Analysis

Energy Savings in Russia – Political Challenges and Economic Potential

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Abstract

Russia's economy is one of the most energy inefficient and carbon dioxide (CO_2) intensive in the world. Russia produces as much CO_2 per capita as Germany, yet the amount of energy consumed per unit of Russian gross domestic product (GDP), measured in purchasing power parity, is almost three times larger than in Germany. There are numerous ways that Russia could save energy, but currently the incentives are not right to encourage such savings. Although Russia's leaders talk about this problem, they will need political will to implement effective solutions.

Russian Energy Efficiency Lags Behind Western Standards

Russia's Energy Strategy until 2020, which was adopted in 2003, assumes a tripling of the GDP with only a 40 percent increase in energy consumption. Russia's leaders hope to achieve this goal by implementing technological and organizational energy-saving measures, as well as introducing structural changes in the economy.

These scenario planners estimated Russia's energy saving potential to be about 278 million tons of oil equivalent (Mtoe). This amount corresponds to 43 percent of Russia's primary energy consumption during 2004, or twice the current exports of natural gas to the European Union.

In fact, the assumptions of the Energy Strategy turned out to be too conservative for the period 2000–2004, underestimating Russia's real energy efficiency potential. Estimates for 2006 show that GDP growth until 2006 was much higher, 43.9 percent compared to 2000, than the forecasted 33.9 percent, but energy consumption was less than (2005) or equal to (2006) the forecast. Therefore, energy intensity decreased more (up to 23.3 percent compared to 2000) than assumed in the Energy Strategy to 2020 (about 17.7 percent). This achievement was mainly the result of a more rapid structural change of the GDP then previously expected. The share of the low energy intensive sectors has increased considerably more rapidly than the other sectors.

According to the Energy Strategy, in 2020 Russia's GDP should reach an energy intensity level of about 0.29 kgoe/USD (PPP) [kilograms of oil equivalent per dollar at purchasing power parity] (See Figure 1 on p. 7). If so, Russia's economy in 2020 would still be twice as energy intensive as today's EU average. Thus, Russia's gains in energy efficiency are more than anticipated, but far below what potentially could be achieved.

Enormous Potential for Energy Savings

Russia can realize much of its energy saving potential at low cost. According to Russian Ministry of Industry and Energy estimates, approximately 20 percent of the energy saving potential can be achieved for as little as $20–$50/t of coal equivalent.

A closer look at the structure of Russia's energy efficiency potential shows that the main opportunities for savings are within the energy sector and the communal services sector (see Figure 2 on p. 8).

Major efficiency potentials within the energy sector are:

- Reducing the amount of flared gas at Russian oil wells and converting this gas to energy. Estimates about the amount of gas flaring in Russia range from 15 to 42 billion cubic meters (bn m^3), creating between 43 and 124 million tons of CO_2.
- Cutting losses in natural gas transmission and distribution. Losses amounted to about 10 percent of the 656 bn m^3 transported in 2006, or approximately 65 bn m^3. Up to 20–25 bn m^3 of these losses could be prevented, according to World Bank estimates. Thus, about 3–4 percent of current natural gas production could be saved.
- Increasing the efficiency of oil refineries. About 50 mn t of oil could be saved annually if the processing depth of Russia's refineries reached 90 percent.
- Replacing outdated power stations with modern gas-steam turbines and gas turbines. An annual savings of about 50 bn m^3 of natural gas could be achieved.
- Improving the domestic heating system. Seventy percent of Russia's heating comes from centralized heat supply systems. Experts have identified the potential for huge energy savings in the heat generating process, particularly by replacing outdated boilers with combined heat and power generators

(CHP) and modernizing more than 48,000 small boilers with an efficiency factor of ≤ 30%. In addition, losses in the heat supply systems, which on average amount to 8.6 percent of the heat generated could be substantially reduced and the fuel mix in heat generation could be improved.

Additionally, Russian industry has an enormous potential for introducing greater energy savings. The energy efficiency of many technologies is still far below respective standards in Europe and even the US. For example, the energy intensity of technologies in the iron and steel sectors is about 0.31 toe/t in Russia compared to 0.17 toe/t in the US, 0.12 toe/t in Germany, and 0.1 toe/t in Japan. Also, in the chemical industry, non-metal primary industry, and food industry, the energy intensity is twice as high as in Germany. Russia's minimum energy efficiency requirements are below international standards. Convergence in this field would help to increase the international competitiveness of Russian products.

Nearly one third of Russia's ability to save energy lies in the communal and housing sector. Due to institutional barriers, such as ownership questions, tariffs, and metering/billing issues, this potential remains almost untapped. Establishing apartment owner communities, which would essentially amount to converting Russian apartments into condominiums, will help to establish the legal basis for financing investment into refurbishing existing buildings, where energy efficiency measures will be one important component. In terms of energy pricing, state subsidies remain in place and few politicians want to risk public ire in removing them. Finally, thanks to Soviet era practices, when there were no meters on individual apartments, it is very difficult to measure and charge for individual consumption and therefore hard to encourage individuals to save energy by raising prices. Russia has introduced a number of communal housing sectors reforms to address these problems, but the process is only moving forward slowly.

Obstacles to Reform

Why has Russia been so slow in taking advantage of its huge potential to improve energy efficiency? For example, Russia could save large amounts of natural gas, which would then be available for export. There should be interest in using this potential.

Many proposed projects seeking to reduce natural gas consumption for domestic heating by introducing individual meters into private households, making it possible to bill households for their real heat consumption, were not implemented. Although the legislation is in place for this reform, actual progress has been slow. The main problem is the institutional structure of the heating sector, which is dominated by badly regulated supply monopolies. At present, they have almost no incentive to save energy since they can easily transfer their huge energy losses to the final costumers.

For natural gas supplier monopolist Gazprom, there are low incentives for energy savings on the consumer side. Many experts assert that Gazprom could benefit from energy savings on Russia's domestic market, where it must sell gas at regulated prices that are much lower than world prices, by making available additional amounts of gas for export to foreign markets, where international prices prevail. In practice, however, the situation is much more complicated and interests are different. Currently, Gazprom has no need to receive additional amounts of natural gas for export, because current contracts are secured over the next several years. If external demand for gas goes up in the future, Gazprom certainly will calculate which gas potentials to exploit at least cost. If exploiting the energy saving potential of the internal Russian market costs less than exploring and developing new gas fields or buying gas from Turkmenistan, Gazprom would have greater incentives to focus on increasing efficiencies. While exploiting new fields is expected to be extremely expensive, Gazprom currently is able to acquire relatively cheap gas from Turkmenistan.

In addition, the Energy Strategy until 2020 assumes that the structure of Russia's domestic energy demand should be changed in favor of increasing the share of coal burned in the country in order to fulfill future obligations in natural gas exports. Pursuing this strategy would, of course, increase Russia's CO_2 emissions. If, instead, Russia could take advantage of greater energy savings, there would be no need to burn more coal.

In Europe, a strong desire to mitigate climate change and the Kyoto Protocol provide strong incentives for developing energy efficiency potentials. In Russia, such incentives have much less influence. According to the Kyoto Protocol, Russia must hold greenhouse gas (GHG) emissions to the level of 1990. At the beginning of the 1990s, the Russian economy contracted and GHG emissions dropped sharply. In parallel with the country's recent economic recovery, emissions started to rise again, but most likely Russia will be able to meet its quantitative Kyoto commitments easily without further domestic measures. In 2004 Russia's GHG emissions reached a level some 33 percent below its Kyoto commitments. Thus, it has a surplus of Assigned Amount of Emissions (AAUs) of about 1 billion metric tons carbon equivalent (mtce) until 2012.

Using Joint Implementation (JI) under the Kyoto Protocol could provide new incentives for investing in energy efficiency projects by providing co-financing from selling Estimated Ultimate Recoveries (EURs) created by the projects. Western companies are strongly interested in such projects. On May 30, 2007, the Russian government issued a decree on the national JI procedure, which now allows for implementing the JI mechanism in Russia. Despite this advance, at the project level, the incentives to reduce CO_2 emissions have much less impact on energy efficiency improvement in Russia than, for example, in the EU member states. In Russia, there are no binding caps for CO_2 emissions on companies. The implementation of Green Investment Schemes, i.e. foreign investment for the transfer of AAUs, could also bring economic benefit. It could push for technological modernization and increased competitiveness within Russian industry. To the extent that energy efficiency technologies become a driver for economic growth, create competitive advantages and new jobs, and attract investment into these sectors, they could help the Russian government reach its political goal of increasing the share of higher value added sectors in the overall GDP. Currently GDP growth is driven mainly by energy exports rather than more desirable technology fields.

Although President Putin and some other Russian leaders have stressed the issue of energy efficiency, in practice, a real policy push is needed to put in place a legal framework that provides energy efficiency incentives for the development of technologies that will improve energy efficiency in all sectors of the economy where there are such potentials. As Western practice shows, improving energy efficiency requires a strong political will to implement an adequate legal and economic framework.

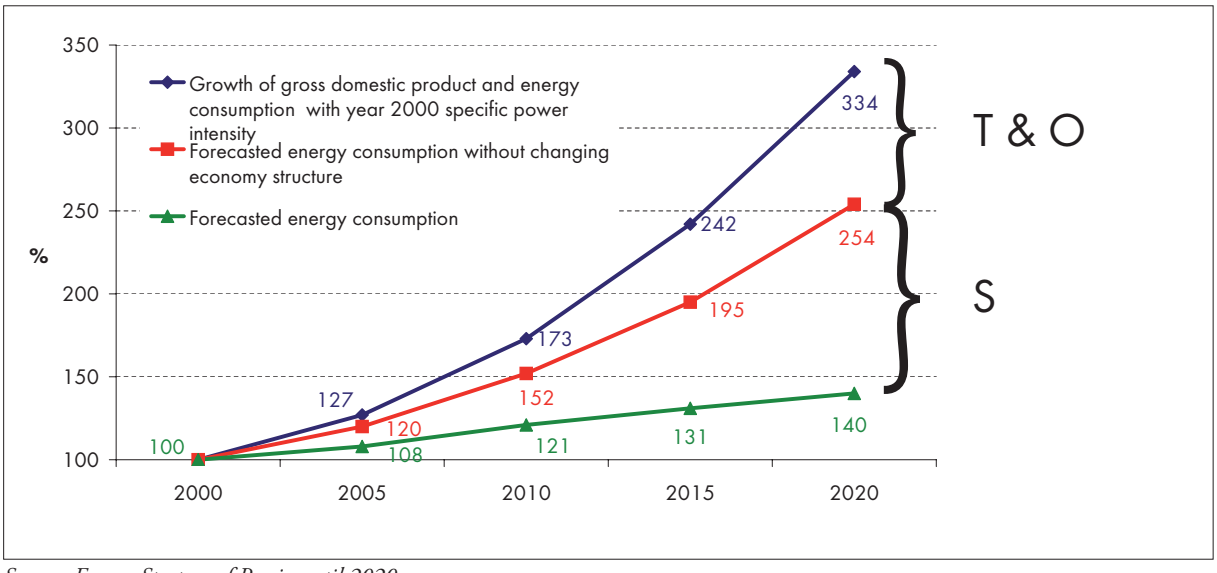
About the author:
Dr. Petra Opitz serves as the Head of Department at the German Energy Agency.

Table 1. Key Indicators, 2004

	Russia	OECD Europe	USA	Germany
Primary energy consumption per capita (toe/capita)	4.46	3.50	7.91	4.22
Energy intensity of GDP (kgoe/USD (PPP))	0.49	0.16	0.22	0.16
CO^2 per capita (t CO^2/capita)	10.63	7.72	19.73	10.5
CO^2-Intensity of GDP (kg CO^2/USD (PPP))	1.17	0.35	0.54	0.43

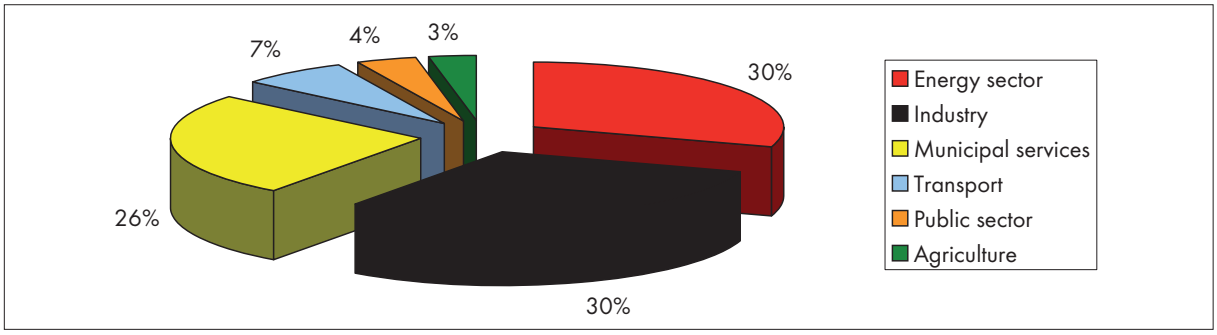
Source: IEA

Figure 1. Forecast of Increase in Russian Energy Consumption, 2000–2020



Source: Energy Strategy of Russia until 2020

Figure 2: Structure of Energy Efficiency Potential in Russia

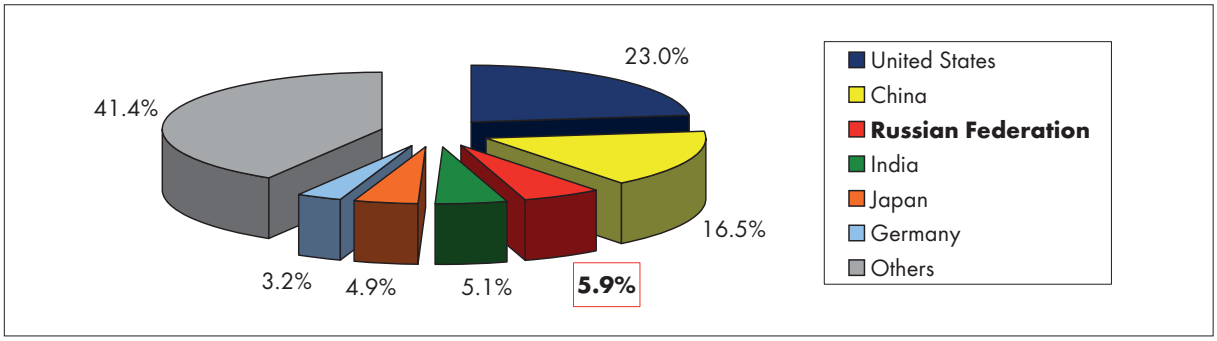


Source: Energy Strategy of Russia until 2020

Tables and Diagrams

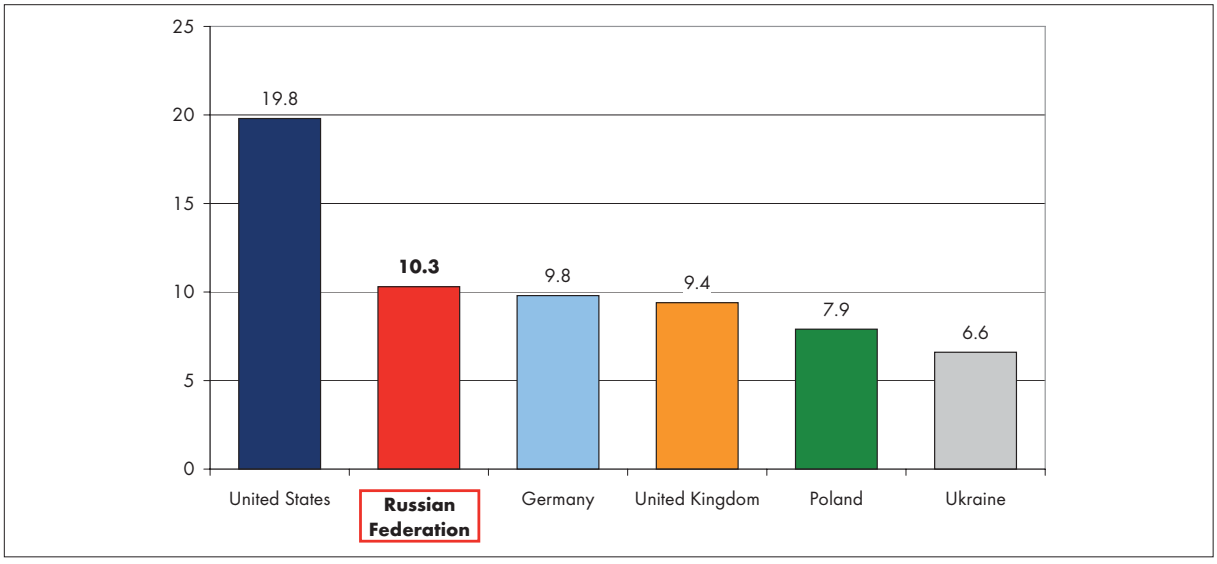
Russian CO_2 Emissions and Energy Consumption in International Perspective

Carbon Dioxide Emissions - Share of World Total (%)



Source: Human Development Report 2006; http://hdr.undp.org/hdr2006/statistics/indicators/204.html

Carbon Dioxide Emissions - Per Capita (Metric Tons)



Source: Human Development Report 2006; http://hdr.undp.org/hdr2006/statistics/indicators/203.html