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Institute for Economic Research and Policy Consulting

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Ukraine energy update 2015/16

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Ukraine energy update 2015/16

Executive Summary

Electricity and gas consumption in Ukraine continue to be low due to the economic recession and the ongoing conflict in the East. The gradual removal of energy subsidies as well as increased energy efficiency efforts might further fuel the downward trend in energy demand. At the same time the structure of Ukraine's energy supply changed dramatically in the past two years. Ukraine became independent from direct gas imports from Russia (which constituted about 20% of primary energy supply in 2013) and nuclear replaced coal as the primary fuel in electricity production.

In terms of its organisation, Ukraine's energy system is far from a sustainable steady state. Reforms in the electricity and gas sector - that have been pending for two decades - have started. Some success in terms of removal of energy-subsidies and improving the management of Naftogaz are visible. But the reform process is far from being completed and still faces significant political barriers.

All in all we see – despite some non-negligible risks - no imminent energy crisis in Ukraine. But if Ukraine does not seize the political momentum to conduct deep structural reforms in the energy sectors, it will remain a major political and economic headache for decades to come.

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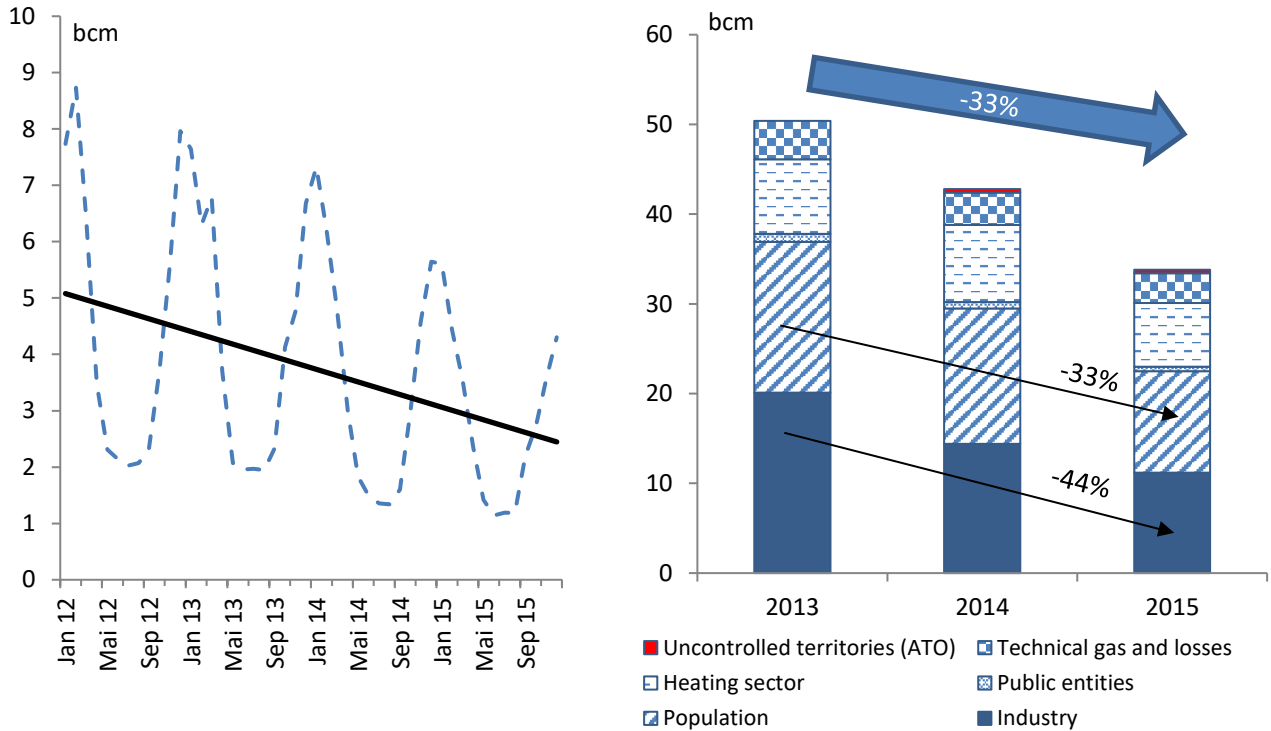
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1 Natural Gas

1.1 Demand

Figure 1

Gas consumption (monthly and by consumer group)



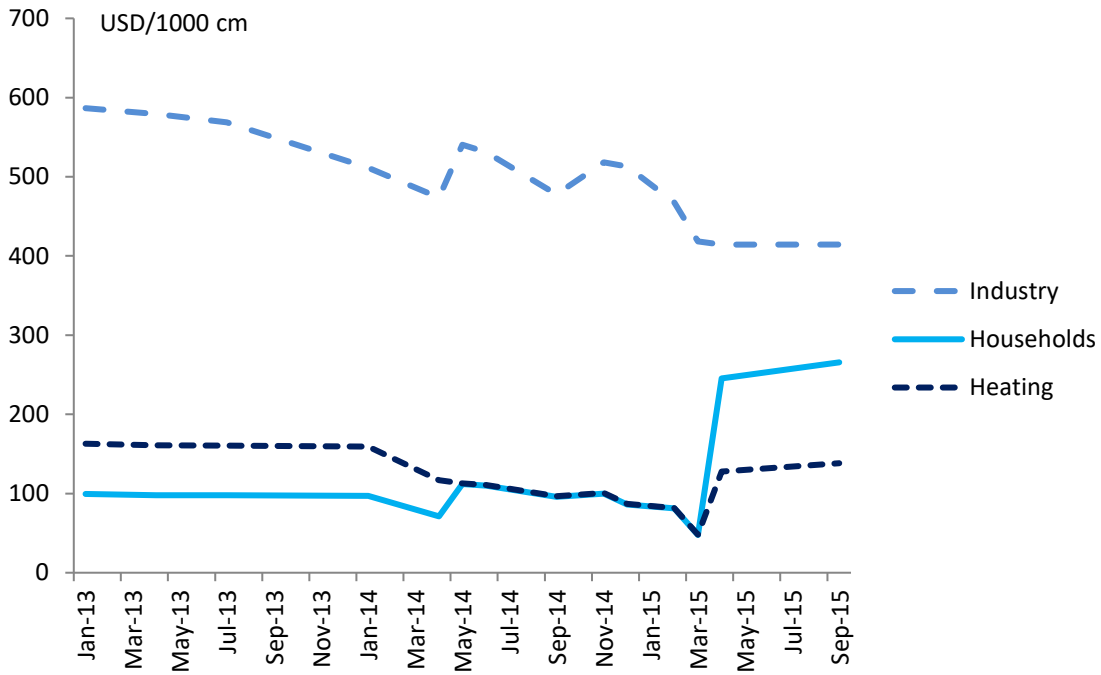
Source: The Ministry of Energy; NJSC Naftogaz

Natural gas demand has been falling at increasing speed from 59.3 bcm in 2011 to 33.7 bcm in 2015. The substantial decline by 33% between 2013 and 2015 is due to a combination of factors. Donetsk, Luhansk and Crimea contributed about 14%, 7% and 4% of Ukraine gas consumption – so the conflict in parts of Donetsk and Luhansk oblasts and the occupation of Crimea might have cut about 15% of Ukraine’s pre-conflict gas consumption. This is slightly less than half the decline in Ukraine’s gas consumption 2013-2015. The other half of the decline in Ukraine’s gas consumption is due to

- (i) An effect of lower residential gas and heating consumption due to increasing gas and heating tariffs (see Figure 2) as well as some rationing.
- (ii) A result of the economic downturn. Industrial output fell by 27.4%. Summer demand has fallen more sharply (about -40%) than winter demand (-30%) indicating the above-proportionate contribution of the drop in industrial activity.
- (iii) Lower technical losses due to less gas transit (-22.1%) and transmission (-33%) and possibly improved monitoring.

Figure 2

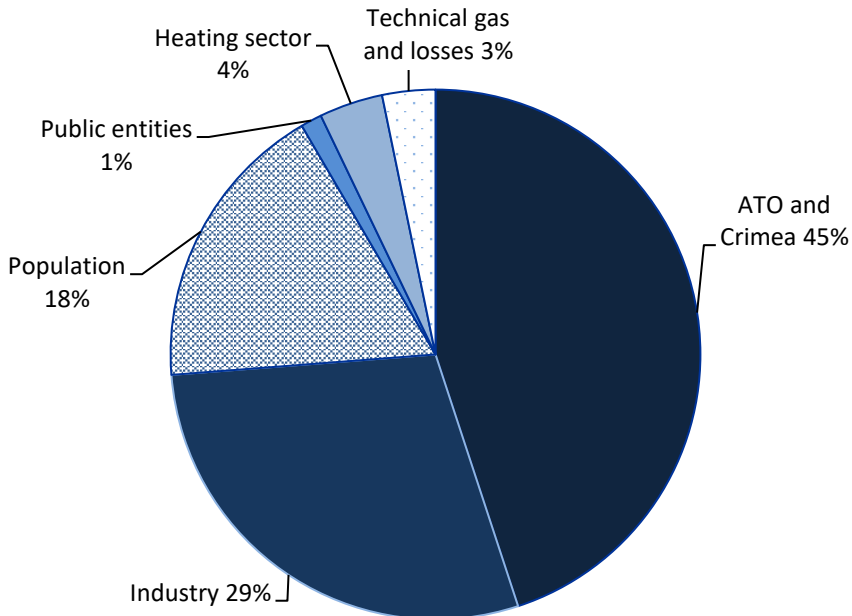
Regulated domestic gas retail prices supplied via oblgases



Source: NJSC Naftogaz

Figure 3

Drivers of gas demand reduction



Source: Own calculation

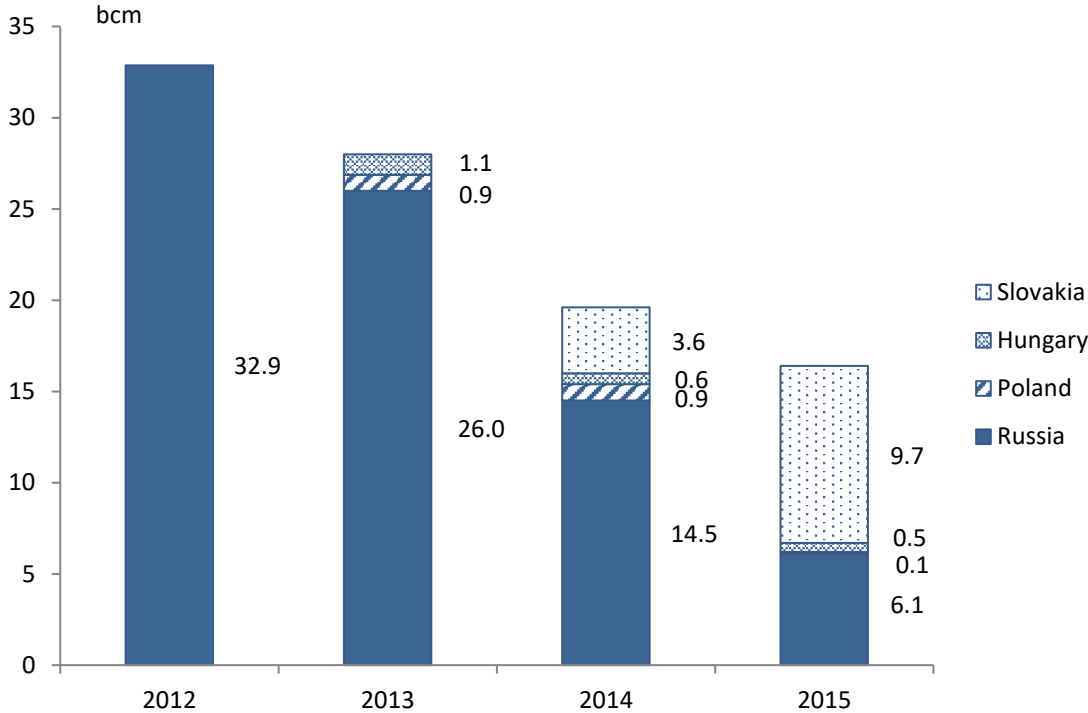
For the coming year it is expected that Ukraine’s economy will stagnate or slowly recover (IMF 2015, estimates 2% yoy growth). Thus, industrial gas consumption might slightly recover. Residential gas consumption will see further downward pressure through further gas tariff increases (planned: +10% in April and +33% in October). In addition, numerous energy efficiency measures are being discussed and partly implemented with support from Western donors. This could bring down gas consumption of district heating companies and households. The technical potential for savings is still significant. It is estimated that in the medium term (3-5 years) investments into boilers, pipelines and heat-regulators could reduce annual gas demand by more than 5 bcm. In the longer term (10 years) a further decrease in annual demand by 9 bcm is feasible through thermo-modernisation of public and private buildings.

1.2 Imports

Ukraine has seen, both, a 50 percent decrease in gas imports and a profound change in its gas import structure. While imports directly from Russia fell by 80% from 33 bcm in 2012 to 6 bcm in 2015, imports from West were stepped up from zero to 10 bcm in 2015.

Figure 4

Gas imports



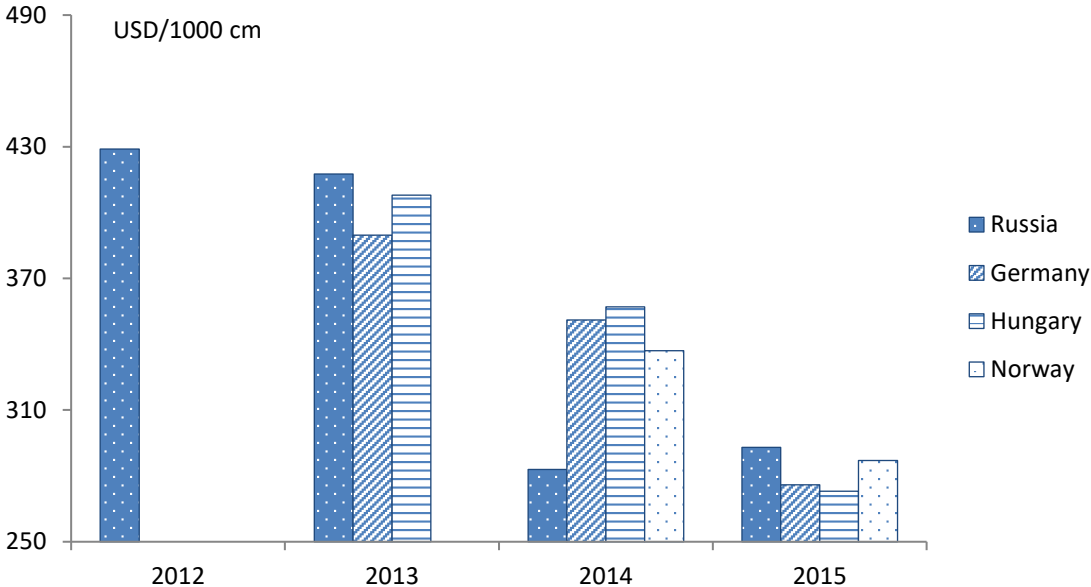
Source: NJSC Naftogaz

Technically, this was possible due to a massive increase in reverse flow capacities. As initial attempts to conduct substantial reverse flows in the existing pipelines or ‘virtual reverse flows’ [financial swaps of Russian gas in Ukraine with gas in the EU] were blocked by Gazprom referring to existing contracts, Ukraine and Slovakia agreed to establish a by-passing pipeline. At full capacity all proven reverse flow connections together allow Ukraine to import about 22 bcm/y [HU: 16.8 mcm/d; PL: 4.3 mcm/d; SK: 40 mcm/d]. Hence, direct supplies from Russia are no more pivotal for Ukraine’s gas supply security. This, however, would require a constant use of these capacities even during summer in order to fill the storages, which involves substantial pre-financing as gas needs to be paid in advance by the importer.

This issue was partly addressed by a USD 300 m three-year revolving facility from the EBRD to Naftogaz that is earmarked as working capital to purchase natural gas in reverse flow mode. This will allow Naftogaz to tender for purchases of about 1.1 bcm of gas. The loan agreement includes conditions on the transparent tendering of the gas as well as on a corporate governance reform of Naftogaz. The later has been subject to some political dispute in Ukraine, as it involved the Ministry of Energy losing control over Naftogaz.

Figure 5

Annual average import gas price by owner country 2012-2015



Source: Ukrstat

Reverse flows, lower import requirements and low gas prices in the EU - gas prices at TTF halved from 27 €/MWh in January 2013 to 14 €/MWh in December 2015 - allowed Ukraine to obtain a much better gas import deal. This was also helped by the fact that Naftogaz brought its trading relations in line with EU standards (e.g., through the use of the standard EFET contract) which allowed to rely on competing European suppliers such as Statoil and RWE. Overall gas import cost dropped from about USD 11 bn in 2013 to about USD 4.5 bn in 2015. Compared to GDP – which according to IMF (2015) fell by 16% from 2013 to 2015, the share of gas imports fell from 2.8% to 1.3%.

The unusually relaxed gas market situation in the EU was a lucky coincidence for Ukraine. EU companies did not need all the gas they had committed to buy from Gazprom and due to the oversupplied European market, Gazprom was unable to effectively punish those companies that resold gas to Ukraine. Hence several EU gas companies competed to bring gas to Ukraine - resulting in a very moderate price for these reverse flows. In the future there are several risks to reverse flows that should not be ignored:

- (i) Nord Stream II might enable Gazprom to largely circumvent Ukraine’s and hence Slovakia’s gas transit system. This might enable Gazprom to make reverse flows to Ukraine more expensive (as Ukraine would move from the centre to the end of the pipeline).
- (ii) A currently difficult to conceive tightening of the gas supply situation in the EU would make EU gas companies preferring to cater for their own customers before engaging into selling redundant gas to Ukraine.

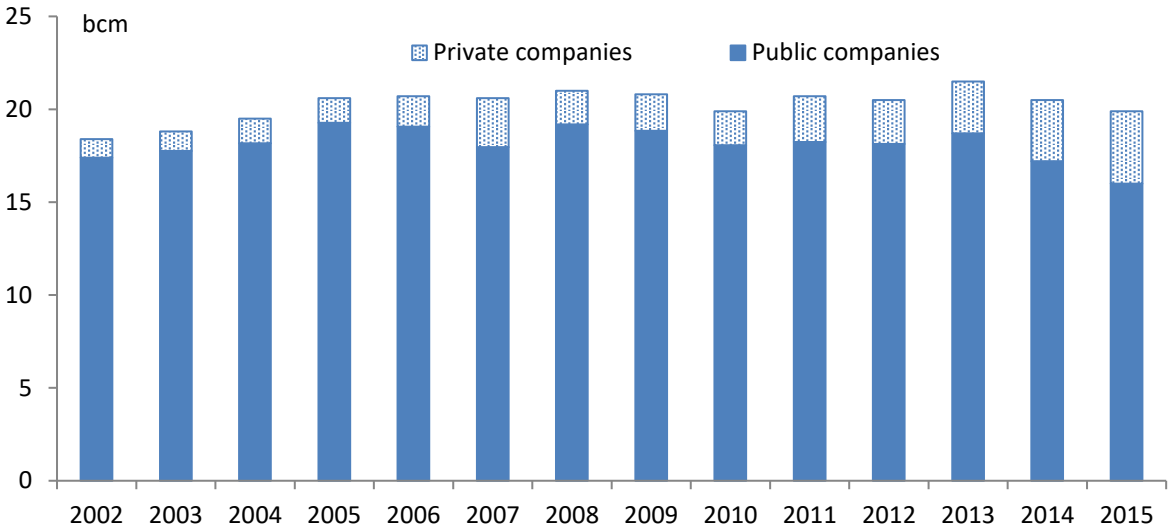
(iii) Any disruption of gas supplies through Ukraine (for example in the stand-off between Naftogaz and Gazprom with regards to their contractual obligations) would mean that less gas arrives in the East of the EU, which will then be very unlikely to provide full reverse flows.

1.3 Production

Gas production in Ukraine has fluctuated around 20 bcm/y for more than a decade. Most of the gas is still produced by public companies – most notably UGV, a subsidiary of Naftogaz. Production in 2015 slightly declined compared to 2013, also in part because of the loss of gas production in the Black Sea around Crimea.

Figure 6

Gas production in Ukraine by public and private companies

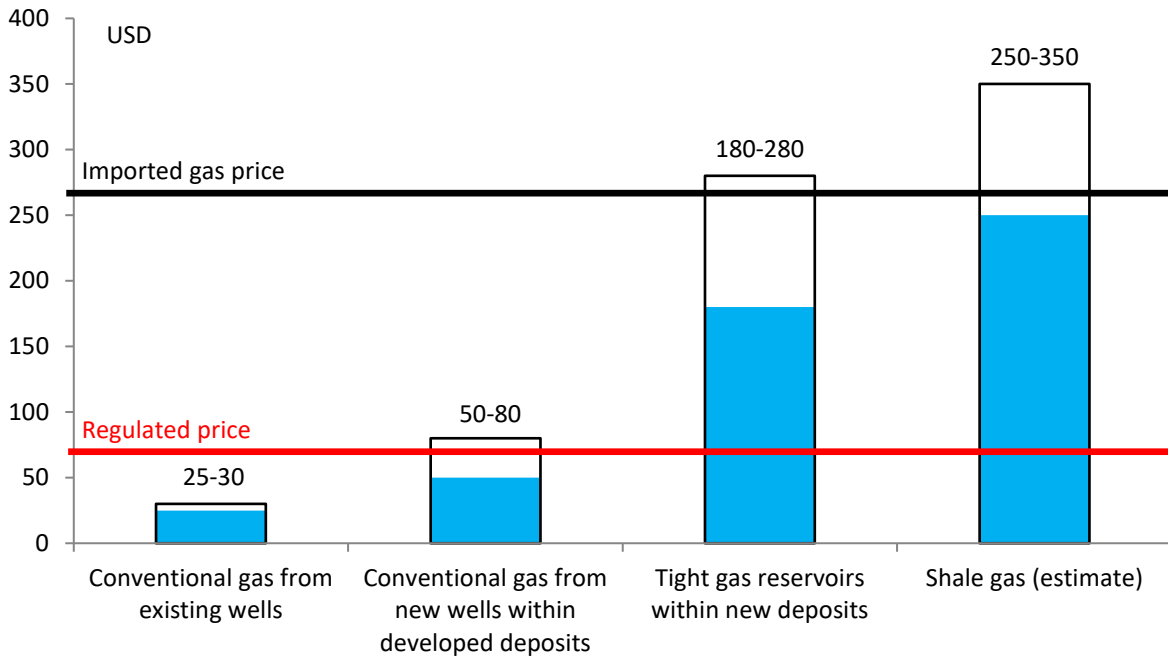


Source: Ukrstat; Naftogaz; Energobusiness

It is expected that Ukraine could substantially increase its gas production when the regulatory framework becomes more permissive. The main regulatory bottlenecks are the unfavourable conditions for the access of private companies (obtaining licenses, access to network, rule of law, taxation) and the low gas prices paid to public companies. There has been some improvements on both fronts. Taxes for private companies have been reduced in 2015 and temporary obligations to sell gas to Naftogaz ran out. Probably due to the politicised environment, currently only smaller private companies with some oligarchic interests (JKX) are able to successfully operate in Ukraine. Two major oil and gas companies - Shell and Chevron - ceased gas extraction projects in Ukraine and Exxon had to stop its Black Sea projects due to the annexation of Crimea. The next year might, however, see a complete sea-change. The government is discussing the restructuring of Naftogaz and one of the considered options is to privatise UGV to a western investor. To be successful this will require a change in the price at which UGV is allowed to sell gas, which remains regulated at a below market-level.

Figure 7

Comparison of Ukrainian gas production cost with gas import prices and regulated producer prices



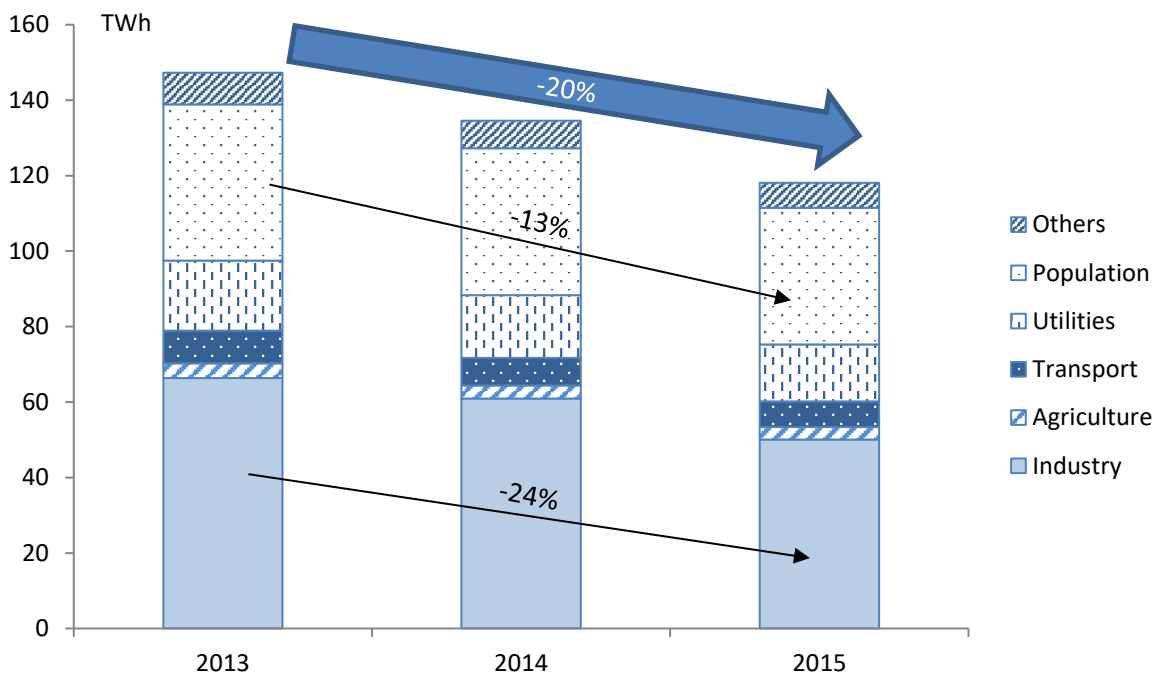
Source: NJSC Naftogaz

2 Electricity, coal and nuclear

Electricity demand in Ukraine dropped by 20% from 2013 to 2015. The main contributing factor was the fall in economic activity – leading to a decline of industrial electricity consumption by 24%.

Figure 8

Electricity consumption by user



Source: The Ministry of Energy

From June 2014 the electricity tariffs were raised by 60% to 110% depending on consumption volumes. This has contributed to lower household electricity consumption. But as for gas demand – the largest drop occurred in industrial electricity demand and can be explained by the occupation of Crimea and the conflict in Donbas and the economic recession.

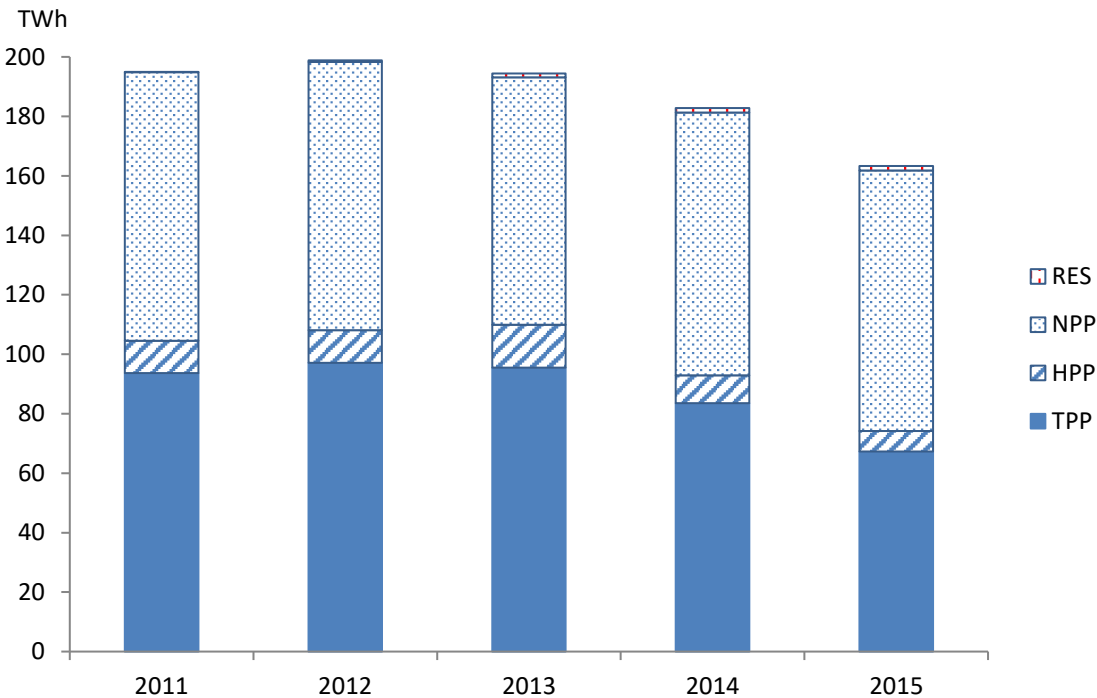
2.1 Electricity production

Due to lower demand and problems of coal supply (see below) the share of conventional power plants in Ukraine’s electricity production dropped by half. Thereby, gas already stopped playing a major role (apart of some CHP’s) before the crisis, due to high gas prices. Hydropower – which is run-of-river in Ukraine also declined due to dry weather. In return, the share of nuclear power in Ukraine’s electricity mix reached its highest ever value – 57%.

While nuclear power generation is entirely under the public Energoatom, most of the coal fired power plants belong to DTEK, a subsidiary of Achmetov’s SKM Holding. The planned electricity market reform has been submitted to the Rada in March 2016. But, given the highly concentrated ownership structure and the large vested interest it would require substantial political efforts to develop a meaningful market-structure. So the unsatisfactory status-quo with somewhat regulated prices for generation is for the time being maintained. In our view the current reform proposal will fail to create a functioning market and instead essentially serves to change the distribution of the revenues along the value chain.

Figure 9

Electricity generation by fuel



Source: Ukrstat

2.2 Electricity trade

Electricity exports to the EU fell by 63% between 2013 and 2015 due to the more tense supply situation in Ukraine. It is argued that the Ministries threat to stop DTEK’s exports altogether – which is one of the few profitable businesses in the current environment - in case DTEK will cut domestic supplies, served to discipline DTEK.

Electricity trade with the occupied territories remains unstable and politicised. A contract for electricity sales to Crimea was concluded in December 2014 that terminated 01 Jan 2016. A new contract has not been signed yet. The electricity supplies to Crimea from the mainland were stopped on 21 November 2015 after two 330 kV high-voltage transmission lines were sabotaged by Crimean Tatars. As of January 2016 the transmission lines were restored but electricity is not actually supplied due to absence of the contract.

Electricity exchanges with the ATO zone has been almost completely ceased excluding small portions of electricity crossflows needed for balancing the system. According to the Cabinet Order # 263 as of 07 May 2015 it was decided that local consumers in ATO will be supplied exclusively from local generation companies thus any supply from Ukraine to ATO zone and backwards is prohibited. Imports of electricity through ATO located electricity transmission lines is prohibited as well. For managing the payments the separate special unit of state enterprise “Ukrenergo” was set up – Donbass electricity system – that will receive money from ATO zone operators (Luhansk energy union and DTEK Donetskoblenenergo).

2.3 Coal for electricity production

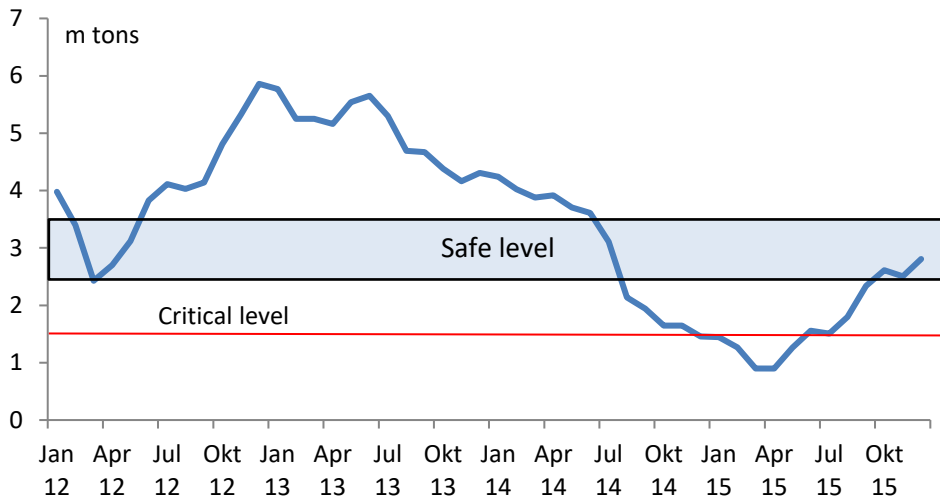
The cumulative coal stocks were decreasing in 2013-2015 after a period of rapid growth in 2012 that is explained by an artificial oversupply of coal from state-owned mines. After the beginning of the armed conflict in Donbas in April 2014 coal supply from the ATO zone (especially, the deficit A+T grades) dropped substantially and coal stocks fell below the critical threshold of 1.5 million tons. This caused coal shortages at several power plants and subsequently electricity supply black-outs in several regions and mothballing of around 80% of TPPs that is fuelled by A+T coal. Current levels of about 3 million tons of coal are considered to be sufficient for the safe functioning of the existing coal fired power plants.

The deficit of coal for TPPs was initially planned to be covered by imports but low import bulker capacities of Ukrainian sea ports (the max. capacity of coal imports now is 0.75 million tons per month) and lack of free A+T grades on the world market at accepted prices made this plans unreachable. A contract to buy coal from South Africa on inappropriate and too expensive coal caused corruption-investigations in 2015.¹ Now there are rumours that some coal supplies from ATO zone were restored through shadow deals with occupied territories.

¹ <http://www.reuters.com/article/us-ukraine-crisis-anniversary-idUSKBN0LM0YG20150218>

Figure 10

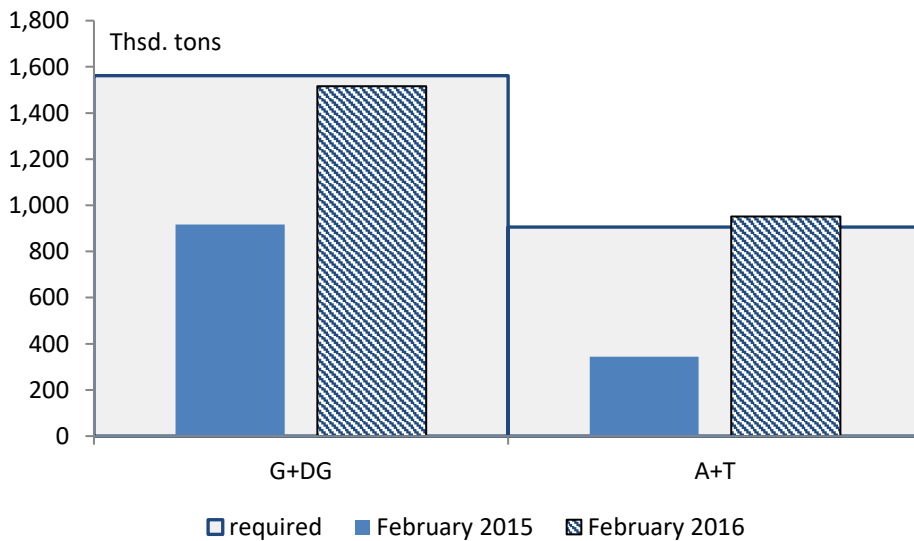
Coal stocks



Source: The Ministry of Energy; EIR analytical centre

Figure 11

Coal stocks by grade



Source: DTEK

2.4 Nuclear fuel

Historically being reliant on Russian nuclear fuel, Ukraine started already in 2000 a program enable alternative supplies to be used in Ukrainian reactors. In the first trial phase 2005–2009, six fuel assemblies manufactured by Westinghouse were tested and a contract for supply of nuclear fuel for annual reloading of three WWER-1000 units in 2011 – 2015 was signed. In 2012 problems with these fuels emerged: assemblies with damaged spacer grids were revealed and the corresponding reactor cores could not be loaded as planned. Subsequently Westinghouse upgraded the fuel assembly design and conducted comprehensive testing of the upgraded robust assemblies. Since then, no issues with the Westinghouse assemblies appeared and Energoatom commissioned further batches of nuclear fuel.

Sources:

- Ukraine's Gas Market Reform: Green Light to Investments in Natural Gas Transmission, Production and Energy Efficiency, presentation by Andriy Kobolyev, CEO, Naftogaz of Ukraine, July 2015
// <http://www.naftogaz.com/files/Information/2015-07-13%20UA-US%20Naftogaz%20Forum%20Presentation.pdf>
- STAT: Gas consumption 2015 //
<http://www.epravda.com.ua/news/2016/01/15/576715/>
http://newsru.ua/finance/15jan2016/na_21_procent.html
- STAT: Gas, electricity and coal, the informational briefing from MinEnergo //
<http://mpe.kmu.gov.ua/minugol/doccatalog/document?id=245079340>
- EIR article for coal imports for Ukrainian TPPs // <http://eircenter.com/ua-analiitika/import-vugillya-dlya-tes-problemi-ta-perspektivi-1/>
- Electricity consumption in 2013; the Ministry of Energy press-release //
<http://delo.ua/business/ukraina-v-2013-godu-sokratila-potreblenie-elektroenergii-224582/>
- DTEK Annual Report 2014 // <http://www.dtek.com/library/file/annual-report2014-en.pdf>
- Naftogaz Annual Report 2014 //
http://www.naftogaz.com/files/Zvity/Naftogaz_Annual_Report_2014_engl.pdf
- Quarterly average gas import prices // <http://tsn.ua/groshi/demchishin-nazvav-vartist-yevropeyskogo-gazu-dlya-ukrayini-571930.html>
- The estimate of state-owned Naftogazvydobuvannya losses of extraction in Donbas due to ATO //
<http://www.naftogaz.com/www/3/nakweb.nsf/0/956937E95620D3A3C2257F1C0050157E?OpenDocument&Expand=1.1&>
- Gas imports in 2015, Uktransgas press-release // <http://economics.unian.net/energetics/1230175-ukraina-v-2015-godu-udvoila-import-gaza-iz-evrosoyuza.html>
- Gas imports in 2013 // <http://www.epravda.com.ua/news/2014/01/3/413075/>
- EBRD gas loans – official brief // <http://www.ebrd.com/news/2015/ebird-ukraine-agree-naftogaz-reform-sign-us-300-million-loan-for-winter-gas-purchases.html>
- EBRD gas loans – Bloomberg article // <http://www.bloomberg.com/news/articles/2015-09-30/ebird-approves-300-million-loan-for-ukraine-winter-gas-purchase>
- Gas production analytical note by MinEnergo //
http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art_id=245073540&cat_id=245070661
- Gas production analysis in 2013 (historical series) // <http://news.finance.ua/ua/news/-/318979/prywatnyj-gazovydobutok-pishov-v-minus-povernutysya-ne-obitsyav>
- The analysis of gas production in 2015 (estimations) // <http://finbalance.com.ua/news/Naskilki-mozhe-zrosti-vidobutok-hazu-v-Ukrani-pislya-znizhennya-rentnikh-platezhiv>
- IMF (2015) World Economic Outlook Database, October 2015 //
<https://www.imf.org/external/pubs/ft/weo/2015/02/weodata/index.aspx>

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