

**MONITORING REPORT
ON THE SECURITY OF NATURAL
GAS SUPPLY**

UKRAINE, JULY 2016

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Introduction

This document has been prepared in accordance with Article 29 of the Treaty Establishing the Energy Community, Article 7 of the Law of Ukraine “On the natural gas market”.

In compiling the Report for 2015 based on the results of monitoring of security of natural gas supply (hereinafter - the Report) Guidelines of Energy Community Secretariat were taken into account for the preparation of the revised statement on security of energy supply in the member-countries of the Energy Community which were approved during the 19th meeting of the High Level Group of the Energy Community on March 23, 2011.

The Report covers gas sector, which is covered by the EU Directives and Regulations set out in the Protocol on Ukraine's accession to the Treaty Establishing the Energy Community.

1. The status of implementation of measures on the security of natural gas supply.

During 2015 the most peak thirty-day period - when there was the highest demand for natural gas - was from January 1 to January 31. During this period the average demand for natural gas in Ukraine was at 186.8 million cubic meters, while the average demand for natural gas in terms of domestic consumers and utility companies amounted to 127.9 million cubic meters. The most active demand for a seven-day period was from January 5, 2015 to January 12, 2015 and amounted on the whole in Ukraine up to 217.8 million cubic meters, while the average demand for natural gas in terms of domestic consumers and utility companies was 152.2 million cubic meters. The daily description of peak consumption in January 2015 is provided in Table 1.

Table 1

Date	Consumption Ukraine on the whole	Consumption Utility companies + population	Average daily temperature	Supply from production	Supply from import	Withdrawal from underground gas storages	Maximum available level of withdrawal
01.01.15	213,6	150,6	-10	54,7	72,0	92,30	129,8
02.01.15	194,4	135,5	0	54,5	71,0	85,15	128,9
03.01.15	184,9	129,1	1	54,7	69,0	72,80	121,9
04.01.15	186,3	129,5	0	54,9	66,0	69,51	121,9
05.01.15	196,3	134,9	-2	54,9	64,7	74,53	121,5
06.01.15	220,2	157,1	-9	54,8	72,6	87,82	121,5
07.01.15	242,6	173,7	-15	54,7	73,4	93,77	121,5
08.01.15	249,0	176,7	-15	54,7	77,8	92,37	121,5
09.01.15	228,3	158,8	-8	54,8	72,7	88,77	121,5
10.01.15	198,8	135,9	1	54,9	72,2	74,30	121,5
11.01.15	189,1	128,3	2	54,9	70,9	71,60	120,4
12.01.15	188,0	125,0	1	55,1	75,5	70,70	114,9
13.01.15	182,4	121,1	1	55,0	73,3	64,53	111,5

Date	Consumption Ukraine on the whole	Consumption Utility companies + population	Average daily temperature	Supply from production	Supply from import	Withdrawal from underground gas storages	Maximum available level of withdrawal
14.01.15	177,0	116,1	1	54,9	71,3	61,17	110,5
15.01.15	172,2	116,9	0	54,7	53,7	71,39	110
16.01.15	175,3	118,0	0	54,9	53,2	73,23	110
17.01.15	175,7	119,4	0	54,9	47,8	74,30	100,3
18.01.15	175,5	117,9	1	54,7	54,7	61,81	100,3
19.01.15	171,4	113,7	1	54,7	54,6	62,43	100,3
20.01.15	170,9	113,7	1	54,8	53,5	64,43	95,3
21.01.15	171,0	114,3	1	54,4	53,1	64,08	95,3
22.01.15	170,5	115,2	1	54,6	52,4	62,77	95,3
23.01.15	169,2	114,9	1	54,5	59,2	63,49	95,3
24.01.15	176,3	121,9	-1	54,4	63,5	54,35	95,3
25.01.15	181,5	125,9	-2	54,5	61,3	56,11	94,4
26.01.15	178,0	122,5	-1	54,1	63,5	58,88	94,4
27.01.15	177,1	120,9	-1	53,8	65,9	57,87	94,4
28.01.15	174,4	119,3	-1	54,1	61,1	59,20	92,7
29.01.15	173,5	117,5	0	54,1	63,7	55,33	92,7
30.01.15	165,7	112,2	2	53,8	65,3	54,24	91,7
31.01.15	161,2	108,6	3	54,0	63,1	56,04	91,7

Thus, during the peak level of natural gas consumption in Ukraine, the volumes of gas that entered the gas transmission system of PJSC “Ukrtransgaz” covered general needs of Ukraine in full in a certain period of time, from such sources as production, imports and withdrawal from underground gas storages. The main source of natural gas which is used for covering peak periods is gas from underground storage facilities, with the highest possible level of withdrawal depending on the volume of active gas in the

underground storages. Even in the coldest period volumes of active gas, fully secured the necessary levels of withdrawal.

2. State of the resources securing for the natural gas market supply

In 2015, natural gas production in Ukraine amounted to 19.9 bcm (Figure 1) while natural gas consumption amounted to 34.4 bcm (Figure 2), thus due to the own production consumption was covered at 58% (in 2014 - 48%).

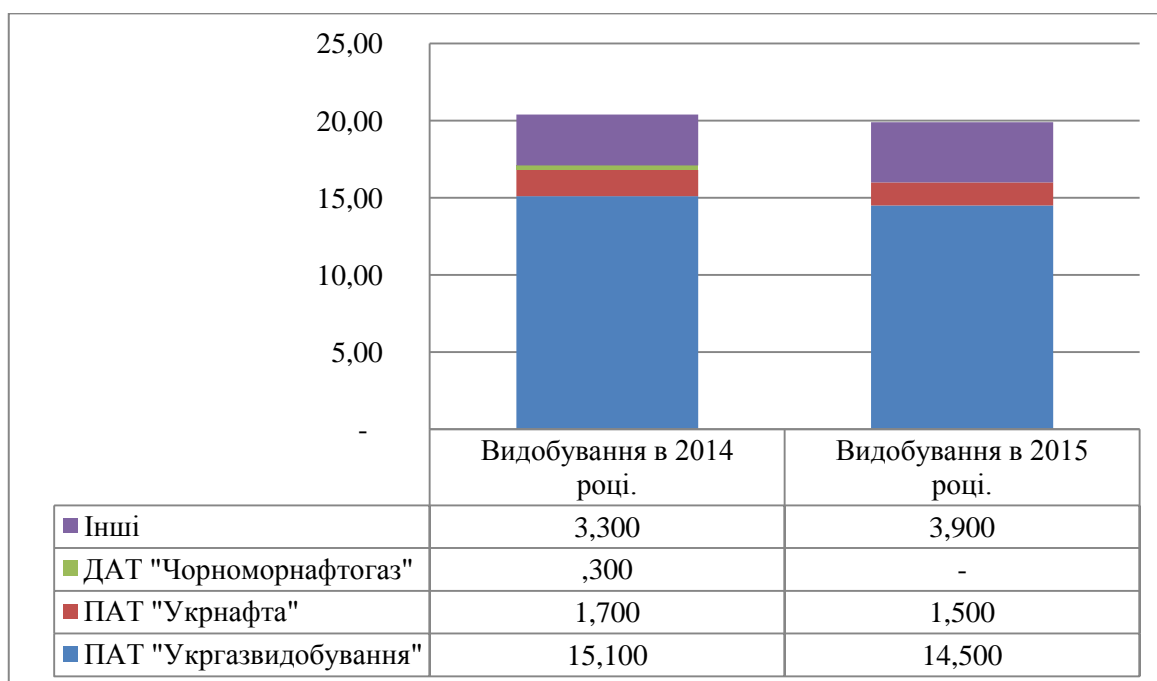


Figure 1: Production of natural gas in 2014 -2015 (billion cubic meters)

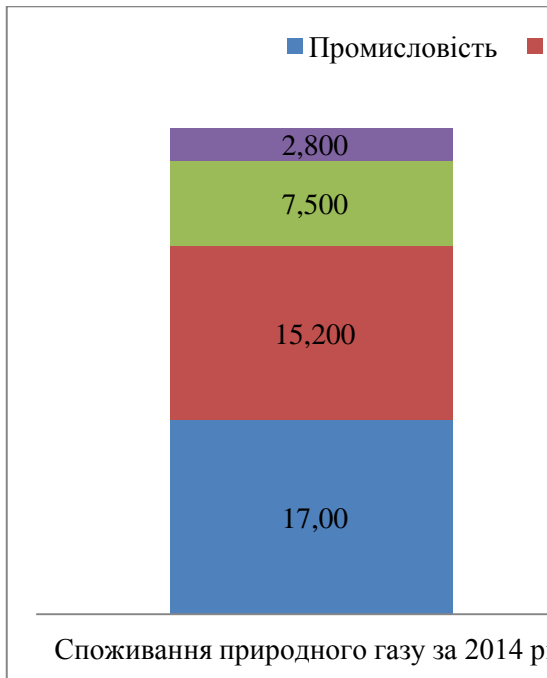


Figure 2: Consumption of natural gas in 2014 -2015 (billion cubic meters)

The total volume of natural gas imports in 2015 was 17.0 billion cubic meters. In general, natural gas supply for the needs of Ukraine had been met at the expense of domestic production and imports and amounted to 36.9 billion cubic meters, and that had met the needs of Ukraine in natural gas in 2015 in full. Sources of imported natural gas in 2015 are given in Figure 3.



Figure 3: Supplies of imported natural gas according to their sources (billion cubic meters)

In 2015 Ukraine managed, for the first time, to achieve significant diversification of sources of natural gas supply as imports of natural gas from the Russian Federation was reduced to 6.7 billion cubic meters (from 14.5 billion cubic meters in 2014), and supply from the territory of Europe grew to 10.3 billion cubic meters (from 5.0 billion cubic meters in 2014), which made up 60.6% of total gas imports. Thus, beginning from 2015 the main source of natural gas supply to Ukraine is the territory of Europe.

An important part of the gas transmission system functioning is a network of underground gas storages, which provide overlapping of consumption in peak periods. The system of underground gas storages of PJSC “Ukrtransgaz” consists of 12 storage facilities with total active capacity of over 30.95 billion cubic meters.

Table 2: Volume of active gas in underground storages (Bcm)

2013/2014		2014/2015		2015/2016		
In the start of withdrawal season	In the end of withdrawal season	In the start of withdrawal season	In the end of withdrawal season	In the start of withdrawal season	As of 27.02.2016	Forecast for the end of withdrawal season
17,1	7,2	16,8	7,7	17,1	10,1	8,8

Table 3: Volumes of gas withdrawal levels from underground storages (Mcm)

2013/2014		2014/2015		2015/2016	
Maximum daily withdrawal	Average daily withdrawal	Maximum daily withdrawal	Average daily withdrawal	Maximum daily withdrawal	Average daily withdrawal
134,5	70,4	132,7	51,1	137,4	57,6

The average volume of active gas in underground gas storages in 2015 was 12.0 billion cubic meters. Detailed description of the volume of active gas in the underground storage system is given in Figure 4.

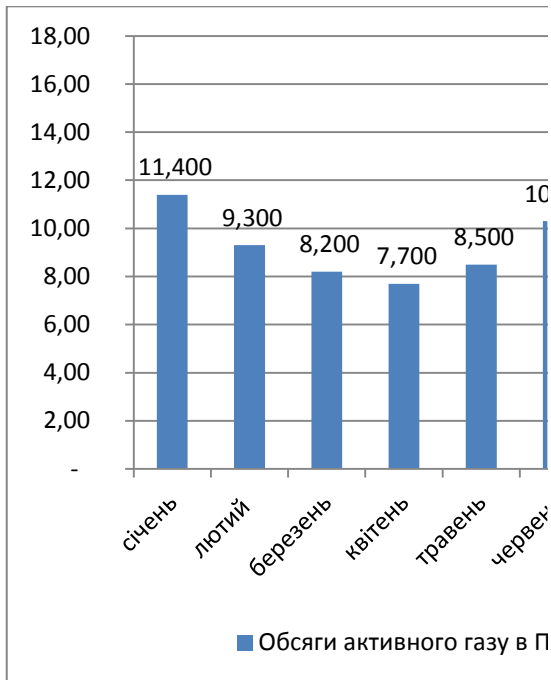


Figure 4: Volumes of active gas in underground storages for the beginning of month (Bcm)

Detailed description of average daily levels of withdrawal and injection of natural gas for 2015 is given in Figure 5.

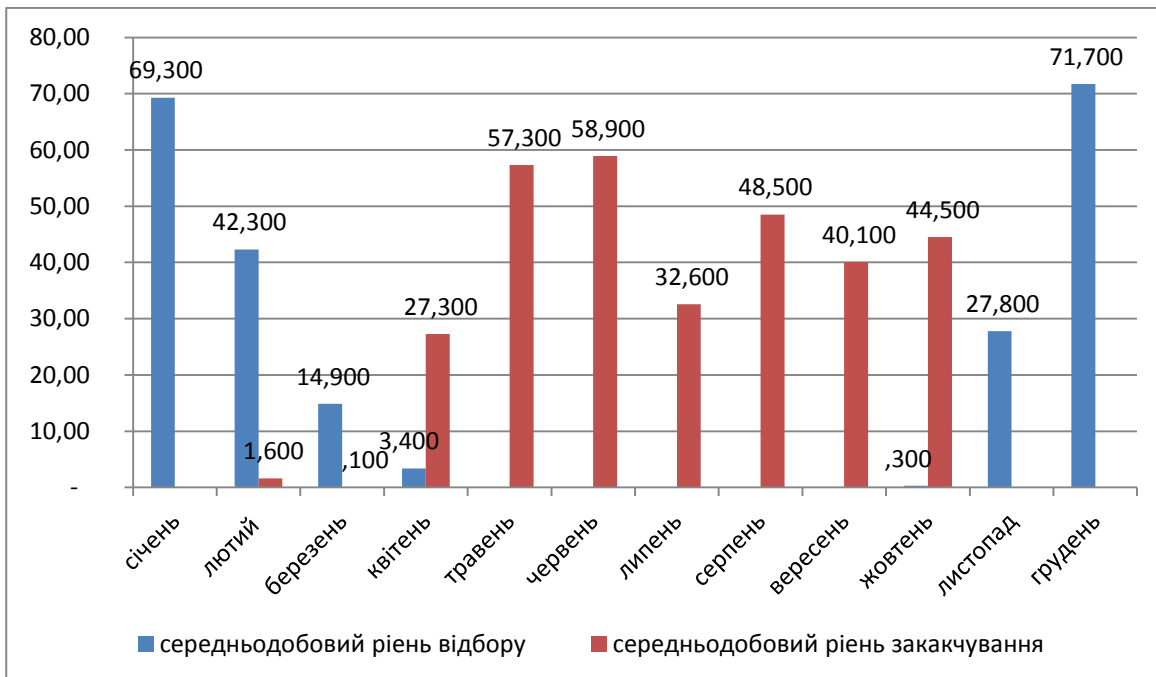


Figure 5: Average levels of withdrawal and injection.

3. The state of the gas transmission system interconnections between Ukraine and other countries.

Table 4: Capacities at the cross-border connection points as of 2015

Entry / exit point	Unit	Number
Capacity of entry points, total, including various entry points:	bcm	302,1
1. Sudzha		107,5
2. Pysarivka		48,5
3. Sokhranivka		46,0
4. Serebrianka		13,0
5. Valuiky		25,5
6. Mozyr		6,0
7. Kobryn		28,9
8. Platovo		5,3
9. Hermanowicze		1,5
10. Beregdaroc		5,4
11. Budince		14,5
Capacity of exit points, total,	bcm	146

including various exit points:		
1. Uzhhorod		92,6
2. Berehovo		13,2
3. Drozdovychi		5,0
4. Orlovka		26,8
5. Tekovo		4,5
6. Moldova		3,5

As of 2015 transport capacities in the direction of Ukraine from the Russian Federation and Belarus amounted to 280.7 billion cubic meters, and this completely meets the needs of Ukraine in imported natural gas. Provided the transit of natural gas at 67.1 billion cubic meters, available capacities would meet Ukraine's needs in imported natural gas at 1256% or overall demand of Ukraine at 621%. European countries technical capacity in 2015 totaled 21.4 billion cubic meters and that covered Ukraine's demand in natural gas at 126%. In 2015 10.3 billion cubic meters were transported via this direction and that made 48% of total capacity.

4. Measures aimed at the securing new capacities for gas transmission system

Within the framework of the implementation of the Program of Cabinet of Ministers of Ukraine activities, as well as with the aim to enhance energy security, diversification of natural gas supply sources to Ukraine, integration of the Ukrainian natural gas market into the Energy Community Market PJSC "Ukrtransgaz" has embarked on the project "Construction of Gas Interconnector Ukraine – Poland".

The scope of the project of construction of Interconnector between Ukraine and Poland within Ukraine's territory lies in the construction of the main gas Interconnector "Drozdovychi – Bilche – Volytsia".

Key indicators of the construction project "Drozdovychy – Bilche – Volytsia" are:

- pipeline diameter: 1000;
- working pressure: 7.4 MPa;
- length: nearly 100 km;
- throughput:
 - Poland – Ukraine: 5 – 8 bcm per year;

- Ukraine – Poland: 5 – 7 bcm per year;
- Project duration: 2 years.

Measures taken in 2015:

- Gaz System S.A. and PJSC “Ukrtransgaz” have developed a joint feasibility study of gas Interconnector construction “Ukraine – Poland”.

- On the order of PJSC “Ukrtransgaz” the project documentation at the stage of “feasibility study” for the project “Construction of gas Interconnector “Drozdovychi – Bilche – Volytsya” have been prepared and in line with the law submitted for the State expertise.

- At the initiative of PJSC “Ukrtransgaz” and GAZ-SYSTEM S.A. the construction project of gas Interconnector Ukraine – Poland was included in ENTSOG ten-year development plan for 2015-2025.

- The project “Construction of Gas Interconnector-Ukraine-Poland” was presented to the European Bank for Reconstruction and Development and the European Investment Bank.

- PJSC “Ukrtransgaz” has proposed NAK “Naftogaz of Ukraine” to envisage in the Government’s Action Programme for 2016 the project “Construction of Gas Interconnector “Ukraine – Poland” implementation extension with the adoption of the Cabinet of Ministers of Ukraine Order “On implementation of the investment project”. In the result of technical and economic calculations of feasibility study the project “Construction gas interconnection pipeline “Drozdovychi–Bilche-Volytsia” is considered as self-supporting. Payback period of capital investment comprises 3.34 years, profitability index is 4.84.

5. Technical condition of the gas transmission system

Transmission system characteristics	Unit	Number
1 The length of the pipelines, in total, Including: - Gas mains - Gas line collaterals - Distribution pipelines	km	38046,030 22202,084 13461,194 2382,752
<i>a) The length of the pipelines are shown with the account of those which remain in the temporarily occupied territory of Ukraine (hereinafter - TOT Crimea), total including:</i> - Gas mains - Gas pipeline collaterals - Distribution pipelines	Km	525,047 323,739 174,573 26,735
<i>b) the length of the pipelines are shown with the account of those which remain temporarily outside of the control of Ukraine (hereinafter – TOC of Ukraine), total including:</i> - Gas mains - Gas pipeline branches - Distribution pipelines	Km	1928,766 1155,187 709,812 63,767
2 Productivity of gas transportation system: - entry points of adjacent transmission lines - exit points to adjacent transmission lines, including to Europe	Bcm/year	302,1 178,5 146,0

3 Number of compressor stations (compressor plants)	station(plant)	72 (110)
- including TOC of Ukraine	station	3 (3)
4 Number of pumping plants	pumping units	702
- including TOC of Ukraine	pumping units	35
5 Compressor stations capacity	MW	5448,0
- including TOC of Ukraine	MW	174,86
6 Number of underground gas storages (UGS)	storage	12
- including TOC of Ukraine	Storage	1
7 Projected UGS active capacity, operating cyclically	Bcm	30,95
- including TOC of Ukraine	Bcm	0,4
8 Number of gas distribution stations (GDS)	distribution station	1473
- TOT Crimea	pumping units	13
- including TOC of Ukraine	pumping units	70
9 Payroll number	person	21073

To ensure the security of natural gas supply PJSC "Ukrtransgaz" continues to realize the project "Reconstruction, overhaul and technical upgrading of main gas pipeline "Urengoy - Pomary – Uzhgorod" (hereinafter the Project), financed through the funds of EBRD and EIB, in accordance with the Cabinet of Ministers of Ukraine Regulation N 70 of 27.01.2016 "On the procedures of preparation, implementation, monitoring and completion of projects of economic and social development of Ukraine, which are supported by international financial institutions".

The Project, financed through the funds of EIB, EBRD and also co-financed by PJSC "Ukrtransgaz", envisages:

- overhaul of the four sections of the linear part, total length 118.99 km;
- reconstruction of the compressor station "Romny" of the main gas pipeline "Urengoy-Pomary-Uzhgorod".

Financial Agreement between Ukraine and EIB in the amount of up to 150,00 mln. Euros and the Project Agreement between PJSC "Ukrtransgaz" and the EIB were concluded December 1, 2014.

Loan Agreement between Ukraine and the European Bank for Reconstruction and Development amounting up to 150,00 mln. Euros and the Project Agreement between PJSC "Ukrtransgaz" and EBRD were concluded December 15, 2014.

Measures taken in 2015:

- Subcredit agreements on EBRD and EIB loans were concluded between the Ministry of Finance of Ukraine, the Ministry of Energy and Coal Industry of Ukraine, NERC, NAK “Naftogaz Ukraine” and PJSC “Ukrtransgaz”;
- the conclusion of the Ministry of Justice states that there is no need for ratification by the Verkhovna Rada of Ukraine of Loan Agreement with the EBRD (letter of the Ministry of Justice N 12926-0-26-15/12.2 of 30.04.2015). The Agreement entry into force is done by accomplishing the prerequisites of the Agreement with EBRD effectiveness as it is stipulated in the Agreement (section 5.01);
- The Law of Ukraine “On Ratification of the Financial Agreement (gas pipeline “Urengoy-Pomary-Uzhgorod” (“Reconstruction, overhaul and technical upgrading of the main gas pipeline “Urengoy-Pomary-Uzhgorod”) between Ukraine and the European Investment Bank” was adopted;
- Grant Agreement between Ukraine and the World Bank to finance a Consultant of the Project Management Unit (PMU) was signed and entered into force 21.10.2015;
- the Committee on the tender procedures of PJSC “Ukrtransgaz” has begun procurement of consultancy services for procurement and project management for the

PMU. Currently the contract for a PMU consultant is concluded with consulting company Su-Yapi Engineering and Consulting Inc. (Turkey).

- PJSC “Ukrtransgaz” has worked out the Terms of Reference for a Lenders’ consultant on monitoring issues.
- Design work on construction sites: “Overhaul of Urengoy-Pomary-Uzhgorod gas pipeline. Section 3364,5-3391,2 km”, “Overhaul of Urengoy-Pomary-Uzhgorod gas pipeline. Section 3488,36-3519,87 km”), “Reconstruction of the “compressor station “Romny” (Feasibility study stage) were completed and submitted for the State expertise.
- Design documentation on construction sites: “Overhaul of Urengoy-Pomary-Uzhgorod gas pipeline. Section 3974,77-4008,45 km” and “Overhaul of Urengoy-Pomary-Uzhgorod gas pipeline. Section 4101,3-4128,4 km” were approved (see the Cabinet of Ministers of Ukraine regulations N 1368 and N 1367 of 23.12.2015).
- Preparation for the development of design and the development of technical documentation for land management in order to conclude the servitude contracts is being carried out.

As to the economic effect of the project, then according to the investment feasibility study, submitted to the Ministry of Energy and Coal Industry for further compilation of package of documents related to the loans of International Financial Organizations, internal rate of return is 17.7%, discount payback period of the project - 12 years, profitability index is 1,04.

PJSC “Ukrtransgaz” is also continuing the implementation of the investment project “Reconstruction of compressor station “Bar” of the “Soyuz” gas pipeline”, for which the loan agreement under the guarantees of the Government of Ukraine was concluded between “Deutsche Bank AG” and PJSC “Ukrtransgaz” 11.12.2012. According to the procurement agreement between PJSC “Ukrtransgaz” and “Ferrostaal Industrieanlagen GmbH” company N 1304007264 of 29.04.2013 there was carried out the “Feasibility Study” (FS), which was approved by the Cabinet of Ministers of Ukraine regulation N 1403 of 30.12.2015. In the result of the FS, the following calculations of investment efficiency were defined

- discounted payback period of investment - 3.26 years,
- the IRR - 68.44%.

According to the schedule of preparation of facilities of PJSC “Ukrtransgaz” for the autumn-winter period of 2015/2016 significant scope of work as of 30.09.2015 was accomplished, including:

Linear part of gas transmission pipelines:

- 1125 of underwater, surface and air pipelines passages through water obstacles were examined;
- overhaul of 95.1 km of linear part of pipelines was carried out, 8.9 km of which was completely replaced;
- instrumental survey of 5389.7 km of linear gas pipelines was done;
- interpipe diagnosis of 882 km of linear part of pipelines was conducted;
- 882 km of inner cavity cleaning of linear part of pipelines was performed;
- 2,316 system defects eliminated;
- 1056 fire works made;
- an overhaul and replacement of valves took place and 378 actuator valves of the linear part replaced.

Gas distribution system:

- anti-corrosion-resistant coating contacts “land – air” type of a total area of 1504.0 sq.m was replaced;
- 5174 gas pressure regulators were checked, audited and underwent preventive maintenance;

Compressor stations:

- overhaul of 40 gas pumping units totaling 247.5 million. UAH was done;
- overhaul and replacement of auxiliary equipment of compressor stations in the amount of 252.8 mln. UAH was performed.

Underground Gas Storage:

- overhaul of 69 wells was completed.

The check-up of the technical condition of gas drying units, regeneration and gas drainage pumps, pumps for chemical agents, repair and inspection of pipelines and valve components, repair of valves, technical maintenance and cleaning of processing tanks were performed.

6. Measures of PJSC "Ukrtransgaz" directed to meet peak demand

In order to prepare PJSC "Ukrtransgaz" branches for the autumn-winter period of 2015/2016, the works were done on the complex of planned and preventive maintenance, and which affect the transit of Russian gas to European countries and being coordinated with JSC "Gazprom" and shipping countries. During 2015 year 16 complexes of planned and preventive maintenance were timely carried out according to the approved time schedule.

Among key organizational and technical measures of PJSC "Ukrtransgaz" functioning in the autumn-winter period of 2015/2016, it is of great importance to inject the natural gas in underground storage facilities, which has been conducted according to the calculated monthly balance of supply and distribution of natural gas throughout Ukraine. The measures envisaged the injection of 13.9 billion cubic meters of gas for 2015. In general 9.5 billion cubic meters of gas were injected and that was less by 0.3 billion cubic meters compared with the same period of last year. Total volume of active gas in the beginning of the season was about 17.1 billion cubic meters.