Annual Planning of Load Balancing for 2013

(Revision: 1)

August 2012

1. Introduction

The present plan is developed in terms of Paragraph 2.c of Article 68 of Act 4001/2011 that assigns liability to the Hellenic Gas Transmission System Operator (DESFA) S.A. for load balancing of the National Natural Gas System (NNGS) and according to the provisions in the Article 46 of the Network Code for the regulation of Natural Gas System (hereafter "Network Code"), referring to the Annual Planning of Load Balancing and the Operational Gas Offsetting.

In terms of Paragraph 1.A, Article 46 of NNGS Network Code, the Operator submits to the Regulatory Authority of Energy (RAE) the Annual Planning of Load Balancing for the following Year (as well as any amendment) that is approved by RAE and published by the Operator.

With its aforementioned authority, the Operator signs load balancing contracts in accordance with the approved (by RAE) Annual Planning of Load Balancing, either after a tender or in terms of Paragraph 2.c, Article 68 of Act 4001/2011.

In terms of Paragraph 2 of Article 46 of Network Code, the Annual Planning of Gas Balancing includes in particular: (a) Forecasts of the Operator for the development of Natural Gas demand per category of Customers and the Stated Transit with regards to the existing Transmission Capacity of the Transmission System, (b) forecast with regards to the necessary Quantities of Natural Gas for Gas Balancing, such as the total annual Quantity of Natural Gas for Balancing, the estimated allocation thereof during the Year, the maximum Supply and the maximum daily Quantity of Natural Gas for Balancing and (c) determination of the required characteristics of the Balancing Agreement or combination of Balancing Agreements that the Operator must enter.

According to the Paragraph 3 of Article 46 of the Network Code, for the development of Planning, the Operator takes into consideration particularly the NNGS Development Plan, the Annual Planning for Gas Balancing, the total demand of Natural Gas served via the NNGTS, the geographic distribution of consumptions, the elimination of technical limitations concerning the operation of the System and, particularly, each event that has lead, or is going to lead, as per his discretion to a congestion, Emergency, access denial or Transit prohibition, the maintenance requirements of the NNGS components, the existing Natural Gas Transmission Agreements, the existing LNG Facility Usage Agreements, as well as the Connected System Agreements entered.

2. Balancing Gas

Balancing Gas is the quantity of Natural Gas injected into the National Transmission System by the Operator during specified time period in order to reach balance between the Deliveries and Off-takes of Natural Gas in that time period and to ensure the reliable, safe and efficient operation of NNGS. In terms of its authority and liability, the Operator secures the balance, taking into consideration the losses and the stored quantities of Natural Gas in the National Transmission System.

3. Forecast for Natural Gas demand in Year 2013

Taking into consideration the historical data of Natural Gas consumption in NNGTS and the expected completion dates of the ongoing and scheduled expansion projects in NNGTS, it is estimated that the Natural Gas consumption will reach at **4,884 mil. Nm^3** in Year 2013. The estimated Natural Gas consumption per consumer category is presented in more detail in Table 1.

Month of Year 2013	Power Production Nm^3	Peak Power Production Nm^3	Other Consumers Nm^3	Total Consumption Nm^3
January	299,002,306	0	229,353,771	528,356,077
February	277,945,483	0	205,252,616	483,198,099
March	298,164,656	0	151,000,145	449,164,801
April	211,320,474	0	97,238,947	308,559,421
May	226,595,788	0	92,895,193	319,490,981
June	238,918,866	0	93,094,825	332,013,691
July	300,399,051	0	91,574,855	391,973,906
August	254,539,243	0	80,788,062	335,327,305
September	276,529,368	0	94,615,975	371,145,343
October	290,894,425	0	120,143,780	411,038,205
November	301,434,426	0	183,385,471	484,819,897
December	291,755,554	0	177,197,480	468,953,034
Total	**3,267,499,640**	**0**	**1,616,541,120**	**4,884,040,760**

Table 1: Forecast of Natural Gas consumption per consumer category in Year 2013

For the estimation of Natural Gas consumption in Year 2013 the following assumptions were taken into consideration:

- During September 2013 the commercial operation of the 400 MW unit “ALIVERI V” of Public Power Corporation at Aliveri in Evia will commence.
- At the end 2013 the 850 MW power plant of Public Power Corporation at Megalopoli in Arkadia will be connected to the NNGTS.
- The yearly Natural Gas consumption of the peak unit in the power plant “HERON” will be zero for the Year 2013.

4. Natural Gas Balancing Quantities

During the current Year, as in previous Years, the calculation of the Balancing Gas is Daily performed, taking into consideration the total Natural Gas Quantity that is measured at the Entry Point 'Agia Triada' of the National Transmission System during that Day and the total LNG quantity declared to be injected into the National Transmission System during the same Day for all the Users that have a contract with the Operator for the utilization of the LNG facility. Hence, the quantity of Balancing Gas generally depends on the daily declared nominations of Natural Gas Deliveries and Off-takes that are submitted by the Transmission Users to the Operator every day and the real daily needs of the consumers.

In the Diagram 1 below, the Monthly of Balancing Gas Quantities that were injected into the NNGTS is shown, as a percentage of the relative Monthly Natural Gas Off-Takes for the period of 01/2008 to 04/2011.

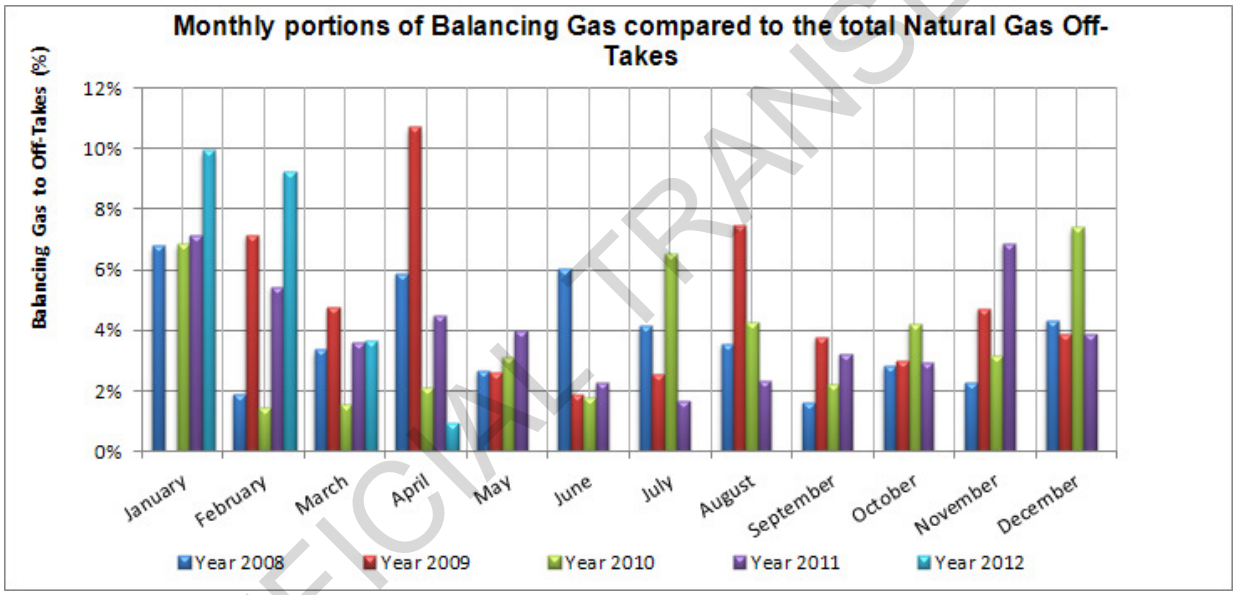

Diagram 1: Monthly Portions of Balancing Gas to Total Natural Gas Off-takes in Time Period 01/2008 – 04/2012 (01/2009 is not included),

Taking the above into consideration, so as DESFA will extract as possible a reliable assessment concerning the Balancing Gas Quantity that will be demanded during the Year 2013, the methodology described below was followed:

- Calculation of mean value ($\overline{x\%}$) and of standard error of the mean value ($\sigma_{\overline{x\%}}$) and their sum $\left(\overline{x}+\sigma_{\overline{x}}\right)\%$ for the sample of the fifty-one (51) values of the Balancing Gas during the period of 01/2008-04/2012 (see Annex 1) (January 2009 not included) for each Month according to the Table 2 below:

Month	$(\bar{x})\%$	$(\sigma_{\bar{x}})\%$	$\left(\bar{x}+\sigma_{\bar{x}}\right)\%$
January	7.67%	0.76%	8.43%
February	5.05%	1.50%	6.55%
March	3.39%	0.52%	3.91%
April	4.82%	1.71%	6.53%
May	3.09%	0.31%	3.40%
June	2.99%	1.02%	4.01%
July	3.73%	1.06%	4.79%
August	4.42%	1.09%	5.51%
September	2.71%	0.48%	3.19%
October	3.23%	0.32%	3.55%
November	4.26%	1.01%	5.27%
December	4.88%	0.85%	5.73%

Table 2: Mean value, standard error for mean value and their sum for the historical data for every Month of previous Years

Because of the uncertainly introduced by the lack of historical data on the actions of new Users and their Suppliers, it is selected to use the maximum estimated probability for the balancing gas. i,e, $BG=\left(\overline{x\%}+\sigma_{\overline{x\%}}\right)\cdot NGO$, where NGO refers to the Operator's estimate for Natural Gas off-takes at all the Exit Points of the National Transmission System in Year 2013, as presented in Table 1. It is noted that the above increase of the Balancing Gas to the overall consumption is justified by the introduction of new consumers in the south part of the National Transmission System that results in more unequal distribution of Natural Gas loads between north and south part.

Taking into consideration the above method and the demand of Natural Gas in Year 2013 (see Table 1 above), the Operator's estimation for the monthly distribution of Balancing Gas in Year 2013 is calculated and listed in Table 3 (overall Table with the Operator's forecast for the monthly demand of Natural Gas per consumption category and estimation for the balancing gas in Year 2013 is given in Annex 1).

Month in Year 2013	Natural Gas for Balancing purposes (MWh)
January	498,964
February	354,649
March	196,890
April	225,726
May	121,806
June	149,219
July	210,316
August	206,821
September	132,864
October	163,378
November	286,399
December	300,672
Total	**2,847,704**

Table 3: Estimation of the Balancing Gas quantities allocation in Year 2013

Finally, taking into consideration the consumption historical data and the expected penetration of Natural Gas in the home, commercial, industrial and power production section (new units), it is estimated **that the maximum daily consumption in Year 2013 will reach at 260,000 MWh**.

5. Balancing Gas Contract

Aiming at the orderly, economical and efficient operation of the NNGS, during the Year 2013, the Operator will sign a contract with a N.G. supplier, who will be chosen after an international bid, as it is defined in article 68 of the Law 4001/2011 and in paragraph 2 in the article 47 of the Natural Code, for the supply of Balancing Gas during the time period 01.01.2013 08:00 – 01.01.2014 08:00.

The supply of Balancing Gas will take place in the context of a request fulfillment of the Operator to supply Balancing Gas issued by the relative Operator to the prequalified Shippers. The choice of Shipper will be based on criteria that will be specified in the contract-framework and relate, among others, with the lower supply price offered and the fulfillment of the Operator's request in terms of the LNG quantity and the delivery date.

Furthermore, taking into consideration:

- the restricted Storage Area of LNG Facility,
- the ever increasing demand (from Users' sides) for access to the LNG Facility,
- the requirements in the Network Code of NNGS and particularly in Chapter 11 for the terms of access to the LNG Facility (Temporary LNG Storage Period. Minimum Regasification

Capacity),

- the size of LNG vessels that are available in the LNG Market,

in the LNG supply Contract-Framework for Balancing Gas, the authority of the Operator to specify the LNG quantity and the time delivery for balancing purposes will be established, so that the smooth operation of the Greek Natural Gas market is not upset, in accordance with the requirement of the Network Code of NNGS. Given the lack of confirmation of the Operator's estimations relating to the Natural Gas Quantities demanded for the Year 2013 for Balancing and the procedure of choosing the final Shipper, the abovementioned contract will not contain imposing restrictions such as minimum supply quantity or payment clauses irrespective of LNG off-takes.

ANNEX 1

Operator's forecast for Monthly Demand of Natural Gas per Consumption Category and Estimation of Balancing Gas in Year 2013

Month in 2013	Power Generation	Peak Power Generation	Other Consumers	Total Consumption		Balancing Gas
	Nm^3	Nm^3	Nm^3	Nm^3	MWh	MWh
January	299,002,306	0	229,353,771	528,356,077	5,917,588	498,964
February	277,945,843	0	205,252,616	483,198,459	5,411,823	354,649
March	298,164,656	0	151,000,145	449,164,801	5,030,646	196,890
April	211,320,474	0	97,238,947	308,559,421	3,455,866	225,726
May	226,595,788	0	92,895,193	319,490,981	3,578,299	121,806
June	238,918,866	0	93,094,825	332,013,692	3,718,553	149,219
July	300,399,051	0	91,574,855	391,973,906	4,390,108	210,316
August	254,539,243	0	80,788,062	335,327,305	3,755,666	206,821
September	276,529,368	0	94,615,975	371,145,343	4,156,828	132,864
October	290,894,425	0	120,143,780	411,038,205	4,603,628	163,378
November	301,434,426	0	183,385,471	484,819,897	5,429,983	286,399
December	291,755,554	0	177,197,480	468,953,034	5,252,274	300,672
Total	***3,267,500,000***	***0***	***1,616,541,120***	***4,884,041,120***	***54,701,262***	***2,847,704***

Notes

1. For the conversion from volume units (Nm^3) to energy units (MWh), the assumption that 1,000 normal cubic meters of Natural Gas are thermally equivalent with 11.2 MWh is made.
2. For the time being, the only peak power generator of NNGTS is HERON and its consumption is directly related to the needs of the Electric Power System, therefore consumption estimation for peak power generation may only be provided on annual basis without distributing it monthly.

ANNEX 2

Historical Data of Balancing Gas in time period 01/2008 – 04/2012

Year	Month	Balancing Gas (MWh)	Total Natural Gas Off-takes (MWh)
2008	January	306,337.95[1]	4,500,972.59
2008	February	80,916.51[1]	4,231,473.47
2008	March	140,589.28[1]	4,176,917.83
2008	April	185,696.29[1]	3,164,356.38
2008	May	96,295.32[1]	3,592,414.49
2008	June	241,146.81[1]	3,991,693.86
2008	July	184,741.79[1]	4,472,372.12
2008	August	137,181.87[1]	3,850,221.56
2008	September	61,759.13	3,801,935.80
2008	October	88,533.81	3,124,133.19
2008	November	66,880.04	2,945,020.44
2008	December	142,696.77	3,295,346.25
2009	January	1,506,613.07[2]	3,231,725.60
2009	February	196,341.04	2,740,043.39
2009	March	113,386.66	2,367,662.27
2009	April	241,152.40	2,249,339.40
2009	May	77,528.88	2,977,330.49
2009	June	54,486.59	2,929,149.60
2009	July	89,210.23	3,463,468.50
2009	August	226,917.86	3,040,362.18
2009	September	123,864.07	3,288,252.36
2009	October	113,013.27	3,792,675.94
2009	November	182,950.93	3,870,229.17
2009	December	155,648.33	3,993,177.62
2010	January	269,670.85	3,944,192.61
2010	February	51,321.25	3,540,047.71
2010	March	53,208.93	3,409,219.38

[1] For Year 2008 the assumption of applying the balancing procedures from the beginning of the year is introduced in order to calculate the balancing gas for the months of 2008, in which there was no contract of natural gas sale from DEPA to DESFA for balancing purposes.

[2] The contribution of balancing gas in January 2009, during the dispute between Russia and Ukraine, is not included in any calculation.

2010	April	60,663.09	2,911,372.26
2010	May	99,018.47	3,178,857.66
2010	June	50,595.86	2,827,402.89
2010	July	242,961.47	3,720,294.65
2010	August	174,982.17	4,083,913.00
2010	September	67,278.75	3,019,067.00
2010	October	153,451.26	3,669,285.00
2010	November	100,476.25	3,180,865.00
2010	December	300,736.22	4,062,802.00
2011	January	320,768.77	4,505,776.00
2011	February	229,454.70	4,208,617.00
2011	March	177,743.89	4,955,267.00
2011	April	178,887.00	3,984,367.71
2011	May	153,445.66	3,868,713.10
2011	June	89,051.14	3,922,047.55
2011	July	79,691.14	4,769,536.55
2011	August	87,502.17	3,724,041.95
2011	September	128,011.43	3,959,608.30
2011	October	113,458.73	3,878,824.05
2011	November	327,456.57	4,752,485.36
2011	December	182,212.09	4,703,443.52
2012	January	571,458.48	5,751,139.74
2012	February	513,634.09	5,542,416.14
2012	March	169,224.79	4,618,416.10
2012	April	28,012.04	2,987,063.24