

Analysis

Improving Russian Energy Efficiency: Next Steps

By Andreas Goldthau, Budapest

Abstract

Russia has enormous potential to increase its energy efficiency. It suffers from the lack of modern heating systems in housing, outdated infrastructure and equipment in energy intensive industrial sectors, natural gas leaks from pipelines during transmission and distribution, and oil companies flaring associated gas at their wells. To address these problems, Russia should provide incentives to reduce flaring, increase domestic prices for gas, breakup the Gazprom monopoly on the pipeline system, and improve the legal framework for international cooperation. The EU has only indirect levers on Russian domestic policy, so it should work to convince Russia that reducing domestic demand serves both Russian and European interests, help Russia cash in on its efficiency potential, and sponsor small-scale energy efficiency projects that could encourage additional efforts at the grassroots level.

Russian Economic Growth and Energy Consumption Have Not Decoupled Yet

Following annual GDP growth rates of up to 10 percent since the turn of this century, Russia expects further growth close to two-digit figures in the coming years. Following the typical developmental path of mature, but growing, industrial economies, Russian energy consumption is projected to increase less than its GDP. Despite its current economic expansion, Russian energy intensity is expected to fall significantly, according to the 2003 Russian Energy Strategy, by 26–27 percent per unit of GDP over 2000 levels by 2010, and by around 50 percent by 2020.

While this is good news, a closer look at this trend reveals some less encouraging facts. At present, Russia still uses around 350 kg of oil equivalent per USD100 or 3.2 times more energy per unit of GDP than the EU-25. The figure is even higher in some branches of manufacturing, such as in the chemical/petrochemical and metals sectors. Even if Russia continues to constantly improve its energy consumption to GDP ratio during the upcoming years, its economy will still be considerably more energy intensive than the European average. Especially in gas, Russian consumption is daunting – both in relative and absolute terms. According to IEA estimates, domestic Russian energy demand is projected to grow significantly, from 148 million tons of oil equivalent (mtoe) in 2005 to 187 mtoe in 2030. While the Russian government plans to foster the use of coal more prominently in the country's primary energy mix, projected to rise from today's 20 percent to 22 percent in 2020, natural gas will still carry the burden of providing for more than 46 percent of total Russian energy consumption in 2020.

Renewable energy sources remain negligible. In absolute numbers, this means that domestic annual Russian gas consumption, presently hovering around 430 billion cubic meters (bcm), will reach 499 bcm in 2010 and 512 bcm in 2020 according to the Energy Strategy's "optimistic" scenario. In a "pessimistic" scenario, it is still projected to be 439 bcm in 2010 and 464 bcm in 2020. The IEA forecasts consumption of 516 bcm in 2015 and 586 bcm in 2030, more or less in line with "optimistic" Russian projections.

These figures are worrisome for several reasons. First, in the face of climate change concerns, a high degree of energy efficiency is key for entering the low carbon age. Major industrial nations – Russia is among the top ten – have an important role in taking the leadership on this issue. Second, given the looming tight supply of fossil fuels, energy efficiency in the world's largest producer country is key to securing energy supplies to consumer nations. In fact, the European call on Russian gas is expected to rise significantly during the upcoming decades. According to the IEA, European gas demand will increase from presently 550 billion cubic meters (bcm) to around 780 bcm in 2030. In this light, Gazprom, the state-controlled Russian gas monopolist, has recently signed a number of long-term contracts with its European customers that include substantial increases in exports. Given recent doubts about Gazprom's ability to meet demand and serve its contractual obligations, increasing domestic energy efficiency would translate into greater supply for export markets and thus enhance the energy security of European customers. In all, leveling Russian energy (i.e. mostly gas) consumption would thus both serve climate purposes and increase supply on strained Eurasian gas markets.

Hence, the European Union has a strong interest in addressing this issue.

Reducing Gas Consumption Is Key, and So Is Flaring

Especially in natural gas, which presently makes up for more than half of Russian primary energy consumption, there exists a huge potential to raise the level of energy efficiency. Out of more than 600 billion cubic meters (bcm) of annually produced gas, around 400 bcm are used in domestic households, industry, transport, and heating and power plants. Put differently, Russia, a USD1.4 trillion economy in 2007, consumed 4.5 times as much gas as Germany, a USD3.3 trillion economy at that time. This differential results from a number of reasons, notably the lack of modern heating systems in housing, outdated infrastructure and equipment in energy intensive industrial sectors, and a power sector hobbled by strong Soviet legacies. At least as important, however, are vast volumes of natural gas lost before they even reach consumers or production facilities. These volumes either leak from pipelines during transmission and distribution, are burned in compressor stations, or constitute associated gas, flared by oil companies instead of being fed into the distribution system. According to official Russian figures, 14.9 bcm of gas were flared in 2005; by contrast, IEA estimations suggest that, in 2004, 41 bcm of Russian gas were flared. Combined with additional volumes leaking from pipelines or being burned in compressor stations, the IEA estimates an annual loss of almost 70 bcm – the equivalent of one third of Russian exports. Based on satellite photos, a recent Worldbank study, carried out by the US National Oceanic and Atmospheric Administration, suggested that the actual flaring rate is even higher, amounting to more than 50 bcm, or a third of the world's total. Hence, while increasing the efficiency of Russian energy use as a whole is imperative, these figures reveal that already a reduction of distribution losses and of flared gas could save considerable amounts of gas. According to the IEA, at least 30 bcm could be saved annually by disincentivising flaring and by investing in maintaining and improving transmission and distribution systems.

Solution Lies in (De)Regulation

A first and crucial element in improving Russian energy efficiency lies in a classical textbook recipe: an increase in domestic gas prices. At present, prices are far below levels of Western European consumers, fostering an inefficient use of energy. In 2006, average domestic Russian gas prices were only 17 percent of West European prices, 29 percent when taking into account

transit charges. In industry, cheap gas discourages plant owners from investing in energy-efficient machinery; in the housing sector, it prevents investment in modern boilers and heating systems; and in the power sector, it serves as a deterrent to modernizing equipment, preserving a situation in which a majority of Russian electricity is still being produced in Soviet-manufactured, inefficient power plants.

In order to change this situation and to allow market incentives to take over, the present Russian dual pricing system needs to be abolished. Designed to subsidize Russian households and domestic manufacturers, Russian federal law provides that Gazprom has to serve the domestic gas demand, regardless of the market situation. The company has to cover consumption of Russian households and industry at governmentally set prices, which are not adjusted in times of high demand. The Russian government has acknowledged the need for reform in order to achieve the goals set in its Energy Strategy. On November 30, 2006, the Russian Cabinet approved a plan to increase natural gas prices for industry by 15 percent in 2007, and by another 25 percent in the subsequent 3 years. In 2011, the domestic gas market for industrial consumers is supposed to be entirely deregulated, with prices reaching parity with world levels on a net back basis. Yet, while these steps point in the right direction, price increases are to partially exclude the important residential sector, which makes up 12 percent of consumption and constitutes some estimated 30 percent of overall potential in energy efficiency gains. Moreover, the government has recently decided to postpone the initially planned price adjustments, and to cap increases at 40 percent of 2006 levels until 2011. This points to a considerable slowdown of the adjustment process. Finally, for a domestic gas market to fully function, the supply side has to be designed to respond to market signals, too; yet, the Russian gas market remains dominated by a monopoly – Gazprom.

This brings us to the second crucial element in improving Russian energy efficiency: an at least partial deregulation of the Russian gas sector. Besides accounting for around 85 percent of domestic gas production, Gazprom at present also controls the entire pipeline system, which enables the company to restrict third party access to the grid. Since Gazprom prevents other producers from exporting gas, they are left with the less profitable and eventually loss-making domestic market. Consequently, oil producers flare associated gas rather than feeding it into the pipeline system, while independent gas producers have little incentive to invest. First cautious attempts to introduce elements of competition to the Russian gas market, such as the 2006 gas exchange, were doomed to fail due to existing mar-

ket structures. As Gazprom can arbitrarily set prices for the use of its pipeline grid, it was able to give itself an edge in transportation costs while charging prohibitively high transit fees to independent gas producers. Splitting up Gazprom's de facto monopoly on the domestic pipeline infrastructure would create incentives for oil producers to feed gas into the system rather than flare it, and foster investment in maintenance and the system's overall efficiency.

A third element consists in providing an adequate domestic legal framework for international cooperation, such as the Joint Implementation (JI) mechanism under the Kyoto Protocol. Designed to reduce greenhouse gas emissions (GHG), JI enables countries and organizations to clear emission reduction credits with own, domestic commitments, and thus incentivizes investments in emission reductions abroad. In particular, the JI scheme fosters investment in climate protection measures where this goal can be achieved at most favorable costs. As the IEA has noted, Russia, and particularly its energy sector, is a highly interesting target for emission reductions under this scheme. As Russia's energy use per GDP ratio is still relatively high, energy efficiency projects are more cost-effective here than in, say, western European economies. With an adequate regulatory framework in place, foreign investment would presumably soar, providing the necessary capital for energy efficiency enhancing projects. Such a win-win situation is however hampered by lagging legal procedures and a general lack of interest on the part of the Russian administration. While the legal basis for JI projects was created in May 2007, there still exist several regulatory hurdles before the mechanism can start working. Most importantly, however, due to a sharp decline in industrial output and hence greenhouse gas emissions during the 1990s, Russia will reach its emissions reductions target, as laid down in the Kyoto Protocol, without any additional measures. Hence, it does not have a strong interest in adopting additional policies targeting GHG emissions and energy efficiency. Finally, given Russia's present growth rates and their potential to lift living standards close to Western levels, the Kremlin will show little inclination to trade domestic economic development against long term global climate goals. As a consequence, Russia has already indicated that it will not support a cap on the use of fossil fuels as part of a Post-Kyoto deal, a policy which will also directly affect efforts to enhance energy efficiency levels.

Where Can the EU Play a Role?

The European Union, committed both to reducing GHG emissions and to rendering future gas supplies more secure, has shown great interest in improving

Russia's energy efficiency levels. Yet, the main existing frameworks to address this issue have proven to be too weak to create clear commitments and yield results. The EU-Russian Partnership and Cooperation Agreement (PCA) provides that "cooperation [in the energy sector] shall take place within the principles of the market economy and the European Energy Charter [..., promoting] energy saving and energy efficiency"; yet, given the PCA's non-binding character, little has been achieved in terms of concrete measures. Talks on a new PCA, to be started soon, will prominently feature energy issues; there is however reason for great doubt that Russia will subscribe to provisions limiting its *marge de manoeuvre* in the field of energy, both domestically and abroad. The EU-Russian Energy Dialogue, basically a forum of mutual exchange, entails a number of small scale assistance projects, financed through the EU-Russia Cooperation Program, that aim at improving energy efficiency levels and providing for a necessary harmonization of standards. Projects include energy efficiency measures in Arkhangelsk, Astrakhan and Kaliningrad, harmonization of technical standards in the gas sectors, and an EU-Russia Energy Technology Centre. While these are important steps, they remain small scale and are a fraction of what would be needed to stimulate real impact.

Hence, since existing instruments such as the Dialogue provide no direct lever, the EU has only indirect means to influence changes in domestic Russian policies. One would be to convince Russian partners of an obvious win-win situation: slowing down rising domestic gas demand through enhanced energy efficiency programs and more market-based gas pricing would both serve the goal of fostering climate protection policies as it would free supply potentials for exports and enhance European energy security. Especially when bearing in mind that Gazprom recently had to accept a significant increase in the prices it pays for Central Asian gas – mainly needed for the domestic Russian market – the economic argument may bear fruit.

Second, the EU should encourage Russia to cash in on its great energy efficiency potential. Germany's Dresdner Kleinwort Wasserstein and Russia's Gazprombank have recently set up a joint emission trading venture to tap the expanding market for GHG securities. US investment house Merrill Lynch has also entered the Russian carbon trading business in a USD200 million deal. These figures and activities suggest that the Russian GHG/carbon/energy saving credits market is believed to entail great prospects. In order to take full advantage of this potential, several regulatory steps need to be taken by Russian authorities, including the establishment of a national emissions trading scheme (ETS). The EU should assist in the process of taking these steps

and provide technical assistance in adopting the necessary measures.

Finally, the EU should continue to foster small-scale energy efficiency projects. While these will not entail

great impact in total volumes, they may contribute to changing minds and attitudes, and support energy efficiency improvements at the grassroots level.

About the author

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Commentary

European Practices Offer a Good Model for Russia

By Peter Richards, Vienna

Ecocities are mushrooming all over the world. China has a few in the pipeline. Several European towns are aiming for zero carbon emissions. California has huge solar projects and even oil-rich Abu Dhabi is investing in a carbon-neutral city, Masdar. Of the major world economies, Russia is one of the last to embrace renewables or efficient energy.

That is a pity, because its titanic stature in fossil fuel production could easily be matched in clean energy. Yet Russia is, according to Torsten Woellert, energy policy officer with the European Commission's Moscow delegation, wasting more energy flaring gas than it exports to Germany in any given year. The flares, burning millions of cubic meters of gas from oil wells instead of making use of it, are visible to any airline passenger flying over the country at night.

The dilapidated state of many Russian housing estates, a hangover from the Soviet Union days, is also responsible for enormous energy wastage in a country which has been renationalising its energy companies. The result is that energy is supplied by large energy companies having trouble keeping up with growing domestic energy demand but that are, at the same time, slow to cut back on waste. Meanwhile, the vast resources of the nation's forests as a source of biomass fuel remain untapped. Only Ukraine is performing worse, says Woellert.

True, there are some exceptions. Innovative projects include an energy-saving street lighting project in

Arkhangelsk, a biomass power plant in Novgorod, a wind farm in Kaliningrad and a Renewable Energy and Energy Efficiency Partnership (REEEP) project to improve energy efficiency of buildings via building codes. The International Energy Agency (IEA) notes that Russia does take advantage of some well-established renewable technologies, producing 174,600 Gwh of hydropower and 410 Gwh of geothermal power in 2005. However, Russia only managed 7 Gwh of wind power and no solar PV electricity in the same year. By comparison, Germany produced 27,229 Gwh of wind, 1,282 Gwh of solar PV and 26,717 Gwh of hydropower that year.

Russia's weak track record, particularly in energy conservation, has prompted a series of meetings with its European neighbors. The talks began back in 2001, not long after Vladimir Putin took over as president. The dialogue, officially backed by top Russian politicians, aims to improve investment in clean and efficient energy, help the markets to open up and decrease negative environmental impacts. From 2008, the dialogue has converged on climate change and efficient energy, facilitated by an international energy consortium, the REEEP, and other stakeholders.

One of the goals from the European side is to help Russia develop policies that work. "The new Russian renewable energy law, which is more of an amendment to an existing power law, is somewhat decorative legislation that needs additional development," states Svetlana