



Operation Report of the NNGS for the Year 2012

(In accordance with the provisions of the paragraph 2.z of Article 68 of the Law 4001/2011 on the operation of Energy Markets of Power Generation and Natural Gas, for Research, Production and Hydrocarbon Transportation Networks and other regulations)

Halandri, Attica

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Unofficial Translation

1 General description of the National Natural Gas System



The National Natural Gas System (NNGS) transports Natural Gas to consumers connected to the NNGS in the Greek mainland from the Greek-Bulgarian borders, the Greek-Turkish borders and the Liquefied Natural Gas (LNG) terminal, which is installed at Revythousa Island at Megara.

It consists of:

- The main pipeline, with 512 Km length and 36" & 30" diameter, and the branches of total length 779 Km (containing the underwater pipeline of Aliveri branch, with 14.20 Km length and 20" diameter), which connect various areas of the country to the main pipeline,
- The Border Metering Stations at Sidirokastro, Serres and at Kipi, Evros,
- The Liquefied Natural Gas (LNG) Station at Revythousa,
- The Compressor Station at Nea Mesimvria, Thessaloniki,
- The Natural Gas Metering and Regulating Stations,
- The Control and Dispatching Centers,
- The Operation and Maintenance Centers at the Sidirokastro Border Metering Station, Eastern Greece, Northern Greece, Central Greece and Southern Greece,
- The Remote Control and Communications system, and
- Two underwater pipes, each one a back-up of the other, of 24" diameter each and of 620 m and 510 m length that connect the Revythousa LNG Station to the mainland.

The Revythousa LNG Station is the only installation in the National Natural Gas System which can temporarily store natural gas quantities, up to 130,000 m³ ≈ 882,700 MWh. In ten years of its operation, LNG Station has received more than three hundred (300) LNG loads arriving in our country by tanker.

It consists of:

- Two (2) Liquefied Natural Gas tanks of 65,000 m³ LNG each,
- LNG unloading installations of a total unloading capacity of 7,250 m³ LNG/h, and

- LNG gasification installations of total capacity of 1,000 m³ LNG/h in continuous working conditions and 1,250 m³/h LNG when the back-up gasifiers are in use.

The Natural Gas is delivered from the Users to three (3) Entry Points of the National Natural Gas Transmission System and it is off-taken by the Users via thirty-six (38) Exit Points in the Greek mainland

2 Report for the operation of NNGS

2.1 Technical Characteristics of the System

The Table 1 below shows the diameters and total lengths of the main pipeline and the branches of the National Natural Gas Transmission System (NNGTS).

N.G. Pipeline	DIAMETER (inch)	TOTAL LENGTH (Km)
Main Pipeline	36 & 30	512.42
Lavrion Branch	30	101.60
Keratsini Branch	30 & 24	24.42
HAR Branch	14	1.81
Oinofyta Branch	10	20.57
Volos Branch	10.75	40.87
EKO Branch	10.75	9.74
Thessaloniki East Branch	24	24.73
Platy Branch	10	10.97
Kavala-Kipi-Komotini Branch	24 & 36	300.25
Aloyminion Branch	20	28.06
Korinthos-Motor Oil Branch	30 & 20	42.00
Trikala-Karditsa Branch	10	71.93
Thisvi Branch	20	28.13
Heron Branch	13	0.65
Aliveri Branch	20	73.19
<i>TOTAL</i>		1,291.34
Revythousa - Agia Triada Underwater Pipeline		
East Pipeline	24	0.60
West Pipeline	24	0.60

Table 1: Diameters and lengths of the Natural Gas pipeline

2.2 Variations in Technical Characteristics of the System

During the Year 2011, the following were inducted in the NNGS:

- ❖ The Exit Point "ALOYMINION III" at Antikira, Viotia, on 14.06.2012
- ❖ The Exit Point "ALIVERI (PPC)" at Aliveri, Evia on 21.11.2012, through which the new PPC power plant at Aliveri, Evia is fueled with Natural Gas. For the induction of this certain Point of the NNGS, the construction of a pipeline, with 20" diameter and 73.19 Km length, from the NNGTS line valve station "STEFANI" to the new PPC Power Plant at Aliveri, Evia, was concluded during

2012. The pipeline consists of a terrestrial section, with approximately 57.9 Km length, and an underwater section, with approximately 14.2 Km length (see Picture 1), while the expansion of the NNGTS to Aliveri, Evia, consists of five (5) line valve stations and two (2) scraper stations, and it is expected, in the addition to supplying new PPC power plant at Aliveri, to induct in the future the use of Natural Gas in civil, commercial and industrial sectors of central Evia.



○
○ *Picture 1: Routing of the pipeline to the underwater section of Aliveri branch*

- ❖ The Compressor Station at Nea Mesimvria, Thessaloniki (see Picture 2), whose operation officially commenced on 17.12.2012. The Compressor Station consists of:
- Two compression units consisting of a centrifugal compressor (SOLAR 453) and gasturbine (SOLAR TAURUS 70) of 7,7 MW power each one in operation and one in backup.
 - Two separation filters for separating liquids and filtration / purification of natural gas (one in operation and one in standby mode) and condensate collectors.
 - Coolers at the outlet of the compressor to regulate the temperature of the gas.
 - Complete compressed air system.
 - Backup power generator with diesel fuel
 - Ventilation
 - Medium voltage substation (MT) (2 * 1000 kVA) lightning protection and protection from voltage drops.
 - Uninterrupted power supply (UPS)
 - Cathodic protection
 - Extinguishing system, fire, gas leak detection system

- Emissions CO<25 ppmV, NOx<25 ppmV, UHC<10ppmV.
- Noise: 85 dB at 1 m distance, 65 dB within the limits of the land station.
- Monitoring and management of the station such as a Data Retrieval System / Telemetry System / DCS for the turbine- compressor pair, engine performance map, and system load sharing.

and it is expected to increase the technical capacity of the NNGTS Entry Points "Sidirokastro" and "Kipi" to 131,000 MWh/Day and 60,487 MWh/Day, respectively (from 109,000 MWh/Day and 30,400 MWh/Day, respectively), provided that the corresponding capacity is available in the upstream Natural Gas transportation systems.



Picture 2: Compressor Station at Nea Mesimvria, Thessaloniki

2.3 NNGS Entry/Exit Points Capacity

The Table 2, as follows, shows the Technical Capacities of the relative Entry/Exit Points of the NNGTS, and the Maximum Capacity of the relative Metering/Regulating Stations.

TECHNICAL CAPACITIES AT ENTRY/EXIT POINTS (RELATIVE POINTS) OF NATIONAL NATURAL GAS TRANSMISSION SYSTEM				
No.	ENTRY POINT	Technical Capacity [MWh/Day] ⁽¹⁾	DESFA Metering/Regulating Station	Maximum Capacity of DESFA Metering/Regulating Station [MWh/Day]
1	SIDIROKASTRO	109,000.000	M SIDIROKASTRO (U-2010)	177,363.648
2	AGIA TRIADA	139,656.115	M AGIA TRIADA (U-3020)	139,656.115
3	KIPI	30,400.000	M/R KIPI (U-3900)	229,314.966
No.	EXIT POINT	Technical Capacity [MWh/Day] ⁽¹⁾	DESFA Metering/Regulating Station	Maximum Capacity of DESFA Metering/Regulating Station [MWh/Day]
1	ALOYMINION	26,784.000	M AdG (U-2820)	26,784.000
2	ALOYMINION II ⁽²⁾	20,777.632	M AdG II	20,777.632
3	ALOYMINION III ⁽²⁾	6,696.000	M AdG III (U-TM1/TM5)	6,696.000
4	ALIVERI (PPC) ⁽²⁾	21,427.200	M ALIVERI (U-6370)	21,427.200
5	MOTOR OIL	26,784.000	M MOTOR OIL (U-7130)	26,784.000
6	MOTOR OIL II ⁽²⁾	21,427.200	M MOTOR OIL II	21,427.200
7	ATHENS	115,385.740	M/R ATHENS NORTH (U-2910)	29,521.057
			M/R ATHENS EAST (U-2940)	29,521.057
			M/R ASPROPYRGOS (U-2970)	26,824.176
			M/R ATHENS WEST (U-2990)	29,519.450
8	ALEXANDROUPOLIS	7,499.520	M/R ALEXANDROUPOLIS (U-3630)	7,499.520
9	VIPE LARISSA	2,678.400	M/R VIPE LARISSA (U-2515)	2,678.400
10	VOLOS	13,832.061	M/R VOLOS (U-2680)	13,832.061
11	VFL	6,510.923	M/R VFL (U-2170)	6,510.923
12	DRAMA	7,499.520	M/R DRAMA (U-2140)	7,499.520
13	ELPE	4,828.352	M/R EKO (U-2250)	4,828.352
14	ENERGIAKI THESS. (ELPE)	26,784.000	M/R ENERGIAKI THESSALONIKI	26,784.000
15	HERONAS	10,713.600	M HERONAS (U-6020)	10,713.600
16	HERON II	22,500.000	M HERON II (U-6030)	22,766.400
17	THESSALONIKI	38,851.263	M/R THESSALONIKI NORTH (U-2240)	19,425.632
			M/R THESSALONIKI EAST (U-2220)	19,425.632
18	THISVI ⁽²⁾	23,800.000	M THISVI	23,837.760
19	THRIASIO	13,580.827	M/R THRIASIO (U-2960)	13,580.827
20	KAVALA	2,678.400	M/R KAVALA (TM4-A)	2,678.400
21	KARDITSA	5,356.800	M/R KARDITSA (TM3-A)	5,356.800
22	KATERINI	7,499.520	M/R KATERINI (U-2340)	7,499.520
23	KERATSINI (PPC)	27,360.660	M KERATSINI (U-3090)	27,360.660
24	KILKIS	11,784.960	M/R KILKIS (U-2260)	11,784.960
25	KOKKINA	2,678.400	M/R KOKKINA (U-2670)	2,678.400
26	KOMOTINI (PPC)	28,926.720	M/R PPC KOMOTINI (U-3570)	28,926.720
27	KOMOTINI	5,356.800	M/R KOMOTINI (TM3-C)	5,356.800
28	LAMIA	7,499.520	M/R LAMIA (U-2620)	7,499.520
29	LARISSA	13,879.469	M/R LARISSA NORTH (U-2520)	6,939.734
			M/R LARISSA SOUTH (U-2530)	6,939.734
30	LAVRION (PPC)	64,281.600	M LAVRION (U-3430)	64,281.600
31	SPATA	3,080.160	M/R MARKOPOULO (TM2)	3,080.160
32	XANTHI	11,784.960	M/R XANTHI (U-3530)	11,784.960
33	OINOFYTA	7,099.903	M/R OINOFYTA (U-2880)	7,099.903
34	PLATY	5,755.346	M/R PLATY (U-2410)	5,755.346
35	SALFA ANO LIOSSIA (2)	2,678.400	SALFA I	2,678.400
36	SALFA ANTHOUSA (2)	2,678.400	SALFA II	2,678.400
37	SERRES	11,784.960	M/R SERRES (U-2110)	11,784.960
38	TRIKALA	5,356.800	M/R TRIKALA (TM3-B)	5,356.800

Table 2

Comments on Table 2:

1. "Technical Capacity" is the maximum invariable capacity that the Operator is able to offer to the Transmission Users, considering the operational demands of the NNGTS.
2. Given that the Operator has not completed the installation works for the measuring device, through which gas is injected from the Transmission System to the relative Natural Gas Extraction Installation and until the completion of the measuring device, Exit Point will be considered the connection point of the last link on the pipeline feeding, where Natural Gas is injected to the Natural Gas Extraction Installation inside a site, which has been given to the Operator for the construction of the corresponding measuring device.

Finally, the Table 3 below depicts the NNGTS Average Natural Gas Deliveries and Off-takes for the year 2012.

Unofficial Translation

Annual profile of Natural Gas Deliveries/Off-takes and Daily peaks at the Entry/Exit Points of NNGTS					
Year 2012					
Entry Point Name	Technical Capacity [MWh/Day]	Annual Average of Natural Gas Delivery for the Point [MWh/Day]	Daily peak of the Point [MWh/Ημέρα]	Annual Average of Natural Gas Delivery for the Point as a percentage of Technical Capacity [%]	Daily peak of the Point as a percentage of Technical Capacity [%]
AGIA TRIADA	139,656.115	39,081.315	143,030.326	28	102
KIPI	30,400.000	17,800.590	25,688.856	59	85
SIDIROKASTRO	109,000.000	71,470.756	128,468.425	66	118
Exit Point Name	Technical Capacity [MWh/Day]	Annual Average of Natural Gas Off-takes for the Point [MWh/Day]	Daily peak of the Point [MWh/Ημέρα]	Annual Average of Natural Gas Off-takes for the Point as a percentage of Technical Capacity [%]	Daily peak of the Point as a percentage of Technical Capacity [%]
ATHENS	115,385.740	8,823.387	34,789.478	8	30
ALEXANDROUPOLIS	7,499.520	18.167	105.455	0	1
ALIVERI (PPC)	21,427.200	0.007	0.430	0	0
ALOYMINION	26,784.000	9,655.077	16,874.374	36	63
ALOYMINION II	20,777.632	13,310.377	19,608.719	64	94
ALOYMINION III	6,696.000	1,036.521	2,735.793	15	41
VIPE LARISSA	2,678.400	128.635	230.590	5	9
VOLOS	13,832.061	2,008.970	5,619.910	15	41
VFL	6,510.923	3,285.362	5,232.005	50	80
DRAMA	7,499.520	332.738	804.732	4	11
ELPE	4,828.352	875.893	3,125.872	18	65
ENERGIAKI THESS. (ELPE)	26,784.000	9,925.582	16,096.500	37	60
HERONAS	22,500.000	7,436.074	18,919.399	33	84
HERON II	10,713.600	0.689	230.509	0	2
THESSALONIKI	38,851.263	7,015.654	24,306.914	18	63
THISVI	23,800.000	11,989.397	19,154.585	50	80
THRIASIO	13,580.827	541.121	1,469.290	4	11
KAVALA	2,678.400	45.355	177.060	2	7
KARDITSA	5,356.800	129.604	534.597	2	10
KATERINI	7,499.520	264.136	308.895	4	4
KERATSINI (PPC)	27,360.660	370.268	9,143.653	1	33
KILKIS	11,784.960	789.860	1,415.316	7	12
KOKKINA	2,678.400	367.432	717.307	14	27
KOMOTINI	5,356.800	94.710	180.134	2	3
KOMOTINI (PPC)	28,926.720	5,769.780	23,229.907	20	80
LAMIA	7,499.520	120.075	257.770	2	3
LARISSA	13,879.468	1,549.455	5,684.380	11	41
LAVRION (PPC)	64,281.600	18,505.631	50,316.294	29	78
MOTOR OIL	26,784.000	9,324.631	13,167.459	35	49
MOTOR OIL II	21,427.200	10,516.240	20,233.653	49	94
XANTHI	11,784.960	148.556	358.854	1	3
OINOFYTA	7,099.903	2,599.205	3,589.545	37	51
PLATY	5,755.346	594.914	3,662.285	10	64
SALFA ANO LIOSSIA	2,678.400	227.135	303.993	8	11
SALFA ANTHOUSA	2,678.400	266.689	371.327	10	14
SERRES	11,784.960	763.852	2,488.345	6	21
SPATA	3,080.160	264.453	638.757	9	21
TRIKALA	5,356.800	72.126	338.90	1	6

Table 3

2.4 Load Balancing

Balancing Gas is considered the Natural Gas quantity that the Operator injects to the National Transmission System, during a certain period, so as to create a balance between Natural Gas deliveries and off-takes (during the same period) so as in every case the safe, reliable and efficient operation of the NNGS will be considered secure. As part of his responsibilities and obligations, the Operator ensures the above balance, taking into account the losses and the stored Natural Gas quantities in the National Transmission System. As for now, the balancing needs of the National Transmission System are covered solely by using the Liquefied Natural Gas (LNG) Installation at Revythousa. During the Year 2012, the Operator obtained the appropriate Natural Gas quantities for the load balancing of the NNGTS to the relative agreements signed with the Public Gas Corporation (DEPA) S.A. for the supply of Liquefied Natural Gas Quantities.

The Table 4 below presents the monthly Operator's predictions for the necessary Balancing Gas quantities, according to the modification of the Annual Planning of Load Balancing of the NNGTS for the Year 2012, which is approved from the Regulatory Authority for Energy (RAE) (Law B' 2238/17.10.2011) and the total quantities of the Balancing Gas actually needed for the Year 2012.

	Updated Annual Balancing Gas Prediction	Balancing Gas
Year 2012	(MWh)	(MWh)
January	339,669	571,458
February	246,968	513,634
March	176,349	169,225
April	303,513	28,012
May	116,562	94,858
June	188,088	65,280
July	237,028	68,602
August	244,207	51,433
September	132,392	67,153
October	164,914	47,074
November	193,599	22,637
December	302,975	143,331
Total	2,646,264	1,842,700

Table 4: Monthly Operator's predictions according to the modification of the Annual Planning of Load Balancing of the NNGTS and the total Balancing Gas quantities for the Year 2012

The Balancing Gas that was injected in the NNGTS in the first two months of 2012 (January and February) is justified by the extreme Off-takes of Natural Gas in the Exit Points of the NNGTS, combined with the reduced Delivery capacities in the Entry Points of the NNGTS, namely “Sidirokastron” and “Kipi”. Natural Gas Off-takes and Deliveries Balancing in the NNGTS and thus the continuity of supply in the NNGS during the period January – February 2012 was ensured by increasing the regasification of LNG at very high levels, resulting to inject large quantities of Natural Gas from the Entry Point “Agia Triada”.

The Diagram 1 shows the monthly Balancing Gas quantities, related to the monthly Natural Gas Deliveries in all the NNGTS Entry Points.

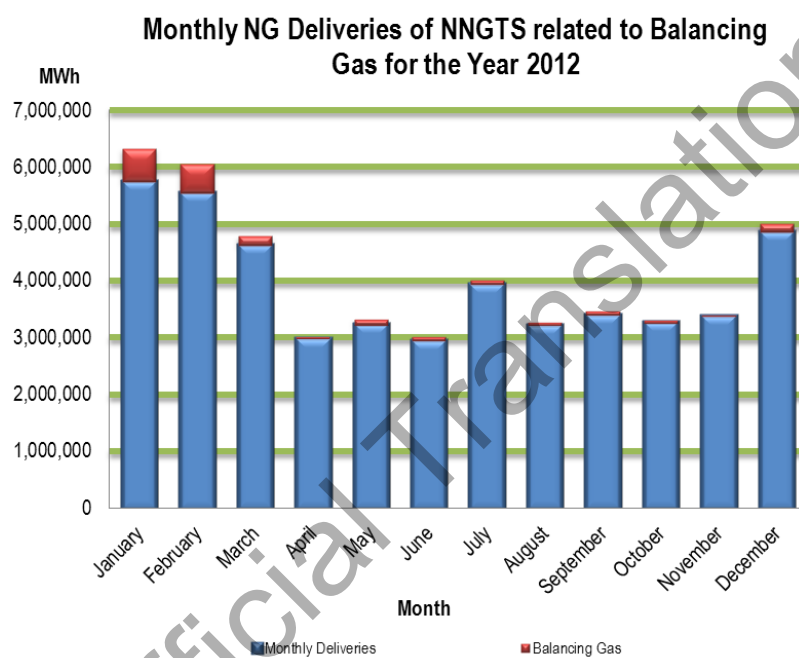


Diagram 1: Monthly Natural Gas Deliveries related to Balancing Gas for the Year 2012

In the year 2012 the Natural Gas quantity that the Transmission Users delivered at the Entry Points is lower than the Natural Gas quantity received from the Exit Points of NNGTS, leading to Transmission Users had an average negative Daily Imbalance (DGI).

Worth noting is the Day 09.02.2012, as it was the maximum quantity of the Natural Gas Deliveries for the Year 2012, which was in the level of 249,094 MWh with DGI -10,224 MWh (which is the 4,10 % of the Natural Gas Total Deliveries). It is noted that the maximum quantity of Balancing Gas for the Year 2012 does not occurred at the above mentioned day, but it was observed the 18th.02.2012 and raging in the level of 68,488.74 MWh.

The Diagram 2 shows the total DGI of the Users for the Year 2012.

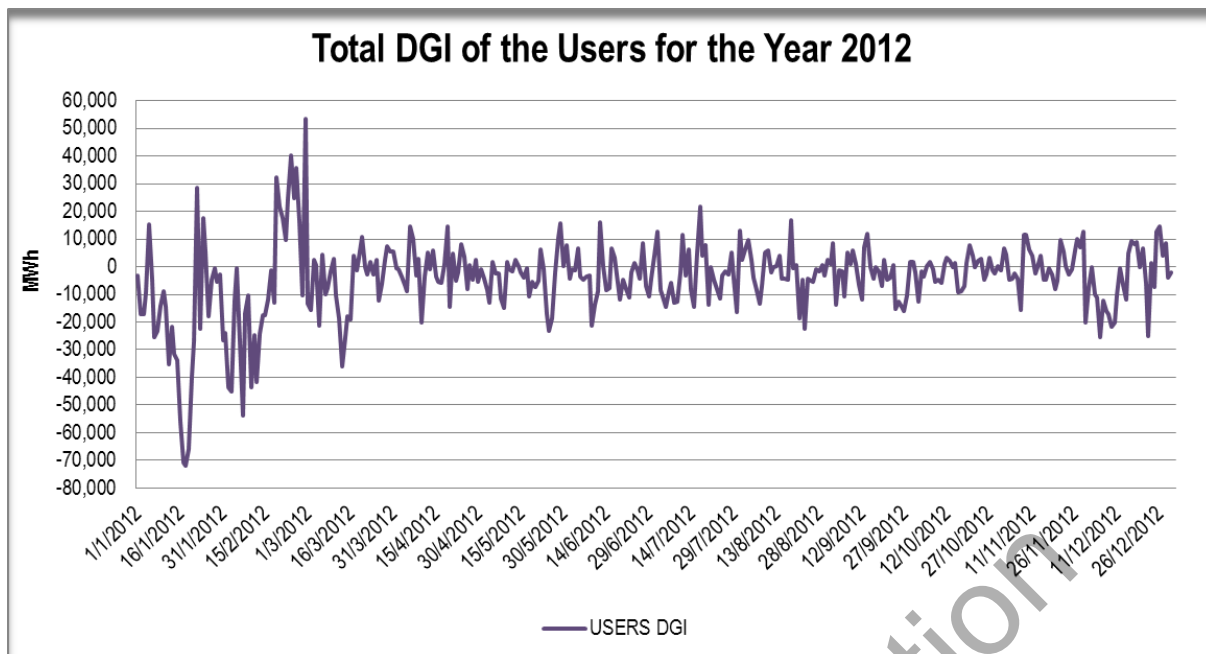


Diagram 2: Total Users DGI for the Year 2012

The Operator, so as to offset the relatively frequent negative DGI of the Users, while ensuring continuous, normal, safe and efficient operation of the NNGS, used the smallest possible Balancing Gas quantities, considering the current pressure level of the network system, functional limitations as well as the estimated Natural Gas demand.

2.5 Maintenance Standard and Quality

The Table 5 shows the Maintenance Program of NNGS for the year 2012 as well as the revision of maintenance work that already had taken place. Preventive maintenance and repair of all electrical and mechanical installations, the inspections, the management and control of the cathodic and lightning protection of the pipeline and installations were done according to the provided in the maintenance manuals, the legislation in use and the so far gained experience due to the running of the system for years.

The calibration of the measuring systems was done according to the table 6 with only minor time deviations from the Annual Calibration Program that was uploaded in the Operator's website.

The Operator is certified with ISO 9001:2008, OHSAS 18001:2004 & EN ISO 14001:2004 for all his activities, including the procedures of preventive and repairing maintenance and calibration of measuring systems.

NNGTS MAINTENANCE PROGRAM - YEAR 2012						
A/A	NNGS POINT	DESCRIPTION OF WORKS	TRANSMISSION CAPACITY RESTRICTION	PERIOD OF WORKS	MAINTENANCE DAYS	NOTES
1	Exit Point "VFL"	Pipeline rearrangement	Available Transmission Capacity at Exit Point "VFL": 0.00 MWh/Day	February - March	2	DESFA planned and informed in writing the User DEPA, as defined in Article 98 of the NNGS Code, on the execution of works in March 2012. Upon written request of the User DEPA works were postponed to be done in October 2012 in order not to disrupt the production process of the customer supplied via the Exit Point "VFL". Finally the works did not took place during the Year 2012, due to that the User DEPA requested for re-shuffle the specific tasks at a time that will not significantly affect the productive function of clients.
2	Entry Point "SIDIROKASTRO"	Valves subtraction and fitting	Available Transmission Capacity at Entry Point "SIDIROKASTRO": 91,000.00 MWh/Day	May	4	Maintenance works took place according to the schedule during the period from 08.05.2012 to 12.05.2012. Nominations for these Gas Days at the Entry Point "SIDIROKASTRO" were below the Available Transmission Capacity of 91,000.00 MWh /Day.
3	Entry Point "SIDIROKASTRO"	Valves subtraction and fitting	Available Transmission Capacity at Entry Point "SIDIROKASTRO": 91,000.00 MWh/Day	September	2	Maintenance works took place in parallel with the maintainace works of the period from 08.05.2012 to 12.05.2012.
4	LNG Terminal	Unloading arms inspection	Unloading Pier not available	June	5	Small-scale Inspection & Maintenance works took place

Table 5: NNGS Maintenance Standard and Quality for the Year 2012

CALIBRATION – YEAR 2012

ENTRY POINT / UNIT NUMBER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SIDIROKASTRO / U – 2010	16 - 20, 24,27	1			14 - 18, 21,22,24				17 - 20, 24,25,27,28	2		
AGIA TRIADA / U – 3020						12 - 13				2-3		
KIPI / U – 3900					22 - 24							10 - 12
EXIT POINT / UNIT NUMBER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
LAVRIO (PPC) / U – 3430			5 - 9				9 - 13				12 - 16	
KERATSINI (PPC) / U – 3090 ⁽¹⁾		15 - 16						OXI				
THRIASIO / U – 2960			18 - 19						18 - 19			
ATHENS / U – 2990 (WEST)					7 - 8							3 - 4
ATHENS / U – 2910 (NORTH)		6 - 7						22 - 23				
ATHENS / U – 2970 (ASPROPYRGOS) ⁽²⁾												
ATHENS / U – 2940 (EAST)		21 - 22						20 - 21				
INOFYTA / U – 2880			23 - 24							8 - 9		
HERON / U – 6020					30	5				16 - 17		
HERON II / U – 6030					30	5				16 - 17		
SPATA / TM2		14								11 - 12		
ALOYMINION / U – 2820				10 - 11						25 - 26		
THIVA / U – 2740 ⁽³⁾												
MOTOR OIL / U – 7130	24 - 25							13 - 14				
VOLOS / U – 2680					21 - 22						19 - 20	

LARISA / U - 2520 (NORTH)				7 - 8						5 - 6	
LARISA / U - 2530 (SOUTH)				9 - 10						7 - 8	
VIPE LARISA / U - 2515				4						9	
KARDITSA / TM3-A				11						14	
LAMIA / U - 2620				15 - 16						12 - 13	
TRIKALA / TM3-B				11						14	
KOKKINA / U - 2670				23						15	
THESSALONIKI / U - 2240 (NORTH)						11 - 12					10 - 11
THESSALONIKI / U - 2220(SOUTH)						13 - 14					13 - 14
PLATY / U - 2410						18				27	
ELPE / U - 2250 (EKO)						20				28	
KILKIS / U - 2260				28 - 29						8 - 9	
ENERGIAKI THESS. (ELPE) / U - 2270 ⁽⁴⁾											
KATERINI / U - 2340 ⁽⁵⁾											
KOMOTINI (PPC) / U - 3570			20 - 23				23 - 27			20 - 23	
KOMOTINI / TM3-C		9						24			
KAVALA / TM4-A		7							18		
VFL / U - 2170				5,20						9-10	
XANTHI / U - 3530			14 - 15						10 - 11		
KOSMIO / U - 2550 ⁽³⁾											
ALEXANDROUPOLIS / U - 3630					14 - 15					9 - 10	

DRAMA / U - 2140			14 - 15						26 - 27			
SERRES / U - 2110			12 - 13						13 - 14			

Table 6: NNGTS Stations Calibrations – Year 2012

Comments on Table 6:

- (1) The programmed calibration (August 2012) for the Unit U-3090 of the Exit Point "KERATSINI (PPC)" did not take place, due to the fact that there was no Natural Gas Off-takes during that period.
- (2) The programmed calibrations for the Unit U-2970 of the Exit Point "ATHENS" for the Year 2012 did not take place, due to the fact that the Natural Gas Off-takes at the specific Unit were zero during the Year 2012.
- (3) During the Year 2012 the Operator's Exit Points "THIVA" and "KOSMIO" were not disclosed by the Operator.
- (4) The completion of the construction of the Unit Σταθμού U-2270 at the Exit Point "ENERGIAKI THESS. (ELPE)" is pending.
- (5) The programmed calibrations for the Unit U-2340 of the Exit Point "KATERINI" for the Year 2012 did not take place, due to the fact that the Natural Gas Off-takes of the specific Unit were lower than the technical minimum flow of the turbine meter of the Unit during the Year 2012.

2.6 Congestion and Congestion Management

According to the paragraph [3] of Article 20 of the Network Code for the regulation of National Natural Gas System, "congestion" occurs when the Transmission available Capacity at an Entry or Exit Point is not sufficient in order to fulfill User's request for Transmission Capacity Booking at that point to the effect of servicing a new Natural Gas Consumer (Congestion). Furthermore, in accordance with paragraph [2] Article 20 of the Network Code for the regulation of NNGS, the above notification obligation shall not apply in case of an Exit Point serving exclusively one (1) Natural Gas Consumer.

Pursuant to paragraph [1] of Article 2 of Regulation (EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009, "congestion management" means the management of the capacity of transmission system operator with a view to optimal and maximum use of technical capacity and the timely detection of future congestion and saturation points. Moreover, under the same Article of the above Regulation, contractual congestion means a situation where the level of firm capacity demand exceeds the technical capacity, and physical congestion is a situation where the level of demand for actual deliveries exceeds, at some point in time, the technical capacity.

The Table 7 below presents the Technical Capacities of the NNGTS Entry/Exit Points, the Booked Transmission Capacity (BTC) of the Points, the Maximum Allocated Quantity of the Points, the Contractual Percentage of the Maximum Booking of the Technical Capacity, the Percentage of the Maximum Usage of the Technical Capacity and notes about the congestion of the Points for the Year 2012.

Annual profile of Technical Capacity, maximum Booked Transmission Capacity and maximum Measured Natural Gas Quantity of Entry/Exit Points of NNGTS							
ENTRY POINT	Technical Capacity [MWh/Day]	Maximum Booked Transmission Capacity of Point [MWh/Day]	Maximum Measured Natural Gas Quantity of Point [MWh/Day]	Maximum Booked Transmission Capacity of Point as a percentage of Technical Capacity [%]	Maximum Measured Natural Gas Quantity of Point as a percentage of Technical Capacity [%]	Congestion (Contractual)	Congestion (Operational)
SIDIROKASTRO	109,000.000	108,000.000	128,468.425	99	118	possible congestion	yes
AG. TRIADA	139,656.115	139,655.444	143,030.326	100	102	yes	yes
KIPI	30,400.000	26,000.000	25,688.856	86	85	possible congestion	possible congestion
EXIT POINT	Technical Capacity [MWh/Day]	Maximum Booked Transmission Capacity of Point [MWh/Day]	Maximum Measured Natural Gas Quantity of Point [MWh/Day]	Maximum Booked Transmission Capacity of Point as a percentage of Technical Capacity [%]	Maximum Measured Natural Gas Quantity of Point as a percentage of Technical Capacity [%]	Congestion (Contractual)	Congestion (Operational)
ALIVERI (PPC)	21,427.200	19,314.000	0.43	90	0	-	-
ALOYMINION	26,784.000	24,167.000	16,874.374	90	63	-	-
ALOYMINION II	20,777.632	19,898.240	19,608.719	96	94	-	-
ALOYMINION III	6,696.000	3,800.000	2,735.793	57	41	-	-
MOTOR OIL	26,784.000	13,001.000	13,167.459	49	49	-	-
MOTOR OIL II	21,427.200	20,017.456	20,233.653	93	94	-	-
ATHENS	115,385.740	82,900.000	34,789.478	72	30	possible congestion	no
ALEXANDROUPOLIS	7,499.520	1,000.000	105.455	13	1	no	no
VIPE LARISSA	2,678.400	1,344.000	230.590	50	9	no	no
VOLOS	13,832.061	13,436.000	5,619.910	97	41	possible congestion	no
VFL	6,510.923	6,250.000	5,232.005	96	80	no	no
DRAMA	7,499.520	1,000.000	804.732	13	11	no	no
ELPE	4,828.352	3,500.000	3,125.872	72	65	-	-
ENERGIAKI THESS. (ELPE)	26,784.000	18,553.560	16,096.500	69	60	-	-
HERONAS	22,500.000	19,385.106	18,919.399	86	84	-	-
HERON II	10,713.600	1,000.000	230.509	9	2	-	-
THESSALONIKI	38,851.263	38,000.000	24,306.914	98	63	possible congestion	no
THISVI	23,800.000	19,621.000	19,154.585	82	80	-	-
THRIASIO	13,580.827	6,816.000	1,469.290	50	11	no	no
KAVALA	2,678.400	1,000.000	177.060	37	7	no	no
KARDITSA	5,356.800	2,600.000	534.597	49	10	no	no
KATERINH	7,499.520	350.000	308.895	5	4	no	no
KERATSINI (PPC)	27,360.660	24,423.465	9,143.653	89	33	-	-
KILKIS	11,784.960	4,200.000	1,415.316	36	12	no	no
KOKKINA	2,678.400	1,344.000	717.307	50	27	no	no
KOMOTINI (PPC)	28,926.720	24,102.300	23,229.907	83	80	-	-
KOMOTINI	5,356.800	858.000	180.134	16	3	no	no
LAMIA	7,499.520	1,400.000	257.770	19	3	no	no
LARISSA	13,879.469	13,460.000	5,684.380	97	41	possible congestion	no
LAVRION (PPC)	64,281.600	58,664.762	50,316.294	91	78	-	-
SPATA	11,784.960	1,700.000	358.854	14	3	no	no
XANTHI	7,099.903	6,700.000	3,589.545	94	51	possible congestion	no
OINOFYTA	5,755.346	4,218.000	3,662.285	73	64	possible congestion	no
PLATY	2,678.400	960.000	303.993	36	11	no	no
SALFA ANO LIOSSIA	2,678.400	960.000	371.327	36	14	no	no
SALFA ANTHOUSA	11,784.960	4,049.000	2,488.345	34	21	no	no
SERRES	3,080.160	1,296.000	638.757	42	21	no	no
TRIKALA	5,356.800	2,600.000	338.905	49	6	no	no

Table 6: Technical Capacities of Entry/Exit Points, Maximum Booked Transmission Capacity (BTC) of the Points, Contractual Percentage of the Maximum Booking for the Technical Capacity, Percentage of Maximum Usage of the Technical Capacity and notes about the congestion of the Points in the Year 2012

Notes on Table 7:

1. As for the congestion at the Entry Point "SIDIROKASTRO" and the forthcoming congestion at the Entry Point "KIPI", the Operator shall announce increase of capacities at the specific Entry Points during early 2013, due to the beginning of the testing operation of the Compressor Station at NEA MESIMVRIA of Thessaloniki at December 2012.
2. Concerning the forthcoming congestion that can be seen at the Entry Point "AGIA TRIADA", the Operator will increase the Technical Capacity of the Point, after the upgrade of the Revythousa LNG Station (as it is provided in the "NNGS DEVELOPMENT PROGRAM, PERIOD 2010 – 2014").
3. Concerning the Exit Point "OINOFYTA", it is not expected to have congestion during the Year 2013, because during that Year the Metering/Regulating Station at Thiva will start its operation and will supply the distribution network of Oinofyta-Schimatari-Thiva along with the existing Metering/Regulating station at Oinofyta.
4. Concerning the forthcoming congestion that can be seen at the Exit Point "THESSALONIKI", the Metering/Regulating Stations of Thessaloniki North & East will be upgraded according to the "NNGS DEVELOPMENT PROGRAM, PERIOD 2010 – 2014".
5. Concerning the possible congestion that could appear at the Exit Point "PLATY", it is not expected during the Year 2013, due to there is no prediction for a User application for the above mentioned Point..
6. Finally, at the Exit Point "VFL" congestion is not expected to occur, because the number of end consumers and the gas consumption at that Exit Point are not expected to increase.

2.7 Emergencies and Dealing with Emergencies

During the Year 2012, the Operator noted the following four (4) Emergencies in the NNGS:

❖ 1st Emergency Situation (20 – 22.01.2012)

During the certain period, the Natural Gas demand in Greece reached historical high limits. The significant increase of the Natural Gas demand, due to unusually low temperature during that period and the increased Power Generation production with Natural Gas, coincided with a significant restrictions in the Natural Gas Deliveries from the Entry Point "Kipi" from the 12th.01.2012, leading to the interruption of Deliveries on the 17th.01.2012. Simultaneously, the improper planning of unloading LNG cargoes at the Revithousa LNG Facility, in combination with the non-guaranteed Deliveries at the Entry Point "Sidirokastro" from the 20th.01.2012, led the Operator to decide and establish an Emergency Situation at the NNGS on the 20th.01.2012.

The Emergency Situation at the NNGS ended the 22nd.01.2012 upon receipt of the following measures

based on the market:

- (1) Increase of the Daily Natural Gas Deliveries at the Entry Point "Sidirokastro", further than the Point's Technical Capacity of 109,000 MWh/day on behalf of the Transmission User DEPA, and
- (2) An Unscheduled LNG Cargo Unloading at the Revithoussa LNG Facility the 22nd.01.2012 on behalf of the LNG Facility User DEPA, and
- (3) Ensuring another Unscheduled LNG Cargo Unloading at the Revitousa LNG Facility the 23rd.01.2012 on behalf of the LNG Facility User DEPA.

❖ **2nd Emergency Situation (03-05.02.2012)**

The significant decrease of the Natural Gas Deliveries at the Entry Point "Kipi", combined with the gradual reduction, almost 50%, of the Natural Gas Deliveries at the Entry Point "Sidirokastro" during that period, led the Operator to decide and establish an Emergency situation at the NNGS on the 03rd.02.2012.

The Emergency Situation at the NNGS ended the 05th.02.2012 upon receipt of the following measures based on the market:

- (1) On the 04th.02.2012 and 10:54 there was a restoration of Natural Gas Deliveries at the Entry Point "Sidirokastro" on behalf of the Transmission User DEPA, and
- (2) On the 05th.02.2012 and 10:54 there was a restoration of Natural Gas Deliveries at the Entry Point "Kipi" on behalf of the Transmission User DEPA.

❖ **3rd Emergency Situation (10-19.02.2012)**

During the period from 10 to 20 February 2012, the Natural Gas Demand in Greece reached historical high limits. The significant increase of the Natural Gas demand coincided with a significant reduction or interruption in the Natural Gas Deliveries from the Entry Point "Kipi". At the same time, the re-scheduling of the Programmed LNG Cargo Unloading at the Revithoussa LNG Facility on behalf of the LNG Facility User DEPA from Monday 13.02.2012 to Saturday 18.02.2012, in combination with the non-guaranteed Deliveries at the Entry Point "Sidirokastro", led the Operator to decide and establish an Emergency situation at the NNGS on Friday 10.02.2012, so as to ensure the Natural Gas supply to the protected customers.

The Emergency Situation ended on the 19th.02.2012 with:

- (1) The rotational interruption/limitation of Natural Gas supply to Natural Gas fueled Power Plants during the period 15-18.02.2012, so as to ensure both the Natural Gas supply of the protected customers and the stability of Power Generation and Natural Gas Transportation Systems (measure that wasn't based on the market),

- (2) The completion of the LNG Cargo Unloading at the Revithousa LNG Facility on the 19th.02.2012 and 12:00 on behalf of the LNG User DEPA (market measure),
- (3) The restoration of Natural Gas Deliveries from the Entry Point "Sidirokastros" from the 13th.02.2012 on behalf of the Transmission User DEPA, and
- (4) The initiation of gradual Deliveries of Natural Gas from the Entry Point "Kipi" on behalf of the LNG User DEPA (market measure).

❖ *4th Emergency Situation (14-21.12.2012)*

Early December 2012, the Natural Gas demand Στις αρχές του Δεκεμβρίου 2012, η ζήτηση σε Φυσικό Αέριο ranged in normal conditions for the period and combined with the initiation of the test operation of the Compressor Station at Nea Mesimvria, the Natural Gas Deliveries at the Entry Points "Sidirokastros" and "Kipi" were ensured as nominated by the Transmission Users. But subsequently, the cancellation of the Programmed LNG Cargo Unloading at the Revithousa LNG Facility on the 13th.12.2012, combined with the concurrent worsening of the weather conditions resulted to the rapid depletion of the LNG reserves at the Revithousa LNG Facility and led the Operator to decide and establish an Emergency situation at the NNGS on the 14th.12.2012.

The Emergency Situation ended on the 21st.12.2012, taking measures based on the market:

- (1) Depletion of the potentials of the Big Customers of the Transmission User DEPA demand management via market mechanisms for the period 15.12.2012 – 21.12.2012,
- (2) The availability and operation (a) of hydroelectric power plants (due to high inventories of the units' reservoirs) and (b) of lignite units, solving the problems that had occurred during the previous period,
- (3) Guarantee of the requested Natural Gas Deliveries from the Entry Points "Sidirokastros" and "Kipi", due to the initiation of operation of the Compressor Station in Nea Mesimvria, and
- (4) The completion of the Unloading of an LNG Cargo of 73,000 m³ at the Revithousa LNG Facility on behalf of the LNG User DEPA, the 21st.12.2012 and 10:54.

2.8 Operating characteristics of NNGS

According to the NNGS Measurements Regulation of DESFA, the Minimum Inlet Pressure at Entry Points "SIDIROKASTRO" and "KIPI" is 47.75 and 50.00 barg respectively. The Diagram 3 below shows the average Daily Inlet Pressure at Entry Points "AGIA TRIADA", "SIDIROKASTRO" and "KIPI" for the Year 2012.

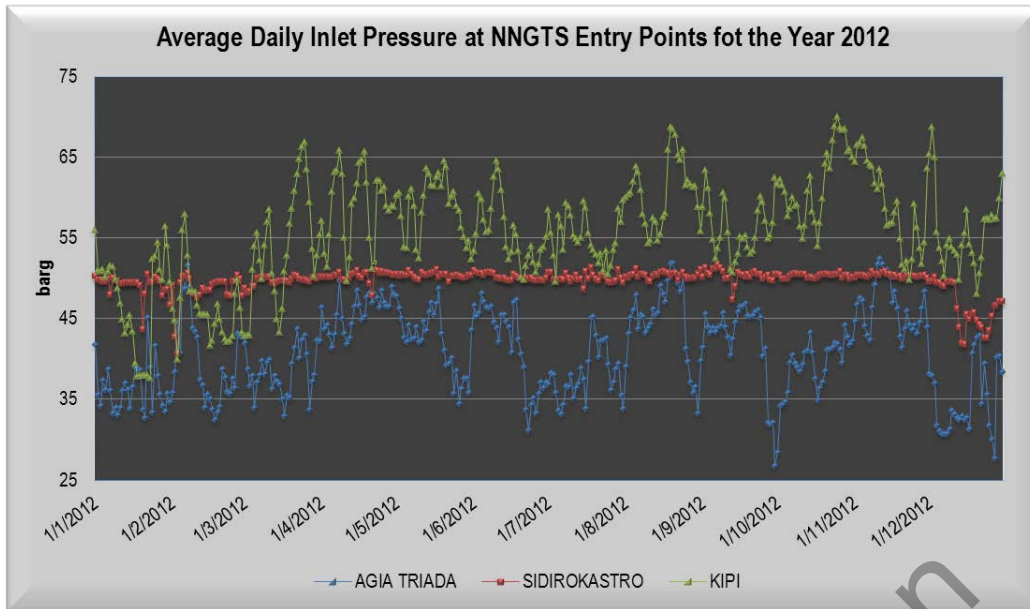


Diagram 3: Average Daily Inlet Pressure at NNGTS Entry Points for the Year 2012

Furthermore, the Diagram 4 below shows the average Daily Pressure of the NNGTS for the Year 2012, as recorded by DESFA's SCADA system.

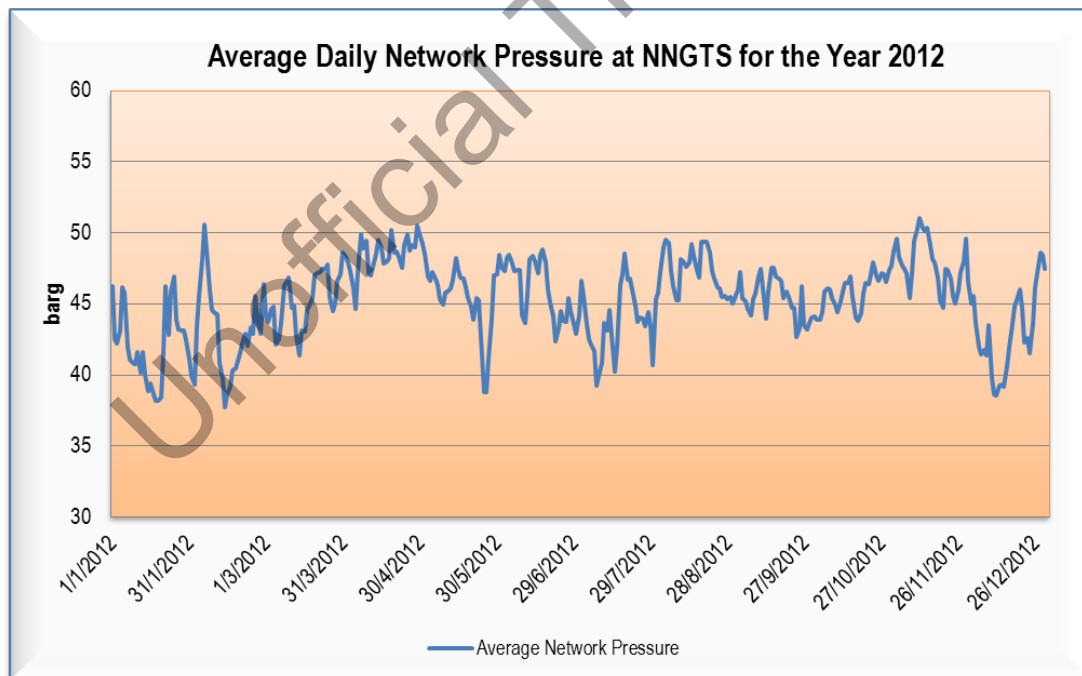


Diagram 4: Average Daily Network Pressure at NNGTS for the Year 2012

2.9 Natural Gas Quantities historical data

During the Year 2012 the total Natural Gas Off-Takes at NNGTS Exit Points was 48,086,750 MWh (compared to 51,232,759 MWh during the Year 2011). The Diagram 5 below shows the Daily Natural Gas Off-Takes of all the NNGTS Exit Points (as a sum) for the Year 2012. It is worth mentioning that the Day

09.02.2012, the maximum Natural Gas consumption was recorded, i.e. 249,094 MWh (compared to 208,527 MWh of the Day 10.03.2011).

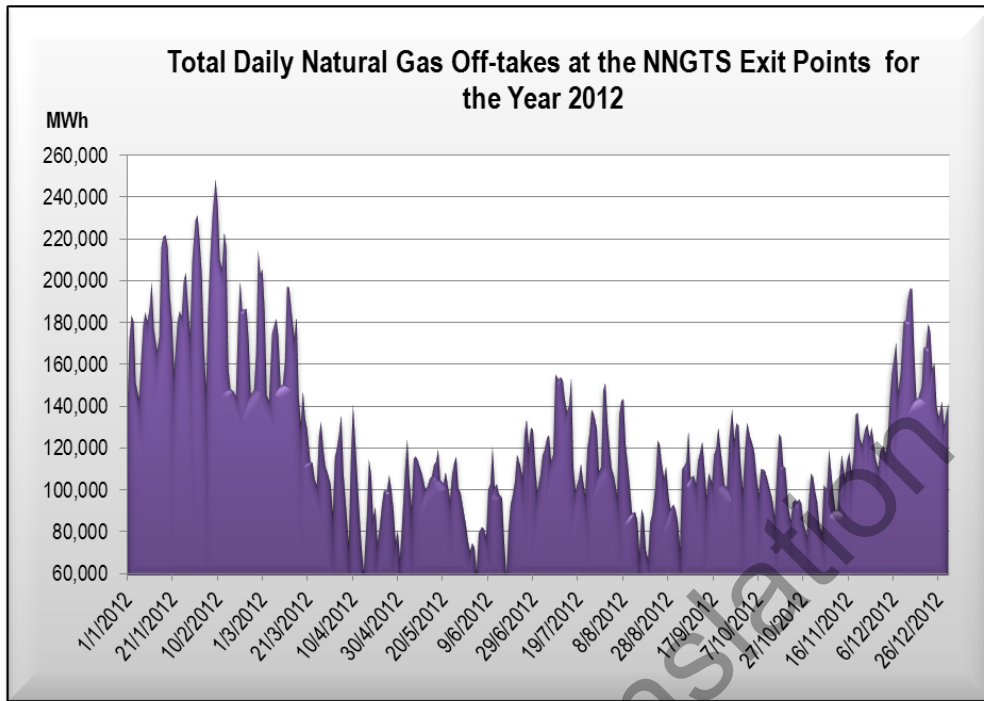


Diagram 5: Total Daily Natural Gas Off-Takes at the NNGTS Exit Points for the Year 2012

During the Year 2012 the total Natural Gas Deliveries at NNGTS Entry Points was 46,977,074 MWh (compared to 51,061,962 MWh during the Year 2011). The Diagram 6 below shows the Cumulative Daily Natural Gas Deliveries of all the NNGTS Entry Points (as a sum) for the Year 2012.

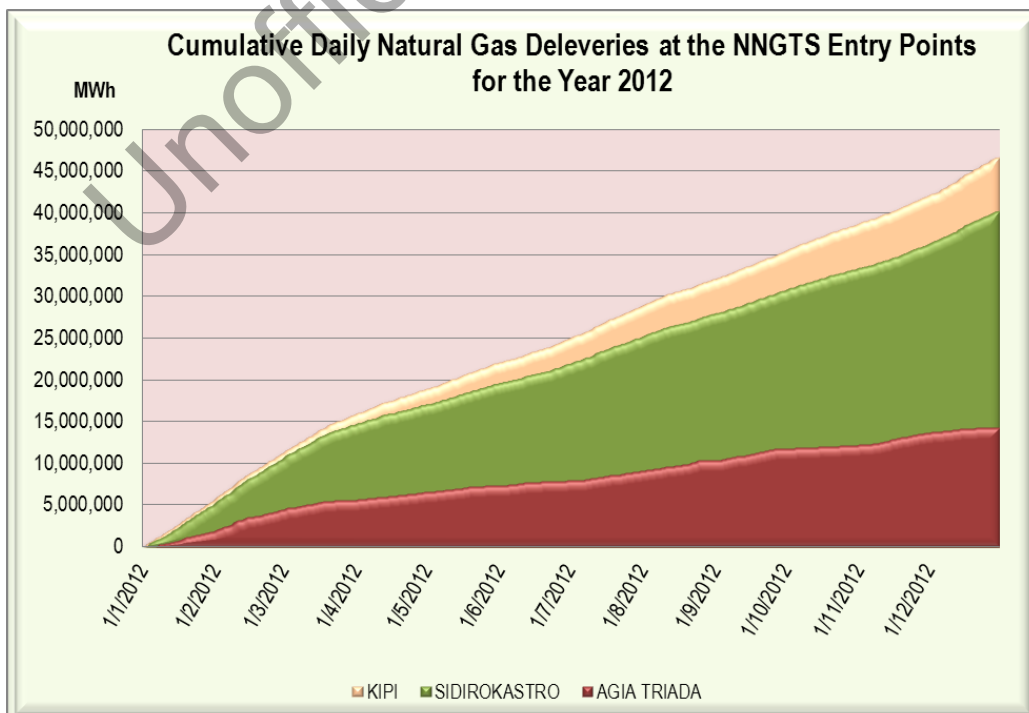


Diagram 6: Cumulative Daily Natural Gas Deliveries at the NNGTS Entry Points for the Year 2012

The Diagram 7 below shows the Daily variation of the Natural Gas quantity stored in the network of NNGTS (Line Pack) for the Year 2012.

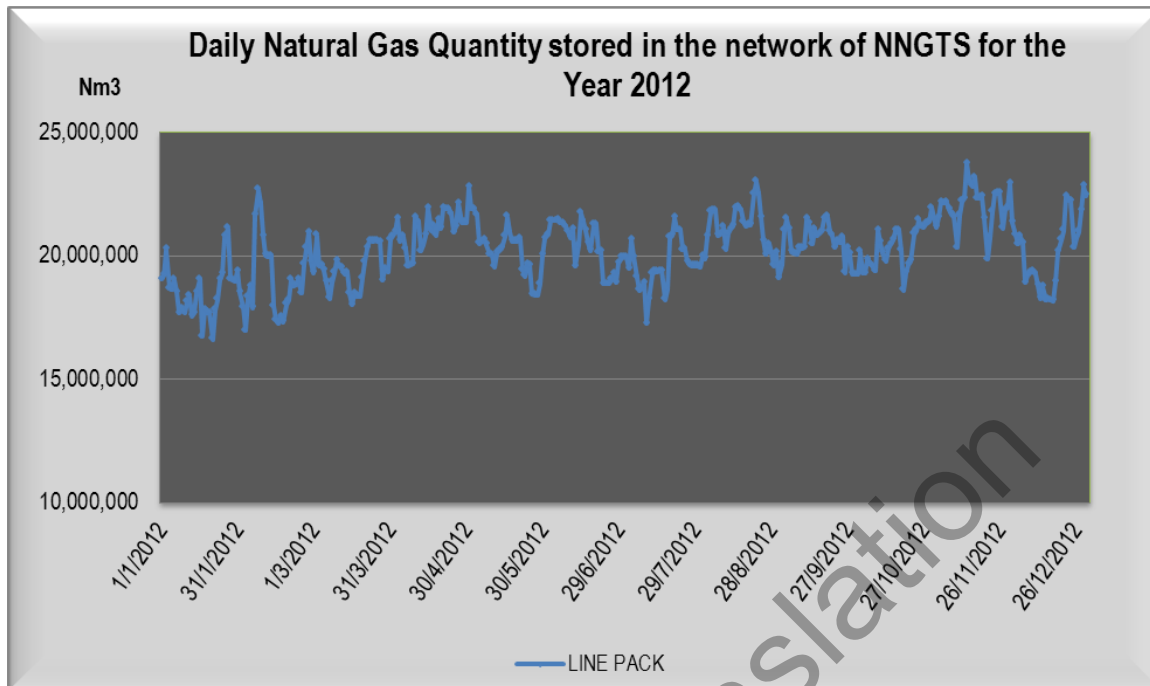


Diagram 7: Daily Natural Gas Quantity stored in the network of NNGTS for the Year 2012

The Diagram 8 below shows the total Daily configuration of the inventory of LNG Facility Users for the Year 2012. It is worth mentioning that the level of 66,700 MWh is practically the minimum reserve held by DESFA to ensure the protected customers.

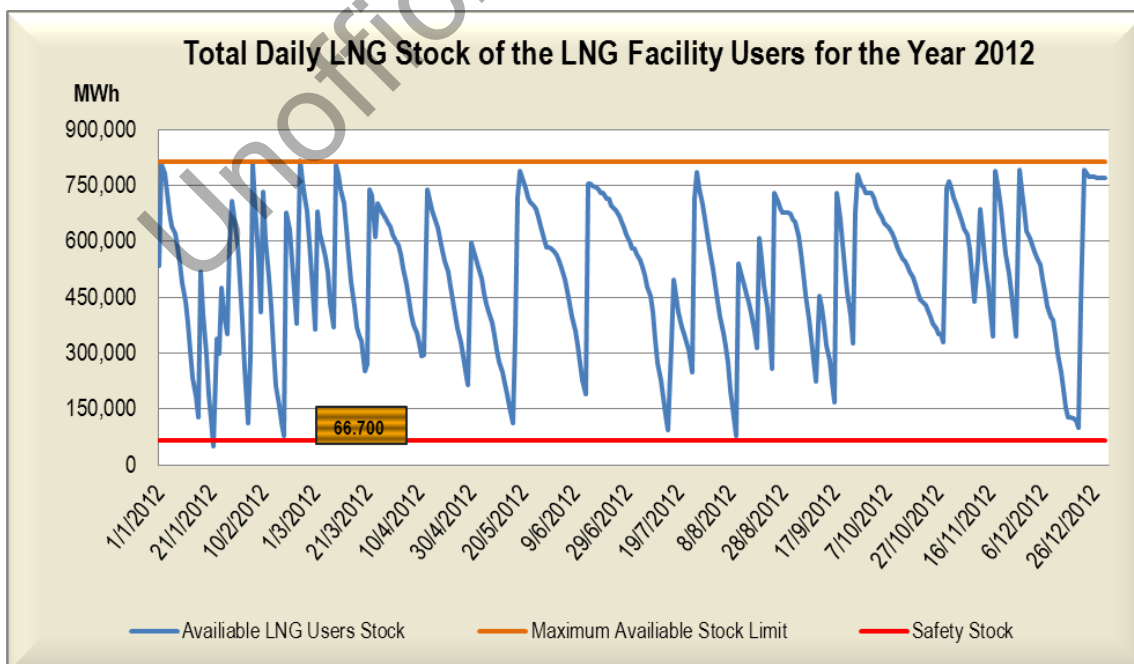


Diagram 8: Total Daily configuration of LNG Facility Users inventory for the Year 2012