



Operation Report of the NNGS for the Year 2016

(In accordance with the provisions of 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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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 Revythoussa island at Megara.

The Natural Gas is delivered from the Users to three (3) Entry Points to the National Natural Gas Transmission System (NNGTS) and it is off-taken by the Users via forty-three (43) Exit Points in the Greek mainland.

It consists of:

- The main pipeline, with 512 Km length and 36" & 30" diameter, and the branches of total length 954 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 Sidirokastron, Serres and at Kipi, Evros;
- The Liquefied Natural Gas (LNG) Station at Revythoussa;
- The Compression Station at Nea Mesimvria, Thessaloniki;
- The Natural Gas Metering and Regulating Stations;
- The Control and Dispatching Centers;
- The Operation and Maintenance Centers at the Sidirokastron Border Metering Station, Eastern Greece, Northern Greece, Central Greece, Southern Greece and Peloponnese;
- 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 Revythoussa LNG Station to the mainland.

The Revythoussa LNG Station is the only installation in the National Natural Gas System which can

temporarily store Natural Gas quantities, up to 130,000 m³ LNG.

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.

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2 Report for the operation of NNGS

2.1 Technical Characteristics of the System

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	40.87
EKO Branch	24 & 10	9.74
Thessaloniki East Branch	24	24.73
Platy Branch	10	10.97
Kavala-Kipi-Komotini Branch	36 & 24	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	14	0.65
Aliveri Branch	20	73.19
Megalopoli Branch	30 & 24	167.99
Mandra-ELPE Elefsis Branch	10	6,84
TOTAL		1,466.17
Revythoussa - Agia Triada Underwater Pipeline		
East Pipeline	24	0.62
West Pipeline	24	0.51

Table 1: Diameters and lengths of the Natural Gas pipeline

2.2 Variations in Technical Characteristics of the System

During the Year 2016 the technical characteristics of the NNGS varied as follows:

1. On 28.01.2016 the NNGTS Metering and Regulating Station 'TRIKALA' (U-6260), at the Exit Point 'TRIKALA' was completed and put in operation, replacing the temporary Station TM3-B that was used for the specific Point until the above mentioned date.
2. On 10.10.2016 the NNGTS Metering and Regulating Station 'KARDITSA' (U-6240), at the Exit Point 'KARDITSA' was completed and put in operation, replacing the temporary Station TM3-A that was used for the specific Point until the above mentioned date.
3. On 15.11.2016 the NNGTS Exit Point 'FARSALA' at the southern zone of the NNGTS, with Technical Capacity 1,874.880 MWh/Day and Delivery Pressure from 9 to 19 barg, was added to

the NNGTS. On the same date, the NNGTS Metering and Regulating Station 'FARSALA' (U-6280), that serves as the metering facilities for the above mentioned Exit Point, was completed and put in operation.

4. On 17.11.2016 the NNGTS Metering and Regulating Stations 'MOTOR OIL B' (U-7140) and 'ADG B' (U-2830) were completed and put in operation at the Exit Points 'MOTOR OIL II' and 'ADG II' respectively.

2.3 NNGTS Relevant Entry/Exit Points Capacity

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

TECNICAL CAPACITIES OF NATIONAL NATURAL GAS SYSTEM (NNGS) RELEVANT ENTRY/EXIT POINTS				
No.	ENTRY POINT	Technical Capacity [MWh/day] (1)	DESFA' s Metering/Regulating Station	Maximum Capacity of DESFA's Metering/Regulating Station [MWh/day]
1	SIDIROKASTRO	121,608.000	M SIDIROKASTRO (U-2010)	178,952.928
2	AGIA TRIADA	150,263.500	M AGIA TRIADA (U-3020)	150,263.500
3	KIPI	48,719.000	M KIPI (U-3900)	232,808.115
No.	EXIT POINT	Technical Capacity [MWh/day] (1)	DESFA' s Metering/Regulating Station	Maximum Capacity of DESFA's Metering/Regulating Station [MWh/day]
1	ALOYMINION	26,784.000	M AdG (U-2820)	26,784.000
2	ALOYMINION II	20,777.632	M AdG B (U-2830)	20,777.632
3	ALOYMINION III	6,696.000	M AdG III (U-TM1/TM5)	6,696.000
4	MOTOR OIL	26,784.000	M MOTOR OIL (U-7130)	26,784.000
5	MOTOR OIL II	21,427.200	M MOTOR OIL B (U-7140)	21,427.200
6	AG. THEODOROI	3,000.000	M/R AG. THEODOROI (U-7045)	3,000.000
7	ATHENS	88,561.564	M/R NORTH ATHENS (U-2910)	29,521.057
			M/R EAST ATHENS (U-2940)	29,521.057
			M/R WEST ATHENS (U-2990)	29,519.450
8	ALEXANDROUPOLIS	7,499.520	M/R ALEXANDROUPOLIS (U-3630)	7,499.520
9	ALIVERI (PPC)	21,427.200	M PPC ALIVERI (U-6370)	21,427.200

10	VIPE LARISSA	2,678.400	M/R VIPE LARISSA (U-2515)	2,678.400
11	VOLOS	13,832.061	M/R VOLOS (U-2680)	13,832.061
12	VFL	6,510.923	M VFL (U-2170)	6,510.923
13	DRAMA	7,499.520	M/R DRAMA (U-2140)	7,499.520
14	ELPE	4,828.352	M/R EKO (U-2250)	4,828.352
15	ELPE-HAR	8,035.200	M/R ATHENS ELDA (U-2970)	8,035.200
16	ENERGIAKI THESS. (ELPE)	26,784.000	M ELPE DIAVATA (U-2270) ⁽²⁾	
17	HERONAS	10,713.600	M HERONAS (U-6020)	10,713.600
18	HERON II	22,500.000	M HERON B (U-6030)	22,766.400
19	THESSALONIKI	38,851.263	M/R THESSALONIKI NORTH (U-2240)	19,425.632
			M/R THESSALONIKI EAST (U-2220)	19,425.632
20	THISVI	23,800.000	M THISVI (U-6650) ⁽²⁾	
21	THRIASSIO	13,580.827	M/R THRIASSIO (U-2960)	13,580.827
22	KAVALA	2,678.400	M/R KAVALA (TM4-A)	2,678.400
23	KARDITSA	5,356.800	M/R KARDITSA (U-6240)	5,356.800
24	KATERINI	7,499.520	M/R KATERINI (U-2340)	7,499.520
25	KERATSINI (PPC)	27,360.660	M PPC KERATSINI (U-3090)	27,360.660
26	KILKIS	11,784.960	M/R KILKIS (U-2060)	11,784.960
27	KOKKINA	2,678.400	M/R KOKKINA (U-2670)	2,678.400
28	KOMOTINI (PPC)	28,926.720	M/R PPC KOMOTINI (U-3570)	28,926.720
29	KOMOTINI	5,356.800	M/R KOMOTINI (U-3580)	5,356.800
30	LAMIA	7,499.520	M/R LAMIA (U-2620)	7,499.520
31	LARISSA	13,879.469	M/R NORTH LARISSA (U-2520)	6,939.734
			M/R SOUTH LARISSA (U-2530)	6,939.734
32	LAVRIO (PPC)	64,281.600	M PPC LAVRIO (U-3430)	64,281.600
33	MEGALOPOLIS (PPC)	42,854.400	M PPC MEGALOPOLIS (U-7320)	42,854.400
34	SPATA	3,080.160	M/R MARKOPOULO (U-3460)	3,080.160
35	XANTHI	11,784.960	M/R XANTHI (U-3530)	11,784.960
36	OINOFYTA	7,099.903	M/R INOFYTA (U-2880)	7,099.903
37	PLATY	5,755.346	M/R PLATY (U-2410)	5,755.346

38	SALFA ANO LIOSSIA	2,678.400	M ANO LIOSSIA (U-5010) ⁽²⁾	
39	SALFA ANTHOUSSA	2,678.400	M ANTHOUSSA (U-5210) ⁽²⁾	
40	SERRES	11,784.960	M/R SERRES (U-2110)	11,784.960
41	TRIKALA	5,356.800	M/R TRIKALA (U-6260)	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 integrity and the operational demands of the NNGTS.
2. Given that the Operator has not completed the installation works of the metering facilities through which gas shall be supplied from the Transmission System to the relative Receiving Natural Gas Installation and until the completion of these metering facilities, Exit Point will be considered the location of the last insulating joint weld on the pipeline which supplies the Receiving Natural Gas Installation within the plot land already purchased by DESFA for the construction of the relevant metering facilities.

Finally, Table 3 on the next page depicts the Annual profile of Natural Gas Deliveries and Off-takes at the relative Entry and Exit Points of NNGTS for the Year 2016.

Annual profile of Natural Gas Deliveries/Off-takes and Daily peaks at the Entry/Exit Points of NNGTS					
Year 2016					
Entry Point Name	Technical Capacity [MWh/Day]	Annual Average of Natural Gas Delivery for the Point [MWh/Day]	Daily peak of the Point [MWh/Day]	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 [%]
SIDIROKASTRO	121,608.00	78,003.27	121,129.00	64.1	99.6
AGIA TRIADA	150,263.50	24,488.36	100,352.88	16.3	66.8
KIPI	48,719.00	19,651.49	48,924.80	40.3	100.4
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/Day]	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 [%]
ALOYMINION	26,784.00	10,168.49	14,188.83	38	53
ALOYMINION II	20,777.63	8,154.48	16,734.43	39.2	80.5
ALOYMINION III	6,696.00	2,171.36	3,110.74	32.4	46.5
MOTOR OIL	26,784.00	4,802.85	9,447.01	17.9	35.3
MOTOR OIL II	21,427.20	8,848.17	18,693.72	41.3	87.2
AGIOI THEODOROI	3,000.00	98.685	222.975	3.3	7.4
ATHENS	88,561.56	8,238.47	30,756.37	9.3	34.7
ALEXANDROUPOLIS	7,499.52	90.938	197.815	1.2	2.6
ALIVERI (PPC)	21,427.20	8,111.32	19,577.13	37.9	91.4
VIPE LARISSA	2,678.40	139.854	242.316	5.2	9
VOLOS	13,832.06	1,686.54	5,263.64	12.2	38.1
VFL	6,510.92	2,643.82	4,915.43	40.6	75.5
DRAMA	7,499.52	761.983	1,231.89	10.2	16.4
ELPE	4,828.35	323.722	2,171.50	6.7	45
ELPE-HAR	8,035.20	2.108	234.584	0	2.9
ENERGIAKI THESS. (ELPE)	26,784.00	6,518.99	19,098.53	24.3	71.3
HERONAS	10,713.60	38.939	1,589.92	0.4	14.8
HERON II	22,500.00	7,559.40	19,423.58	33.6	86.3
THESSALONIKI	38,851.26	6,933.33	24,747.72	17.8	63.7
THISVI	23,800.00	7,828.44	17,509.40	32.9	73.6
THRIASIO	13,580.83	364.313	903.608	2.7	6.7
KAVALA	2,678.40	0	0	0	0
KARDITSA	5,356.80	241.27	999.891	4.5	18.7
KATERINI	7,499.52	286.507	325.271	3.8	4.3
KERATSINI (PPC)	27,360.66	0.987	161.799	0	0.6
KILKIS	11,784.96	878.933	1,594.93	7.5	13.5
KOKKINA	2,678.40	72.868	150.738	2.7	5.6
KOMOTINI (PPC)	28,926.72	9,971.68	22,988.15	34.5	79.5
KOMOTINI	5,356.80	133.864	224.424	2.5	4.2

LAMIA	7,499.52	132.008	242.15	1.8	3.2
LARISSA	13,879.47	1,549.62	5,682.15	11.2	40.9
LAVRION (PPC)	64,281.60	9,000.39	25,720.01	14	40
MEGALOPOLIS (PPC)	42,854.40	7,231.39	25,946.27	16.9	60.5
SPATA	3,080.16	238.043	493.707	7.7	16
XANTHI	11,784.96	156.561	342.846	1.3	2.9
OINOFYTA	7,099.90	2,675.38	3,651.82	37.7	51.4
PLATY	5,755.35	540.974	3,616.62	9.4	62.8
SALFA ANO LIOSSIA	2,678.40	242.594	319.498	9.1	11.9
SALFA ANTHOUSA	2,678.40	205.173	277.367	7.7	10.4
SERRES	11,784.96	449.102	1,149.62	3.8	9.8
TRIKALA	5,356.80	229.509	931.464	4.3	17.4

Table 3

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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. During the Year 2016, the balancing needs of the National Transmission System were covered solely by using the Liquefied Natural Gas (LNG) facility at Revythoussa.

Table 4 below presents the monthly Operator's predictions for the necessary Balancing Gas quantities, according to the Annual Planning of Load Balancing of the NNGTS for the Year 2016, which is approved by the Regulatory Authority for Energy (RAE) (RAE Decision 219/2015) and the actual Balancing Gas quantities needed for the Year 2016.

	Balancing Gas Prediction according to Annual Planning of Load Balancing	Balancing Gas (Actual)
Year 2015	(MWh)	(MWh)
January	121,843	75,015
February	154,029	1,454
March	125,258	131,067
April	137,378	73,292
May	151,757	17,626
June	103,986	100,630
July	156,607	32,207
August	68,268	19,821
September	80,317	142,130
October	157,883	64,057
November	182,706	151,286
December	229,688	478,634
Total	1,669,720	1,287,217

Table 4: Monthly Operator's predictions according to the Annual Planning of Load Balancing of the NNGTS and the actual Balancing Gas quantities for the Year 2016

The Balancing Gas that was injected in the NNGTS during the Year 2016 is less than the initial Operator's predictions in the Annual Planning of Load Balancing of the NNGTS for the specific Year by approximately 23% and this is mainly due to the "maturity" of the Transmission Users, regarding the balancing of their portfolios, and to factors such as the electricity market framework.

Diagram 1 shows the Monthly Balancing Gas quantities, related to the Monthly Natural Gas Off-takes in

all the NNGTS Exit Points.

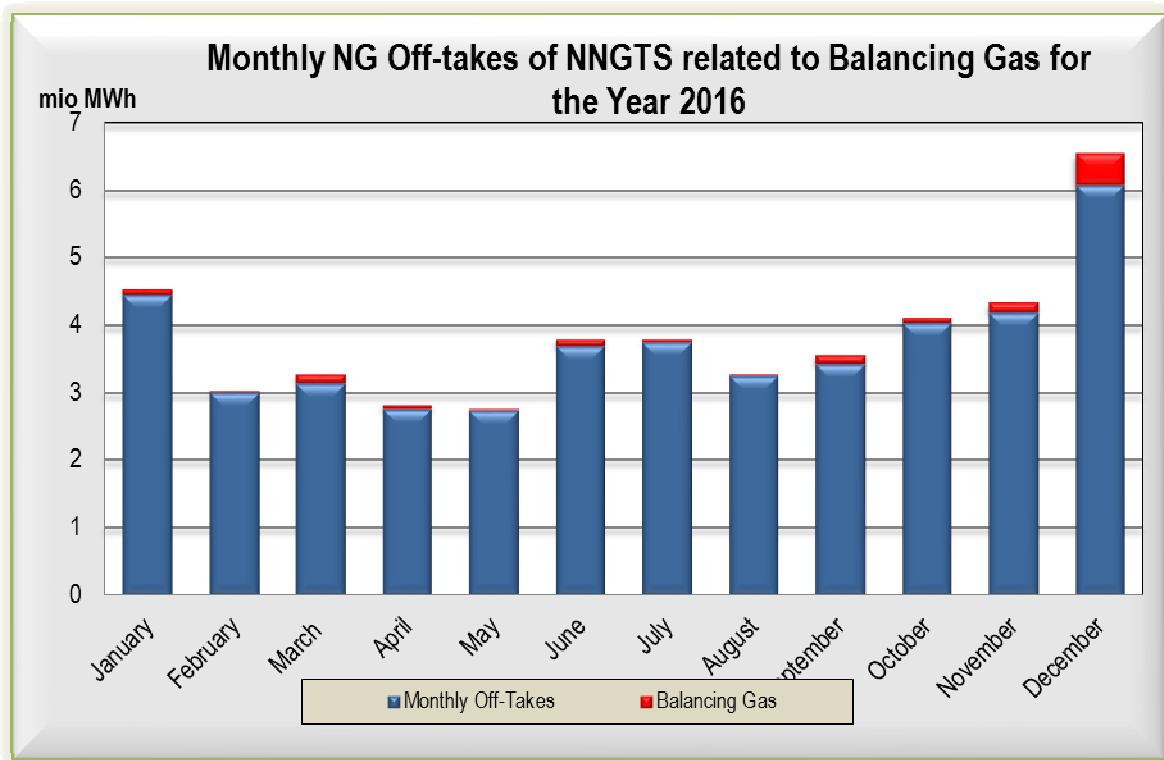


Diagram 1

In the Year 2016 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 a negative average Daily Gas Imbalance (DGI) of the Transmission Users.

Worth noting is the Day 14.12.2016, as it was the maximum quantity of the Natural Gas Off-takes for the Year 2016, which was in the level of 226,658 MWh with DGI -41,256.414 MWh (which is about 18 % of the Natural Gas Total Off-takes). It is also noted that the maximum quantity of Balancing Gas for the Year 2016 does occur at the above mentioned Day, ranging in the level of 41,742.996 MWh.

Diagram 2 shows the total DGI of the Users for the Year 2016.

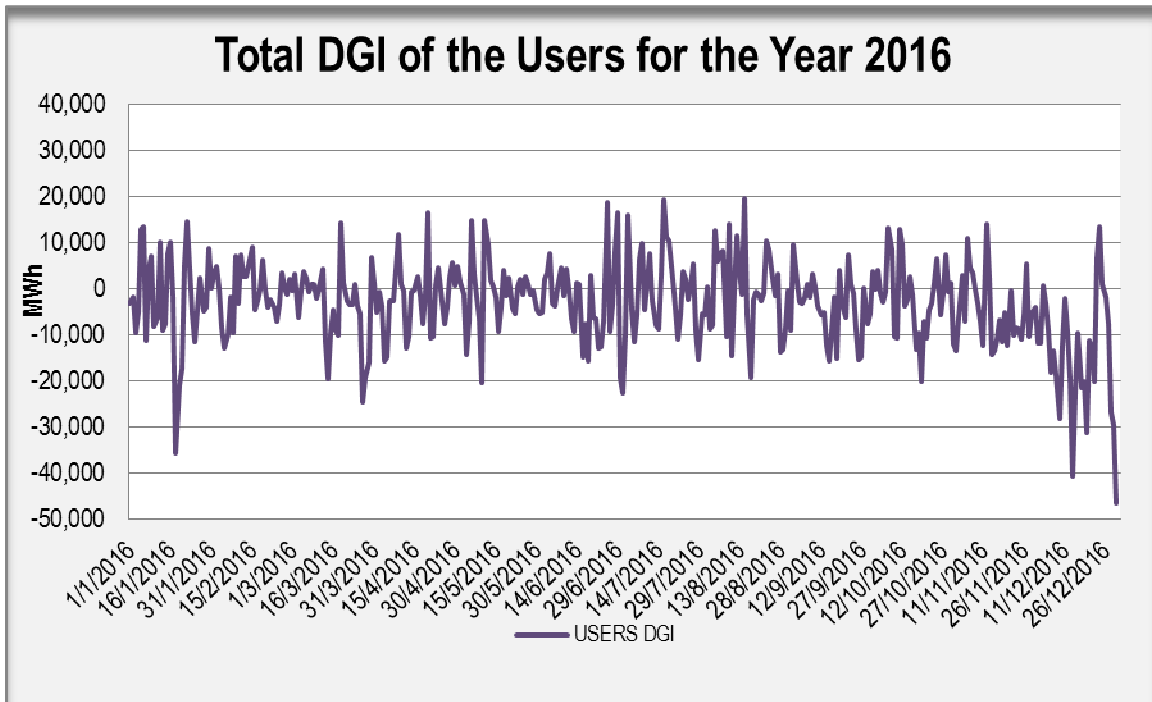


Diagram 2

The Operator, so as to offset the imbalance between the Transmission Users Off-takes and Deliveries in the NNGTS, made balancing actions aiming at minimizing the injection of Balancing Gas quantities by taking into account the pressure level of the network system, functional limitations as well as the estimated Natural Gas demand.

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2.5 Maintenance Standard and Quality

Table 5 shows (a) the Maintenance Program of NNGS for the Year 2016, as it was announced in the Operator's website, according to the provisions of Article 98 of the Network Code, (b) Emergency Maintenance works, done by the Operator, according to the provisions of Article 99 of the Network Code, so as to assure the safe, reliable and efficient operation of the NNGS, and (c) their revisions. 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 maintenance manuals, the legislation in use and the so far gained experience operating the system for years.

The calibration of the measuring systems was done according to Table 6 with only minor time deviations from the Annual Calibration Program that was uploaded in the Operator's website on December 2015, according to the provisions of Article 27 of the NNGS Metering Regulations.

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. Furthermore, the Operator has a Pressure and Chemical Laboratory certified by the Hellenic Accreditation System (E.SY.D.) with ELOT EN ISO/IEC 17025:2005. It is noted that on November 2016 the Hellenic Accreditation System (E.SY.D.) approved the Pressure Calibration Laboratory Accreditation Field to 110 bar, providing the Operator the capability to calibrate, with its own means, all the pressure instruments installed in the NNGTS.

NATIONAL NATURAL GAS SYSTEM MAINTENANCE PROGRAM - YEAR 2016 / EMERGENCY MAINTENANCE WORKS

No.	NNGS POINT	DESCRIPTION OF WORKS	IMPLICATIONS	PERIOD OF WORKS	MAINTENANCE DAYS	REMARKS
1	Entry Point 'SIDIROKASTRON'	Second Upgrade of Border Metering Station (BMS) SIDIROKASTRON	Delivery Transmission Capacity to Entry Point 'SIDIROKASTRON': 67,560.000 MWh/Day	20.07.2016 08:00-01.08.2016 08:00	12	The works were included in the NNGS Maintenance Program for the Year 2016
2	Exit Point 'THESSALONIKI'	Installation of third metering line at Thessaloniki East (U-2220) and Thessaloniki North (U-2240) M/R Stations	Reception Transmission Capacity from Exit Point 'THESSALONIKI': 19,425.632 MWh/Day	September - October	6	The works were rescheduled for the period March-April 2017 and were to the NNGS Maintenance Program for the Year 2017
3	Revithoussa LNG Terminal	Maintenance of the Distributed Control System (DCS) at Revithoussa LNG Terminal	Revithoussa LNG Terminal Regasification Capacity: 87,653.708 MWh/Day Delivery Transmission Capacity to Entry Point 'AGIA TRIADA': 87,653.708 MWh/Day	07.09.2016 08:00-08.09.2016 08:00	1	Emergency Maintenance Works
4	Entry Point 'AGIA TRIADA'	Repair of the non-return valve at skid No. 1 of the Metering Station 'AGIA TRIADA' of Entry Point 'AGIA TRIADA'	Delivery Transmission Capacity to Entry Point 'AGIA TRIADA': 75,131.75 MWh/Day	17.10.2016 08:00-18.10.2016 08:00	1	Emergency Maintenance Works
5	Revithoussa LNG Terminal	Checking and taking measurements in the suction well of sea water pumps J-4302 A/B/S for the needs of the 2 nd Upgrade of Revithoussa LNG Terminal	Revithoussa LNG Terminal Regasification Capacity: 104,835.000 MWh/Day Delivery Transmission Capacity to Entry Point 'AGIA TRIADA': 104,835.000 MWh/Day	10.11.2016 08:00 – 12.11.2016 08:00	2	Emergency Maintenance Works
6	Revithoussa LNG Terminal	Maintenance of Revythoussa LNG Terminal's unloading arms	Available LNG Injection Rate: 5,500.000 m3 LNG/hour	September-October	60	The maintenance was smaller than the scheduled without affecting the LNG Injection Rate

Table 5: NNGS Maintenance Standard and Quality for the Year 2016

CALIBRATION – YEAR 2016

ENTRY POINT / UNIT NUMBER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SIDIROKASTRO / U – 2010	18-19,21-22, 25-26,29				16-20, 23-24,30				16,19, 20-22			
AGIA TRIADA / U – 3020					26-27							
KIPI / U – 3900					17-19					18-21		
EXIT POINT / UNIT NUMBER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
LAVRIO (PPC) / U – 3430			7-11				4-8				7-11	
KERATSINI (PPC) / U – 3090 ⁽¹⁾												
THRIASIO / U – 2960					17-18						2	
ALIVERI (PPC) / U – 6370		9			19				22			
ATHENS / U – 2990 (WEST)						16-17						7-8
ATHENS / U – 2910 (NORTH)				12-13						13 - 14		
ATHENS / U – 2940 (EAST)				14-15						11 - 12		
ATHENS ELDA / U-2970		10							12			
INOFYTA / U – 2880						14-15						19-20
HERON / U – 6020			15						15			
HERON II / U – 6030			15						15			
SPATA / U-3460					23						3	
ALOYMINION / U – 2820						7-8						12
ALOYMINION III / TM1/TM5						8						13
ALOYMINION II / U-2830												14

MOTOR OIL / U – 7130	28											
MEGALOPOLIS (PPC) / U – 7320	27		21					29				
AGIOI THEODOROI / U – 7045			19-20									
MOTOR OIL II / U – 7140					28							
VOLOS / U – 2680				25-26						28-29		
LARISA / U – 2520 (NORTH)				18-19						21-22		
LARISA / U – 2530 (SOUTH)				23-24						23-24		
VIPE LARISA / U – 2515				16-17						16-17		
KARDITSA / TM3-A				13						9-10		
LAMIA / U – 2620				5-6								
KARDITSA / U-6240									12-13			
TRIKALA / TM3-B												
FARSALA / U-6280											7-8	
TRIKALA / U-6260				11-12							5-6	
KOKKINA / U – 2670				5-6						9-10		
THESSALONIKI / U – 2240 (NORTH)				25-26						10-11		
THESSALONIKI / U – 2220 (SOUTH)				23-24						7-14		
PLATY / U – 2410			20-21							15-16		
ELPE / U – 2250 (EKO)			11-12						17-18			
KILKIS / U – 2060			13-14						19			
KATERINI / U – 2340				10-11					24			

KOMOTINI (PPC) / U – 3570			21-24				19-22				22-25	
KOMOTINI / U-3580				21-22							30	2
KAVALA / TM4-A				8						12		
VFL / U – 2170							16					5-6
XANTHI / U – 3530			3-4								16-17	
ALEXANDROUPOLIS / U – 3630						10-11					28-29	
DRAMA / U – 2140			15-16						29-30			
SERRES / U – 2110			17-18						26-27			

Table 6: NNGTS Stations Calibrations – Year 2016

Comments on Table 6:

The programmed calibration for May and November 2016 for the Station U-3090 of the Exit Point 'KERATSINI (PPC)' did not take place, due to the fact that there were no Natural Gas Off-takes during the Year at that Point.

2.6 Congestion and Congestion Management

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

Table 7 below presents the Technical Capacities of the NNGTS Entry/Exit Points, the Maximum Booked Transmission Capacity (MBTC) of the Points for Year 2016, in absolute terms and as a percentage of the Technical Capacity.

Annual profile of Technical Capacity, maximum Booked Transmission Capacity and maximum Measured Natural Gas Quantity of Entry/Exit Points of NNGTS			
Year 2016			
ENTRY POINT	Technical Capacity [MWh/Day]	Maximum Booked Transmission Capacity of Point [MWh/Day]	Congestion Maximum Booked Transmission Capacity of Point as a percentage of Technical Capacity [%]
SIDIROKASTRO ⁽¹⁾	121,608.00	123,824.00	98%
AG. TRIADA ⁽²⁾	150,263.50	116,421.75	77%
KIPI	48,719.00	48,719.00	100%
EXIT POINT	Technical Capacity [MWh/Day]	Maximum Booked Transmission Capacity of Point [MWh/Day]	Congestion Maximum Booked Transmission Capacity of Point as a percentage of Technical Capacity [%]
ALOYMINION	26,784.000	14,500.000	54%
ALOYMINION II	20,777.632	17,000.000	82%
ALOYMINION III	6,696.000	3,501.000	52%
MOTOR OIL	26,784.000	9,501.000	35%
MOTOR OIL II	21,427.200	18,700.000	87%
AG. THEODOROI	3,000.000	250.000	8%
ATHENS	88,561.564	37,920.500	43%
ALEXANDROUPOLIS	7,499.520	211.000	3%
ALIBERI (PPC)	21,427.200	17,001.000	79%
VIPE LARISSA	2,678.400	220.000	8%
VOLOS	13,832.061	4,879.000	35%
VFL	6,510.923	6,510.923	100%
DRAMA	7,499.520	1,286.000	17%
ELPE	4,828.352	1,801.000	37%
ELPE-HAR	8,035.200	141.000	2%

ENERGIAKI THESS. (ELPE)	26,784.000	17,866.450	67%
HERONAS	10,713.600	1,301.000	12%
HERON II	22,500.000	20,001.000	89%
THESSALONIKI	38,851.263	29,372.000	76%
THISVI	23,800.000	17,768.620	75%
THRIASSIO	13,580.827	841.000	6%
KAVALA	2,678.400	0.000	0%
KARDITSA	5,356.800	850.000	16%
KATERINI	7,499.520	365.407	5%
KERATSINI (PPC)	27,360.660	1.000	0%
KILKIS	11,784.960	1,439.500	12%
KOKKINA	2,678.400	122.000	5%
KOMOTINI (PPC)	28,926.720	23,001.000	80%
KOMOTINI	5,356.800	211.000	4%
LAMIA	7,499.520	249.500	3%
LARISSA	13,879.469	5,303.000	38%
LAVRIO (PPC)	64,281.600	27,001.000	42%
MEGALOPOLIS (PPC)	42,854.400	35,001.000	82%
SPATA	3,080.160	513.000	17%
XANTHI	11,784.960	354.000	3%
OINOFYTA	7,099.903	3,836.500	54%
PLATY	5,755.346	3,276.000	57%
SALFA ANO LIOSSIA	2,678.400	326.000	12%
SALFA ANTHOUSSA	2,678.400	281.000	10%
SERRES	11,784.960	1,101.400	9%
TRIKALA	5,356.800	850.000	16%

Table 7

Notes on Table 7:

1. At the Entry Point 'SIDIROKASTRON' the congestion was calculated based on the sum of the Technical Capacity of the specific Point, i.e. 121,608.00 MWh/Day, and the maximum of the Additional Transmission Delivery Capacity, i.e. 4,300.00 MWh/Day, booked by the Users in the Year 2016.
2. With regards to the Entry Point 'AGIA TRIADA', DESFA is going to increase the Technical Capacity of the Point to 230,400 MWh/Day on the first half of 2018, along with the upgrade of Revythoussa LNG Station.
3. With regards to the Exit Point 'THESSALONIKI', DESFA is going to increase the Technical Capacity of the Point in 2017 by upgrading the Metering/Regulating Stations 'THESSALONIKI NORTH' (U-2240) and 'THESSALONIKI EAST' (U-2220).
4. With regards to the Exit Point 'INOFYTA', congestion is not expected to occur, due to the implementation of the Metering/Regulating Station 'THIVA' (U-2740), which will supply the off-takes network of Inofyta-Shimatari-Thiva, along with the existing Metering/Regulating Station of 'INOFYTA' (U-2880).

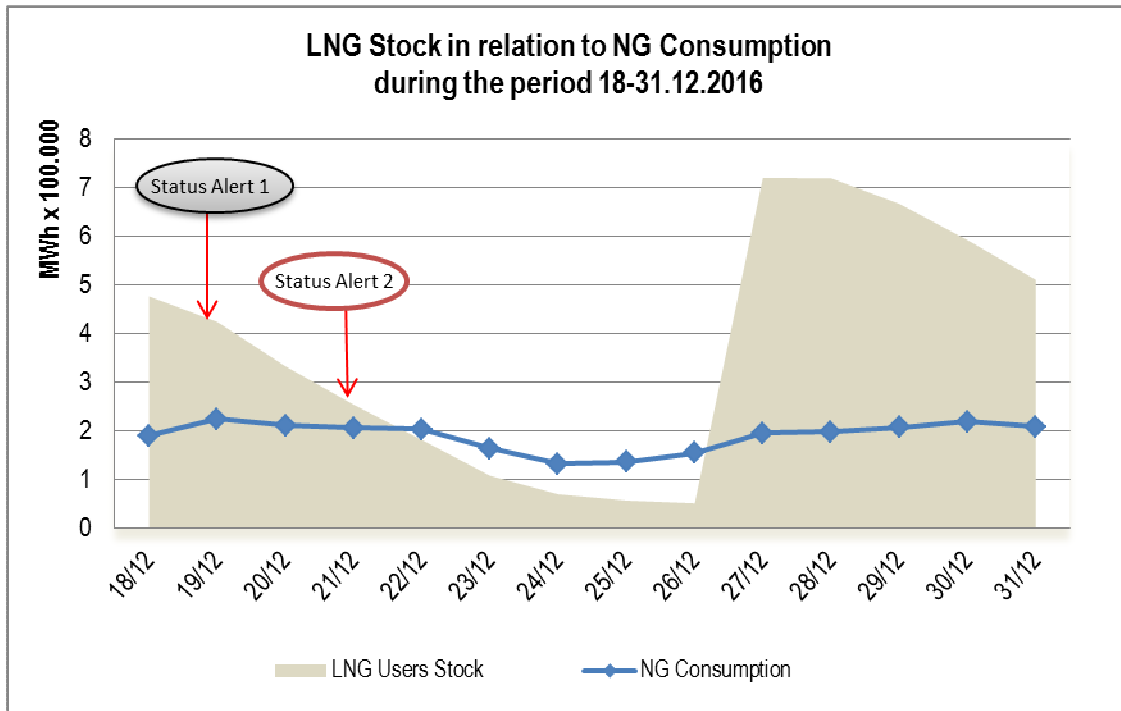
2.7 Emergencies and Dealing with Emergencies

In December 2016, the constantly increasing demand of natural gas led to the rapid depletion of LNG stocks in Revithoussa LNG Terminal, endangering the Country's Natural Gas Supply. The Operator's Crisis Management Unit (CMU), locating the supply problem on time, declared Early Warning Level (Alert Status 1) in the NNGS on the Day 19.12.2016 and at 20:46, under the terms of the Emergency Plan and cooperated with all the involved parties in the Natural Gas Market (RAE, Users, ADMIE, etc.) to avoid worsening the crisis.

On the Day 21.12.2016 and at 12:05, the Operator's CMU decided the upgrade of the crisis level to Alert Level (Alert Status 2), due to the criticality of the situation created by the postponement of the unplanned LNG Cargo Unloading at Revithoussa LNG Terminal from the Day 24.12.2016 to the Day 26.12.2016 and the meeting of the Crisis Management Group (CMG) was requested, according to the Emergency Plan, so as to inform the involved parties about the state of the operation of the NNGS at that moment, the evaluation of the criticality of the situation and the necessary measures that should be taken so as not to further disrupt the security of supply of the Country's Natural Gas and the NNGS safe and efficient operation.

The gradual reduction of the Natural Gas consumption by the Power Plants and Interruptible Consumers, in conjunction with the arrival of the LNG Vessel on the Day 26.12.2016, normalized the Country's Natural Gas Supply and led the Operator/CMU to decide the lift of Alert Level (Alert Status 2) and reset the Early Warning Level (Alert Status 1) on the Day 26.12.2016 and at 19:03.

Subsequently, taking into consideration the Final Monthly LNG Unloading Plan for January 2017, according to which an LNG Cargo Unloading was expected on the Day 04.01.2017, the Operator/CMU lifted the Early Warning Level (Alert Status 1) and reinstated Alert Status 0 (i.e. normal NNGS operation) on the Day 31.12.2016 and at 11:48.



2.8 Operating characteristics of NNGS

According to the NNGS Measurements Regulation of DESFA, the Minimum Inlet Pressure at Entry Points 'SIDIROKASTRON' and 'KIPI' is 47.75 and 50.00 barg, respectively. Diagram 3 below shows the average Daily Inlet Pressure at Entry Points 'AGIA TRIADA', 'SIDIROKASTRON' and 'KIPI' for the Year 2016. Note that in the Diagram below, the Average Daily Inlet Pressure at NNGTS Entry Points is not shown for Days with zero Natural Gas Deliveries at the specific Points.

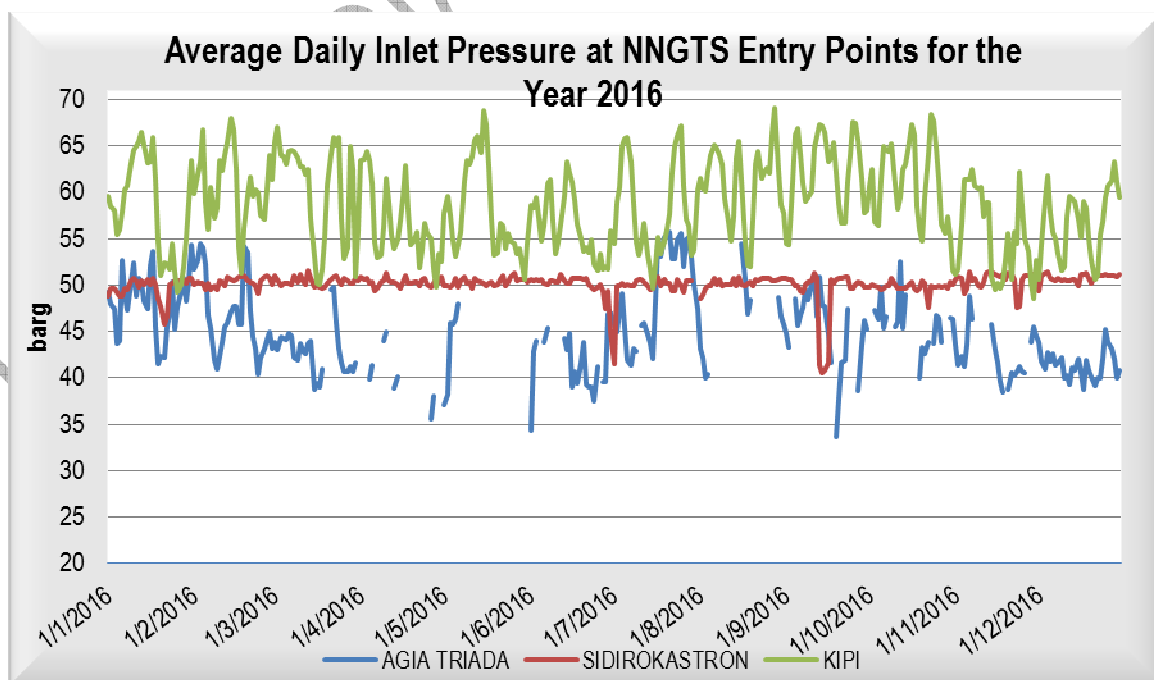


Diagram 3

Furthermore, Diagram 4 below shows the average Daily Network Pressure of the NNGTS for the Year 2016, as recorded by DESFA's SCADA system.

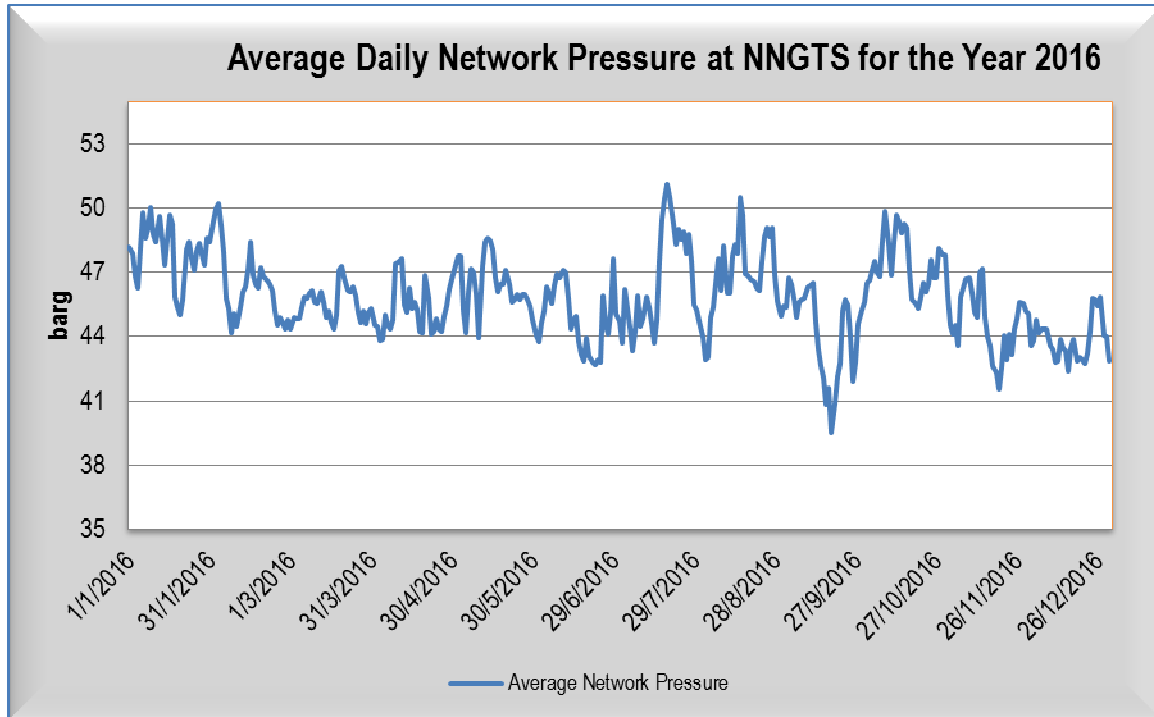


Diagram 4

2.9 Natural Gas Quantities historical data

2.9.1 Daily Natural Gas Off-takes/Deliveries

During the Year 2016 the total Natural Gas Off-Takes at NNGTS Exit Points was 44,535,393 MWh (compared to 34,126,533 MWh during the Year 2015). Diagram 5 below shows the Daily Natural Gas Off-Takes at the NNGTS Exit Points (as a sum) for the Year 2016. It is worth mentioning that the maximum Natural Gas consumption for the Year 2016 was recorded in the Day 14.12.2016, i.e. 226,658 MWh.

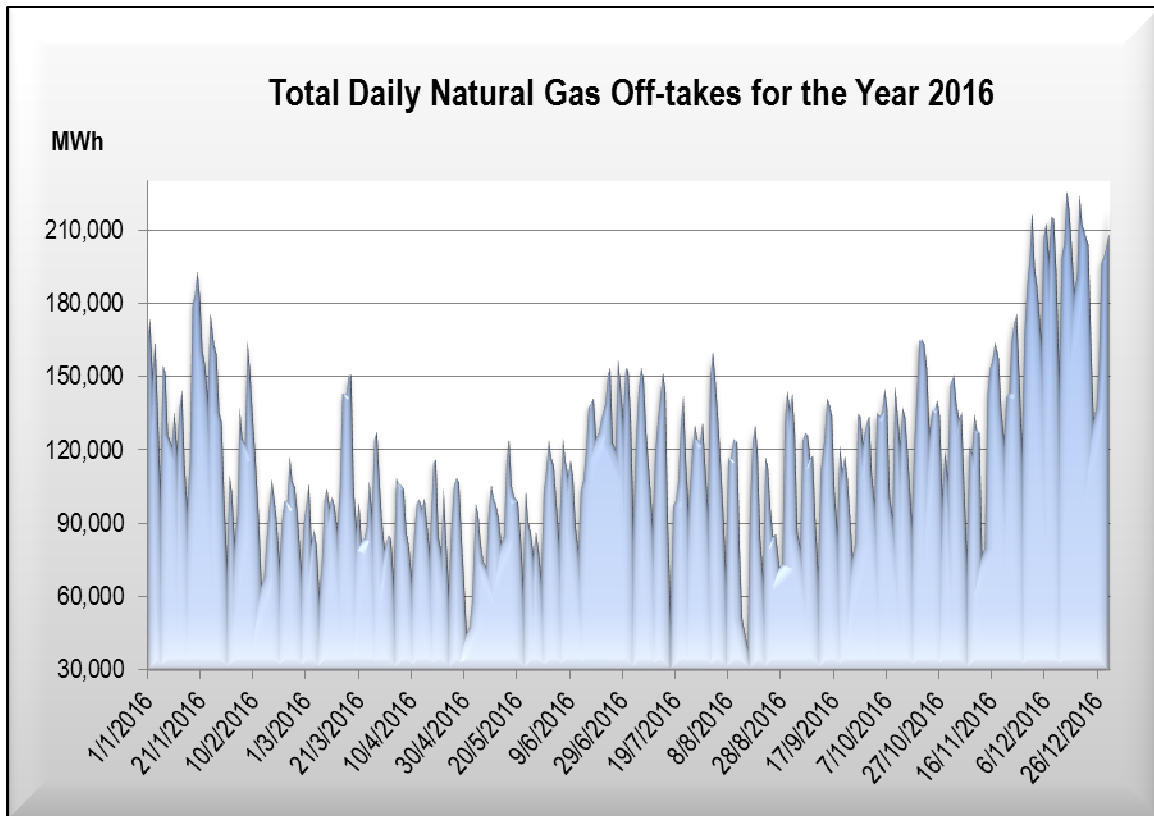


Diagram 5

During the Year 2016 the total Natural Gas Deliveries at NNGTS Entry Points was 44,704,382 MWh (compared to 34,289,681 MWh during the Year 2015). Diagram 6 below shows the shares of Daily Natural Gas quantities per NNGTS Entry Point for the Year 2016.

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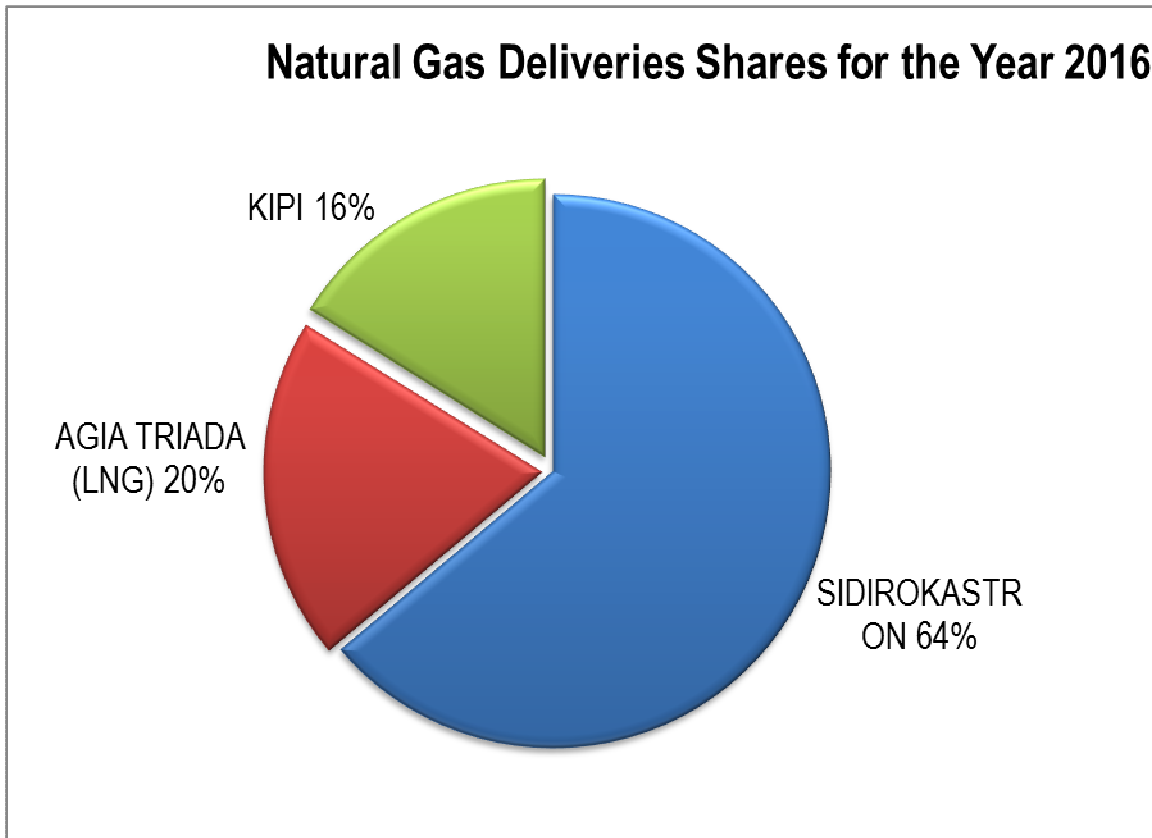


Diagram 6

2.9.2 Daily Natural Gas Quantity stored in the network of NNGTS

The Daily Natural Gas quantity stored in the NNGTS (i.e. Line Pack) varied from 19,852,290 Nm³ (Day 19.09.2016) to 26,224,917 Nm³ (Day 20.07.2016). Diagram 7 below shows the Daily variation of the Line Pack for the Year 2016.

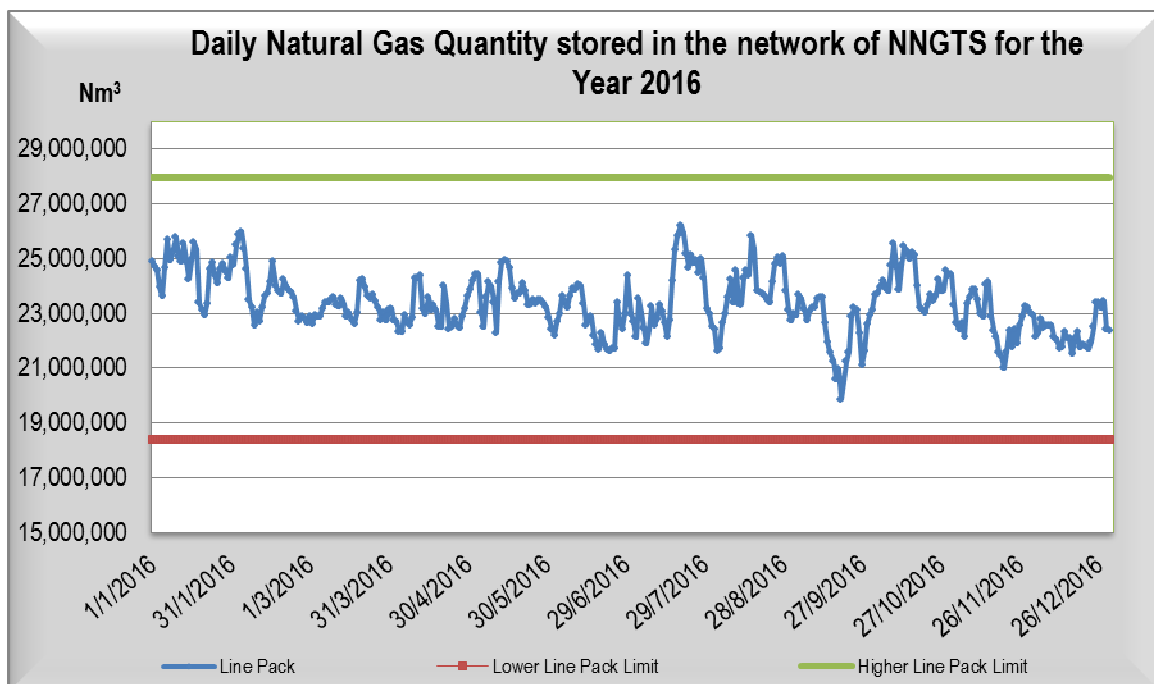


Diagram 7

2.9.3 Total Daily LNG Stock

In the Entry Point 'AGIA TRIADA' 8,962,740 MWh of Regasified Natural Gas were injected to the NNGTS (increase of about 37.4% compared to the Year 2015), while the LNG unloads led to 9,001,046 MWh (increase of about 32.7% compared to the Year 2015).

Diagram 8 below shows the Daily configuration of the total stock of the LNG Facility Users, including the Balancing Gas that DESFA stored for Balancing purposes, during the Year 2016.

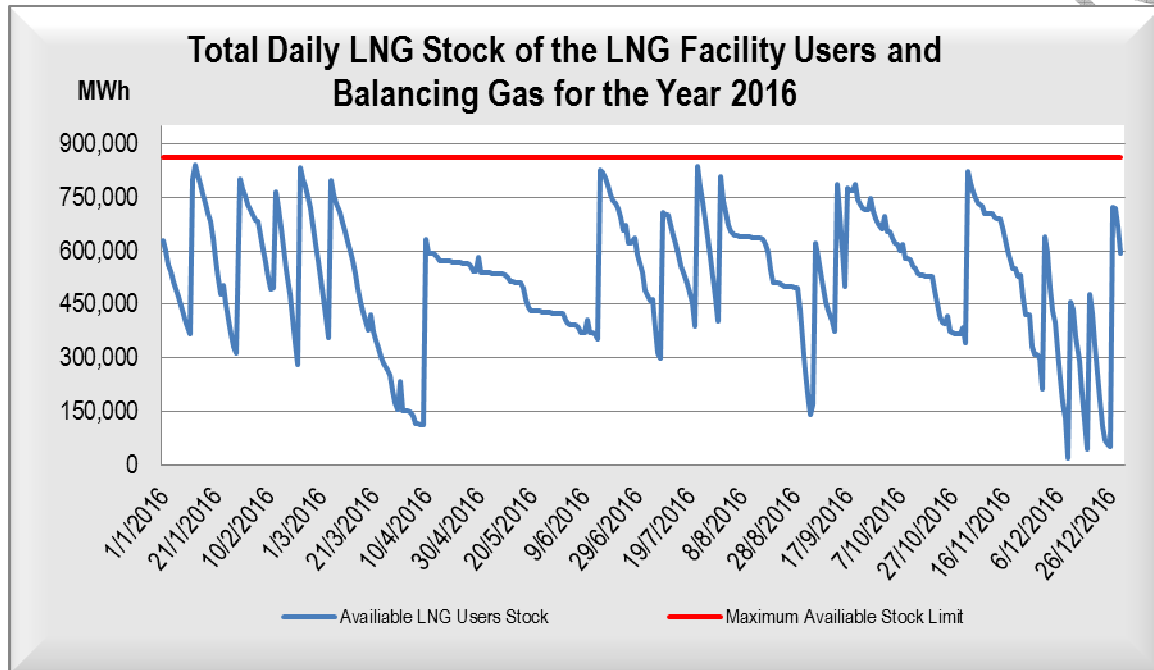


Diagram 8

2.9.4 Historical Operational data of the Compressor Station in Nea Messimvria

The Compressor Station in Nea Messimvria, Thessaloniki has operated during the Year 2016 for 7,152 hours, consuming 98,116.14 MWh of Natural Gas as fuel. That amount corresponds to 94% of the total Operational Gas that was used in the NNGTS during the Year 2016, which amounts to 104,628.990 MWh.

Diagram 9 below (see next page) shows the Operational Gas used in the NNGTS and the Natural Gas consumed as fuel for the operation of the Compressor Station on a Monthly basis during the Year 2016.

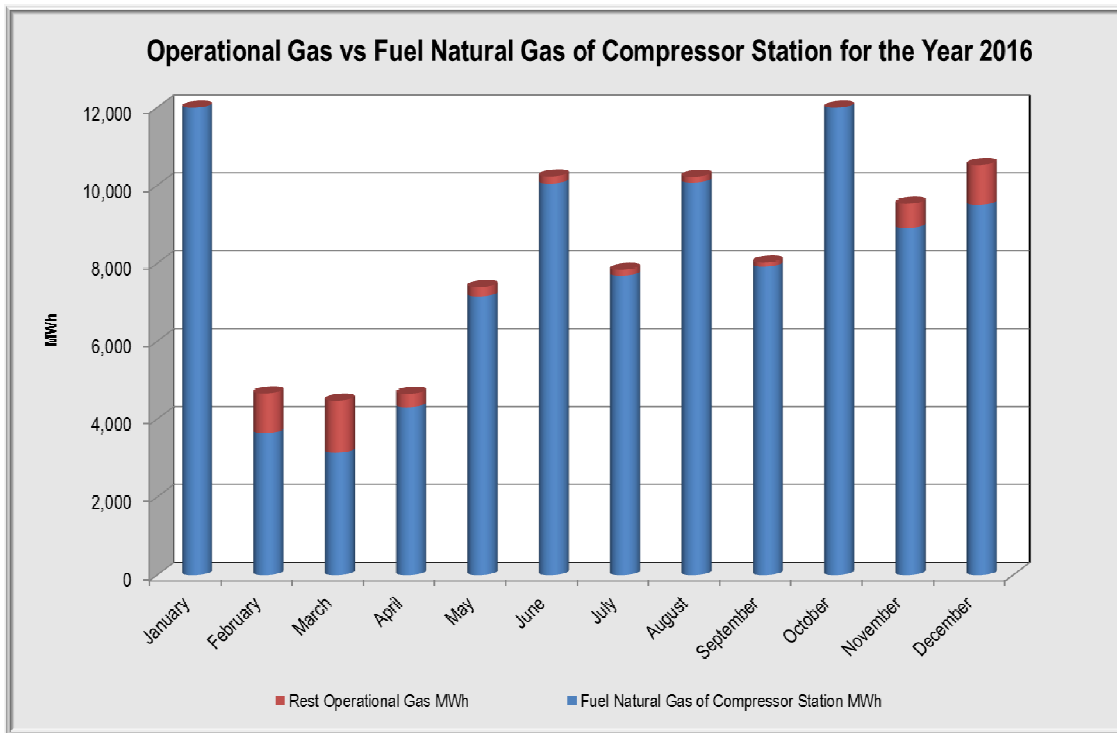


Diagram 9

Diagram 10 below shows the Natural Gas quantity that was handled by the Compressor Station on a Monthly basis during the Year 2016.

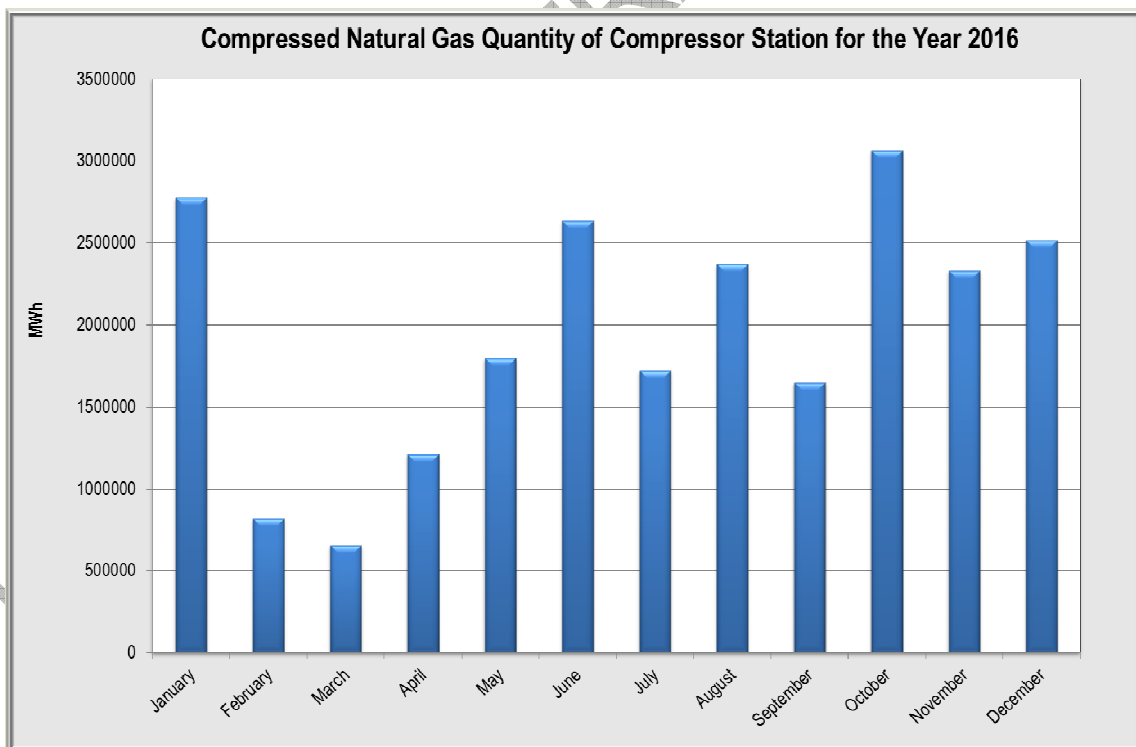


Diagram 10

2.9.5 Natural Gas out of specifications during the Year 2016

During the Year 2016 the following violations of Minimum Entry/Exit Pressure in the Entry/Exit Points of the NNGTS occurred:

1. The Delivery Pressure in the Entry Point 'SIDIROKASTRON' has been lower than the Minimum Entry Pressure, i.e. 47.75 barg for thirteen (13) Days.
2. The Delivery Pressure at the Entry Point 'KIPI' has been lower than the Minimum Delivery Pressure, i.e. 50.00 barg for one (1) Day.

Finally, during the Year 2016 there were no violations of Natural Gas quality specifications, as specified in the Annex I of the NNGS Network Code.

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