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The gas challenge

On securing natural gas transits and stabilising the domestic market in Ukraine

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The gas challenge

Executive Summary

The Ukrainian-Russian gas crises in January 2009 demonstrated an urgent need to secure gas transits through Ukraine. Although both parties eventually signed agreements that regulate Ukrainian gas import as well as transit of Russian gas through Ukraine, the underlying conflict is far from being resolved. Most importantly, the difficult technical state of Ukraine's Gas Transit System (GTS) and the urgent need for investments impose severe risks as they endanger the reliability of the system and thus, of gas transits through Ukraine.

The EU and international financial institutions have offered technical and financial help to improve the technical state of the GTS. However, the economic viability of the already proposed investment projects is still unclear. This paper undertakes a first assessment. We demonstrate that the transit tariffs as determined by the agreement signed in January 2009 are not sufficient to finance the proposed construction of new transit capacity and that they can cover the cost of modernising the existing pipelines only if these will be utilised at (almost) full capacity. However, considering the severe uncertainty with respect to future transit volumes, we conclude that neither the construction of a new pipeline nor the modernisation of existing lines can be financed based on the currently specified transit terms.

A main condition for technical and financial support by the EU and international financial institutions is that Ukraine develops a Gas Sector Reform Program for 2010-2011 in order to attract investments. Given the current financial turmoil in the sector, developing appropriate reform steps should have highest priority. We argue that the strong increase in import prices in line with slowly changing regulated prices for privileged consumers are expected to cause losses of more than 1% of GDP which will mainly accrue to NAK Naftogaz, the incumbent gas company. With the largest operator in the sector under systemic bankruptcy threat, the domestic pricing system needs to be reformed and the sector be reorganised in order to attract investments.

For Ukrainian policy makers to attract investments in the GTS we recommend proceeding along the following lines:

First, the current agreement on gas transits should be renegotiated. These negotiations should focus on securing more suitable transit tariffs as well as further guarantees for investments, such as a 'ship-or-pay' obligation under which the shipper must pay for reserved transit capacity independently of actual transit volumes.

Second, reforms in the domestic sector should start by separating the loss-making supply obligations to privileged consumers (residential households and district heating companies) to a separate state-owned entity which will bear the full economic risk of these operations while the state as owner will have to ensure its economic viability. In this way, the systemic risk from domestic price regulation could be removed from NAK Naftogaz, the operator of most of the relevant infrastructure in the sector.

Finally, further reforms must focus on improving incentives for privileged consumers to reduce their actual consumption volumes and on ensuring compliance of the Ukrainaian gas sector with EU principles such as regulated third party access to the GTS or legal unbundling and independency of the GTS operator.

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1. Introduction

The Ukrainian-Russian gas crises in January 2009 demonstrated an urgent need to secure gas transits through Ukraine. Although both parties eventually signed agreements that regulate Ukrainian gas import as well as transit of Russian gas through Ukraine, the underlying conflict is far from being resolved. In the short term, Ukraine's ability to pay for higher gas imports has been repeatedly questioned due to the impact of the global economic slowdown on its economy. Also, gas demand in Ukraine as well as transit volumes have so far been significantly lower than foreseen in the agreements, which might even impose extra payments on Ukraine due to 'take or pay' obligations. Finally, securing reliable gas transit during winter months usually requires Ukraine to fill up its underground storage facilities during summer. However, given the distressed financial situation of the Ukrainian economy it is uncertain to which extent this has been executed so far. In the medium term, the difficult technical state of Ukraine's Gas Transit System (GTS) and the urgent need for investments impose even greater risks as they might endanger the reliability of the system and thus, of gas transits through Ukraine.

So far, the EU and international financial institutions have rejected to support Ukraine in solving these short-term problems. However, they have offered technical and financial help t improve the technical state of the GTS in order to strengthen its potential in the mid- and long-run. While a first joint declaration has already been signed in Brussels earlier this year, concrete steps about how to proceed still need to be worked out. This will be the focus of this paper. In the next section, we first assess the proposed plans to modernise and expand the GTS. Special emphasis will be given on the extent to which such investments can be financed under the current transit agreements and how these need to be improved, respectively. The third section focuses on the impact of current import prices on Ukraine's domestic gas sector and how the sector should be reformed in order to stimulate investments. In the forth section we provide our policy recommendations.

2. Modernisation of the Gas Transit System

2.1. The EU-Ukraine investors conference

In March 2009, policymakers and representatives from business and international financial institutions held a conference on securing the transit of natural gas from Russia through Ukraine. In a joint declaration, the parties stressed the important role of gas transits through Ukraine, welcomed plans to modernise and extend the Ukrainian GTS and expressed their readiness to cooperate on technical and financial issues.[1] The Government of Ukraine committed itself to:

- ensure that the operation of the GTS complies with the relevant principles in the EU internal gas market,[2] in particular with respect to:
  - legal unbundling of the GTS operator from other activities in the gas sector,
  - regulations to secure non-discriminatory third party access to the GTS and storage facilities, and
  - tariff setting in line with EU principles (cost reflective, non-discriminatory, transparent and accountable);
- develop a Gas Sector Reform Program for 2010-2011 with the shared objective of attracting investments.

The issue of compliance with the principles of the EU internal energy market has been analysed in an earlier advisory paper (German Advisory Group 2006). The general conclusion

[1] See http://ec.europa.eu/external_relations/energy/eu_ukraine_en.htm.

[2] As specified in the relevant directive 2003/55/EC (see http://europa.eu/legislation_summaries/energy/index_en.htm).

was that the current design of Ukraine's gas sector already resembles most of the relevant EU principles. In particular, transit and transmission operations are performed by a separate legal entity, *Ukrtransgaz*.[3] Securing full compliance with the legal unbundling provision requires further improvements in personnel planning and accounts separation to guarantee full legal independency of the GTS operator. Concerning the rights of third parties to access the GTS and storage facilities, there is need for additional, appropriate regulations. Finally, the responsibilities and independency of NERC, the regulatory authority, must be further strengthened. Nevertheless, the overall conclusion is that Ukraine's gas sector does already largely comply with the respective EU principles and regulations. Hence, the Government of Ukraine will be able to fulfil the first of the two above-listed commitments without running into significant political problems.

However, the second commitment – developing a reform program to attract investments – is far more complex and difficult to achieve. In the reminder of this paper we will assess in how far the present frame conditions in Ukraine's gas sector support or not support significant investments and will develop suggestions of how the conditions for natural gas transit and domestic market development should be further improved. Special emphasis will be given on assessing the terms for Russian gas exports to Ukraine and gas transit through Ukraine which both parties agreed upon in January 2009.[4] In this paper, they will be referred to as 'current transit agreement' and 'current import agreement'.

2.2. A Master Plan for the GTS

During the investor conference, Ukrainian business representatives presented a Master Plan for the modernisation and reconstruction of the GTS. It foresees the complete modernisation of three pipelines in the western transit corridor (*Soyuz; Urengoy-Pomary-Uzhgorod; Progres*) and three pipelines in the southern transit corridor (*Kremenchuk-Kryvyi Rig; Ananiiv-Bogorodchany; Ananiiv-Tyraspol-Izmail*). The plan also foresees modernisation of underground storage facilities and metering stations at various entry and exit points. In total, the plan stipulates the modernisation of 106bcm annual transit capacity, which is only slightly below the minimum volume of 110bcm as stipulated in the current transit agreement between Naftogaz and Gazprom. The plan also proposes the construction of an additional east-west transit pipeline with a capacity of 59bcm per year. The costs for both proposals are estimated at USD 3 bn and USD 5.5 bn, respectively (Table 1).

Table 1

Masterplan for modernisation and expansion of Ukraine's GTS

	Modernisation	New pipeline
Capacity (in bcm/year)	106	59
Distance (average, in km)	1198	1013
Investments (in m USD)		
▪ Gas pipelines	2,052	5,500
▪ Storage facilities	455	
▪ Gas metering stations	512	
Total (in m USD)	**3,019**	**5,500**

Source: http://ec.europa.eu/external_relations/energy/eu_ukraine_en.htm.

Relevant details for Russian gas transit through Ukraine, including transit tariffs and volumes, are regulated by the current transit agreement. Obviously, the first issue that needs to be analysed is whether these terms can generate sufficient revenue for financing the investment plans as shown in Table 1. Our assessment addresses the following two questions:

- Can the investment projects foreseen by the Master Plan be economically implemented under the current transit agreement?

[3] Ukrtransgaz is a separate legal entity owned by the NAK Naftogaz holding. This corresponds to the structure in e.g. Germany and generally complies with the legal unbundling provision specified in directive 2003/55/EC.

[4] The discussion of the transit and import agreements signed by Naftogaz and Gazprom on January 19, 2009, is based on the respective texts published on the website of Ukrayinska Pravda.

- How does this assessment change if relevant risks, e.g. with respect to transit volumes, are considered?

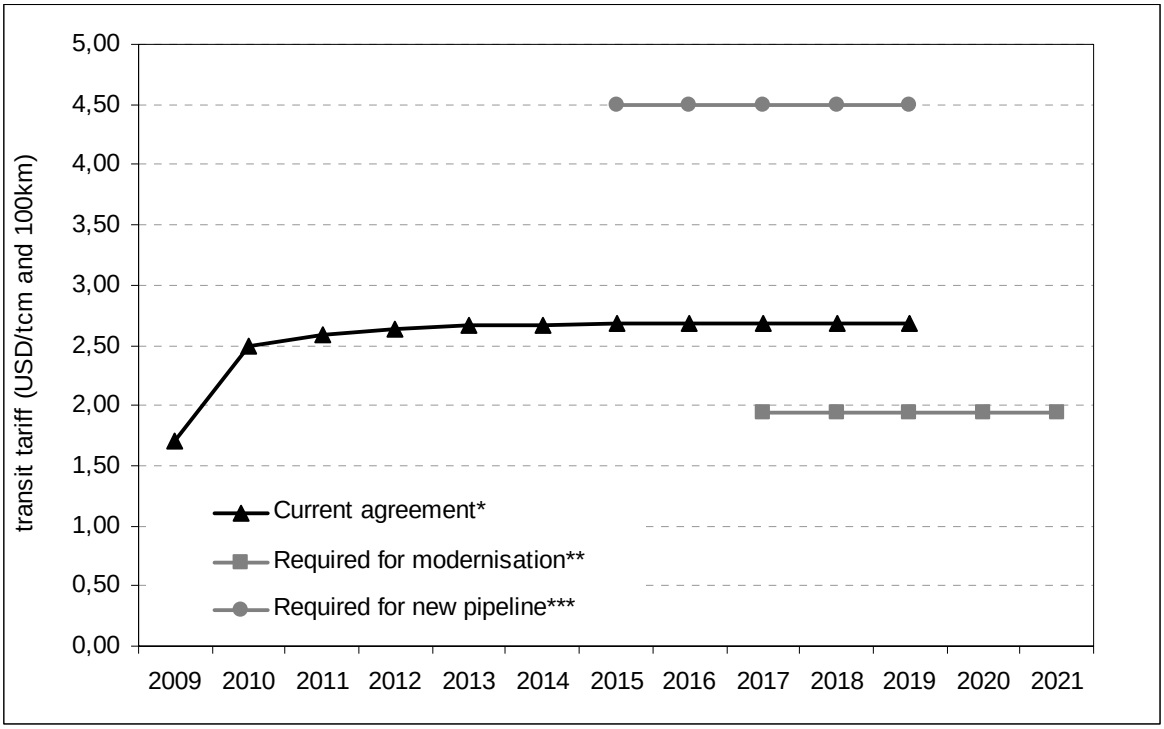
We start by comparing the transit tariff as determined by the current transit agreement with the minimum tariff levels necessary to cover all costs of financing and operating the pipelines as proposed by the Master Plan.

Under the current transit contract, the transit tariff for 2009 is set at 1.7 USD/tcm/100km. From 2010, this price will strongly increase, based on a formula that stipulates an adjustment of non-fuel related costs to 2.04 USD/tcm/100km while fuel costs change with the price for gas imports (assuming that the required *technical gas* accounts for 3% of the transit volume).

Figure 1 shows estimated minimum transit tariffs for the two investment options outlined in Table 1 (see Annex 1 for details) and compares them with the expected transit tariffs in the respective year under the current agreement. Because of different construction periods, the modernised pipelines are expected to re-start operations by 2017 while we expect a new line to be operational in 2015. Because the value of fixed capital assets depreciates over time, transit tariffs for the modernisation and new pipeline projects in Figure 1 are defined as average levels over the first five years of operation. Note further that these tariffs are sufficient to cover all operational expenses as well as capital costs (at an average capital cost of 20%), but they do not include any provision of transit rents for Ukraine. Finally, calculations are based on the assumption that the modernised or newly installed capacity will be fully utilised (for capacity levels as shown in Table 1). Hence, the results of this calculation must be seen as absolute minimum of what would be necessary for economically pursuing the Master Plan.

Figure 1

Necessary transit tariffs for the GTS



Notes: Tariffs include all costs, including technical gas. Gas import prices are 250USD/tcm, the weighted average costs of capital 20%

* Assuming an average EU-wide inflation of 2% per year; agreement expires in 2020

** Five years construction period (2010-2014)

*** Seven years construction period (2010-2016)

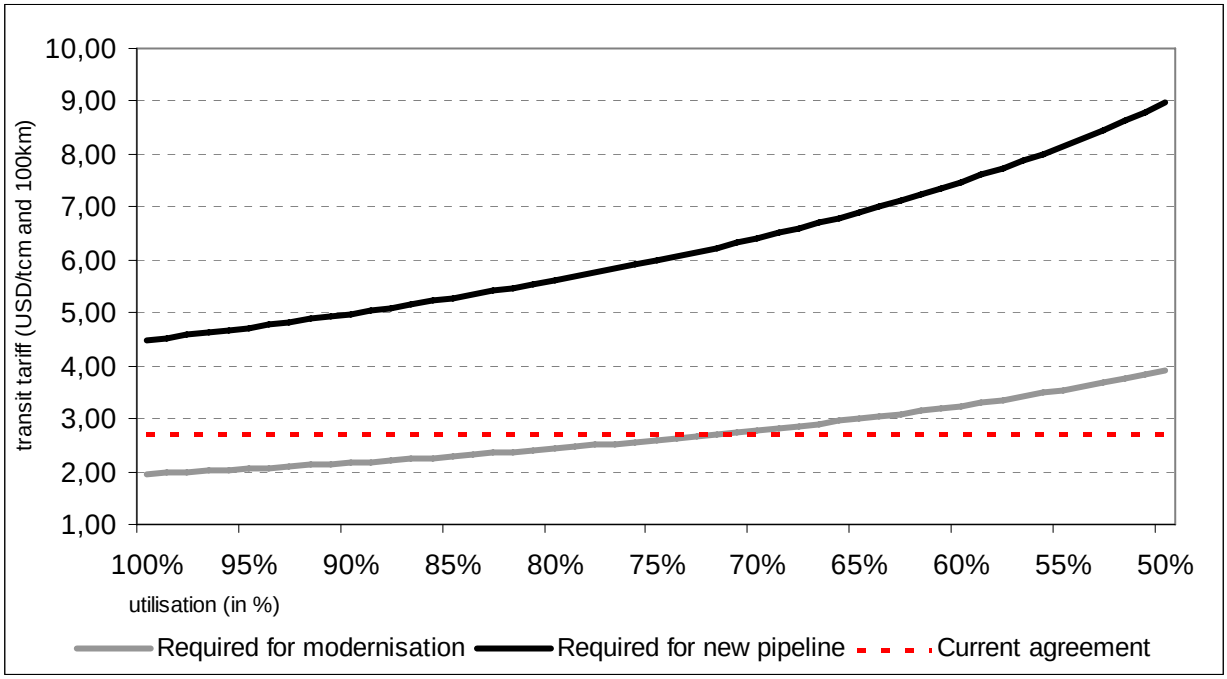
Source: own calculations

The figure demonstrates that – assuming 100% capacity utilisation – the investment projects proposed in the Master Plan require a minimum transit tariff of 1.95 USD/tcm/100km for the modernisation of existing lines and 4.5 USD/tcm/100km for the construction of additional transit capacity. In contrast, the transit tariffs under the current agreement are expected to increase to only about 2.7 USD/tcm/100km by 2017. While this still generates sufficient revenue for the planned modernisation of 106bcm of annual transit capacity, it falls short of the level that is necessary to cover the full costs of building a new pipeline.[5] Hence, the current terms for Russian gas transit through Ukraine do not allow for the full implementation of the projects proposed by the Master Plan.

So far, the calculations assume that all available capacity will be utilised by 100%. However, this is far from certain. Between 2015 and 2030, natural gas demand in the EU is expected to increase from 606 to 681bcm (IEA 2008). Given the high reliance on imports, this will cause natural gas imports from Russia to increase from 230 to 270bcm (slightly below 40% of total demand in the EU).[6] Given that Gazprom has already build 49bcm of bypass capacity around Ukraine (*Yamal* and *Blue Stream*) and given concrete plans for additional 118bcm through the Black- (*South Stream*) and Baltic Sea (*Nord Stream*), transit volumes through Ukraine might even decrease to about 63bcm by 2015 and could recover to only 103bcm by 2030.[7] While these calculations are of course only indicative, they still demonstrate that capacity utilisation of Ukraine's GTS is far from certain.

The impact of lower capacity utilisation on required transit tariffs is shown in the following figure. For both investment projects, required tariffs increase with lower utilisation rates. For example, assuming a capacity utilisation of 70%, the tariffs increase to 2.78 and 6.4USD/tcm/100km, both higher than what the current agreement foresees (dotted line).

Figure 2: Impact of capacity utilisation on transit tariffs



Source: own calculations

[5] All estimated transit tariffs change with gas import prices. However, since the respective price will always be the same for all three tariffs, the relative magnitude remains unchanged.

[6] During the same period, total imports will increase from 435bcm in 2015 to 582bcm in 2030 (IEA 2008).

[7] Russian exports to the EU are 230bcm in 2015, minus 118bcm maximum bypass capacity yields 63bcm. In 2030, exports are estimated at 270bcm minus 118bcm bypass capacity equals 103bcm.

Overall, this analysis demonstrates that the current transit agreement between Naftogaz and Gazprom does not provide sufficient incentives for investments into the Ukrainian GTS and that already pure modernisation investments are likely to require higher transit tariffs. At the same time, it is important to note that both, the investment volumes specified in the Master Plan as well as the estimated tariff levels seem to be reasonable. In fact, a comparison of tariffs for high-pressure gas transmission by the Council of European Energy Regulators (ERGEG) reveals that average transit tariffs in the EU are even much higher. For six selected transmission systems, the ERGEG estimated an average tariff of 5.35USD/tcm/100km (the lowest tariff is 3.55, the highest 7.82USD/tcm/100km, see Table 2). Hence, there should be sufficient scope for renegotiation in the current agreement. In addition to the transit tariff per se, also the requirements for transit volume should be re-assessed. While the current agreement specifies an overall volume of 110bcm per year, there are no explicit penalty clauses to enforce it. Hence, investors will carry a significant risk which they can hardly control for. To avoid this problem, a re-negotiated transit agreement should foresee a commitment of shippers (in particular Gazprom) to pay for booked capacity, independently of whether they will use it or not. Such a 'ship-or-pay' obligation is similar to the well-known 'take-or-pay' obligations in gas import contracts and enables the system operator to recover fixed charges on the investment such as debt service. In fact, such provisions are widely used for securing investments into gas transmission infrastructure in Europe and the US (Energy Charter Secretariat 2007).

Table 2

Transit tariffs in selected EU countries

Country	Company	Tariff (in USD/tcm/100km)
France	GRTgaz	4,58
France	TIGF	3,55
Denmark	Energinet.dk	7,82
Hungary	MOL	6,66
Netherlands	GTS (1)	5,54
Netherlands	GTS (2)	3,98
Average		**5,35**

All tariffs are calculated for a 5bcm shipment at a load factor of 0.88 over a distance of 350km. The original entry/exit tariffs have been converted to a commodity equivalent (in USD/tcm/100km)

Source: ERGEG (2007).

In addition to the Master Plan, the discussion on securing gas transits through Ukraine also focuses on allowing EU traders to buy natural gas at the Russian Ukrainian border and to ship it through the GTS to EU territory. Obviously, this would diversify transit relations and thus – to a certain extend – also the risks that arise from the present, one-sided structure (in particular, the risk that a commercial argument between Naftogaz and Gazprom turns into a political conflict between Ukraine and Russia). Also, since Ukraine does no longer bargain on low gas import prices in exchange for low transit tariffs, this would not contradict its national interests. In fact, Ukrainian policy makers tend to even favour this option. However, EU traders can not be forced to replace Gazprom as shipper and the incentives for them to do so are unclear. Typically, the existing long-term contracts foresee delivery points at the EU border. All important EU traders have recently renewed their contracts, often with concrete steps for mutual cooperation with Gazprom in Europe.[8] Hence, existing contracts already foresee that Gazprom bears the transit risk outside the EU and it would need a strong additional incentive for EU traders to change that. A possible option would be to offer beneficial terms for entry into the domestic gas market of Ukraine. Since gas import prices will be no longer discounted after 2009, supplying gas to industrial consumers at unregulated prices could be a promising option for EU traders. Moreover, the major EU trading companies

[8] In 2006, OMV (Austria), E.ON-Ruhrgas (Germany), Gaz de France and ENI (Italy) all announced that their existing contracts with Gazprom have been extended. In particular, OMV will receive gas imports of around 7 bcm/year until 2027, E.ON-Ruhrgas has agreed on total deliveries of 400 bcm until 2036 (including 20bcm/year for delivery to Waidhaus on the Czech-German border and 4bcm/year through Nord Stream) and Gaz de France will receive 12 bcm/year until 2030 plus additional 2.5 bcm/year from 2010 through Nord Stream. Italian ENI also extended its contract till 2035, including a volume of 3bcm/year which Gazprom will be able to sell directly on the Italian market (Energy Charter Secretariat 2007).

have significant experiences in purchasing gas from Gazprom and are capable to negotiate rather favourable terms which they could pass on to Ukrainian consumers. However, Ukraine's domestic gass market is currently in critical performance and severely threatened by bankruptcy of NAK Naftogaz, its biggest players. This clearly needs to be resolved and the market be placed on a sustainable development path. Against this background, the following section will discuss necessary steps to stabilise the market and to induce future developments.

3. Gas Sector Reform

In the light of this discussion, it is obvious why the joint declaration of the investor conference specifies a Gas Sector Reform Program as requirement for joint cooperation. However, the discussion above has already stressed that compliance with the relevant EU principles is clearly not the main challenge. In fact, while the main principles have already been stipulated, the sector and in particular the financial performance of NAK Naftogaz suffers from severe state interventions in gas pricing.[9]

In its core, the problem stems from domestic price regulations that policy makers imposed to cope with the substantial increases of import prices since January 2006. In particular, prices for residential consumers and district heating companies are set at rather low levels. With the strong increase in import prices in January 2009, this has caused severe imbalances. In this section we will analyse the newly adopted agreement on Russian gas imports as well as its impact on the domestic market.

2.1. Import regime

Essentially, the new agreement on Russian gas imports imposes flexible prices that adjust every three months depending on the development of fuel oil and black oil prices in the EU. Moreover, the agreement stipulates a 20% price discount in 2009 while import prices will be set at 'European levels' in the following years.

Generally, the shift to market prices and the adoption of a transparent and accountable pricing formula reduce the political and economic dependency of Ukraine from cheap Russian gas and thus, should strengthen supply security. However, it imposes a hard shock with almost no transition path. In assessing the economic implications of this agreement, two issues are of particular importance:

a) Does the agreement stipulate reasonable price levels?
b) Does the indexation to fuel oil prices reasonably reflect price developments on the EU gas market?

To evaluate the price level we compare present import prices with those in Germany, one of the major export destinations for Russian gas. Overall, the difference between import prices in Germany and Ukraine should reflect the higher transit costs for deliveries to Germany. Assuming a distance of 1700km from Ukraine to the German border and average transit costs of 5.5USD/tcm/100km, import prices should differ by around 90USD/tcm. Figure 3 compares the import price in Ukraine with two estimates for Germany. The Ukrainian price has jumped from 179.5USD/tcm in 2008 to 360USD/tcm in the first quarter of 2009 and back to 270USD/tcm in the second quarter. However, since the 2009 prices for Ukraine include a discount of 20%, the relevant price for further comparisons are 450USD/tcm as foreseen in the respective contract (UA-100%). As shown in Figure 3, this price decreases to 339USD/tcm in April 2009.

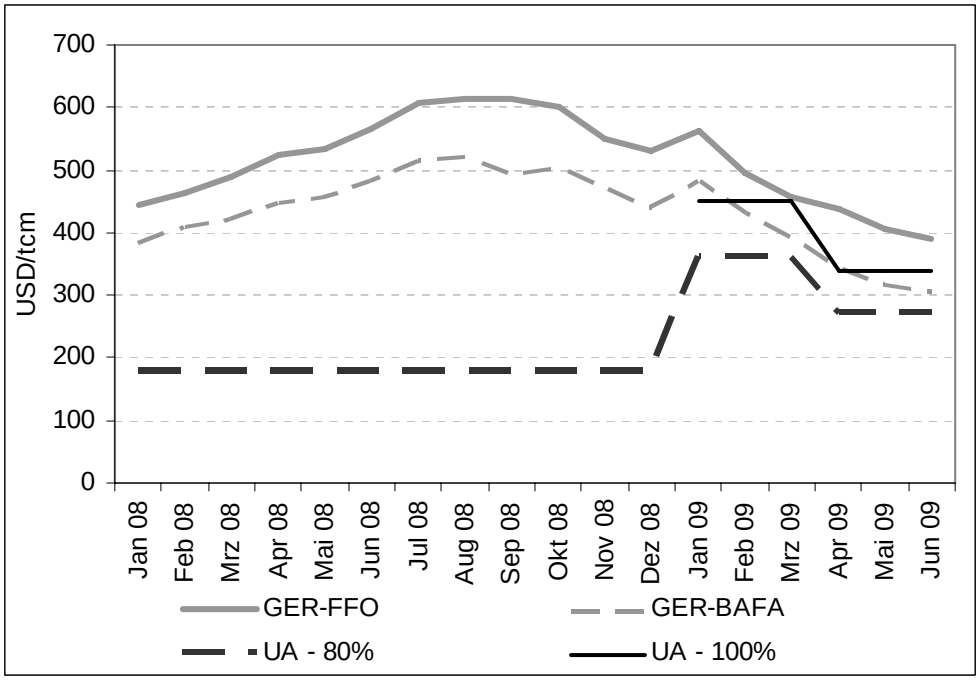
For Germany, Figure 3 displays two alternative estimates. The first (GER-FFO) is an estimate for the import price of Russian Gas at the German-Polish border (through the Yamal pipeline), the second (GER-BAFA) is the weighted average price for German gas imports from different

[9] See German Advisory Group (2008) for a discussion on current problems and details on required reforms.

countries as provided by the Federal Office of Economics and Export Control. As the comparison reveals, the import prices in Ukraine and Germany have strongly converged and the difference is mostly smaller than the costs of transportation would suggest. Hence, the price levels in Ukraine appear to be rather high by German (European) standards.[10]

Figure 3

Import prices in Ukraine and Germany



Source: Energate, own calculations.

As far as the indexation of gas prices to the oil market is concerned, the assessment is different. Since December 2008, the gas import price in the second quarter of 2008 has decreased by 25%. In comparison, the two import prices for Germany have declined by 23% (Ger-FFO) and 27% (Ger-BAFA), respectively. Hence, the indexation scheme in the current agreement seems to reasonably reflect the price changes for gas imports in Germany.

Overall, the conclusion from this short analysis is that the current agreement for Russian gas imports sets prices at relatively high levels. In 2010, when the discount of 20% will expire, this will become particularly severe. Hence, the pricing formula should be renegotiated. However, chances for obtaining better conditions are poor because in addition to pricing, the contract also stipulates 'take or pay' obligations at rather high volumes which Ukraine will not be able to consume due to the economic crises. Hence, negotiations will have to focus mainly on reducing the penalties for lower gas consumption and to change those obligations for subsequent years. While this limits the chance to realise an overall more beneficial agreement, it demonstrates the benefits that market entry of EU traders could bring along since they are capable to negotiate own gas imports at more beneficial terms.

2.2. Domestic price regulation

As stated above, price regulation on the domestic market constitutes a major barrier to economic improvements in the gas sector. While prices for industrial consumers are generally determined by market forces, they are regulated for two types of consumers (see appendix 2 for further details):

[10] In fact, the difference between UA-100% and GER-FFO exceeds the 90USD level only for January and April 2009, while GER-BAFA is even lower than UA-100% in four out of the first six months of 2009.

Residential consumers pay a price which is estimated to cover the costs of domestic gas extraction. Because domestic extraction almost matches household consumption volumes (20bcm), this regulation does not immediately induce financial losses.

District heating companies consume imported gas but pay regulated prices that account for only about 40% of import prices. Since Gaz Ukrainy – the trading company of NAK Naftogaz – is obliged to supply these companies, it incurs substantial financial losses.

Using a model of Ukraine's gas market as described in German Advisory Group (2008) we estimate overall cash flow and financial losses in the domestic market (excluding the costs and revenues from gas transit). Results of this calculation are shown in Table 3. To cope with the increasing import prices since 2006, policy makers and regulators have introduced additional charges on industry prices to collect further revenue. In particular, a 'Realisation Charge' is directly collected by Naftogaz to (partly) compensate for the losses from supplies to residential consumers and district heating companies, and an additional 'Extra Charge' is collected by the government to balance cash flows in the overall sector. As the calculations show, this scheme has worked sufficiently well in 2008 as indicated by a slightly positive overall balance in this year. In 2009, however, this system will no longer work because import prices are expected to increase by 30% (year-on-year) to an estimated annual average of 235USD/tcm, industrial demand is expected to decrease by almost 40% due to the economic crises and the Ukrainian currency is strongly devaluating. As a result, the 30% increase in import prices in USD causes import prices in UAH to double. Obviously, this limits the scope for additional charges on industry prices while it increases the losses from regulated supply to district heating companies. According to our calculations, industry prices (in UAH) are expected to increase by almost 80% on average (the strongest increase already occurred in the first quarter of this year) while losses from supplies to district heating companies will almost triple (Table 3). For residential consumers, NERC increased prices in December 2008 by 35%.[11] As the costs of domestic gas extraction remain rather constant, this is expected to considerably reduce losses from gas supplies to residential consumers. Finally, also domestic gas transportation is expected to generate financial losses in 2009 (Table 3). Currently, transportation costs are covered by an additional charge on all transmitted volumes, which NERC has raised for the last time in September 2008.[12] While we expect that the transportation charge was adjusted so as to cover the costs of gas transportation in 2008 (based on an import price of 179.5USD/tcm), it will clearly generate losses in 2009 when the import price increases to an annual average of 235USD/tcm. Overall, we estimate the financial losses of Naftogaz in the domestic gas market at UAH 20.3bn (USD 2.5bn). Considering market income and 'Realisation Charge' proceeds of UAH 6.1bn (USD 0.8bn) this causes net losses of UAH 14.2bn (USD 1.8bn). Including the income of other traders who sell gas to industrial consumers as well as the proceeds from the 'Extra Charge', the overall balance of the sector displays a loss of UAH 12.2bn (USD 1.5bn) or 1.3% of nominal GDP.[13]

[11] NERC resolution #1239 as of October 25, 2008.

[12] NERC resolution #935 as of August 2008.

[13] Based on an expected nominal GDP in 2009 of UAH 930.8bn (USD 116.1bn).See IER: *Macroeconomic Forecast Ukraine – update*. No.5 (21), May 2009.

Table 3

Domestic gas prices and cash flow in the Ukrainian gas sector

	2008	2009E	2008	2009E
Prices:	*- in UAH per tcm -*		*- in USD per tcm -*	
Import price	898	1880	180	235
Price for industrial consumers*	1312	2346	262	293
Price for district heating companies **	656	727	131	91
Price for residential consumer***	442	597	88	75
Revenue and losses:	*- in m UAH -*		*- in m USD -*	
Naftogaz:				
Market income****	849	1618	170	202
Revenue from Realisation Charge	3586	4487	717	561
Losses from supplies to:				
- district heating companies*****	-5510	-16156	-1102	-2020
- residential consumers	-2494	-625	-499	-78
- domestic transportation	0	-3544	0	-443
Naftogaz balance	**-3569**	**-14221**	**-714**	**-1778**
Net income of other traders	**684**	**623**	**137**	**78**
Revenue from Extra Charge	**4941**	**1409**	**988**	**176**
Total balance	**2056**	**-12188**	**411**	**-1524**
in % of GDP	*0.2%*	*-1.3%*	*0,2%*	*-1,3%*

* Including supplier"s margin, realisation costs, extra charge and storage, transportation and supply costs, without VAT

** Including extra charge and storage, transportation and supply costs, without VAT

*** Weighted average of prices for different consumer types (by consumption volume), including extra charge, storage, transportation and supply costs, VAT

**** The market income of Naftogaz (Gaz Ukrainy) is the product of wholesale margin and the relevant trading volume.

***** Based on a payment rate of 70%

Source: own calculations (see appendix 2).

Overall, these projections demonstrate that current price regulations severely endanger the financial viability of NAK Naftogaz. While the company has already generated losses during 2008, this has dramatically accelerated since January 2009 while covering those losses by proceeds generated within the sector will no longer be possible. Even worse, this development can be expected to continue in 2010 when the 20% discount on import prices will be cancelled. As a result, bankruptcy of the largest market player becomes increasingly likely, which impedes the economic development of the sector and prevents market entry of firms with decent economic objectives. Hence, eliminating the price distortions that are in the heart of this problem must be a main element in the Gas Sector Reform Program for 2010-2011 to attract investments, which the Ukrainian government has committed itself to present.

4. Policy recommendations

The paper highlights that developing a Gas Sector Reform Program for 2010-2011 to attract investments requires improvements in the current transit and import agreements with Gazprom and reforms of the domestic market with a particular focus on the pricing system. In this section we will provide the main recommendations that should be followed.

Improve current transit and import agreements with Gazprom

As we argue above, the current agreements on transit and imports both need to be re-negotiated. Although both contracts are generally valid till 2020, the strong impact of the current economic crises on gas demand in Ukraine and the EU with its strong impact on import and transit volumes constitutes an important event which justifies this request. Generally, such a request does not automatically alter Ukraine's reputation as a reliable partner in transit operations. In fact, renegotiation of existing contracts is common business practice everywhere in the world, especially if those contracts stipulate long term agreements. In

addition to the fundamental change of basic assumptions of the transit agreement (reduced transit volumes through Ukraine and lower domestic consumption volumes in Ukraine), the concrete proposals for modernising existing pipelines or building new ones also justify a request for renegotiations since Gazprom as main shipper would benefit through increased technical reliability. Hence, a request for renegotiation is justified by a number of developments and intentions. Moreover, it does not deteriorate Ukraine's reliability as transit country as long as everything is performed properly. To this end, achieving the best possible results requires that political tensions during the negotiations are avoided by as much as possible. Therefore, both parties should first mutually agree on how to proceed with negotiations. This should inter alia address the following questions:

- Who will be appointed as negotiator on both sides and which authorization do negotiators need?
- Which topics will be negotiated?
- Who can be called upon as arbitrators in case both sides fail to reach an agreement (ideally, each party nominates a given number and accepts those nominated by the other party)?
- In which period should the negotiations take place?
- Which topics will be on the agenda for negotiations?

As far as the agenda for negotiations is concerned, the above analysis has demonstrated that the following issues should be discussed:

Transit agreement (highest priority):

- Adjustment of transit tariffs to 'European levels' which we expect to be in a range from 3.50 to 5.50USD/tcm/100km (based on the comparison by ERGEG as shown in Table 2)
- Inclusion of a 'Ship or Pay' obligation under which the shipper (Gazprom) needs to pay for reserved transit capacity independently of actual transit volumes.

Import agreement:

- Adjustment of the volumes under 'Take or Pay' obligation to the current development of gas demand in Ukraine.
- Renegotiation on the benchmark price level (450USD/tcm) since actual market developments have revealed lower price levels.

Start reforming the domestic market [14]

As the discussion in the previous section demonstrates, the current pricing scheme is not sufficient to balance losses and income of all market players. Rather, it creates a severe, systemic risk for the financial performance of NAK Naftogaz. To improve this situation, the domestic market requires significant reforms. Key priorities are to stabilise the financial performance of NAK Naftogaz by separating loss-making supply obligations in an independent entity, improve domestic price regulation and provide incentives for privileged consumers to reduce their energy consumption. Hence we recommend the following:

Set up a public entity fully independent from Naftogaz with the obligation to supply gas to residential consumers and district heat generators at regulated prices. The entity will purchase gas from domestic producers at regulated prices and from the wholesale market at market prices. To the extent that this will cause losses, the government of Ukraine will have to compensate the entity in order to ensure future supplies to privileged consumers. Because the entity is legally and economically independent from all existing entities within Naftogaz, possible financial turmoil has no direct impact on the financial performance of Naftogaz.

[14] For more detailed recommendations on reforming the domestic gas market see German Advisory Group (2008).

Apply a short transition period (e.g. three years) within which prices for district heating companies have to adjust to market prices. To stimulate necessary reforms in the district heating sector, shift from compensating the gas-supplying entity to compensating the heat generator and then gradually reduce the compensated amounts. In this way, local authorities will have stronger pressure to increase heat tariffs and improve efficiency.

Impose a price formula to determine domestic gas transportation costs based on the costs of capital and operational costs (including fuel costs). Allow transportation costs to change within reasonable periods (e.g. by quarter).

Assess the energy needs of residential gas consumers, specify appropriate thresholds for essential gas consumption and implement a tariff system that benefits consumption volumes below the essential consumption level while taxing higher ones![15]

Improve the general regulatory framework so as to stimulate competition and investment by following the principles set out in the EU energy directives (i.e. mandatory unbundling of the operation of transportation and distribution systems, regulated third party access to all networks and the gradual opening of all markets).

[15] For details see German Advisory Group (2006).

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Appendix 1

Estimating cost-covering transit tariffs

Estimation of capital expenditures:

- Costs for engineering and project management (7% of fixed assets), insurance (1%) and contingency (12.5%) have been added to the foreseen investment volumes in fixed assets as shown in Table 1 (these assumptions are based on Energy Charter Secretariat 2007, Table 4.1). This results in overall investments of USD 3.6bn (modernisation) and USD 5.7bn (new pipeline), respectively;
- Construction periods are seven years for modernisation and five years for the new pipeline. Total investments are spread over this period as shown in the Master Plan;
- Weighted average costs of capital are set at 20%. Interest charges during the construction period apply;
- Fixed assets depreciate linearly over the project lifetime (15 years for modernisation, 30 years for the new pipeline;
- Annual capital costs (capex) are calculated as sum of depreciation and return on capital.

Estimation of operational expenditures:

- Non-fuel related operational expenditures (*opex*) have been calculated in accordance to the values given by Energy Charter Secretariat (2007, Table 4.1);
- Fuel-related *opex* are calculated based on the installed capacity of the compressor stations, assuming a gas import price of 250USD/tcm.

Transit tariffs for the first five years of operation are calculated by dividing the sum of average *opex* and *capex* during the first five years over the transit volume and the average length of the respective pipeline.

Appendix 2

Modelling domestic gas pricing in Ukraine

Current pricing schemes distinguish three types of consumers, (a) industrial consumers (including thermal power generators and gas transportation), (b) district heating companies, and (c) residential consumers. For each type, a different pricing scheme applies:

(a) Industrial consumers:

- buy gas on the wholesale market at unregulated prices which are determined by *import prices* and *wholesale margins*. Wholesale prices are capped by several decrees of NERC;
- are charged an additional mark-up on wholesale prices, the so-called '*realization cost*', for covering the losses of Gaz Ukrainy from supplying gas to the other two consumer groups (see below);
- pay an *Extra Charge* of 2% (0% for the chemical industry) on wholesale price and realization costs; and
- pay *storage fees* as well as (average) *transportation and supply costs*.

(b) District heating companies receive gas deliveries from Gaz Ukrainy at regulated prices set by CabMin. They also pay an Extra Charge of 2% as well as average transportation and supply costs.

(c) Residential consumers have a special privilege: their annual consumption volume of about 20bcm approximately matches the volume of domestic gas production. To keep residential gas prices as low as possible, the three Naftogaz subsidiaries that together produce about 93% of domestic volumes[16] are ordered to sell all output at regulated prices to Gaz Ukrainy, which supplies the gas to residential consumers. Prices are set by CabMin so as to cover the costs of gas extracting companies plus a 4% Extra Charge, average transportation and supply costs and VAT.

In accordance with current legal practices in Ukraine, prices are set according to:

$$P = (Pw + Cr) * Ce + T$$

where P is the consumer price net of VAT, Pw is the wholesale market price (= import price + wholesale margin), Cr is a *Realisation Charge*, Ce is an *Extra Charge* and T denotes a storage fee and average transportation and supply costs. For residential consumers, Cr=0 and Pw is given by the regulated sales price for domestic gas.

[16] Ukrgazvydobuvannya (14.7 bcm), Ukrnafta (3.2 bcm) and Chernomorneftegaz (1.3 bcm, all in 2007).

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