DESFA
Hellenic Gas Transmission System Operator

Halandri, Attica

Operation Report of the NNGS for the Year 2019

(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)

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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 Revithoussa 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 four (43 Exit Points in the Greek mainland, including Reverse Flow Exit Point "SIDIROKASTRO", through which the delivery of Natural Gas quantities to the Interconnected Natural Gas Transmission System of Bulgaria is achieved.

The NNGS consists of:

- The main pipeline, with 512 Km length and 36'' & 30'' diameter, and the branches of total length 953.20 Km (containing (a) the underwater pipeline of Aliveri branch, with 14.20 Km length and 20" diameter and (b) the two (2) underwater pipes, each one a back-up to the other, of 24'' diameter each and of 620m and 630m length, that connect the Revithoussa LNG Station to the mainland), 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 Revithoussa connected to the Entry Point 'Agia Triada';
- The Compression Station at Nea Messimvria, Thessaloniki;
- The Natural Gas Metering and Regulating Stations;
- The Control and Dispatching Centers;
- The Operation and Maintenance Districts of Sidirokastro at Serres, North-Eastern Greece,

Northern Greece, Central Greece, Southern Greece and Peloponnese; and

- The Remote Control and Communications system.

The Revithoussa LNG Station is the only installation in the NNGS, which following its 2nd upgrade, can now temporarily store Natural Gas quantities up to 221,815.677 m³ LNG. It consists of:

- Three (3) Liquefied Natural Gas storage tanks of 63,379.931 m³, 63,379.931 m³ and of 95,055.815 m³ LNG storage capacity;
- LNG unloading installations of maximum LNG unloading rate 7,250 m³ LNG/h; and
- LNG gasification installations of sustained maximum sendout rate 1,000 m³ LNG/h and peak sendout rate 1,250 m³ LNG/h.

Diagram 1: NNGS Geographical Depiction

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 NNGTS.

Natural Gas Pipeline	Diameter (inch)	Total Length (Km)
Main Pipeline	36 & 30	**512**
Transmission Branches of NNGTS		
Lavrion Branch	30	100.05
Keratsini Branch	30 & 24	24.48
HAR Branch	14	2.02
Oinofyta Branch	10	20.62
Volos Branch	10	40.42
Thessaloniki North - EKO Branch	24 & 10	9.70
Thessaloniki East Branch	24	24.41
Platy Branch	10	10.98
Karperi - Komotini Branch	24	216.79
Komotini - Kipi Branch	36	86.71
Alouminion Branch	20	28.12
Megara - Korinthos Branch	30	52.88
MOTOR OIL Branch	20	1.46
Trikala Branch	10	71.94
Thisvi Branch	20	26.27
Heron Branch	14	0.75
Aliveri Branch	20	73.13
Elefsina (ELPE) Branch	10	6.41
Korinthos - Megalopoli Branch	24	155.43
Revithoussa - Agia Triada Underwater Pipeline		
East Pipeline	24	0.62
West Pipeline	24	0.63
TOTAL (Transmission Branches and Underwater pipelines)		**953.20**

Table 1: Diameters and lengths of the NNGTS Natural Gas pipelines

2.2 Variations in Technical Characteristics of the System

During the Year 2019, the technical characteristics of the NNGS varied as follows:

1. On 28.03.2019, due to the completion of the 2nd upgrade of the LNG Facility at Revithousa the Technical Capacities of the following NNGTS Entry and Exit Points varied, as follows:
   - ❖ Entry Point 'AGIA TRIADA' from 149,872,697 kWh/Day to 204,481,800 kWh/Day,
   - ❖ Reverse Flow Exit Point 'SIDIROKASTRO' from 11,350,000 kWh/Day to 46,535,000 kWh/Day.

   And the Maximum Capacity of the NNGTS Metering Station 'AGIA TRIADA' varied from 149,872,697 kWh/Day to 241,073,280 kWh/Day.
2. On 01.06.2019 the Metering/Regulating Station 'THRIASIO' (U-2960) was integrated in the NNGTS Exit Point 'ATHINA', increasing the Technical Capacity of the Point to 101,876,740 kWh/Day (from 88,331,234 kWh/Day), and
3. On 04.12.2019 the NNGTS Metering Station 'ANTHOUSA STATION' was completed and put into operation at the NNGTS Exit Point 'ANTHOUSA', decreasing the Technical Capacity of the Point to 1,371,600 kWh/Day (from 2,671,434 kWh/Day).

2.3 NNGTS Entry/Exit Points Capacity

Table 2 below shows the Technical Capacities of the 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) ENTRY/EXIT POINTS				
No.	**ENTRY POINT**	**Technical Capacity [kWh/Day] (1)**	**DESFA' s Metering/Regulating Station**	**Maximum Capacity of DESFA's Metering/Regulating Station [kWh/Day]**
1	SIDIROKASTRO	122,580,000	M SIDIROKASTRO (U-2010)	180,383,280
2	AGIA TRIADA	204,481,800	M AGIA TRIADA (U-3020)	241,073,280
3	KIPI	48,592,292	M KIPI (U-3900)	232,202,632
No.	**EXIT POINT**	**Technical Capacity [kWh/Day] (1)**	**DESFA' s Metering/Regulating Station**	**Maximum Capacity of DESFA's Metering/Regulating Station [kWh/Day]**
1	ALOYMINION	26,714,340	M AdG (U-2820)	26,714,340
2	ALOYMINION II	20,723,593	M AdG B (U-2830)	20,723,593
3	ALOYMINION III	6,678,585	M AdG III (U-TM1/TM5)	6,678,585
4	MOTOR OIL	26,714,340	M MOTOR OIL (U-7130)	26,714,340
5	MOTOR OIL II	21,371,472	M MOTOR OIL B (U-7140)	21,371,472
6	AG, THEODOROI	2,992,197	M/R AG, THEODOROI (U-7045)	2,992,197
7	ATHENS	101,876,740	M/R NORTH ATHENS (U-2910)	29,444,279
			M/R EAST ATHENS (U-2940)	29,444,279
			M/R THRIASIO (U-2960)	13,545,506
			M/R WEST ATHENS (U-2990)	29,442,676
8	ALEXANDROUPOLIS	7,480,015	M/R ALEXANDROUPOLIS (U-3630)	7,480,015
9	ALIVERI (PPC)	21,371,472	M PPC ALIVERI (U-6370)	21,371,472
10	VIPE LARISSA	2,671,434	M/R VIPE LARISSA (U-2515)	2,671,434
11	VOLOS	13,796,086	M/R VOLOS (U-2680)	13,796,086
12	VFL	6,493,989	M VFL (U-2170)	6,493,989

13	DRAMA	7,480,015	M/R DRAMA (U-2140)	7,480,015
14	ELPE	4,815,794	M/R EKO (U-2250)	4,815,794
15	ELPE-VEE	12,756,552	M ELPE ELEFSINAS (U-7420)	12,756,552
16	ELPE-HAR	8,014,302	M/R ATHENS ELDA (U-2970)	8,014,302
17	ENERGIAKI THESS, (ELPE)	26,714,340	M ELPE DIAVATA (U-2270)	26,714,340
18	HERONAS	10,685,736	M HERON (U-6020)	10,685,736
19	HERON II	22,441,482	M HERON B (U-6030)	22,707,189
20	THESSALONIKI	77,501,024	M/R THESSALONIKI NORTH (U-2240)	38,750,512
			M/R THESSALONIKI EAST (U-2220)	38,750,512
21	THISVI	23,738,101	M IPP THISVI (U-6650)	23,738,101
22	KAVALA	2,671,434	M/R KAVALA (TM4-A)	2,671,434
23	KARDITSA	5,342,868	M/R KARDITSA (U-6240)	5,342,868
24	KATERINI	7,480,015	M/R KATERINI (U-2340)	7,480,015
25	KERATSINI (PPC)	27,289,500	M PPC KERATSINI (U-3090)	27,289,500
26	KILKIS	11,754,309	M/R KILKIS (U-2060)	11,754,309
27	KOKKINA	2,671,434	M/R KOKKINA (U-2670)	2,671,434
28	KOMOTINI (PPC)	28,851,488	M/R PPC KOMOTINI (U-3570)	28,851,488
29	KOMOTINI	5,342,868	M/R KOMOTINI (U-3580)	5,342,868
30	LAMIA	7,480,015	M/R LAMIA (U-2620)	7,480,015
31	LARISSA	13,843,371	M/R NORTH LARISSA (U-2520)	6,921,685
			M/R SOUTH LARISSA (U-2530)	6,921,685
32	LAVRIO (PPC)	64,114,418	M PPC LAVRIO (U-3430)	64,114,418
33	MEGALOPOLIS (PPC)	42,742,945	M PPC MEGALOPOLIS (U-7320)	42,742,945
34	SPATA	3,072,149	M/R MARKOPOULO (U-3460)	3,072,149
35	XANTHI	11,754,309	M/R XANTHI (U-3530)	11,754,309
36	OINOFYTA	11,836,679	M/R THIVA (U-2740)	4,755,242
			M/R INOFYTA (U-2880)	7,081,437

37	PLATY	5,740,377	M/R PLATY (U-2410)	5,740,377
38	SALFA ANO LIOSSIA	2,671,434	M ANO LIOSSIA (U-5010) (2)	
39	SALFA ANTHOUSSA	1.371.600	M ANTHOUSSA (U-5210)(	1.371.600
40	SERRES	11,754,309	M/R SERRES (U-2110)	11,754,309
41	TRIKALA	5,342,868	M/R TRIKALA (U-6260)	5,342,868
42	FARSALA	1,870,003	M/R FARSALA (U-6280)	1,870,003
No.	**REVERSE FLOW EXIT POINT**	**Technical Capacity [kWh/Day] (1)**	**DESFA' s Metering/Regulating Station**	**Maximum Capacity of DESFA's Metering/Regulating Station [kWh/Day]**
1	SIDIROKASTRO	46,535,000	M SIDIROKASTRO (U-2010)	180,383,280

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 physical Deliveries and Off-takes at the Entry and Exit Points of NNGTS for the Year 2019,

DESFA
Hellenic Gas Transmission System Operator

Annual profile of physical Natural Gas Deliveries/Off-takes and Daily peaks at the Entry/Exit Points of NNGTS					
Year 2019					
Entry Point	**Technical Capacity [kWh/Day]**	**Annual Average of Natural Gas Deliveries to the Point [kWh/Day]**	**Daily peak of the Point [kWh/Day]**	**Annual Average of Natural Gas Deliveries to the Point as a percentage of Technical Capacity [%]**	**Daily peak of the Point as a percentage of Technical Capacity [%]**
SIDIROKASTRO	122,580,000	49,710,049	112,052,676	40.6	91.4
AGIA TRIADA	204,481,800	86,099,797	195,443,571	42.1	95.6
KIPI	48,592,292	22,216,280	49,366,516	45.7	101.6
Exit Point	**Technical Capacity [kWh/Day]**	**Annual Average of Natural Gas Off-takes from the Point [kWh/Day]**	**Daily peak of the Point [kWh/Day]**	**Annual Average of Natural Gas Off-takes from the Point as a percentage of Technical Capacity [%]**	**Daily peak of the Point as a percentage of Technical Capacity [%]**
ALOYMINION	26,714,340	10,122,370	15,874,903	37.9	59.4
ALOYMINION II	20,723,593	11,520,637	19,754,236	55.6	95.3
ALOYMINION III	6,678,585	1,957,240	2,851,785	29.3	42.7
MOTOR OIL	26,714,340	9,268,448	13,063,445	34.7	48.9
MOTOR OIL II	21,371,472	12,225,791	19,337,173	57.2	90.5
AG, THEODOROI	2,992,197	125,462	252,889	4.2	8.5
ATHENS	101,876,740	10,337,421	37,743,024	10.1	37.0
ALEXANDROUPOLIS	7,480,015	91,864	191,484	1.2	2.6
ALIVERI (PPC)	21,371,472	10,068,505	19,306,174	47.1	90.3
VIPE LARISSA	2,671,434	161,058	262,118	6.0	9.8
VOLOS	13,796,086	1,925,110	7,084,565	14.0	51.4
VFL	6,493,989	3,858,193	4,848,771	59.4	74.7
DRAMA	7,480,015	826,726	1,115,180	11.1	14.9
ELPE	4,815,794	842,525	2,131,562	17.5	44.3
ELPE-VEE	12,756,552	5,611,294	14,110,419	44.0	110.6
ELPE-HAR	8,014,302	2,190,247	4,710,566	27.3	58.8
ENERGIAKI THESS, (ELPE)	26,714,340	10,244,161	17,713,147	38.3	66.3
HERONAS	10,685,736	17,984	1,586,971	0.2	14.9
HERON II	22,441,482	9,112,812	18,080,890	40.6	80.6
THESSALONIKI	77,501,024	7,956,007	35,285,584	10.3	45.5
THISVI	23,738,101	6,827,904	17,194,600	28.8	72.4
KAVALA	2,671,434	1,867	15,736	0.1	0.6

KARDITSA	5,342,868	366,877	1,815,615	6.9	34.0
KATERINI	7,480,015	298,499	329,710	4.0	4.4
KERATSINI (PPC)	27,289,500	0	0	0.0	0.0
KILKIS	11,754,309	1,235,009	1,864,199	10.5	15.9
KOKKINA	2,671,434	149,182	225,024	5.6	8.4
KOMOTINI (PPC)	28,851,488	7,827,957	22,617,083	27.1	78.4
KOMOTINI	5,342,868	163,523	243,324	3.1	4.6
LAMIA	7,480,015	142,542	248,825	1.9	3.3
LARISSA	13,843,371	1,869,378	8,722,117	13.5	63.0
LAVRIO (PPC)	64,114,418	15,482,642	37,940,407	24.1	59.2
MEGALOPOLIS (PPC)	42,742,945	9,180,799	23,525,433	21.5	55.0
SPATA	3,072,149	304,004	612,014	9.9	19.9
XANTHI	11,754,309	149,106	342,906	1.3	2.9
OINOFYTA	11,836,679	3,015,677	4,052,506	25.5	34.2
PLATY	5,740,377	239,243	439,184	4.2	7.7
SALFA ANO LIOSSIA	2,671,434	272,584	524,161	10.2	19.6
SALFA ANTHOUSA	1,371,600	138,760	280,825	10.1	20.5
SERRES	11,754,309	496,671	1,275,839	4.2	10.9
TRIKALA	5,342,868	353,088	1,751,116	6.6	32.8
FARSALA	1,870,003	34,737	188,614	1.9	10.1
Reverse Flow Exit Point	**Technical Capacity [kWh/Day]**	**Annual Average of Natural Gas Off-takes from the Point [kWh/Day]**	**Daily peak of the Point [kWh/Day]**	**Annual Average of Natural Gas Off-takes from the Point as a percentage of Technical Capacity [%]**	**Daily peak of the Point as a percentage of Technical Capacity [%]**
SIDIROKASTRO	46,535,000	482,130	19,169,237	1.0	41.2

Table 3

2.4 Load Balancing

Balancing Gas is the Natural Gas required for the load balancing of the NNGTS. The Balancing Gas Quantity that the Operator injects/takes to/from the National Transmission System, during a certain period, is set out to create a balance between Natural Gas Deliveries and Off-takes (during the same period) so as in every case the reliable, safe and efficient operation of the NNGS is considered secure. As part of his responsibilities and obligations, the Operator ensures the above balance by undertaking Balancing Actions, taking into account the losses and the stored Natural Gas quantities in the NNGTS.

In accordance with the provisions of Chapter 8 of the 4th Revision of the NNGS Network Code, the Operator may undertake Balancing Actions through (a) purchase and sale of Balancing Gas in the form of Short-Term Standard Products which are auctioned at the Balancing Platform and/or (b) use of Balancing Actions through Balancing Services Contracts.

Diagram 2 below shows the Balancing Actions done by the Operator during the Year 2019.

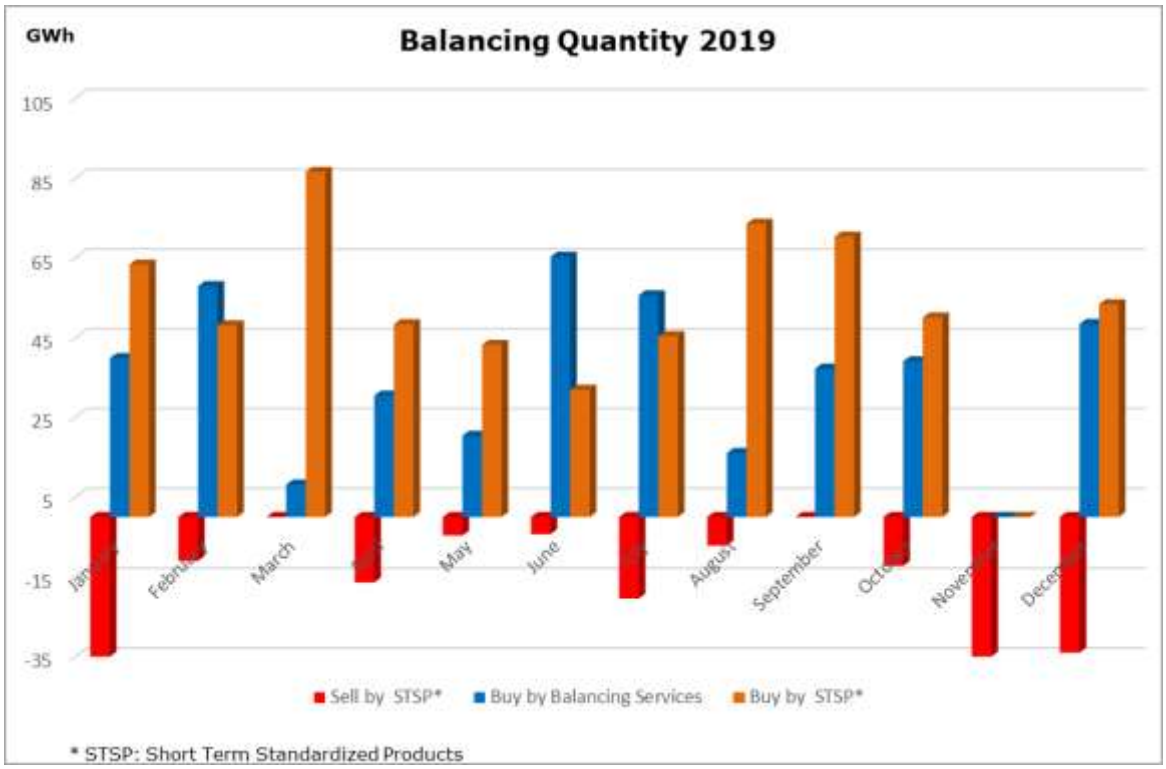

Table 4 on the next page shows data on the cost/revenue, frequency and quantity of the Balancing Actions undertaken by the Operator during the Year 2019, in accordance with the provisions of paragraph 7 of Article 44A of the NNGS Network Code.

2019	Balancing Gas Purchases via usage of LNG Supply Agreements for performing Balancing Services			Balancing Gas Purchases via Short Term Standardized Products			Balancing Gas Sales via Short Term Standardized Products		
	Quantiy of Balancing Gas injected {kWh}	Balancing LNG Supply Cost	Frequency of Balancing Gas injected (number of Days)	Quantity of Balancing Gas Purchases {kWh}	Balancing Gas Purchases Cost	Frequency of Balancing Gas Purchases (number of Days)	Quantity of Balancing Gas Sales {kWh}	Balancing Gas Sales Revenue	Frequency of Balancing Gas Sales (number of Days)
JANUARY	39,833,971	0.00 €	6	63,300,000	2,681,147.70 €	11	54,470,000	837,352.94 €	4
FEBRUARY	57,900,079	1,174,017.22 €	6	48,070,000	1,658,873.32 €	13	11,000,000	136,200.00 €	1
MARCH	8,131,680	643,349.74 €	2	86,530,000	2,514,124.46 €	11	0	0.00 €	0
APRIL	30,436,999	1,008,486.50 €	1	48,350,000	1,435,063.61 €	11	16,400,000	126,915.20 €	4
MAY	20,362,676	1,065,470.00 €	7	43,160,000	1,086,412.65 €	8	4,600,000	34,406.00 €	2
JUNE	65,259,542	1,831,347.00 €	11	31,890,000	938,211.18 €	5	4,300,000	47,568.50 €	2
JULY	55,602,269	1,692,087.00 €	9	45,350,000	1,217,109.55 €	10	20,440,000	172,410.30 €	5
AUGUST	16,067,887	860,255.70 €	7	73,550,000	1,945,990.85 €	15	7,150,000	62,578.50 €	1
SEPTEMBER	37,218,934	939,193.20 €	8	70,300,000	1,761,985.70 €	16	0	0.00 €	-
OCTOBER	39,036,838	1,069,631.98 €	8	50,050,000	1,199,524.30 €	14	12,250,000	67,015.95 €	1
NOVEMBER	0	567,329.20 €	0	0	0.00 €	-	109,300,000	812,441.29 €	21
DECEMBER	48,395,298	1,143,622.92 €	7	53,350,000	1,389,976.95 €	13	39,420,000	263,313.50 €	5
YEARLY SUM	**418,246,173**	**11,994,790.46 €**	**72**	**613,900,000**	**17,828,420.27 €**	**127**	**279,330,000**	**2,560,202.18 €**	**46**

Table 4

2.5 Maintenance Standard and Quality

Table 5 shows the Maintenance Program of NNGS for the Year 2019, as it was announced in the Operator's website, according to the provisions of Article 98 of the NNGS Network Code and its revision. Preventive and repairing maintenance of all electromechanical installations, supervision, management and control of the pipeline row zone as well as the supervision and control of cathodic and lighting protection of the pipeline and the installations were carried out in accordance with the provisions of the maintenance manuals, the current legislation and the experience granted so far by the multiannual operation of the system.

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 on the Operator's website in December 2018, 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.

NATIONAL NATURAL GAS SYSTEM MAINTENANCE PROGRAM - YEAR 2019 / NON-SCHEDULED MAINTENANCE						
No.	**NNGS POINT**	**DESCRIPTION OF WORKS**	**IMPLICATIONS**	**PERIOD OF WORKS**	**MAINTENANCE DAYS**	**REMARKS**
1	Exit Point: 'SALFA ANO LIOSIA'	Tie in of the SALFA Ano Liossia Metering Station (U-5010) to the NNGTS	Transmission Capacity for Reception at Exit Point 'SALFA ANO LIOSSIA': 0 kWh/Day	February - March	4	Works were not implemented in the Year 2019
2	Entry Points: 'SIDIROKASTRO' 'KIPI' Reverse Flow Exit Point: 'SIDIROKASTRO'	- Maintenance at Border Metering Station (BMS) Sidirokastro - Maintenance at Nea Messimvria Compression Station	Transmission Capacity for Delivery at Entry Point 'SIDIROKASTRO': 41,877,445 kWh/Day Transmission Capacity for Delivery at Entry Point 'KIPI': 31,234,488 kWh/Day Transmission Capacity for Reception at Reverse Flow Exit Point 'SIDIROKASTRO': 0 kWh/Day	04.06.2019 07:00-06.06.2019 07:00	2	Works were included in the NNGS Maintenance Program for the Year 2019
3	Entry Points: 'SIDIROKASTRO' 'KIPI'	Maintenance at Nea Messimvria Compression Station	Transmission Capacity for Delivery at Entry Point 'SIDIROKASTRO': 41,877,445 kWh/Day Transmission Capacity for Delivery at Entry Point 'KIPI': 31,234,488 kWh/Day	06.06.2019 07:00-08.06.2019 07:00	2	Works were included in the NNGS Maintenance Program for the Year 2019
4	Entry Point: 'SIDIROKASTRO' Reverse Flow Exit Point: 'SIDIROKASTRO'	- Maintenance at Border Metering Station (BMS) Sidirokastro - Maintenance at Nea Messimvria Compression Station	Transmission Capacity for Delivery at Entry Point 'SIDIROKASTRO': 57,581,486 kWh/Day Transmission Capacity for Reception at Reverse Flow Exit Point 'SIDIROKASTRO': 0 kWh/Day	12.08.2019 07:00-14.08.2019 07:00	2	Works were included in the NNGS Maintenance Program for the Year 2019
5	Entry Points: 'SIDIROKASTRO' 'KIPI'	Maintenance at Nea Messimvria Compression Station	Transmission Capacity for Delivery at Entry Point 'SIDIROKASTRO': 57,581,486 kWh/Day Transmission Capacity for Delivery at Entry Point 'KIPI': 15,023,369 kWh/Day	14.08.2019 07:00-15.08.2019 07:00	1	Works were included in the NNGS Maintenance Program for the Year 2019
6	Entry Points: 'SIDIROKASTRO' 'KIPI'	Maintenance at Nea Messimvria Compression Station	Transmission Capacity for Delivery at Entry Point 'SIDIROKASTRO': 57,581,486 kWh/Day Transmission Capacity for Delivery at Entry Point 'KIPI': 15,023,369 kWh/Day	17.09.2019 07:00-20.09.2019 07:00	3	Works were included in the NNGS Maintenance Program for the Year 2019
7	Revithoussa LNG Station Entry Point: 'AGIA TRIADA'	Construction works for the LNG reloading system and for the tie-in lines required for the Small Scale LNG project	LNG Injection Rate: 0 m^3 ΥΦΑ/h LNG Stations Gasification Capacity: 0 kWh/Day Transmission Capacity for Delivery at Entry Point 'AGIA TRIADA': 0 kWh/Day	09.04.2019 07:00-10.05.2019 07:00	31	Works were included in the NNGS Maintenance Program for the Year 2019

Table 5

CALIBRATION – YEAR 2019

ENTRY POINT / UNIT NUMBER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SIDIROKASTRO / U – 2010				15,17-19,22,24						21-25		
AGIA TRIADA / U – 3020				15						14		
KIPI / U – 3900				16-19						16-18		
EXIT POINT / UNIT NUMBER	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**
LAVRIO (PPC) / U – 3430			18-23				8-12				18-21	
THRIASIO / U – 2960					14						6	
ALIVERI (PPC) / U – 6370	16						4					
ATHENS / U – 2990						4-5						9
ATHENS / U – 2910				9-10						21		
ATHENS / U – 2940				8 & 10						16-17		
ATHENS ELDA / U-2970		26						20				
INOFYTA / U – 2880						26						18
HERON / U – 6020			26-27						10-11			
HERON II / U – 6030			26						11			
SPATA / U-3460					16						7	
THISVI / U-6650	22						3					
ALOYMINION / U – 2820						11						10
ALOYMINION II / U-2830						13						11

EXIT POINT / UNIT NUMBER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ALOYMINION III / TM1/TM5						12						12
THIVA / U-2740	17						2					
ELPE ELEFSINA / U-7420				11						15		
ANTHOUSA STATION / U-5210										17		
MOTOR OIL / U – 7130	9-10						8-10					
MOTOR OIL II / U – 7140	14-15						9-10					
MEGALOPOLIS (PPC) / U – 7320	28-29						2-3					
AGIOI THEODOROI / U – 7045				10-11						7-8		
VOLOS / U – 2680					15-16						18-19	
LARISSA / U – 2520					10-11						20-21	
LARISSA / U – 2530					12-13						25-26	
VIPE LARISA / U – 2515					8-9						7-8	
LAMIA / U–2620					6-7						5-6	
KARDITSA / U–6240					13-14						13-14	
TRIKALA / U-6260					29-30							4-5
FARSALA / U-6280					10						11	
KOKKINA / U-2670					27						27-28	
THESSALONIKI / U–2240					1-15					30-31		
THESSALONIKI / U-2220					13.14.16					29-30		
ELPE DIAVATA / U-2270					6-7						5	

EXIT POINT / UNIT NUMBER	*JAN*	*FEB*	*MAR*	*APR*	*MAY*	*JUN*	*JUL*	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*
PLATY / U–2410						24				21-22		
EKO / U–2250				15-30							6	
KILKIS / U–2060					27-28						7	
KATERINI / U–2340					20-21						12	
KOMOTINI (PPC) / U–3570			15-30				09-12				11-14	
KOMOTINI / U-3580				11-12						09-10		
KAVALA / TM4-A				5						15		
VFL / U–2170						6-7						11-12
XANTHI / U–3530				3-4					7-8			
ALEXANDROUPOLIS / U–3630					30-31						19-20	
DRAMA / U–2140			19-20						23-24			
SERRES / U–2110			21-22						25-26			

Table 6

2.6 Congestion and Congestion Management

According to paragraph [3] of Article 20 of the NNGS Network Code, 'Congestion' occurs when the available Transmission Capacity at an Entry Point or Exit Point or Reverse Flow Entry Point or Reverse Flow Exit Point is not sufficient to fulfill a User's request for Booking Transmission Capacity at that Point in order to serve a new Natural Gas Consumer.

Table 7 below presents the Technical Capacities of the NNGTS Entry/Exit/ Reverse Flow Exit Points, the Maximum Booked Transmission Capacity (MBTC) of the Points for Year 2019, in absolute terms and as a percentage of the Technical Capacity.

ENTRY POINT	Technical Capacity [kWh/Day]	Maximum Booked Transmission Capacity of Point [kWh/Day]	Maximum Booked Transmission Capacity of Point as a percentage of Technical Capacity [%]
SIDIROKASTRO[1)]	122,580,000	172,180,000	140%
AGIA TRIADA	204,481,800	204,481,800	100%
KIPI[(2)]	48,592,292	74,133,250	153%
EXIT POINT	Technical Capacity [kWh/Day]	Maximum Booked Transmission Capacity of Point [kWh/Day]	Maximum Booked Transmission Capacity of Point as a percentage of Technical Capacity [%]
ALOYMINION	26,714,340	15,900,000	60%
ALOYMINION II	20,723,593	19,000,000	92%
ALOYMINION III	6,678,585	2,400,000	36%
MOTOR OIL	26,714,340	12,500,000	47%
MOTOR OIL II	21,371,472	19,000,000	89%
AG. THEODOROI	2,992,197	261,292	9%
ATHENS	101,876,740	33,987,099	33%
ALEXANDROUPOLIS	7,480,015	174,202	2%
ALIVERI (PPC)	21,371,472	19,300,000	90%
VIPE LARISSA	2,671,434	222,903	8%
VOLOS	13,796,086	6,675,042	48%
VFL	6,493,989	4,820,000	74%
DRAMA	7,480,015	1,017,746	14%
ELPE	4,815,794	1,900,000	39%

ELPE-VEE	12,756,552	7,400,000	58%
ELPE-HAR	8,014,302	4,500,000	56%
ENERGIAKI THESS. (ELPE)	26,714,340	17,029,805	64%
HERONAS	10,685,736	1,300,000	12%
HERON II	22,441,482	17,767,400	79%
THESSALONIKI	77,501,024	36,550,256	47%
THISVI	23,738,101	15,997,543	67%
KAVALA	2,671,434	5,001	0%
KARDITSA	5,342,868	1,832,106	34%
KATERINI	7,480,015	319,540	4%
KERATSINI (PPC)	27,289,500	0	0%
KILKIS	11,754,309	1,828,853	16%
KOKKINA	2,671,434	624,780	23%
KOMOTINI (PPC)	28,851,488	20,940,000	73%
KOMOTINI	5,342,868	229,960	4%
LAMIA	7,480,015	225,634	3%
LARISSA	13,843,371	8,433,084	61%
LAVRIO (PPC)	64,114,418	39,100,000	61%
MEGALOPOLIS (PPC)	42,742,945	25,013,144	59%
SPATA	3,072,149	627,686	20%
XANTHI	11,754,309	338,493	3%
OINOFYTA	11,836,679	3,999,966	34%
PLATY	5,740,377	438,000	8%
SALFA ANO LIOSSIA	2,671,434	350,000	13%
SALFA ANTHOUSA	1,371,600	170,000	12%
SERRES	11,754,309	1,258,492	11%
TRIKALA	5,342,868	1,929,554	36%
FARSALA	1,870,003	111,622	6%
REVERSE FLOW EXIT POINT	Technical Capacity [kWh/Day]	Maximum Booked Transmission Capacity of Point [kWh/Day]	Maximum Booked Transmission Capacity of Point as a percentage of Technical Capacity [%]
SIDIROKASTRO(3)	46,535,000	52,838,000	114%

Table 7

Comments on Table 7:

1. The percentage of the Entry Point 'SIDIROKASTRO' was calculated based on the sum of the Technical Capacity of the specific Point and the maximum of the sum of the Additional and the Interruptible Transmission Delivery Capacity, booked by the Transmission Users in the Year 2019.

2. The percentage of the Entry Point 'KIPI' was calculated based on the sum of the Technical Capacity of the specific Point and the maximum of the Additional Transmission Delivery Capacity, booked by the Transmission Users in the Year 2019.

3. The percentage of the Exit Point 'SIDIROKASTRO' was calculated based on the sum of the Technical Capacity of the specific Point and the maximum of the sum Interruptible Transmission Reception Capacity, booked by the Transmission Users in the Year 2019.

2.7 Emergencies and Dealing with Emergencies

During the Year 2019 there was not any Crisis in the National Natural Gas System as defined in the Emergency Plan in force (Law 691/B/26.03.2013), in accordance with Article 4 of Regulation No 994/2010 of the European Parliament and of the Council concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC) and Chapter 10 of the NNGS Network Code.

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 barg, respectively. Diagram 3 below shows the average Daily Inlet Pressure at NNGTS Entry Points 'AGIA TRIADA', 'SIDIROKASTRON' and 'KIPI' for the Year 2019.

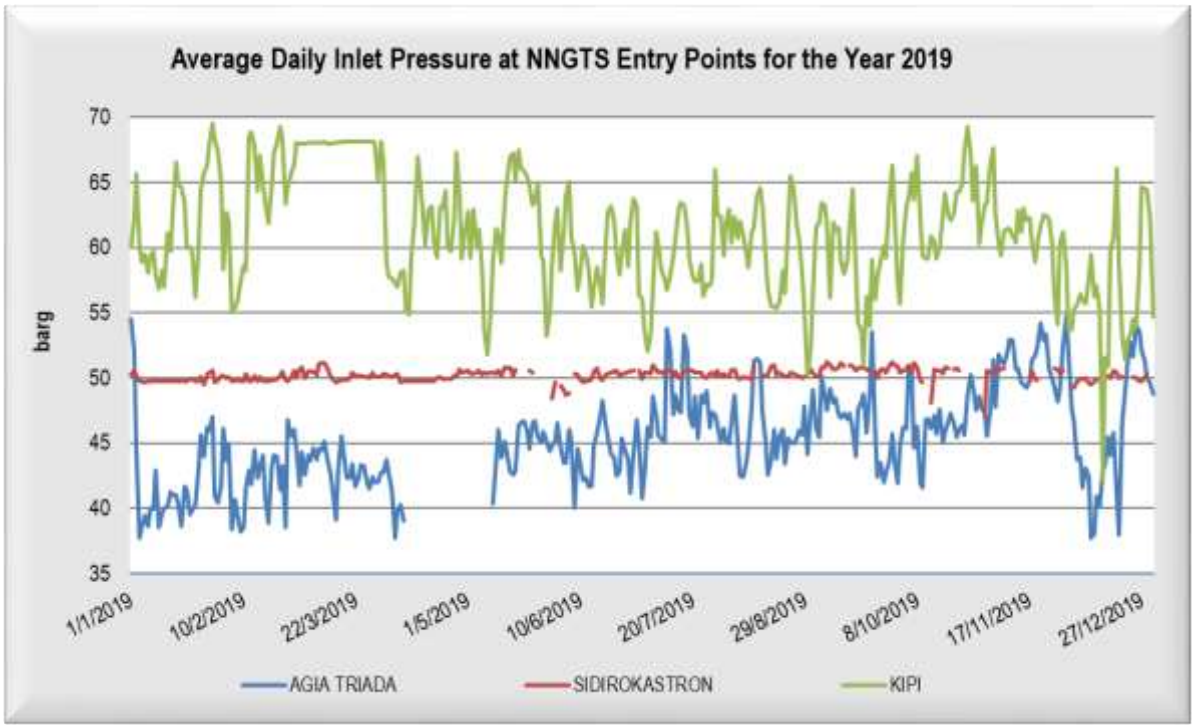

Diagram 3

Furthermore, Diagram 4 on the next page shows the average Daily Network Pressure of the NNGTS for the Year 2019, as calculated by data recorded by DESFA's SCADA system.

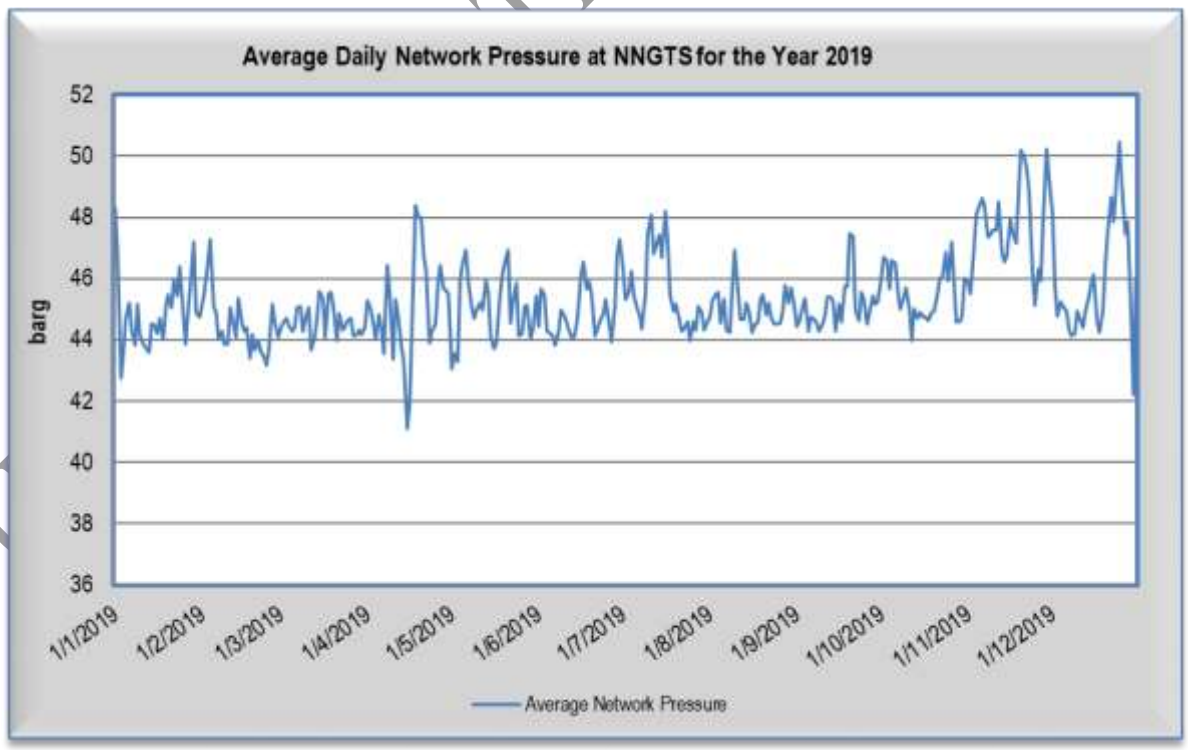

Diagram 4

2.9 Natural Gas Quantities historical data

2.9.1 Daily Natural Gas physical Deliveries/Off-takes

During the Year 2019 the total physical Natural Gas Off-takes at the NNGTS Exit/ Reverse Flow Exit Points was 57,583 mil. kWh (compared to 52,451 mil. kWh during the Year 2018). Diagram 5 on the next page shows the Daily physical Natural Gas Off-Takes at the NNGTS Exit/ Reverse Flow Exit Points (as a sum) for the Year 2019. It is worth mentioning that the maximum Natural Gas physical consumption for the Year 2019 was recorded on the Day 08.01.2019, i.e. 297,353,667 kWh.

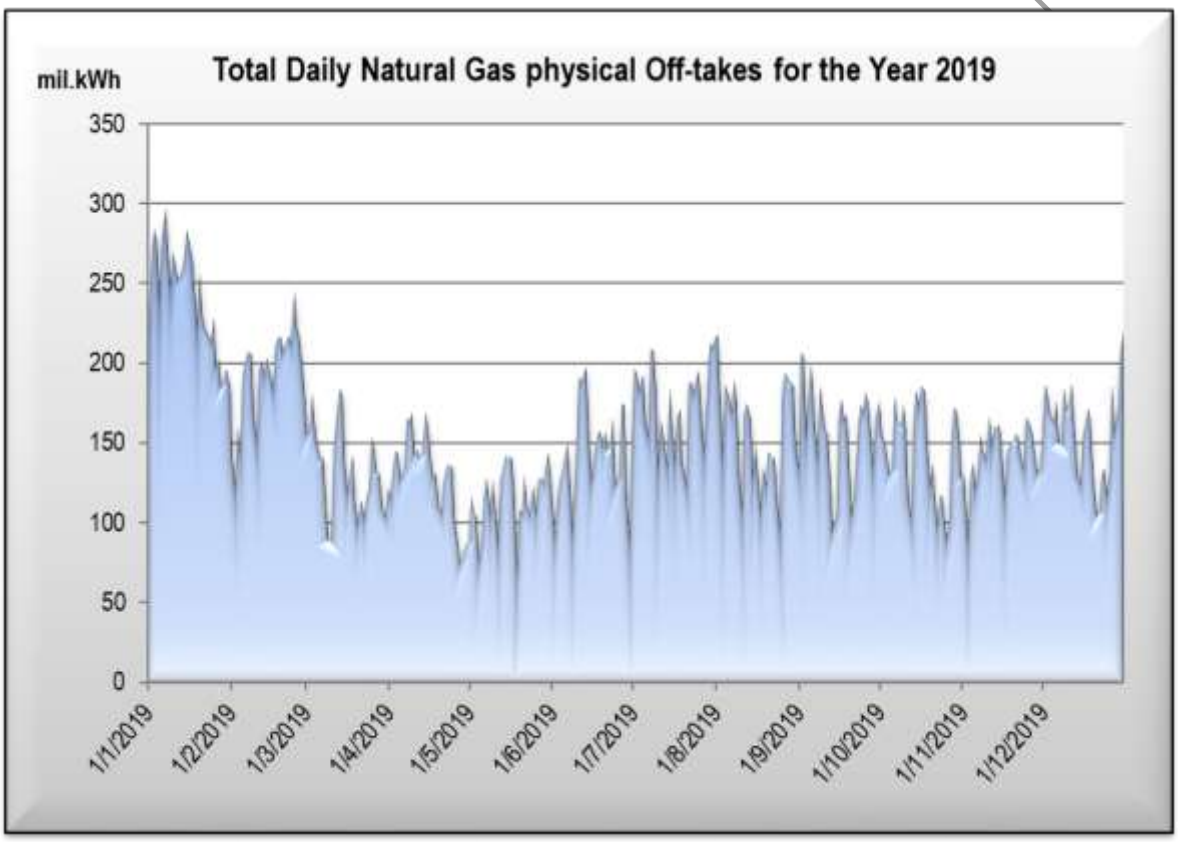

Diagram 5

During the Year 2019 the total Natural Gas physical Deliveries at the NNGTS Entry Points was 57,680 mil. kWh (compared to 52,740 mil. kWh during the Year 2018). Diagram 6 shows the shares of Natural Gas physical Delivery quantities per NNGTS Entry Point for the Year 2019.

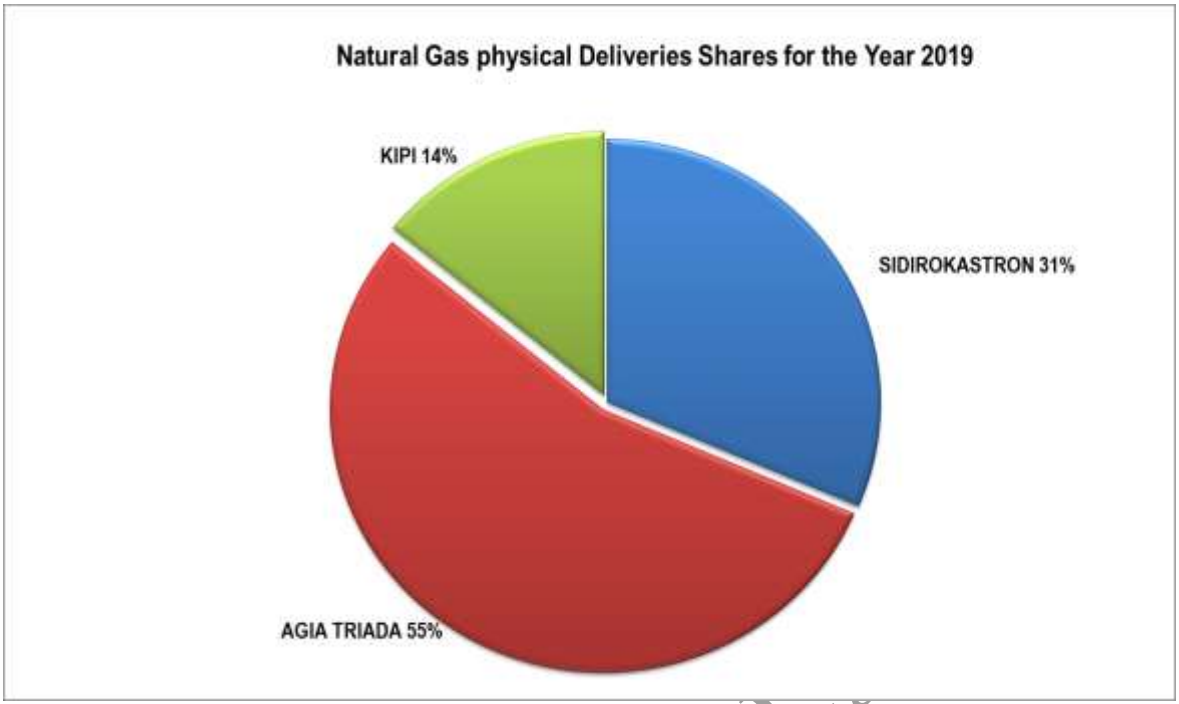

Diagram 6

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 25,949,782 Nm^3 (Day 26.12.2019) to 20,822,716 Nm^3 (Day 16.04.2019). Diagram 7 below shows the Daily variation of the NNGTS Line Pack, as well as the delimitation of the NNGTS Natural Gas reserves for the Year 2019, according which the Operator performs Balancing Actions so that:

a) to maintain the NNGTS within its operating limits, which concern the minimum and maximum stored Natural Gas Quantity in the NNGTS pipeline at 20.5 and 26 million Nm^3, respectively, at the end of a Day, and/or

b) at the end of a Day, targets to a stored Natural Gas Quantity in the NNGTS pipeline within the range [22.3 - 24.3] million Nm3, in order to ensure the cost-effective and efficient operation of the NNGTS during the Day.

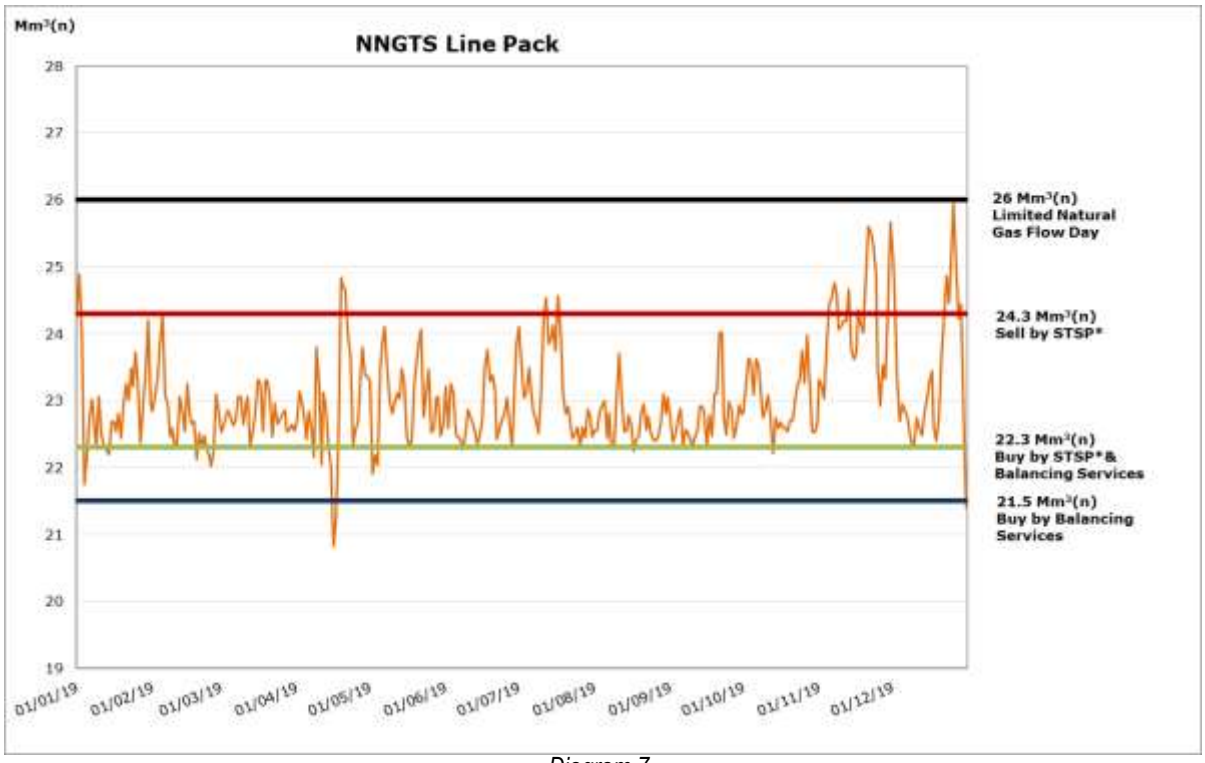

Diagram 7

2.9.3 Total Daily LNG Stock

In the Entry Point 'AGIA TRIADA' 31,426 mil. kWh of Natural Gas were injected to the NNGTS (compared to 10,834 mil. kWh during the Year 2018), while the LNG unloads led to 31,289 mil. kWh (compared to 11,598 mil. kWh during the Year 2018).

Diagram 8 shows the Daily configuration of the total LNG stock, including the Balancing Gas that DESFA stored for balancing purposes, during the Year 2019. It is noted that during the period 0904.2019 07:00 – 10.05.2019 07:00 the gasification and injection by the Operator of Natural Gas Quantities in the NNGS through the Entry Point 'Agia Triada' were interrupted, due to the shutdown of the LNG Terminal Station on the island of Revithoussa for the upgrade works of the Station.

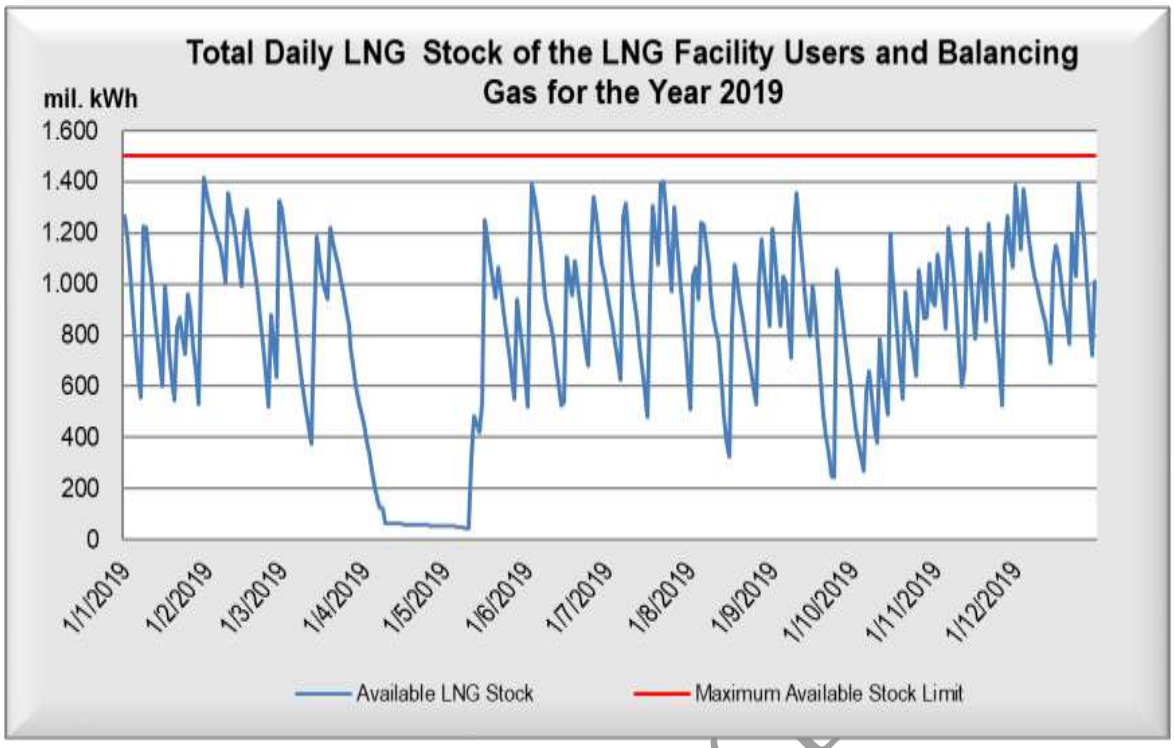

Diagram 8

2.9.4 Historical Operational data of the Compression Station in Nea Messimvria

The Compression Station at Nea Messimvria, Thessaloniki, consumed 41,869,792 kWh of Natural Gas as fuel during the Year 2019. The amount corresponds to 90% of the total Operational Gas that was used in the NNGTS during the Year 2019, which amounts to 46,392,090 kWh.

Diagram 9 on the next page shows the Operational Gas used in the NNGTS and the Natural Gas consumed as fuel for the operation of the Compression Station on a Monthly basis during the Year 2019.

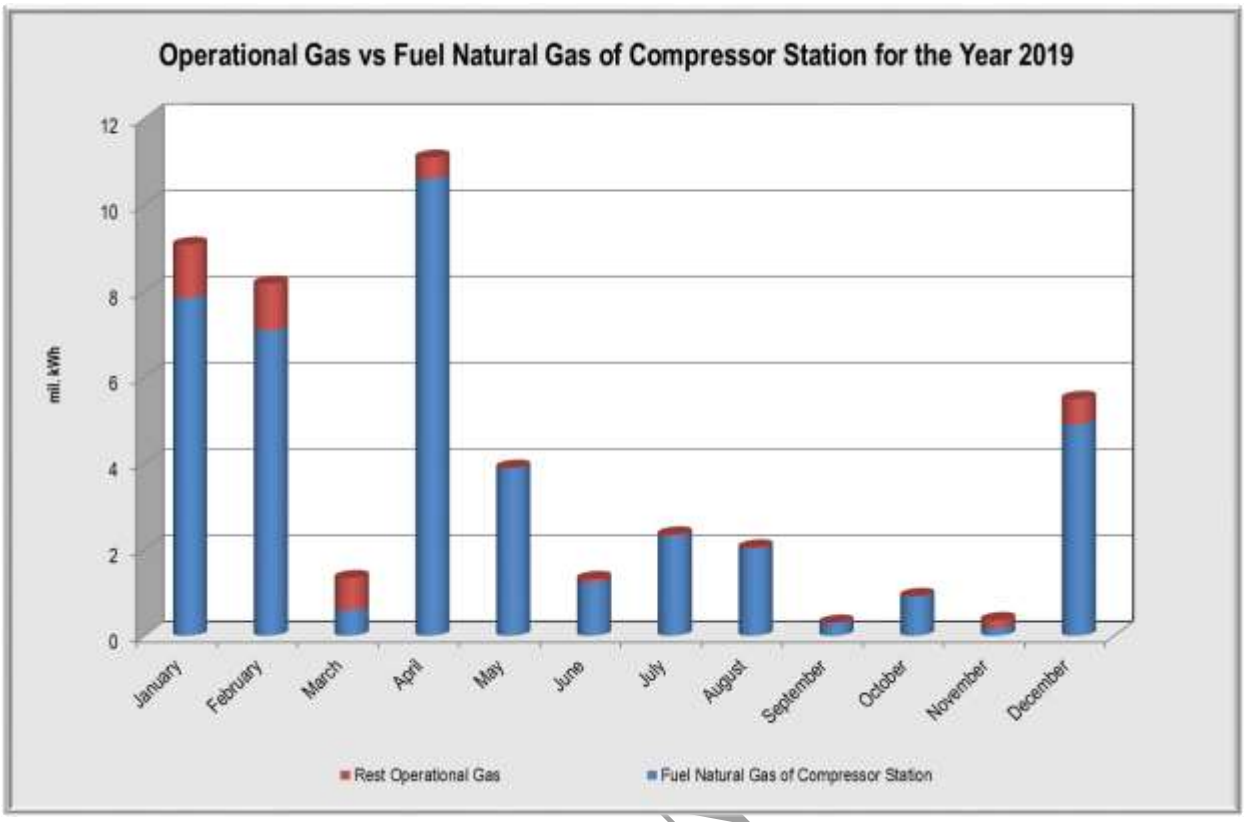

Diagram 9

Diagram 10 below shows the Natural Gas quantity that was handled by the Compression Station on a Monthly basis during the Year 2019.

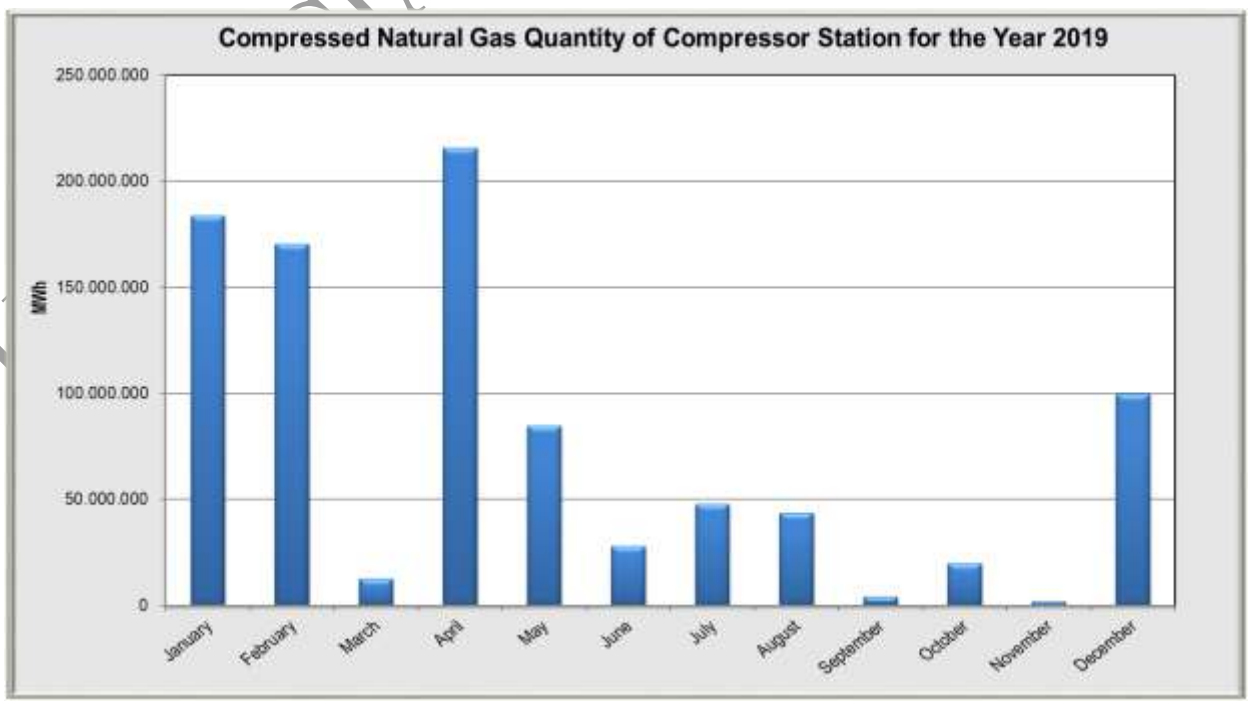

Diagram 10

2.9.5 Natural Gas out of specifications during the Year 2019

During the Year 2019, the average Daily Delivery Pressure at the Entry Point 'KIPI' was for two (2) Day lower than the Point's Minimum Delivery Pressure (50 barg), while there was no average Daily Delivery Pressure lower than the Minimum Delivery Pressure (47.75 barg) at the Entry Point 'SIDIROKASTRO'.

Finally, during the Year 2019, the following violations of the quality standards of Natural Gas were noted, as the latter are specified in Annex I of the NNGS Network Code:

1. The Natural Gas Water Dew Point (WDP) delivered to the Entry Point 'SIDIROKASTRO' was for two (2) Days higher than the maximum limit (5^{o}C at 80 barg).

2. The Natural Gas Water Dew Point (WDP) off-taken at the Exit Points 'THESSALONIKI', 'KILKIS' and 'SERRES' was for two (2) Days higher than the maximum limit (5^{o}C at 80 barg).

3. The Natural Gas temperature off-taken at the Exit Point 'ALOUMINION III' was for two (2) Days lower than the minimum limit (-5 ^{o}C).