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Adjusting gas prices to unlock Ukraine's economic potential

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Adjusting gas prices to unlock Ukraine's economic potential

Executive Summary

Ukraine imports gas from Russia at a price of USD 416 per thousand cubic metres (tcm). At the same time, gas is sold within Ukraine for a much lower price: Householdspay as little as 83 USD/tcm and heating companies pay only 136 USD/tcm. This huge price mismatch has a wide range of severe economic effects. Firstly, the cost of gas price subsidies, including the administrative price setting of gas extracted in Ukraine at only 53 USD/tcm, add up to a massive 6% of GDP. This is money that needs to be paid for by the population through higher taxes or a lack of funding for health services, better education and infrastructure. Secondly, because low prices for households and heating companies encourage wasteful energy use, Ukraine needs to import over 74% of its gas demand.As such, subsidised gas prices are the single major economic and fiscal barrier to higher economic growth and prosperity in the country.

Given the high prices currently paid by Ukraine for its imported gas in comparison to Western European countries negotiating better terms is a legitimate undertaking. However, the fundamental problem will remain and there is little doubt that gas prices for households and heating companies have to be raised. In this context a number of crucial implementation questions arise: When to raise prices? By how much should prices be increased? Which other policy measures are necessary to accompany price rises? How to communicate this policy with the population in order achieve approval? The key for a successful price adjustment lies in finding the right answers to these questions.

A starting point in finding the right policy is the relationship between price and demand for gas. Economic theory and empirical evidence clearly show that demand for gas is high when the price of gas is low and vice versa. Thus, by increasing gas prices Ukraine can reduce gas demand and its need for imports. Falling gas demand would also go a long way in softening the impact on consumers' energy bills.

However, the speed and the size of the reduction of demand following a price increase depend on a number of conditions. Indeed, the government can actively impact how demand will respond to rising prices. Firstly, the population has to understand that for many years to come gas (and heating) prices will increase ("one-way road"). This will create the strong incentives needed for reducing consumption and investing in energy efficiency. Consequently, policy makers should not just announce a one-off price increase, but a series of gradual price increases over the coming years. In order for this announcement to be credible the immediate price increase has to be substantial.

Secondly, the government at the central and local level has to create the technical preconditions for a swift reduction in demand. In particular, more meters need to be installed and other measures that allow consumers to reduce demand are to be implemented swiftly. Cooperation with foreign international financial institutions and donors can provide substantial assistance here. By doing so, the government will show to the population that people are not let alone with higher prices and higher energy bills. This will contribute to a better acceptance of the measures.

It is necessary to implement a significant increase of gas prices in the nearest future. Once prices go up, the pressure on authorities “to do something” will increase and thus accelerate reforms. Postponing price increases until the technical preconditions are there is not an option, since without political pressure little will happen.

Keeping households’ energy bills low is a legitimate concern. However, instead of subsidising prices the government should help households to reduce the amount of energy they need. Doing so would signal a major policy shift and has the potential to solve one of Ukraine’s key economic problems. A much more favourable macroeconomic, fiscal and investment climate would be the result unlocking Ukraine’s enormous economic potential.

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1 Introduction

The debate about gas tariffs in Ukraine – while over two decades old – hasyet failed to answer some of the fundamental underlying questions, such as:

i. At what level should gas tariffs be set in the absence of working markets?

ii. What are the relevant benchmark prices for gas tariffs (import costs, the cost of domestically produced gas or European market prices)?

iii. Do the various gas tariffs reflect this benchmark and is there a need to adjust gas prices for individual consumer groups?

iv. How would a gas tariff increase affect gas demand and energy bills?

v. How would it affect the costs for subsidies?

vi. What can the government do to accompany the process and keep the overall economic costs to a minimum and maximise the economic benefits?

This policy paper aims at answering these questions starting with rationale for higher prices in section 2. Specifically, we ask what the relevant benchmark prices for gas tariffsin Ukraine are. We then compare the benchmark with the existing gas tariffs for the various consumer groups. Consequently, we can determine the need and scale for a gas price adjustment.

Section 3 of the report looks at how a potential gas prices increase would affect demand for gas and, in turn, the gas bills households and companies would face. To answer this question we consider past and international evidence on how consumers react to changing energy costs. Also in section 3 we ask what would be the impact on the massive subsidy costs the Ukrainian population is currently shouldering in order to keep gas tariffs below their relevant benchmark prices.

Finally, in section 4, we explore how a policy that aims at aligning gas tariffs with benchmark costs should be implemented. Specifically, we outline what the government can do to minimise the costs of increased gas tariffs for households and companies while maximising the benefits such as reduced gas consumption and saving on subsidies for gas tariffs.

2 Rationale for energy price adjustment

One of the fundamental questions within the gas price debate is the question about the appropriate level for gas tariffs. To answer this question we consider what determines the actual costs of gas in Ukraine – the so-called benchmark prices – and if the various tariff groups reflect it. Comparing both, current tariffs and the relevant benchmark prices, provides us with an indication about the adjustment need for gas tariffs in Ukraine.

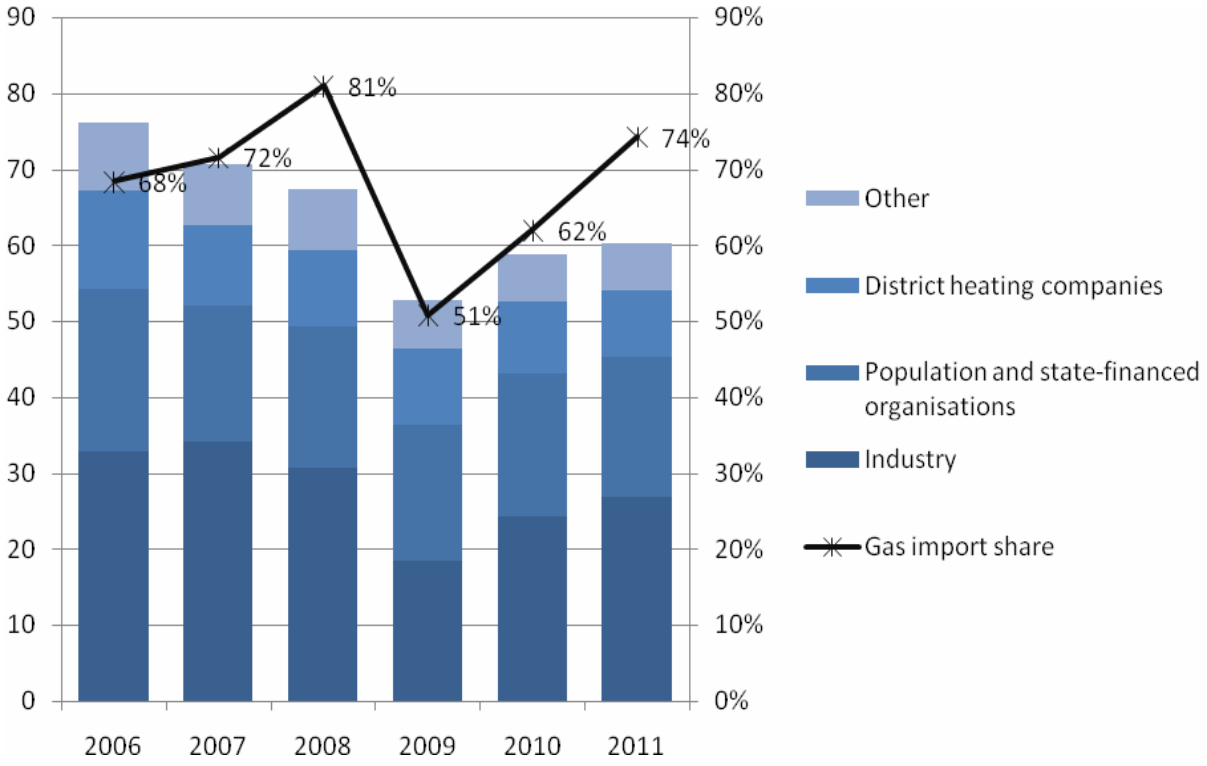
2.1 What is the benchmark price and do current prices reflect it?

In well working markets prices reflect a balance of demand and supply. In Ukraine gas and heating tariffs are administratively set and regulated. Without the market mechanism determining prices the question is, if current tariffs are at an appropriate level.

The price of a good or service should reflect the costs of obtaining it. In the Ukrainian case a large share of gas demand needs to be imported from Russia. In 201174% of total domestic gas consumption had to be covered through imports(Enerdata, 2011). The cost of importing gas from Russia is well-known and widely discussed. Currently, the gas price is USD 416 per thousand cubic metres (tcm) of natural gas[1].

Figure 1

Total gas consumption by user groups (bn cm, left hand scale) and gas import share (in % of gas consumption, right hand scale)



Source: Enerdata (2011)

Furthermore, supplying households and companies with gas incurs further costs for billing, transporting the gas to the end user and administrative overheads. In Europe the additional overhead account for around 35% of household tariffs(DREWAG, 2012). Determining the level of these additional costs in Ukraine is difficult as the actual gas tariffs are largely administratively set. In this paper we assume, rather conservatively, that overheads for transport and administration account for 25% of average gas tariffsfor different consumers groups. Consequently, the benchmark for gas tariffs, in order to cover the import costs of gas and the additional cost of supplying for companies and households, is likely to be around USD 520 per thousand cubic metres.

This reflects theactual costs of supplying gas and hence theminimum forgas price tariffs. Any price lower than this benchmark will result in losses whichhave to be covered by the

[1]The current price of 416 USD/tcm is rather high when compared with European prices. As such, trying to lower it through negotiation is a legitimate undertaking. While any future adjustments will change some of the numbers in this analysis it is unlikely to change the overall need for rising gas tariffs.

government and, eventually, recouped through higher taxes or by reducing public spending in other areas.

Box 1

Are domestic production costs a relevant benchmark for gas tariffs?

Although, Ukraine has significant domestic gas resources, this has little relevance for the benchmark price of gas tariffs.

Firstly, the cost of extracting gas, currently around USD53tcm are administratively set and do not reflect the actual production costs. Secondly, this*arbitrarily set price does not reflect opportunity costs. Indeed, Ukrainian gas extracting companieslose significant revenues for each unit sold as this price.*If *domestic gas producers*were *able to set price on their own, the price would be close to the import costs of 416 USD/tcm as this is the price companies could achieve when competing with Russian imports. As such, the government taxes companies for each unit of gas extracted with 363 USD/tcm (and consequently subsidises gas consumers with* 363 *USD/tcm.)*

With most gas producers in Ukraine being actually in state-ownership, the government loses potential revenues of around 366 USD/tcm for each unit of gas it sells at the subsidised cost of 53 USD/tcm.

Consequently, forcing prices for domestically produced gas to stay at 53 USD/tcm is just another way of subsidising gas prices. It does in no way reflect the cost of gas and can thus not serve as a benchmark for gas tariffs.

Thus, the minimum price for gas in Ukraine is 520 USD/tcm. Having established the relevant benchmark price for natural gas in Ukraine we will compare it with the current level of prices being paid in the various segments of the markets. Consequently, we can deduct the extend of any potential need for adjustment.

2.2 Current prices for gas and adjustment need

Prices for gas and heating are currently regulated by NERC[2]and local municipalitiesfor local heating companies with heat generating capacity less than 20 Gkal/hour. Gas prices differ according to the consumer group with residential users generally enjoying lower rates than commercial users and industrial companies.

Householdgas tariffs increase depending on annual consumption with residential users which use less than 2500 cbm per year applicable for the lowest rate of 83 USD/tcm [3] (NERC, 2012).While tariffs are higher for consumers with higher annual

[2]Legally, the rights to develop and approve the heat tariffs for heating companies with installed capacity more than 20 Gkal/hour belong to recently established National Commission of Utilities market Regulation but before it will become operational its duties are performed by the NERC.

[3]We use the rate for households without gas meters. Consumers with gas meterspay 10% less than those that have their gas consumption estimated without a meter.

consumption levels, the overall cost are well below the established benchmark costs of 520 USD/tcm.

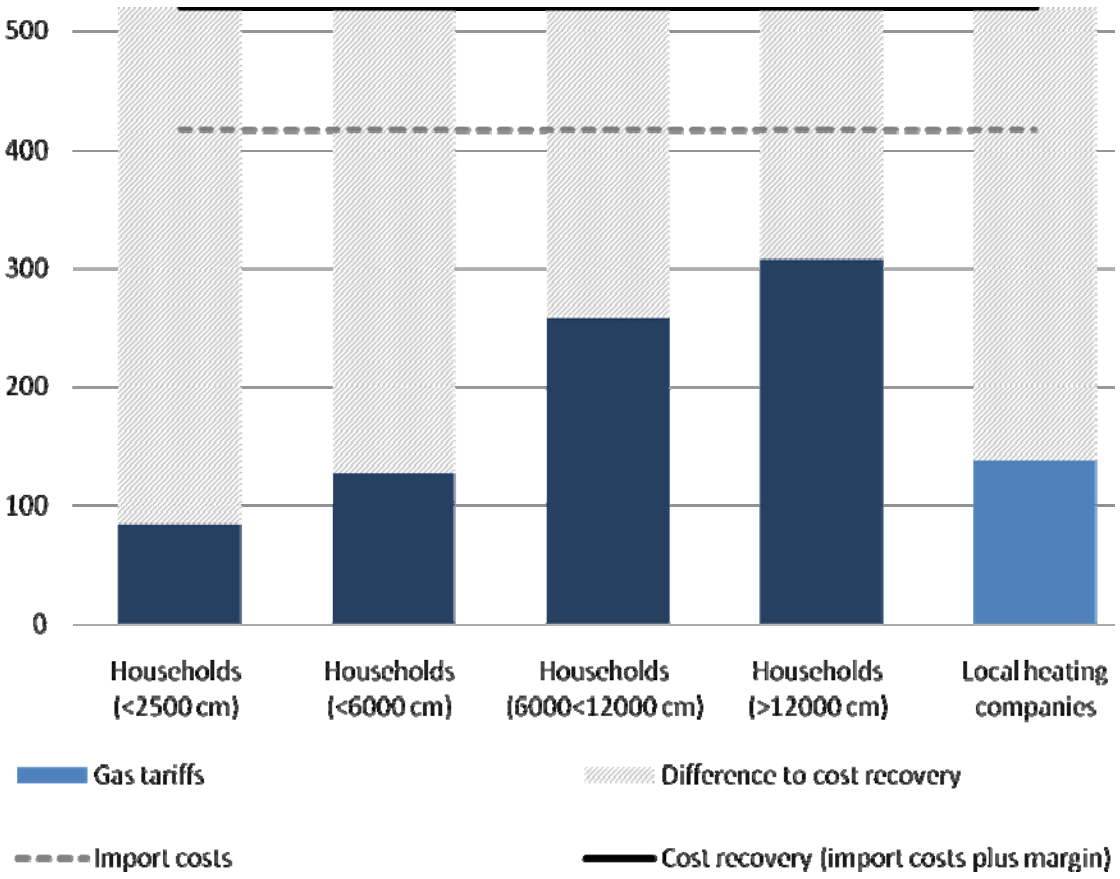
Furthermore, most consumers fall into the two lowest tariff bands. It is estimated that around 40% of the households belongto thefirst tariff band (83 USD/tcm) and the majority of household users consuming less than 6000 cm per year(Hi-chun Park, 2009). As such, there is a large discrepancy between household tariffs and the benchmark costs of 520 USD/tcm (see Figure 2).

The second consumer group with a large discrepancy between the tariffs they pay and the cost recovery level of gas are heating companies. Indeed,local heating companies currently pay only around 136 USD/tcm – substantially below the benchmark costs of gas.

The problem is less acute with industrial users and budget institutions – with tariffs significantly closer to the current cost recovery level of 520 USD/tcm. Indeed, some users with access to the pipeline network can negotiate their terms directly with Gazprom. Therefore, our analysis will concentrate on the adjustment need for households and heating companies.

Figure 2

Gas tariffs for different consumer groups and benchmark prices



Source: Own analysis based on (NERC, 2012)

As such, the data show that households and heating companies are the two user groups that receive gas at highly subsidised rates.Indeed, as Table 1 shows that there is a massive adjustment need for these user groups. Households in the lowest tariff band

(below 2500 cm annual consumption) do currently only pay 16% of the actual cost of providing gas. Likewise, heating companies do pay only around one quarter of the benchmark price of gas.

Table 1

Current gas prices and adjustment need by consumer group

Consumer group	**Tariff in USD**	**Difference to cost recovery (import costs plus margin)**	**Currentcostcoverage**
Households (<2500 cm)	83	333	16%
Households (<6000 cm)	126	290	24%
Households (6000<12000 cm)	258	158	50%
Households (>12000 cm)	308	108	59%
Localheatingcompanies	136	280	26%

Source: Own analysis based on (NERC, 2012)

With an evident need to align gas tariffs with the cost recovery level it is important to understand what the impact of rising prices will be. The main impacts of a potential rise of gas prices will be discussed in the following section of the report.

3 The socio-economic impact of higher energy tariffs

There is a significant need for price adjustments in the Ukrainian energy market. Especially households and local heating companies pay only a small share of the benchmark price. However, adjusting energy prices will have wide economic ramifications.

First of all, increasing the price of gas is likely to lead to reduced demand for energy. Secondly, there will be an impact on the amount of money households and companies will have to spend on energy bills. Thirdly, with the gap between import costs and tariffs closing, increasing gas prices will reduce the cost of subsidising energy consumption. However, there will be some additional cost from higher government spending on social benefits. In the following section of the report we estimate the impact of rising gas prices in these four areas.

3.1 Demand for energy products

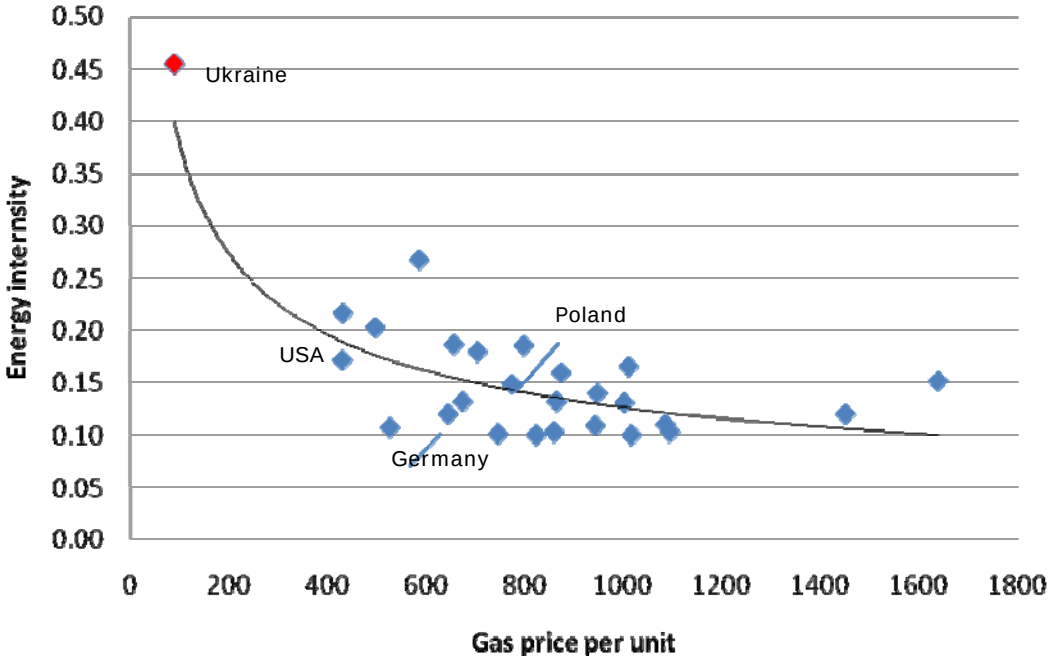
Energy demand, like many other goods, shows a strong relationship between price and demand. High prices depress demand while low prices increase affordability and in turn demand. Indeed, there is sample evidence thatlow energy prices observed in Ukraine – especially for gas and heating tariffs – are a key factor for wasteful energy use.

To illustrate this point we have analysed the relationship between average energy prices and relative energy consumption among different countries. Figure 3 shows the results of

this analysis. It illustrates the relationship between energy demand (we use the amount of energy consumed for each unit of goods and services produced) and average household gas prices. It confirms that countries with low gas prices generally consume more energy. Indeed, Ukraine with household gas tariffs below 100 USD/tcm for a large share of residential consumers is one the country with the highest energy demand in the sample[4]. The Danish economy, in comparison, with a high residential tariff consumes comparatively little energy. Energy intensity here was 0.12 koe in 2009.

Figure 3

Relationship between household gas prices* and energy consumption**



Source: Own calculations based on Enerdata (2011) and (OECD/ IEA, 2011)

**2010 Householdgas prices measured in USD/10^7 kcal gross calorific value*

***2010 kg of oil-equivalent per unit of gross domestic product measured in 2005 USD purchasing power weighted*

Consequently, for Ukraine, a major result of adjusting energy prices would be a reduction in energy consumption. This could be illustrated as moving down the curve displayed in Figure 3.

However, it is not clear if the benefits of reduced energy consumptions will materialise immediately. Indeed, a legitimate concern in the Ukrainian context is that while energy price increases would take effect instantly, consumers will find it difficult to adjust their demand in the short run. Unlike other goods, energy and gas consumption is often not discretionary. That is, households and commercial users have little choice but to continue

[4]Clearly, low gas tariffs cannot explain all of Ukraine's high energy intensity. For example, the country's large heavy industry sector and cold climate may explain some of the above average energy demand.

using energy at higher costs if prices increase. Only in the medium and long term can consumers make changes that allow them to shift to other energy sources, reduce consumption and increase efficiency.

To shed some light on the responsiveness of energy demand to price changes it makes sense to review existing studies and empirical evidence (see Box 2). The existing literature confirms the notion that energy demand is less responsive to price changes than other goods. Furthermore, it takes time for consumers to adapt to higher prices. Nevertheless, past experience suggests that each 1% increase of the price for gas would lead to a reduction of energy demand of around 0.5%.

Box 2

How does energy demand respond to changes inprices?

The responsiveness of demand of a good to changes in its price is in economics often expressed as elasticity. The elasticity of demand measures how demand will change if the price of a good changes by 1%.

For energy, elasticity is often below 1 in absolute terms. That means an increase in prices is usually not reflected in a corresponding change in demand. This confirms the notion that consumers find it difficult to use less energy if the price it goes up. Also, using energy is not discretionary as it is often connected to essential activities as cooking or heating living spaces.

Table 2

Literature review of gas and energy demand elasticity

Study	Short run	Long run	Sector	Fuel
Bohi & Zimmermann (1984)	-0.2	-0.3	Residential	Natural gas
Liu (2004)	-0.2	-0.77	Residential	Natural gas
Liu (2004)	-0.12	-0.5	Industrial	Natural gas
Kouris (1983)	-0.15	-0.43	All	Final energy demand
Prosser (1985)	-0.22	-0.4	All	Final energy demand
Bentzen and Engsted (1993)	-0.14	-0.47	All	Final energy demand
Bernstein & Griffin (2006) RAND	-0.12	-0.36	Residential	Natural gas

Empirical evidence suggests that a 1% increase in prices will only lead to 0.1-0.2% decline in demand in the short term. In the long term – more than one year after the price change – consumers are able to respond more effectively as it takes time to adjust behaviour. Furthermore, energy savings measures can only be implemented after some time. Eventually, each 1% price increase is likely to lead to around 0.5% decline in demand.

Source: Own analysisbased onD R Bohi and M B Zimmerman (1984), Gang Liu (2004), M.A Bernstein and J. Griffin (2006),Prosser Richard D (1985), Jan Bentzen and Tom Engsted (1993)

The implications for Ukraine a manifold: The data suggest that countries with higher energy prices use less energy and are more efficient in their energy use. By increasing gas prices, the Ukrainian government will set the incentives for reducing energy demand.

However, how much and quick consumers react to a gas price increase depends on many factors. For example, our literature review indicates that countries with high energy demand are more responsive than those that are already frugal energy users.

Furthermore, the speed and scale of consumers'response can be actively influenced by the government by using a credible and transparent adjustment strategy (see section4). For example, the government needs to make it clear that prices will have to go up and underline its commitment for a policy change. It also should outline the future adjustment path by clearly communicating what price levels will be and how it intends to get there.

Clearly, reducing demand for energy would be a major benefit of increased gas and energy prices. As such, it could mitigate some of the additional costs consumers would have to face. Nevertheless, there will be some increases in the costs households and companies faces.In the following section we estimate how gas price increases would affect the amount of money consumers spend on energy – and in turn the revenues gas providers receive.

3.2 The impact on expenditure and revenues

If gas prices would go up, whatwould be the impact on the amount of money consumers need to spend on gas bills? Spending on their energy bills depends on two factors – quantity and price. Concerning gas prices there is plain evidence of a need to bring them in line with the cost recovery level. In particular, heating companies and households pay tariffs considerably below the benchmark costs for gas.

The second factor that affects gas expenditure is gas demand. Demand is likely to be affected by a potential price increase. To recap, empirical evidence shows that consumers reduce the amount of gas by 0.5%for each 1% price increase. For example, if prices rise by 10% demand, with some delay, is likely to fall by 5%. As such, total costs of a gas price rise for consumers (an in turn the revenues Naftogaz will receive) depend on how consumers react to a prices rise.

To illustrate the impact of rising gas prices on energy costs for consumers it makes sense to consider an example. For illustrative purposes, we assume a gas price increase by 30% for households and 58% for heating companies – in line with IMF demands[5]. The tariffs for other commercial users would remain unchanged.

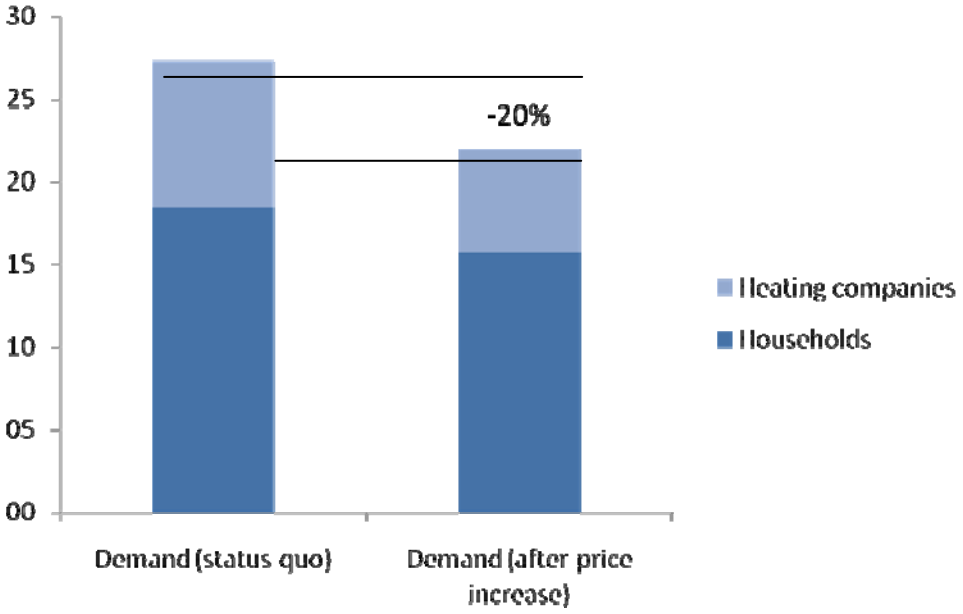
With heating companies facing the highest increase, they are likely to reduce demand the most. If we assume the same responsiveness of demand as suggested in the literature, the 58% gas price increase could lead to a reduction of demand of around 30%. Households, the other consumer group affected by the price hike, are likely to reduce demand over time by 15%. Industrial users would not be affected by the price rise.

[5]Please note that the IMF position suggests that gas distributors and heating utility companies should see the gas price paid to Naftogaz increase by 30 and 58 percent, respectively, with full pass-thru to end-users. The associated rise in end-user tariffs will be lower than 30 and 58 percent for gas and heating assumed here. The exact figures will depend on the weight of transportation and other costs in the composition of the end-user tariff.

Overall, we would expect a decline in gas demand ofaround 5.3 bn cm as consumers adjust to higher prices - the equivalent of around 20% of current demand from households and heating companies. To put this into context,the Ukrainian economy used 55.1 bn cm of natural gas in 2011. The assumed gas price increase would thus reduce by overall consumption by around20% when the effects have fed through to the economy (see Figure 4).

Figure 4

Impact of the assumed gas price rise on demand from households and heating companies, in bn cm



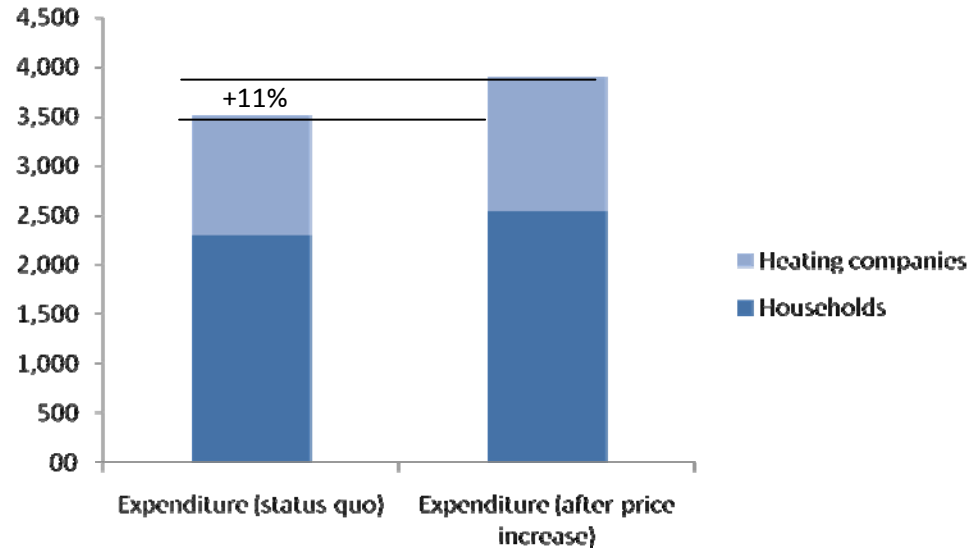
Source: Own analysis

As such, the reduction in demand, after consumers have adjusted to higher prices, could mitigate some of the increases in gas tariffs. However, as mentioned above, energy demand is generally less responsive to price changes than other products. Additionally, the adjustment takes time.

Nevertheless, as households and heating companies react to higher prices by reducing gas consumption it is likely that the increase in prices would not affect expenditure on energy proportionately. Indeed, taking into account the projected decline in demand the rise of gas prices of 30% for private households and 58% for heating companies would only lead to a 11% increase in gas related expenditure forthese user groups (see Figure 5).

Figure 5

Impact of the gas price increase on gas tariff expenditure by consumer group, USD m



Source: Own analysis

Looking a bit closer at the two consumers groups that are affected by the illustrative gas tariff increase we would expect expenditure for households to increase by 11%. Heating companies would see their expenditureon gas consumption increase by 12%. Other user groups would not experience any change as tariffs for industrial users remain the same.

Compared with the estimated annual expenditure of USD 11.5 bn in 2011 for the whole of Ukraine, the tariff increase for households and heating companies would lead to additional annual cost of USD 390 m – an increase of 4%. Clearly, this assumes that households and companies would adjust their demand in line with international experiences. Indeed, one of the major benefits from aligning tariffs with import prices would be the incentive to reduce gas consumption and increase energy efficiency.

3.3 Impact on subsidies and cross-subsidies

Increasing prices does not have to lead to a corresponding increase in costs as consumers will inevitably have the incentive to reduce gas demand. The government should assist and encourage gas consumers here – for example by supporting energy efficiency improvements. Nevertheless, there may be an overall increase in gas tariff expenditure especially immediately after gas tariffs are raised. While this means a financial burden for households it also reflects higher revenues for Naftogaz.

Indeed, as highlighted earlier, tariffs for some consumer groups (notably private households and heating companies) are considerably below the relevant cost recovery levels. Each unit of gas sold below import costs causes a loss to Naftogaz as the state-owned provider needs to cover the difference between tariffs and import costs. Naftogaz, in turn, relies on the government to pay for this deficit. Indeed, each year a significant share of government funds is used to subsidise the loss-making gas distributer.

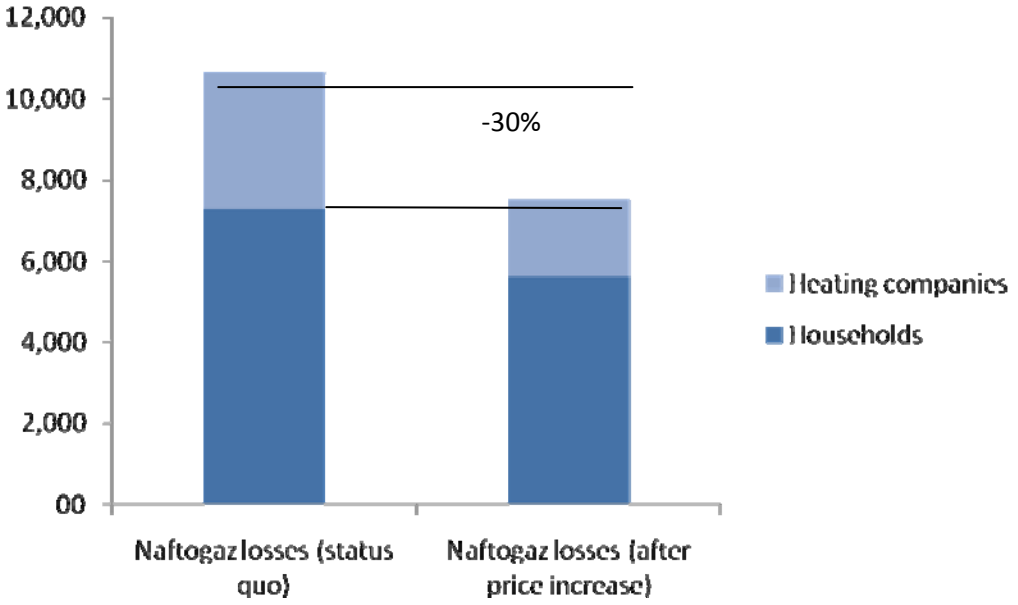
Our analysis suggests that currently – with import costs for Russian gas of over USD 400 per thd. cbm – the cost of subsidising gas prices for households and heating companies

amounts to USD 10.7 bn per year. This is the equivalent of 6.3% of Ukraine's gross domestic product.Consequently, aligning gas tariffs further towards their actual costs would offer the potential of reducing the costs the government faces in the form of these subsidies.

Consider, for example, again the scenario of a tariff increase of 30% for household gas tariffs and a 58% tariff increase for heating companies. Such a rise in gas tariffs would lower the losses Naftogaz faces for each unit of gas. We estimate that by increasing gas tariffs Naftogaz losses would be reduced by USD 3.2 bn per year. Indeed, higher gas tariffs would have two beneficial effects:Lower losses per unit of gas sold and a reduction in overall demand as consumers consume less gas.

Figure 6

Change in subsidy costs resulting from gas price increase, USD m



Source: Own analysis

Overall, this would reflect a 30% decline in the cost of subsidies to Naftogaz. Consequently, this would free up USD 3.2 bn of public funds that would otherwise have to be raised through taxes or would not be available for spending on other public services – such as education or infrastructure investments. Indeed, raising gas tariffs would free up funds that could be used to support households in consuming less energy. For example, part of the funds should be dedicated to investments in increasing energy efficiency. This way instead of subsidising wasteful energy use the government would support households in saving money by reducing demand and increasing energy efficiency.

4 Recommendations and conclusions

Gas prices in Ukraine are well below their benchmark costs. As such there is an urgent need to adjust them and bring them in line with the cost of obtaining and supplying gas. So the question is not if but how such an adjustment should be conducted.

A successful adjustment policy aims directly at helping companies and households to reduce their gas demand. It provides the incentives and instruments for consumers to

respond to increased prices by reducing gas consumption. Consequently, a large share of the tariff increase will not, or only temporarily, translate into higher gas bills as households and heating companies adjust, with time, the amount of energy they need.

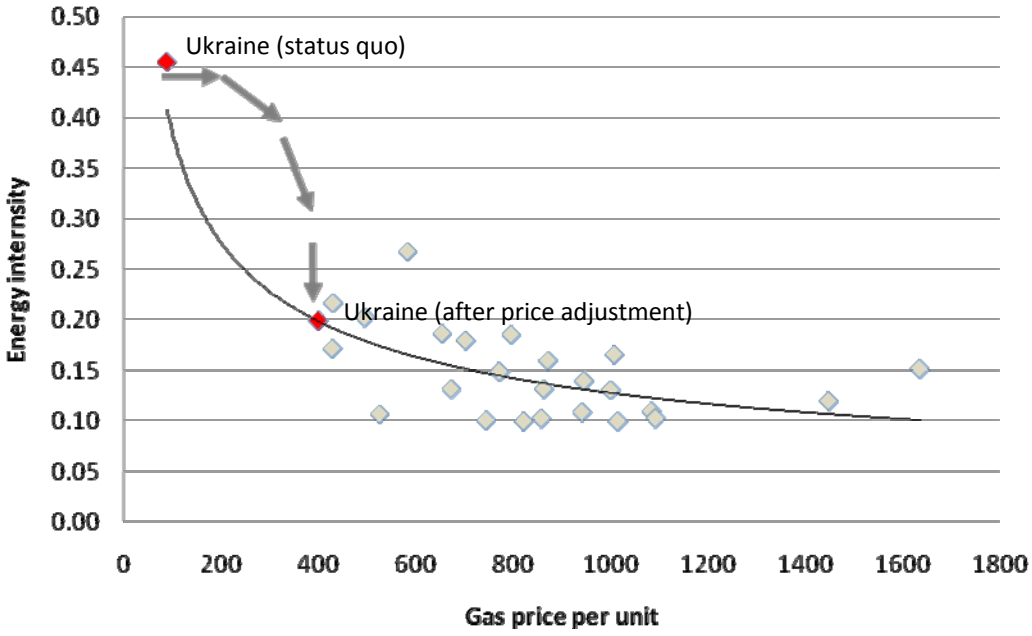
Such a successful implementation of gas price increases should include:

- A clear communication and commitment of the government that gas prices haveto be aligned with import costs and where it sees gas tariffs in the future.
- The government will announce how it intends to raise gas tariffs in the foreseeable future thus providing planning security, transparency and predictability of its policy.
- A significant gas price rise at the beginning which would send the signal that the government is committed to align gas tariffs with import costs. Additionally, this would make it clear that gas tariffs will not get back to their low, unsustainable levels.
- Improving acceptance among consumers by making sure that gas tariff increases will be accompanied with investments in infrastructure.
- Specifically, dedicating funding towards measures that assist companies and consumers in their efforts to reduce gas consumption. This could include financial assistance for energy efficiency measures, obtaining new energy efficient equipment, installing metering devices and enabling households to control their gas use.
- Keeping energy bills low is a legitimate concern. However, the government should shift the focus from subsidising energy prices(and encouring wasteful energy use) to promoting energy efficiency and thus helping consumers to consume less. This new policy orientation should be clearly communicated.
- Making sure that the poorest, and only those, are protected from increased gas prices through well-targeted measures.

In an ideal world consumers are able to adjust their gas consumption swiftly or even before prices go up. By following an implementation strategy outlined above, policy makers would help consumers to achieve just that.As Figure 7 shows,a successful adjustment policy helps consumers to respond to each gas tariff increase with reduced demand. Ukraine would move in line with other economies and keep the cost for consumers and companies to a minimum.

Figure 7

Implementation of gas price adjustment under two different policy scenarios



Source: Own calculations based on Enerdata (2011) and (OECD/ IEA, 2011)

Such a smooth and swift adjustment is only likely to happen if the government follows a predictable, credible and transparent policy including measures to help consumers to adjust their gas consumption. If, however, consumers do not anticipate gas price rises or do not believe that the government is serious about aligning gas tariffs with import costs, companies and households will not or only sluggishly adjust their gas consumption. Consequently, gas tariff increases will lead to a proportional increase in gas bills.

Sources

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