of the unit cost of capacity, measured in €/(kWh/day)/km, was not adequately justified.[13] In particular, ACER concluded that the application of a zero price at the exit point to the VIP could distort cross-border trade and it is unlikely that this zero price could contribute to alleviating congestion in the direction Spain->Portugal, since historically the booking of export capacity to Spain did not occur on days of greater use of the VIP. The improvements now introduced by ERSE aim to obtain a methodology close to the methodology proposed in the 66th public consultation, which obtained a favourable evaluation by several participants. Following this modification the various reference prices, in particular at the exit to the VIP, may assume non-zero values based on statistical data relevant to the proper functioning of the national transmission network.[14] Consequently, ERSE replaced the concept of unit cost of capacity with two new cost allocation parameters, namely the economic value factor and the physical utilization factor.

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[12] Abbreviation for '*capacity weighted distance*' (CWD).

[13] The unit cost of capacity could assume two values, namely a positive or a null value (the null value was applied to the entry-exit paths that exit towards transmission infrastructures, i.e. exiting to the VIP, to the LNG terminal or to the underground storage). The null value for this parameter was justified by ERSE as these network exit points do not correspond to a utilization that may imply new investments in the future, since they are used contrary to the dominant flow at those points. As a result, the zero value for the unit cost of capacity also implied a zero reference price, in line with the current tariff structure (tariff period 2018-2019).

[14] In the methodology proposed in the 66th public consultation the application of a null value to the unit cost of capacity at the exit points to the gas infrastructures connected to the transmission network (VIP, LNG terminal, underground storage) necessarily implied a zero reference price.

12. The **economic value factor** reflects for each entry-exit combination the use of transmission network assets from the economic point of view by weighting the distances between an entry point and an exit point. In particular, a gas flow leaving the transmission network at a consumption exit point uses, in addition to gas pipelines, measured in kilometres, also the gas regulation and metering stations (GRMS). The economic value factor, which corresponds to a multiplicative factor, assumes a value greater than 100% for entry-exit combinations that use GRMS, in order to reflect the economic value of GRMS, and assumes a value equal to 100% for the entry-exit combinations that do not use GRMS.

13. The **physical utilization factor** reflects for each entry point and for each exit point the proximity between the physical flows of natural gas to the technical capacity. The closer the physical flows are to the technical capacity of a given network point, the more likely is the occurrence of congestion and the need for new expansion investments. The physical utilization factor, which corresponds to a multiplicative factor, is determined as the ratio between a measure for the most relevant physical gas flows and the technical capacity of a given point.

14. The two factors described above, economic value factor and physical utilization factor, will be used to adjust in a multiplicative way the two cost drivers, distance and forecasted capacities, respectively. These multiplicative adjustments will give rise to two new concepts, namely effective distance and effective capacity. In short, the modified CWD methodology consists in applying the CWD methodology, defined in article 8 of the TAR NC, to the two new concepts of effective distance and effective capacity.

15. The concept of effective distance allows reflecting the investments in GRMS, which are only used by gas flows exiting to customers connected to the High Pressure (HP) network and to distribution networks. On the other hand, the concept of effective capacity allows the identification of points whose physical utilization is closer to the technical capacity, allowing to increase the price signal in these points and consequently to identify the greater probability of congestion to be solved through new investments in incremental capacity.

3.1 FORMULAS FOR THE APPLICATION OF THE MODIFIED CWD METHODOLOGY

16. The modified CWD methodology consists in applying the CWD methodology, defined in Article 8 of the TAR NC, to the concepts of effective distance and effective capacity.[15] This section details the mathematical formulas for applying the modified CWD methodology.

17. First, the concept of effective distance needs to be defined. The effective distance equals the distance between two points in the network, adjusted by a multiplicative factor that will exceed 100% if the gas flow between these two points uses additional network assets that are not measurable in terms of distance, but in terms of economic value. Considering the simplified transmission network diagram, and considering the classification of assets into pipelines (primary and secondary) and GRMS, the multiplicative factor will be greater than 100% for all entry-exit combinations that have as exit point customers connected to the HP network or the distribution networks.[16] This multiplicative factor will be called economic value factor. The expression to determine the effective distance is:

$$\mathrm{D}^{\mathrm{e}}_{\mathrm{i,j}}=\mathrm{D}_{\mathrm{i,j}}\times\mathrm{v}_{\mathrm{i,j}}$$

Where:

$\mathrm{D}^{\mathrm{e}}_{\mathrm{i,j}}$ – effective distance, measured in km, between an entry point i and an exit point j

$\mathrm{D}_{\mathrm{i,j}}$ – distance, measured in km, between an entry point i and an exit point j

$\mathrm{v}_{\mathrm{i,j}}$ – economic value factor to be set by ERSE for the path between an entry point i and an exit point j, to reflect the economic value of the assets of the transmission system being used

18. Second, the concept of effective capacity needs to be defined. The effective capacity equals the forecasted capacity for each entry point and each exit point, adjusted by a multiplicative factor that measures the physical use of that point. For a point that is permanently with a use equal to the technical capacity, the multiplicative factor, called the physical utilization factor, shall be equal to 100%. For points whose use is less than the technical capacity, the physical utilization factor shall be less than

[15] With the exception of the formulas to determine the pre-equalization prices, which will continue to use forecasted capacities, and not effective capacities.

[16] And equal to 100% in the remaining situations.

100% and determined by the ratio between the physical use and the technical capacity. The expressions to determine effective capacities at entry points and exit points are:

$$K_i^e = K_i \times f_i$$

$$K_j^e = K_j \times f_j$$

Where:

K_i^e – effective capacity, measured in kWh/day, at entry point i

K_i – forecasted capacity, measured in kWh/day, at entry point i

f_i – physical utilization factor, to be set by ERSE, at entry point i

K_j^e – effective capacity, measured in kWh/day, at exit point j

K_j – forecasted capacity, measured in kWh/day, at exit point j

f_j – physical utilization factor, to be set by ERSE, at exit point j

19. Based on the values of effective distance and effective capacity, the weighted average distances for each entry point and for each exit point are determined, using formulas equivalent to the formulas of the CWD methodology of the TAR NC. The expressions for determining the weighted average distance at entry points and exit points are:

$$AD_i = \frac{\sum_{j=1}^{J} K_j^e \times D_{i,j}^e}{\sum_{j=1}^{J} K_j^e}$$

$$AD_j = \frac{\sum_{i=1}^{I} K_i^e \times D_{i,j}^e}{\sum_{i=1}^{I} K_i^e}$$

Where:

AD_i – weighted average distance, measured in km, for entry point i

K_j^e – effective capacity, measured in kWh/day, at exit point j

$D_{i,j}^e$ – effective distance, measured in km, between an entry point i and an exit point j

$\mathrm{AD_j}$ – weighted average distance, measured in km, for exit point j

$\mathrm{K_i^e}$ – effective capacity, measured in kWh/day, at entry point i

J – total number of exit points j

I – total number of entry points i

20. Once the weighted average distances are calculated, the weight of cost for each entry point and each exit point is calculated. The weight of cost determines the proportion of revenue to be recovered at each point of entry and exit. It should be noted that the respective formulas are equivalent to the formulas of the CWD methodology of the TAR NC. The expressions for determining the weight of cost at entry points and exit points are:

$$\mathrm{W_{c,i}}=\frac{\mathrm{K_i^e}\times\mathrm{AD_i}}{\sum_{\mathrm{i}=1}^{\mathrm{I}}\mathrm{K_i^e}\times\mathrm{AD_i}}$$

$$\mathrm{W_{c,j}}=\frac{\mathrm{K_j^e}\times\mathrm{AD_j}}{\sum_{\mathrm{j}=1}^{\mathrm{J}}\mathrm{K_j^e}\times\mathrm{AD_j}}$$

Where:

$\mathrm{W_{c,i}}$ – weight of cost for entry point i

$\mathrm{K_i^e}$ – effective capacity, measured in kWh/day, at entry point i

$\mathrm{AD_i}$ – weighted average distance, measured in km, for entry point i

I – total number of entry points i

$\mathrm{W_{c,j}}$ – weight of cost for entry point j

$\mathrm{K_j^e}$ – effective capacity, measured in kWh/day, at exit point j

$\mathrm{AD_j}$ – weighted average distance, measured in km, for exit point j

J – total number of exit points j

21. Given the values for the weight of cost for each network point, and given the entry-exit split between entry and exit points, the pre-equalization prices for each point are determined. The expressions for determining pre-equalization prices at entry points and exit points are:

$$\mathrm{T_i} = \frac{\mathrm{W_{c,i}} \times \mathrm{S_I} \times \mathrm{R_{total}}}{\mathrm{K_i}}$$

$$\mathrm{T_j} = \frac{\mathrm{W_{c,j}} \times \mathrm{S_J} \times \mathrm{R_{total}}}{\mathrm{K_j}}$$

Where:

$\mathrm{T_i}$ – pre-equalization price resulting from the reference price methodology for entry point i

$\mathrm{W_{c,i}}$ – weight of cost for entry point i

$\mathrm{S_I}$ – proportion of allowed revenues to be recovered across all entry points i

$\mathrm{R_{total}}$ – allowed revenues of transmission services, measured in euros, to be recovered from capacity-based transmission tariffs

$\mathrm{K_i}$ – forecasted capacity, measured in kWh/day, at entry point i

$\mathrm{T_j}$ – pre-equalization price resulting from the reference price methodology for exit point j

$\mathrm{W_{c,j}}$ – weight of cost for exit point j

$\mathrm{S_J}$ – proportion of allowed revenues to be recovered across all exit points j

$\mathrm{K_j}$ – forecasted capacity, measured in kWh/day, at exit point j

22. Finally, the adjustments referred to in Article 6(4), the discounts provided for in Article 9 and the multipliers applied to non-yearly standard capacity products for firm capacity must be applied to the pre-equalization prices. First, price equalization resulting from Article 6(4)(b) is applied, which allows price equalization across points belonging to a homogeneous group of points. In the Portuguese case, equalization is applied to the two interconnection points, forming the Iberian VIP, and to the exit points to customers connected to the transmission network and to the distribution networks. The resulting prices are called post-equalization prices. Secondly, the discounts provided for in Article 9 and the multipliers applied to non-yearly standard capacity products for firm capacity are incorporated. The prices obtained are called pre-scaling prices. Finally, a multiplicative scaling factor is applied to the pre-

scaling prices of the entry points and another multiplicative scaling factor to the pre-scaling prices of the exit points, in order to ensure the recovery of the allowed revenues based on the forecasted capacities, maintaining the entry-exit split.

3.2 APPLICATION OF THE MODIFIED CWD METHODOLOGY TO THE PORTUGUESE TRANSMISSION NETWORK

23. This section illustrates the application of the modified CWD methodology to the transmission network in mainland Portugal. According to the simplified diagram of the transmission network in mainland Portugal[17], the network is characterized by a total of 11 exit points (A to K), 4 of which are also entry points of the network (A to D). The list of points is summarized in Table 3-1 and includes the entry and exit points of the transmission network, which are classified into points for consumption, interconnection points (IP) and interface points with the LNG terminal and the underground storage.

Table 3-1 - Entry and exit points of the transmission network

Name	Type	Entry	Exit
A - Campo Maior	IP	Yes	Yes
B - Valença do Minho	IP	Yes	Yes
C - LNG terminal in Sines	LNG terminal	Yes	Yes
D - Carriço	Storage	Yes	Yes
E - Lisboagás, Setgás, Carregado, Ribatejo	Consumption	No	Yes
F - Portgás, Outeiro power plant	Consumption	No	Yes
G - Lusitâniagás, Lares power plant, Figueira da Foz power plant	Consumption	No	Yes
H - Tagusgás, Pego power plant	Consumption	No	Yes
I - Portucel	Consumption	No	Yes
J - Sines refinery, Portucel	Consumption	No	Yes
K - Beiragás	Consumption	No	Yes

24. According to the simplified diagram of the transmission network a distance matrix can be computed which indicates for each entry-exit combination the distance in kilometres. The distance matrix is shown in Table 3-2.

[17] See the annex in chapter 7.

Table 3-2 - Distance matrix

Distance matrix											
km	A	B	C	D	E	F	G	H	I	J	K
A	0,0	509,0	481,8	254,3	416,9	434,0	290,2	148,2	477,8	441,0	274,9
B	509,0	0,0	549,5	321,9	484,5	190,7	357,9	371,0	71,7	508,6	334,0
C	481,8	549,5	0,0	294,7	276,8	474,4	330,7	343,8	518,2	51,1	462,8
D	254,3	321,9	294,7	0,0	229,7	246,9	36,0	116,2	290,6	253,8	235,2

25. Subsequently, the effective distances are obtained by multiplying the distance between points by the respective economic value factor. In the case of entry-exit combinations using GRMS, the economic value factor is equal to 131.6%, in order to reflect the economic value of GRMS.[18] In the case of entry-exit combinations that do not use GRMS, the economic value factor is equal to 100%. The matrix of effective distances, obtained by applying the formula of paragraph 17, is given in Table 3-3.

Table 3-3 - Effective distance matrix

Effective distance matrix											
km	A	B	C	D	E	F	G	H	I	J	K
A	0,0	509,0	481,8	254,3	548,5	571,1	381,9	195,0	628,7	580,3	361,7
B	509,0	0,0	549,5	321,9	637,5	250,9	470,9	488,1	94,4	669,2	439,5
C	481,8	549,5	0,0	294,7	364,2	624,3	435,1	452,3	681,9	67,2	608,9
D	254,3	321,9	294,7	0,0	302,2	324,8	47,3	152,9	382,4	334,0	309,5

26. It is also important to identify the effective capacities per entry point and exit point. As explained earlier, effective capacity results from multiplying forecasted capacity by the physical utilization factor. The physical utilization factor for each entry point and each exit is equal to the ratio between a measure for physical gas flows and their technical capacity. The effective capacity for a given point, measured in kWh/day, measures the use of an entry or exit point from a physical perspective. The effective capacity per network point, obtained by applying the formulas in paragraph 18, as well as the forecasted capacity and the physical utilization factor, are presented in Table 3-4.

[18] The value of 131.6% is due to the fact that GRMS represent, on average, 24% of the investments in the transmission network. Therefore, compared to gas pipelines, which represent the remaining 76%, the use of GRMS represents an additional investment of 31.6% (24% ÷ 76%).

Table 3-4 - Effective capacity per entry point and exit point

		Physical flow factor		Forecasted capacity *GWh/d*		Effective capacity *GWh/d*	
		Entry	Exit	Entry	Exit	Entry	Exit
A	Campo Maior	90%	7%	114.322	0.093	103.370	0.006
B	Valença do Minho	90%	7%	8.532	0.042	7.714	0.003
C	LNG terminal (Sines)	89%	0%	77.226	1.445	69.048	0.000
D	Underground storage (Carriço)	49%	28%	4.894	4.894	2.411	1.376
E	Lisboagás, Setgás, Carregado, Ribatejo	-	59%	-	66.687	-	39.254
F	Portgás, Outeiro power plant	-	59%	-	79.763	-	46.952
G	Lusitâniagás, Lares power plant, Figueira da Foz power pla	-	59%	-	69.210	-	40.740
H	Tagusgás, Pego power plant	-	59%	-	34.031	-	20.032
I	Portucel	-	59%	-	4.796	-	2.823
J	Refinery (Sines), Portucel	-	59%	-	29.893	-	17.596
K	Beiragás	-	59%	-	3.548	-	2.088

27. The physical utilization factor presented in Table 3-4 was determined by the ratio between the physical gas flow in kWh/day and the technical capacity, also in kWh/day. The measure of physical gas flow corresponds to the average daily flow of natural gas in the 10%[19] of the days of greatest value for a period of 3 years.[20] The data presented for the physical utilization factor highlights some particular circumstances. In the 10% of days of highest gas flow, the use of the entry point from the VIP and from the LNG terminal presents an average value close to 90% of the respective technical capacities. With regard to the exit point to the VIP the utilization has a low value of around 7%, consistent with the fact that the VIP is used predominantly to import natural gas from Spain. In the case of the exit point to the LNG terminal, the value is necessarily equal to 0% because the capacity booking occurs in reverse flow and is of a commercial and not a physical nature.

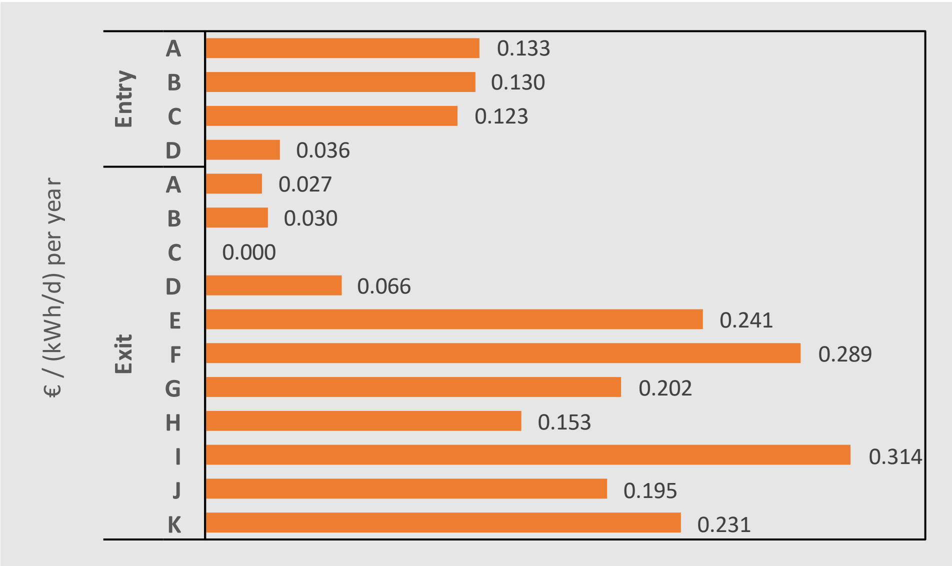
28. Based on the effective distance and effective capacity values it is possible to determine the pre-equalization prices of the modified CWD methodology by applying the formulas presented in section 3.1. Figure 3-1 illustrates the indicative pre-equalization prices for the four entry points and the 11 exit points.[21]

[19] Since there are different ways of measuring the most relevant physical flows, ERSE will discuss in the scope of the tariff proposal to be sent to the Tariff Council, until 31 March 2019, the calculation of the value.

[20] Using a three-year period is equivalent to using information from a time interval equivalent to the duration of the regulatory period. In this particular case, information was used for the period from 1 March 2016 to 28 February 2019 (10% of days in 3 years equals a total of 109 days) for High Pressure infrastructures.

[21] As will be explained in section **Erro! A origem da referência não foi encontrada.**, the entry-exit split used in applying the formulas in paragraph 21 is equal to 28/72.

Figure 3-1 - Indicative pre-equalization prices pursuant to the modified CWD methodology



29. Finally, the prices in Figure 3-1 will need to be adjusted, including price equalization, Article 9 discounts, multipliers and scaling factors.

3.3 ENTRY-EXIT SPLIT

30. In the case of the CWD methodology defined in Article 8 of the Tariff Network Code it is mandatory to use a 50/50 entry-exit split, i.e. the recovery of half of the allowed revenues at entry points and the other half at the exit points. In the modified CWD methodology an entry/exit split of 28/72 will be applied, i.e. the recovery of 28% of the allowed revenues at entry points and the recovery of the remaining 72% at exit points.

31. The entry-exit split of 28/72 results from a rational that allocates the costs of the transmission network to each set of network points according to their use of network assets. Table 3-5 shows the investments in the transmission system from 2010 to 2022, at constant prices for year 2019, which results in the following average structure by network asset type: primary pipelines (56%), secondary pipelines (20%) and GRMS (24%).

Table 3-5 - Investments in the transmission network, at constant 2019 prices

Investments in the transmission network, at constant prices of 2019													
Thousand €													
Year	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
Primary pipelines	32 998	1 176	1 792	53 084	1 240	5 587	1 935	619	264	893	4 181	4 962	4 816
Secondary pipelines	31 727	1 361	801	98	225	29	727	834	264	893	1 225	1 173	717
GRMS	16 271	8 821	190	346	3 831	2 708	1 318	3 519	474	1 873	3 875	3 435	3 537
Total	**80 996**	**11 358**	**2 784**	**53 529**	**5 297**	**8 324**	**3 980**	**4 972**	**1 002**	**3 660**	**9 281**	**9 571**	**9 071**

Note: data for the period 2010-2017 are investments that entered into exploration; data for the period 2018-2022 are forecasts.

32. The primary pipelines represent the main infrastructure of the transmission network, connecting the various entry points directly to GRMS or to secondary pipelines. Since any entry point or exit point relies on primary pipelines, it is considered that they should be allocated in equal proportions to the entry points and exit points, resulting in weights of 28% for each set of points. The remaining assets of the transmission network (secondary pipelines and GRMS), which represent on average 44% of investments in the transmission network, are assets that should be allocated exclusively to exit points. Theoretically, if the transmission network were to be built without exit points to transmission-connected customers and without connections to distribution networks, investments in secondary pipelines and GRMS would not have been necessary. Thus, a proportion of 44% of the allowed revenues to be recovered each year should be attributed exclusively to exit points. Thus, this rational results in an entry-exit split of 28/72.

33. The entry-exit split of 28/72 differs from the 40/60 split proposed in the 66th public consultation from ERSE. The entry-exit split of 40/60 was based on the investment structure beginning in 1997, coinciding with the start of the national transmission network in mainland Portugal. After the initial network expansion phase, in which investments in primary pipelines accounted for approximately 80%, in subsequent periods investments in secondary pipelines and GRMS assumed a greater weight. Therefore, investments between 2010 and 2017 and forecasted investments for years 2018 to 2022 suggest a lower weight of investments in primary pipelines and a greater weight of investments in secondary pipelines and GRMS, resulting in the entry-exit split of 28/72, which represents more adequately the current and future situation. In addition, the majority of comments received at the 66th public consultation from ERSE warned of the risk of a structural change in the entry-exit split, given the 27/73 split used in the approved tariffs for gas year 2018-2019.

3.4 UPDATE FREQUENCY OF THE REFERENCE PRICES

34. The reference prices resulting from the reference price methodology will be updated at the beginning of each tariff period in accordance with the allowed revenue established by ERSE and the demand forecasts existing at the time. Notwithstanding this annual update, and in order to ensure the principle of tariff stability, ERSE will keep pre-scaling prices constant during the regulatory period.[22] The difference between the concepts of reference prices and pre-scaling prices is explained in the following paragraphs.

35. In applying the reference price methodology it is important to distinguish four distinct reference price concepts, namely (1) pre-equalization prices, (2) post-equalization prices, (3) pre-scaling prices and (4) reference prices.

36. Pre-equalization prices correspond to the prices that result directly from the reference price methodology prior to the application of the adjustments provided for in Article 6(4) of the Tariff Network Code.[23] This means that the pre-equalization prices correspond to a price for each entry point and a price for each exit point.

37. Post-equalization prices correspond to the equalization of pre-equalization prices for points belonging to a homogeneous group of points. In the Portuguese case price equalization applies to interconnection points in both directions, resulting in single prices for the virtual interconnection point (Iberian VIP) as entry point and exit point of the transmission network, and for all exit points to consumers connected to the transmission system and all exit points to distribution networks. This latter equalization arises directly from the principle of tariff uniformity, a principle enshrined in the basic law and in the tariff code for the natural gas sector. As a result, the number of post-equalization prices is lower than the number of pre-equalization prices.[24]

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[22] This decision is in line with ERSE's general procedure for tariff setting, preserving a certain price structure during the regulatory period, subject to multiplicative adjustments to ensure the recovery of allowed revenues in each year.

[23] Article 6(4) establishes the list of adjustments, namely through price competitiveness criteria, the equalization of prices in points belonging to a homogeneous group of points and the scaling of prices by multiplicative or additive factors.

[24] Post-equalization prices consist of three entry prices (Iberian VIP, LNG terminal, underground storage) and four exit prices (Iberian VIP, LNG terminal, underground storage, customers/distribution networks).

38. Pre-scaling prices correspond to the application of the pre-equalization prices to the various capacity products and to the various tariff options. Pre-scaling prices also include the application of multipliers for non-yearly products and the underground storage discount, which follows from Article 9.

39. Finally, the reference prices consist of the regulated prices applied to network users and the reserve prices of standard capacity product auctions. Reference prices result from pre-scaling prices multiplied by scaling factors to recover the amount of allowed revenues.[25]

3.5 COMPARISON OF THE REFERENCE PRICE METHODOLOGY

40. Where the reference price methodology differs from the capacity weighted distance methodology as defined in Article 8 of the TAR NC, its comparison with the latter is mandatory.

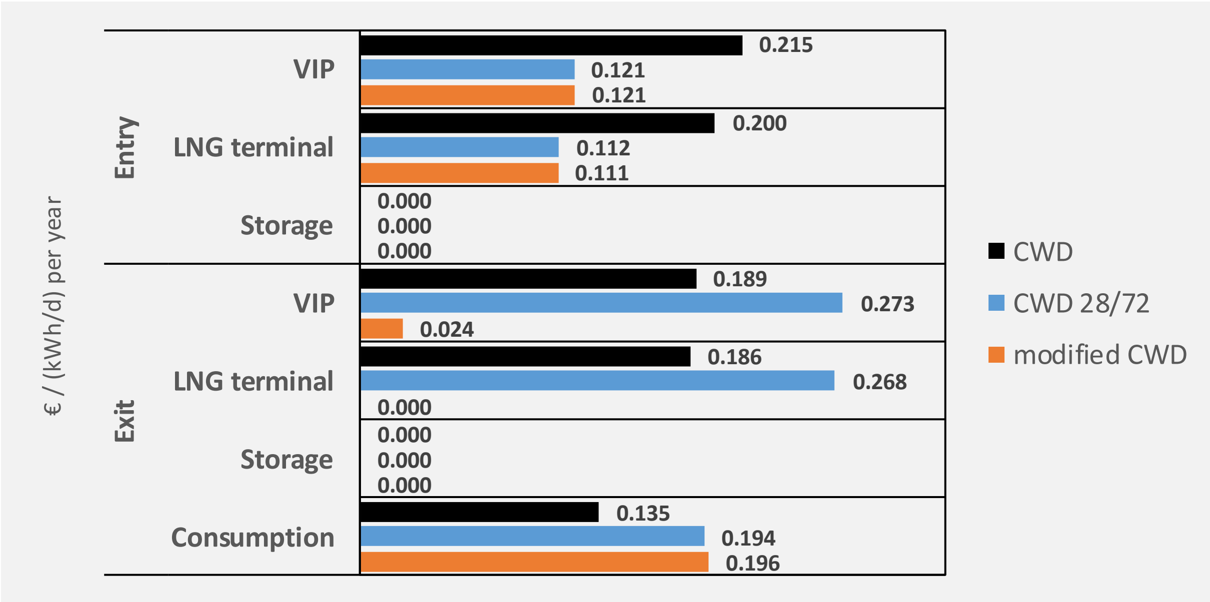
41. Figure 3-2 shows a comparison of the reference prices that result from three distinct methodologies, namely the CWD methodology, a CWD methodology with an entry-exit split of 28/72 (CWD 28/72)[26] and the modified CWD methodology. The latter corresponds to the reference price methodology adopted by ERSE.

42. The direct comparison of reference prices highlights the different assumptions in terms of entry-exit splits. In the case of the CWD methodology, the TAR NC establishes a 50/50 split. The modified CWD methodology uses a split of 28/72.

[25] In order to respect the entry-exit split in revenue to be recovered at entry points and exit points, it is necessary to apply a scaling factor to the entry tariffs and another scaling factor to the exit tariffs.

[26] The CWD 28/72 scenario is included in Figure 3-2 in order to compare the modified CWD methodology with the CWD methodology on a comparable basis.

Figure 3-2 - Comparison of reference prices between the CWD methodology and the modified CWD methodology



Note: **CWD** - CWD methodology of the Tariff Network Code; **CWD 28/72** - CWD methodology with an entry-exit split of 28/72; **Modified CWD** - reference price methodology adopted by ERSE.

43. These different assumptions in terms of entry-exit split result in higher reference prices at entry points for the CWD methodology when compared to the modified CWD methodology, with the opposite situation at exit points.

3.6 COST ALLOCATION ASSESSMENT

44. In accordance with Article 5 of the TAR NC, two cost allocation assessments should be carried out, namely to assess whether there is cross-subsidization between network use at cross-system level (gas transits) and at intra-system level (domestic consumption).

45. Article 5 requires the calculation of two indicators, one for capacity-based tariffs and one for commodity-based tariffs, to assess whether the recovery of revenues from cross-system and intra-system use is proportional to the cost drivers. The indicator for the presence of cross subsidization ranges from 0% to 200%, where 0% indicates the absence of cross subsidization and 200% indicates the maximum cross subsidization. Article 5(6) provides that where the calculated indicators exceed

10%, the national regulatory authority shall justify these results in its motivated decision referred to in Article 27(4).

46. In the Portuguese case, the elimination of commodity-based tariffs implies that only the cost allocation assessment for capacity-based tariffs has to be carried out. The following table shows the result for the capacity cost allocation comparison index[27] for three distinct methodologies, namely the CWD methodology, the CWD methodology with an entry-exit split of 28/72 (CWD 28/72) and the modified CWD methodology, the latter being the reference price methodology adopted by ERSE.

Table 3-6 - Capacity cost allocation assessment (with forecasted contracted capacity as cost driver)

		CWD	CWD 28/72	modified CWD
Revenues				
Intra-system	million €	92.73	92.74	92.80
Cross-system	million €	0.11	0.10	0.04
Cost driver: forecasted contracted capacity				
Intra-system	GWh/d	249.55	249.55	249.55
Cross-system	GWh/d	0.14	0.14	0.14
Ratio = Revenues ÷ Cost driver				
Intra-system	million € ÷ (GWh/d)	0.3716	0.3716	0.3719
Cross-system	million € ÷ (GWh/d)	0.7792	0.7695	0.2707
Capacity cost allocation comparison index		**(-) 70.8%**	**(-) 69.7%**	**(+) 31.5%**

Note: The sign in parentheses indicates the direction of cross subsidization: a positive sign (+) indicates that cross-system uses are being subsidized; A negative sign (-) indicates that intra-system uses are being subsidized.

47. Table 3-6 shows that the three methodologies exceed 10%, suggesting a cross-subsidization between intra-system and cross-system use. In this context, two observations should be highlighted. On the one hand, the CWD methodology itself, as defined in the TAR NC, exceeds the maximum threshold of 10%, and therefore does not guarantee the absence of cross-subsidization between intra-system and cross-system use. On the other hand, the modified CWD methodology has the lowest value among the three methodologies, and consequently has a lower degree of cross-subsidization when compared to the CWD methodology of the TAR NC.

[27] Article 5(1)(a) of the Tariff Network Code defines four alternatives to use as cost driver in the capacity cost allocation assessment. ERSE chose point ii) as cost driver, namely the forecasted contracted capacity.

48. Since the value of the capacity cost allocation comparison index (capacity CACI) exceeds 10%, ERSE is required to present a justification. Firstly, the capacity CACI proved to be a very volatile indicator in the analysis for situations where cross-system use is residual, as is the case in Portugal. That is, in a situation where the modified CWD methodology recovers 0.04% of the allowed revenues from cross-system use, while the forecasted capacity from cross-system use represents 0.05% of the total, the capacity CACI concludes that there is a cross subsidy towards cross-system use as the revenues to be recovered (0.04%) are approximately 1/5 lower than the weight (0.05%) suggested by the forecasted contracted capacity. While in relative terms the difference can be considered significant, the difference between the two proportions is only 0.01%. Secondly, Article 5 limits the admissible cost drivers for the cost allocation assessment to a restricted universe. The modified CWD methodology defines reference prices based on the two cost drivers defined as effective capacity and effective distance.[28] Therefore, the cost allocation assessment to be undertaken should include at least one of these two cost drivers. In this sense, ERSE recalculated the capacity CACI using effective capacity as cost driver, presenting the results in Table 3-7.

Table 3-7 - Capacity cost allocation assessment (with effective capacity as cost driver)

		CWD	CWD 28/72	modified CWD
Revenues				
Intra-system	million €	92.73	92.74	92.80
Cross-system	million €	0.11	0.10	0.04
Cost driver: effective capacity				
Intra-system	GWh/d	176.64	176.64	176.64
Cross-system	GWh/d	0.065	0.065	0.065
Ratio = Revenues ÷ Cost driver				
Intra-system	million € ÷ (GWh/d)	0.5250	0.5250	0.5254
Cross-system	million € ÷ (GWh/d)	1.6215	1.6013	0.5634
Capacity cost allocation comparison index		**(-) 102.2%**	**(-) 101.2%**	**(-) 7.0%**

Note: The sign in parentheses indicates the direction of cross subsidization: a positive sign (+) indicates that cross-system uses are being subsidized; A negative sign (-) indicates that intra-system uses are being subsidized.

49. Table 3-7 shows that effective capacity as a cost driver yields a value below the 10% threshold only for the modified CWD methodology. ERSE considers this result to be evidence that the reference price

[28] Check formulas in paragraphs 17 and 18.

methodology adopted by ERSE does not imply cross-subsidization between intra-system and cross-system use.

3.7 COMPLIANCE OF THE REFERENCE PRICE METHODOLOGY WITH ARTICLE 7

50. This section assesses whether the reference price methodology to be applied in the calculation of transmission tariffs in Portugal complies with the requirements of Article 7 of the TAR NC and of Article 13 of Regulation (EC) 715/2009.

51. Pursuant to Article 7 of the TAR NC, a set of requirements must be met, namely: (i) to enable network users to reproduce the calculation of reference prices; (ii) to take into account the actual costs incurred for the provision of transmission services (considering the level of complexity of the transmission network); (iii) to ensure non-discrimination and to prevent undue cross-subsidisation; (iv) to ensure that significant volume risk related to gas transits is not assigned to final customers; and (v) to ensure that the resulting reference prices do not distort cross-border trade.

52. Pursuant to Article 13 of Regulation (EC) 715/2009, which concerns tariffs for access to networks in the natural gas sector, thus covering transmission tariffs, tariffs (or the methodologies used to calculate them)) shall be "transparent, take into account the need for system integrity and its improvement and reflect the actual costs incurred", shall 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 of different transmission systems".

53. In ERSE's understanding, the reference price methodology adopted meets the above requirements. Firstly, the reference price methodology is simple enough and well documented to be transparent, allowing users to reproduce calculations by the system users. The availability of a simplified tariff model in Excel contributes to this objective and allows estimating the evolution of transmission tariffs until the end of the regulatory period.

54. Secondly, the reference price methodology takes into account the actual costs of the transmission service given the complexity of the transmission network. The simplified network diagram and a classification of the network investments allows to reflect the main aspects of the network.

55. Third, the use of a single methodology to allocate the overall amount of allowed revenues from the transmission system operator contributes to non-discrimination and to the absence of cross subsidization. The results of the cost allocation assessment (see section 3.6) confirm the absence of cross-subsidization between intra-system and cross-system users.[29]

56. Fourthly, ERSE considers that the assignment of the volume risk of gas transits to final consumers is not a real concern for Portugal, as cross-border flows represent residual values for Portugal.

57. Lastly, the promotion of cross-border trade results from reference prices that encourage an efficient use of the transmission network through the price signals applied at each entry and exit point, in particular at the Iberian VIP. Specifically, the adoption of the physical utilization factor allows to reflect the proximity between the physical flows and the technical capacity, signalling the greater probability of situations of capacity shortage and consequently the need for investment to reinforce capacity.

[29] Result obtained when effective capacity is used as cost driver.

4 REVENUE STRUCTURE OF THE TRANSMISSION SYSTEM OPERATOR

58. This section refers to the requirement under Article 26(1)(b) of the Tariff Network Code to provide indicative information set out in Article 30(1)(b), under points (i), (iv) and (v), relating to the transmission system operator's allowed revenues.

59. The indicative information on the transmission system operator's revenues is provided in the table below.

Table 4-1 - Indicative information on the transmission system operator's revenues

Article of the TAR NC	Description	Information	
Art. 30 (1)(b)(i)	Allowed revenues, in thousands of euros		92 840
Art. 30 (1)(b)(iv)	Transmission service revenues, in thousands of euros		92 840
Art. 30 (1)(b)(v)(1)	Capacity-commodity split of the transmission services revenue	Capacity	100%
		Commodity	0%
Art. 30 (1)(b)(v)(2)	Entry-exit split of the transmission services revenue (capacity-based tariffs)	Entry	28%
		Exit	72%
Art. 30 (1)(b)(v)(3)	Cross-system/ Intra-system split of the transmission services revenue (calculated as set out in Article 5)	Intra-system use	99.96%
		Cross-system use	0.04%

60. The table above gives indicative information based on a level of allowed revenues of the transmission system operator equal to the amount included in the transmission tariffs for the tariff period 2018-2019.

5 EVOLUTION OF THE TRANSMISSION TARIFFS

61. This section refers to the requirement under Article 26(1)(d) of the TAR NC, in particular with regard to the publication of indicative information in Article 30(2):

– the difference in the level of transmission tariffs for the same type of transmission service applicable for the prevailing tariff period and for the tariff period for which the information is published;

– the estimated difference in the level of transmission tariffs for the same type of transmission service applicable for the tariff period for which the information is published and for each tariff period within the remainder of the regulatory period.

62. Table 5-1 shows the indicative reference prices for the tariff periods until the end of the regulatory period 2019-2022, determined on the basis of the modified CWD methodology. The table includes for comparative purposes the prices of the transmission tariff in force in tariff period 2018-2019, which resulted from the application of a different methodology, namely a matrix model.

63. It is important to note that the reference prices presented are merely indicative and are based on simplified assumptions in order to use reasonable forecasts for the evolution of allowed revenues and capacity.[30]

64. For the tariff period 2019-2020 there is a reduction in the various prices compared to the tariff period 2018-2019, in particular at the entry point from the LNG terminal, due to an expectation of a significant increase in forecasted capacity for 2019-2020.[31] Also noteworthy in 2019-2020 is the application for the first time of positive exit price at the Iberian VIP, as a result of the new reference price methodology and the recent data indicating significant net exports of natural gas to Spain over several days in the first two months of 2019. Another highlight is the 100% decrease in the entry price from underground storage as a result of a 100% discount in accordance with Article 9 of the TAR NC.[32]

[30] In terms of allowed revenue the table assumes a value in each year equal to the allowed revenue for the tariff period 2018-2019 (92.84 million euros). In terms of forecasted capacity the table assumes the same demand structure as the one used in the tariff period 2018-2019, including a uniform growth of + 7.5% for 2019-2020 and a zero growth for the two subsequent gas years.

[31] The growth estimate of +7.5% is based on a provisional demand estimate for gas year 2019-2020.

[32] See section **Erro! A origem da referência não foi encontrada.**.

65. For tariff periods 2020-2021 and 2021-2022, reference prices are stable, given the assumptions of zero growth in allowed revenues and in forecasted capacities.

Table 5-1 - Indicative reference prices for the tariff periods until the end of the 2019-2022 regulatory period, including a comparison with the prices of the tariff period 2018-2019

					Indicative reference prices *(unit prices)*			Indicative reference prices *(annual change, %)*		
	Point	*Product*	*Unit*	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**	**2019-2020**	**2020-2021**	**2021-2022**
Entry	VIP	Annual	€/(kWh/d)/year	0.1218	0.1211	0.1211	0.1211	-0.6%	0.0%	0.0%
		Quarterly	€/(kWh/d)/year	0.1583	0.1574	0.1574	0.1574	-0.6%	0.0%	0.0%
		Monthly	€/(kWh/d)/year	0.1827	0.1816	0.1816	0.1816	-0.6%	0.0%	0.0%
		Daily	€/(kWh/d)/year	0.2436	0.2421	0.2421	0.2421	-0.6%	0.0%	0.0%
		Within-day	€/(kWh/h)/year	6.4308	6.3919	6.3919	6.3919	-0.6%	0.0%	0.0%
	LNG terminal	Annual	€/(kWh/d)/year	0.1218	0.1114	0.1114	0.1114	-8.5%	0.0%	0.0%
		Quarterly	€/(kWh/d)/year	0.1583	0.1448	0.1448	0.1448	-8.5%	0.0%	0.0%
		Monthly	€/(kWh/d)/year	0.1827	0.1671	0.1671	0.1671	-8.5%	0.0%	0.0%
		Daily	€/(kWh/d)/year	0.2436	0.2228	0.2228	0.2228	-8.5%	0.0%	0.0%
		Within-day	€/(kWh/h)/year	6.4308	5.8822	5.8822	5.8822	-8.5%	0.0%	0.0%
	Underground storage	Daily	€/(kWh/d)/year	0.0034	0.0000	0.0000	0.0000	-100.0%	-	-
		Within-day	€/(kWh/h)/year	0.0902	0.0000	0.0000	0.0000	-100.0%	-	-
Exit	VIP	Annual	€/(kWh/d)/year	0.0000	0.0240	0.0240	0.0240	-	0.0%	0.0%
		Quarterly	€/(kWh/d)/year	0.0000	0.0311	0.0311	0.0311	-	0.0%	0.0%
		Monthly	€/(kWh/d)/year	0.0000	0.0359	0.0359	0.0359	-	0.0%	0.0%
		Daily	€/(kWh/d)/year	0.0000	0.0479	0.0479	0.0479	-	0.0%	0.0%
		Within-day	€/(kWh/h)/year	0.0000	1.2650	1.2650	1.2650	-	0.0%	0.0%
	LNG terminal	Annual	€/(kWh/d)/year	0.0000	0.0000	0.0000	0.0000	-	-	-
		Quarterly	€/(kWh/d)/year	0.0000	0.0000	0.0000	0.0000	-	-	-
		Monthly	€/(kWh/d)/year	0.0000	0.0000	0.0000	0.0000	-	-	-
		Daily	€/(kWh/d)/year	0.0000	0.0000	0.0000	0.0000	-	-	-
		Within-day	€/(kWh/h)/year	0.0000	0.0000	0.0000	0.0000	-	-	-
	Underground storage	Daily	€/(kWh/d)/year	0.0000	0.0000	0.0000	0.0000	-	-	-
		Within-day	€/(kWh/h)/year	0.0000	0.0000	0.0000	0.0000	-	-	-
	Distribution networks and HP customers	Long uses	€/(kWh/d)/year	0.2110	0.1965	0.1965	0.1965	-6.9%	0.0%	0.0%
	HP customers	Annual Flexible Tariff - Annual Base Capacity	€/(kWh/d)/year	0.2110	0.1965	0.1965	0.1965	-6.9%	0.0%	0.0%
		Annual Flexible Tariff - Additional Monthly Capacity (April to September)	€/(kWh/d)/year	0.3165	0.2947	0.2947	0.2947	-6.9%	0.0%	0.0%
		Flexible Monthly Tariff - Monthly Capacity (October to March)	€/(kWh/d)/year	0.6329	0.5894	0.5894	0.5894	-6.9%	0.0%	0.0%
		Flexible Monthly Tariff - Monthly Capacity (April to September)	€/(kWh/d)/year	0.3165	0.2947	0.2947	0.2947	-6.9%	0.0%	0.0%
		Daily Flexible Tariff - Daily Capacity (October to March)	€/(kWh/d)/year	2.1097	1.9646	1.9646	1.9646	-6.9%	0.0%	0.0%
		Daily Flexible Tariff - Daily Capacity (April to September)	€/(kWh/d)/year	1.2658	1.1787	1.1787	1.1787	-6.9%	0.0%	0.0%

6 DISCOUNTS AND MULTIPLIERS

66. This section responds to Article 28(1) of the TAR NC, 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, relevant stakeholders on the level of multipliers, the level of seasonal factors[33] and the discounts provided for in Articles 9 and 16.

6.1 DISCOUNTS AT ENTRY POINTS FROM AND EXIT POINTS TO STORAGE FACILITIES (ARTICLE 9)

67. In accordance with Article 9(1) of the TAR NC, a discount of at least 50% should apply to the reference prices applicable at entry points from and exit points to storage facilities.

68. In the case of the national natural gas transmission network this discount will be applied to the interface with the underground storage, with a 100% discount at the entry point from and at the exit point to the underground storage.

69. The decision to increase the 95% percent discount, proposed in the 66th public consultation, to 100% aims to make it easier for traders to be in balance using the underground storage, taking advantage of the flexibility this infrastructure can provide to the system. Thus, this infrastructure, whose use is significantly below its technical capacity, can be used to better contribute to the system balance.

6.2 DISCOUNT APPLICABLE TO STANDARD CAPACITY PRODUCTS FOR INTERRUPTIBLE CAPACITY (ARTICLE 16)

70. As an alternative to applying the ex-ante discount pursuant to Article 16(1) of the TAR NC, the national regulatory authority may decide to apply an ex-post discount whereby network users are compensated after the occurrence of interruptions. This 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.

71. In view of ERSE's public consultation and the absence of comments contrary to ERSE's decision, ERSE retains its decision to apply the ex-post discount foreseen in Article 16(4) of the TAR NC.

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[33] In Portugal, seasonal factors do not apply to standard capacity products to date.

72. The ex-post compensation paid for each day on which an interruption occurred shall be equal to three times the reserve price for daily standard capacity products for firm capacity.

73. Pursuant to ACER's interpretation of the application of Article 16(4) of the TAR NC, published in the context of ACER's analysis of the public consultation conducted by the Dutch regulator, the calculation of the ex-post discount is made according to the following formula[34]:

Table 6-1 - Formula for the ex-post discount pursuant to Article 16 of the TAR NC

$$\underbrace{\text{Ex-post discount}}_{€} = 3 \cdot \underbrace{\text{Reserve price (daily product, firm capacity)}}_{€/(\text{kWh/day})} \cdot \underbrace{\text{Contracted capacity}}_{\text{kWh/day}}$$

Note: The amount of 'Contracted Capacity' is given by the contracted capacity value of a standard capacity products for interruptible capacity of a user for which the transmission system operator has interrupted the capacity product.

6.3 MULTIPLIERS

74. The TAR NC lays down rules for the level of multipliers in Article 13, applicable to non-yearly standard capacity products at interconnection points. The multipliers, applicable to the reserve prices of yearly products, determine the non-yearly reserve prices, namely on the quarterly, monthly, daily and within-day horizons.

75. In accordance with Article 13(1), the multiplier level shall not be less than 1 and not more than 1.5 for quarterly and monthly standardized capacity products. For daily and intraday standard capacity products the level of their multiplier shall not be less than 1 and not more than 3, but may in duly justified cases be higher than 3 and less than 1, but higher than zero.

76. Table 6-2 lists the applicable multipliers to the VIP, the LNG terminal and the underground storage (Carriço). The multipliers shown in this table comply with the limits set out in Article 13(1).

[34] It should be noted that this formula differs from the wording presented by ERSE in the 66th public consultation, where the discount was being calculated on the basis of non-served energy. The formula in Table 6-1 takes into account the interpretation of ACER published afterwards.

Table 6-2 - Level of multipliers

Standard capacity product	**VIP**	**LNG terminal**	**Underground 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 to the VIP pursuant to Article 13(1) of the TAR NC.

7 ANNEX – DESCRIPTION OF THE NATIONAL TRANSMISSION NETWORK

77. This chapter briefly describes the national gas transmission network, in particular to justify the simplified network representation that is adopted for the application of the reference price methodology.

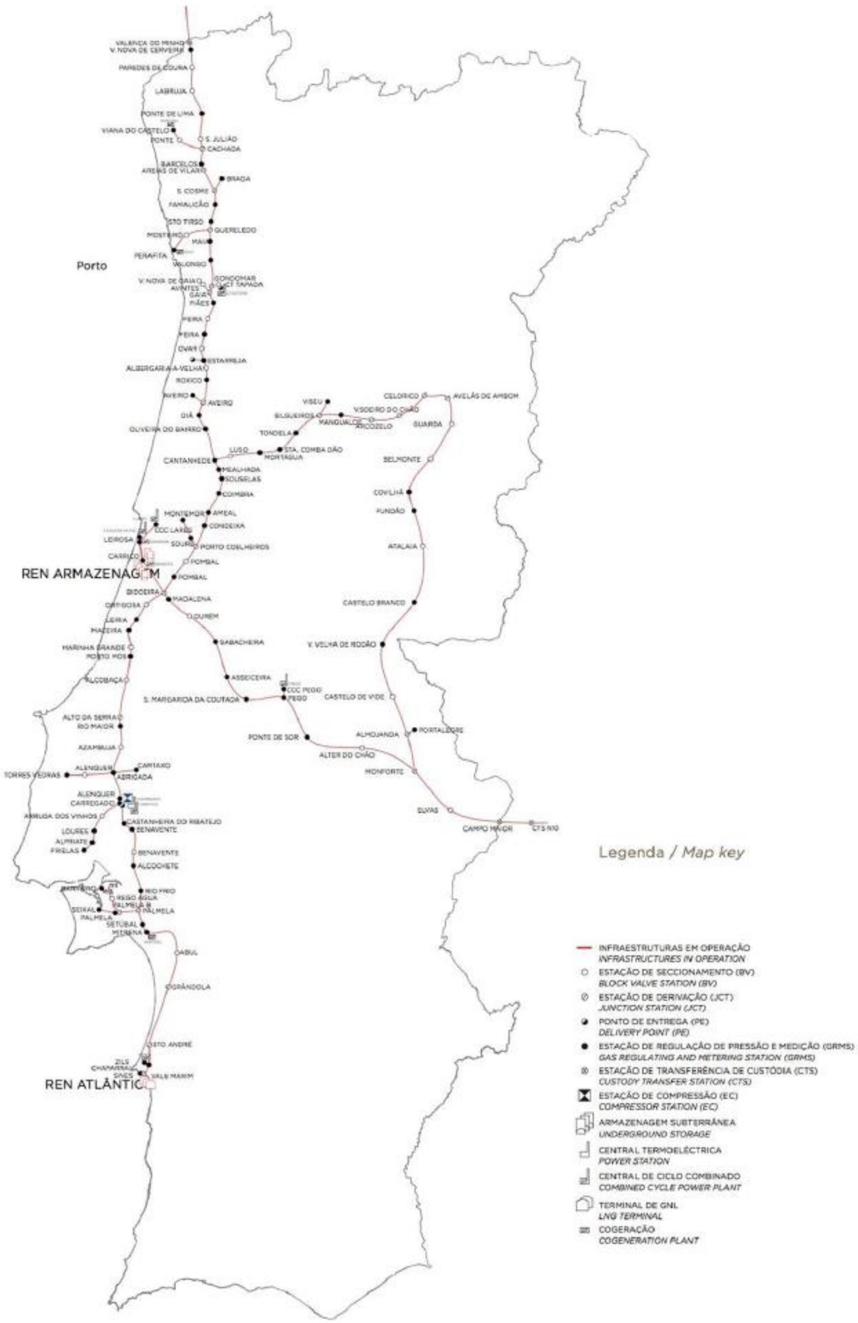
78. The national gas transmission network, shown in Figure 7-1, consists of two axes[35]: a north-south axis linking the interconnection with Spain in Valença do Minho with the LNG terminal in Sines, and an east-west axis connecting the interconnection with Spain in Campo Maior with the coastal area, passing near the underground storage in Carriço. In 2013, the connection between two sections ending in Mangualde and Guarda was completed, resulting in a circular section connecting these two points.

79. The natural gas transmission network is currently 1 375 km long, has pipeline diameters between 150 and 800 mm and includes 85 gas metering and regulation stations at delivery points.[36]

[35] The figure is based on the transmission network map presented by the TSO (REN Gasodutos).

[36] Data for the end of 2016, presented in the Indicative Ten-Year Network Development Plan for transmission, storage facilities and LNG facilities for the period 2018-2027.

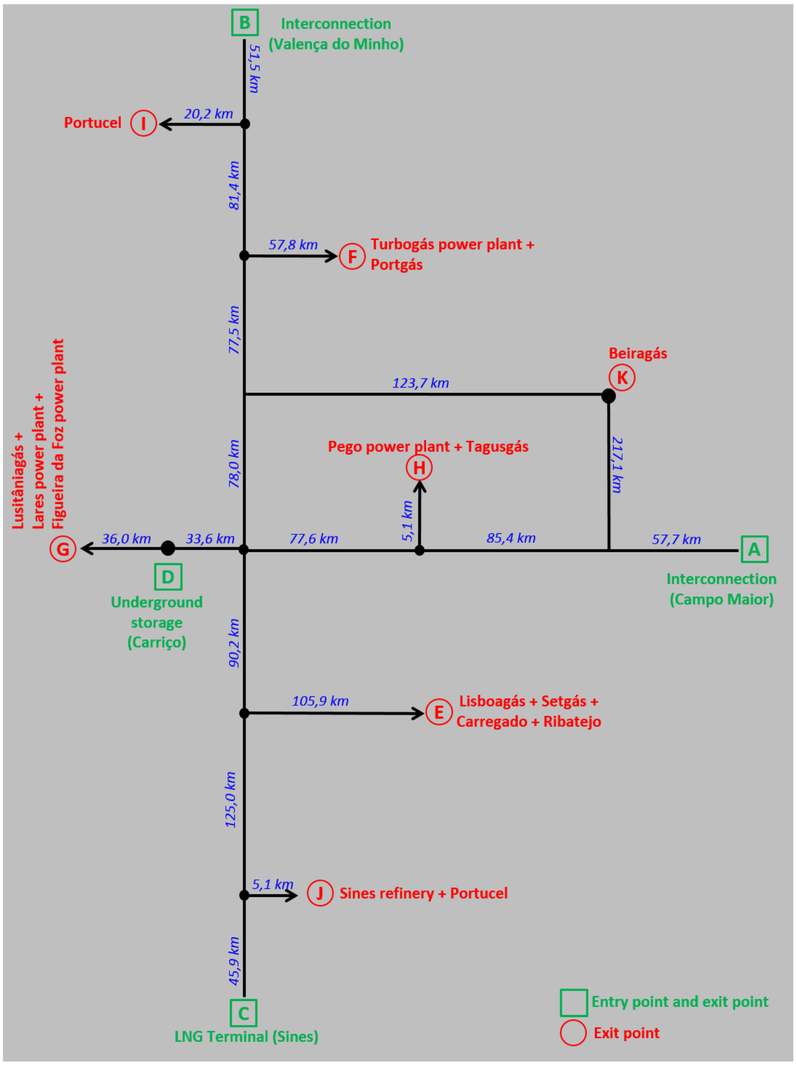
Figure 7-1 - Map of the gas transmission network



Source: Based on the map of the transmission network published by the TSO (REN Gasodutos).

80. The following figure presents the simplified network diagram used in the reference price methodology to determine the distances between entry points and exit points.[37]

Figure 7-2 - Simplified network diagram of the transmission network



81. The simplified network diagram of the 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 represented also as exit points. In the

[37] This simplified network diagram represents an update of the diagram presented in the document "Natural Gas Transmission Tariffs Summary - Portugal 2018-2019", published in June 2018 and made available on the ERSE's website.

case of the interconnection points and the underground storage the infrastructures are effectively bidirectional, allowing gas flows in both directions. In the case of the LNG terminal, although the natural gas flow is unidirectional, representing an entry point of the network, agents may, on a contractual basis, place gas in the LNG terminal through the reduction of the physical flow of gas leaving the terminal, implying that the LNG facility operates as an exit point as well.

82. The remaining exits points, represented by the gas metering and regulating 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 7-2. Distances towards these exit zones were determined by taking the most significant points within each zone as the reference point.

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