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Energy efficiency – a new energy resource for Russia?

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Executive summary

- 1) Investing in energy efficiency is an economically rational choice for Russia. By investing in energy efficiency Russia will be able to meet supply needs at approximately one third of the cost of building new production capacity. Moreover, if all of the oil, gas and oil products that could be saved by realising Russia's energy efficiency potential were exported, Russia would obtain additional revenues of 80–90 billion USD every year. For example, Russia has a potential to reduce its natural gas consumption by 240 billion cubic meters, which would largely exceed the volume of Russian gas exports in 2005–2008.
- 2) Reducing the energy intensity of Russian economy will create positive environmental effects by reducing greenhouse gas emissions. Realising its full energy efficiency potential would help Russia to achieve the goals of Kyoto Protocol because its greenhouse gas emission would stay well below the 1990 threshold level until 2050, even in the case of strong economic growth.
- 3) Improving Russia's energy efficiency will be beneficial for the EU as well. First of all, if Russia invests in energy efficiency, it will increase the likelihood that Russia will be able to satisfy the EU's natural gas demand in the future. Second, energy efficiency and energy saving can open opportunities for the EU-Russia energy cooperation. Third, global sustainable development, that the EU also greatly emphasises, requires actions from all countries, including Russia. Investing in energy efficiency is an important step towards it.
- 4) Russia's need to improve its energy efficiency can create business opportunities for Finnish companies. In Russia there is demand for expertise, technologies, and equipment in the field of energy efficiency, which Finnish companies have, and collaborating and networking can benefit both sides.
- 5) Although the first steps towards realising Russia's energy efficiency potential were taken when the Russian leadership acknowledged the importance of energy saving and incorporated it into the country's energy strategy, the real challenge is still ahead – to implement energy-saving measures effectively. Furthermore, the majority of Russians still remain unaware of the benefits of energy saving, and a real transition to energy efficient economy will require embedding the energy-saving attitudes in the whole Russian society.

Prologue

“Of course, we also need to think about the natural resources that we can preserve and pass on to future generations. This is why I think that increasing energy efficiency and making the transition to a rational resource consumption model is another of our economy’s modernisation priorities. We can resolve this task only if each of us reflects on our personal responsibility for energy saving, as people are now doing throughout the globe. This is something everyone is thinking about elsewhere in the world.”

Dmitry Medvedev
President of Russia
Presidential Address to the Federal Assembly
November 12, 2009
Grand Kremlin Palace, Moscow
(For reference see Medvedev 2009b)

1 Introduction

The global energy sector is going through a significant transformation. While the energy consumption and energy costs are growing – world energy consumption is expected to increase by 49 % from 2007 to 2035² – there is an increasing demand for sustainable and environmentally sound energy solutions to fight climate change. The need to provide adequate yet sustainable supplies of energy to fuel global economic growth require profound changes in the world's energy system, especially a shift to renewable energy sources and energy-efficient technologies.³

It is clear that growing energy demand cannot be met just by increasing conventional energy supply. Continued reliance on the predominant energy source, fossil fuels, undermines energy security and raises serious environmental concerns, especially related to climate change. Instead of relying on them, countries should exploit energy efficiency as their energy resource of first choice because it can bring nearly immediate results with existing technology and proven policies, and do so while generating higher financial returns than investments in conventional energy supply. Energy efficiency is an important and cost-effective instrument for facilitating sustainable economic development, enhancing national security, and mitigating further damage to the climate system. Improvements in energy efficiency can create various positive results, such as reduce energy consumption and greenhouse gas emissions, increase competitiveness, reduce the need for investment in energy infrastructure, cut fuel costs and improve consumer welfare. Improved energy efficiency can also enhance energy security by decreasing the reliance on imported fossil fuels.⁴

In both Russia and its predecessor the Soviet Union the wealth of the nation has been largely based on enormous natural resources. Abundant energy resources have kept Russia more or less immune to international energy challenges concerning adequate supply or rising prices. However, the time has come for Russia to wake up to reality. Russia is among the most energy inefficient countries in the world. Although its energy resources are one of the largest in the world, they are not unlimited. Furthermore, wasteful consumption of natural resources is not in line with sustainable development, the path of which Russia is also eventually forced to follow if it wants to guarantee its future prosperity and well-being. Indeed, Russia has considerable potential, not to

² EIA 2010, 9.

³ United Nations Foundation 2007, 1–9.

⁴ United Nations Foundation 2007, 1–9.

mention great need to improve its energy efficiency, and it is under a huge pressure to do it.

Improving Russia's energy efficiency is not important only for the country itself, but also for the European Union and other importers of Russian energy. One of the most important factors influencing the EU's future energy security is Russia's ability to deliver natural gas to the EU. Russia is increasingly facing difficulties in meeting the energy demand of both domestic and export customers and has to look for ways to ensure sufficient energy production levels. In a situation like this, energy saving could be a rational choice for Russia.

This report concentrates on specifying the focal questions related to energy efficiency in Russia. First, Russia's current energy inefficiency, as well as the need and potential to improve it will be analysed. Second, the focus is in analysing the energy efficiency in Russia's current energy policy, as well as in discussing the measures and indentifying the obstacles to improving Russia's energy efficiency. All in all, this research wishes to shed light on the possibilities investing in energy efficiency can offer for Russia, as well as critically evaluate Russia's ability to realise its energy efficiency potential.

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Liulto, Kari: Energy in Russia's foreign policy. Electronic Publications of Pan-European Institute 10/2010.

Mäkinen, Hanna: The future of natural gas as the European Union's energy source – risks and possibilities. Electronic Publications of Pan European Institute 9/2010.

Mäkinen, Hanna: Shale gas – a game changer in the global energy play? Baltic Rim Economies 1/2010.

Turku, 17.8.2010

Hanna Mäkinen

2 Background: Inefficient use of energy in Russia

Besides possessing some of the largest energy reserves in the world, Russia has huge potential for improving its energy efficiency.⁵ Of the ten largest energy consuming nations in the world, energy intensity of Russian GDP (energy consumed per unit of GDP) remains the highest (Table 1). Although energy intensity of Russian GDP fell by almost 5% annually between 2000 and 2008, it still remains 2.5 times higher than the world average and 3.5 times higher than in developed countries (in 2006).⁶ In addition, Russia's energy intensity has decreased much less than most former Soviet Republics over the past 15 years.⁷ Moreover, the decrease in Russian energy intensity is rather a consequence of changes in the Russian economy than of any specific policies or measures.⁸ Thus, despite considerable improvement in its energy efficiency during the recent years, Russia still remains among the world's most energy-inefficient countries.

Table 1 Energy intensity of the top 10 energy consuming countries in 2005

Country	Total energy consumption (mtoe*)	Energy intensity kgoe** per GDP	Ranking in terms of kgoe per GDP***
United States	2 340.29	0.19	58
China	1 717.15	0.20	55
Russia	646.68	0.42	12
India	537.31	0.14	87
Japan	530.46	0.14	92
Germany	344.75	0.14	90
France	275.97	0.14	88
Canada	271.95	0.25	33
United Kingdom	233.93	0.12	101
Korea	213.77	0.20	53

*million tons of oil equivalent

**kilograms of oil equivalent

***out of 121 countries

Source: World Bank 2008.

In general, energy intensity of a country is influenced by various factors affecting energy efficiency. The energy efficiency of an economy's capital stock, such as vehicles, appliances and manufacturing equipment, affects energy intensity. More energy-efficient technologies are often used in new stock than in the older equipment it replaces. Changes in energy prices relative to prices for other goods and services and

⁵ Millhone et al. 2010.

⁶ UNDP 2010, 90–91.

⁷ However, despite a decrease in energy consumption relative to GDP, a decline in energy intensity can also be driven by an increase in GDP relative to energy consumption. World Bank 2008, 28.

⁸ Novikova et al. 2009, 1.

investment in research and development also affect energy intensity, as well as expectations for future levels of energy consumption, fuel mix, and carbon dioxide emissions. Energy intensity is also influenced by the industry structure of a country. Countries whose economies rely on energy-intensive heavy industries, such as iron, steel and cement, tend to have high energy intensities. Structural shifts in national economies from energy-intensive to non-energy-intensive industries can thus lead to a decline in energy intensity. Other influences on energy intensity trends include changes in consumer tastes and preferences, climate issues, taxation, the availability of energy supply, government regulations, and the structure of energy markets themselves.⁹

Although there are several factors contributing to the high energy intensity of Russia, such as its geographical size, cold climate, the size of its economy and the predominance of heavy industry in its industry structure, according to the World Bank (2008) they only explain around 75 % of Russia's energy consumption. Thus, compared with other countries with similar conditions Russia's energy consumption remains 25 % higher. If only the abovementioned factors would determine Russia's energy consumption, its energy intensity would be around 0.34 kgoe/GDP instead of 0.42 kgoe/GDP.¹⁰

What, then, are the other driving factors behind Russia's high energy intensity? To begin with, Russia's abundant energy resources have fed a negligent attitude towards global energy worries and energy saving in general. For long, the country has remained more or less immune to international shortages of energy or rising energy prices. In most developed countries the trigger for the energy conservation efforts was the OPEC oil embargo in 1973–1974. However, the Soviet Union and other centrally planned economies avoided most of the negative impacts of the embargo because of the huge indigenous energy resources. After the collapse of the Soviet Union, the former socialist countries have found different paths in dealing with the realities of the global energy market.¹¹ Whereas for example the Baltic Countries have succeeded in increasing their energy efficiency, Russian energy sector still bears the legacy of the Soviet era with outdated and wasteful energy technologies and consumption.¹²

⁹ EIA 2010, 129.

¹⁰ World Bank 2008, 27–31.

¹¹ Millhone 2010, 13.

¹² World Bank 2008, 28; UNDP 2010, 90.

Providing people with inexpensive power and heat are still widely considered as a public service and energy saving has only recently risen on the national agenda.¹³

Indeed, energy efficiency has received little appreciation in Russia, which can be seen in cultures, values and social norms of all Russian sectors. In industrial sector, the value of improving companies' energy efficiency is underestimated and greater emphasis is put on increasing revenues than on cutting costs. In energy sector, building new generation capacity is preferred to saving energy. In financial sector, banks consider energy efficiency projects to perceive a higher risk and rarely lend to them. In public sector, the value of long-term investments in energy efficiency is not appreciated. Finally, consumers are not motivated to save energy because its concrete benefits are still not visible in their daily lives. Basically, there remains a general lack of awareness about energy efficiency in the Russian society.¹⁴

Still, the Russian society itself carries the burden of inefficient energy use. Russian households, businesses and institutions are all affected by energy inefficiency. Energy is lost through various ways, for example in apartments temperature is often regulated by opening windows because most buildings lack thermostats. Energy is lost all the way between the source and the end-user: leaking and unevenly pressured gas pipelines, poorly insulated heating mains, and outdated power plants and power lines all constitute losses of energy. Flaring of associated gas is also a source of energy loss.¹⁵

However, Russian policymakers have recently expressed rather strong interest towards energy saving and included energy efficiency as one of the top priorities of national energy strategy and policy. Increasing energy efficiency is mentioned as one of the main goals of the Russian energy strategy until 2030, adopted in 2009.¹⁶ The Russian leadership, first and foremost President Dmitry Medvedev, has also emphasised the importance of energy efficiency.¹⁷ In addition, the Energy efficiency legislation, approved by the State Duma, came into force in November 2009. The legislation is very ambitious and introduces a wide range of measures for energy-saving.¹⁸

¹³ World Bank 2008, 65–66, 68–69.

¹⁴ World Bank 2008, 65–66.

¹⁵ McKinsey & Company 2009, 5.

¹⁶ Gromov 2009.

¹⁷ See e.g. Medvedev 2009a.

¹⁸ Millhone 2010, 9–11.

As stated in the UNPD's report (2010), *human development has for centuries been accompanied by increase of energy productivity*.¹⁹ Indeed, improving Russia's energy efficiency is a precondition for the continuation of the country's economic growth in the future. Realising its full energy efficiency potential would allow Russia to maintain competitiveness, increase its oil and gas export earnings, lower budget expenditures and reduce environmental costs.²⁰ In contrast, if Russian economy continues to be highly energy intensive, the country can face many difficulties in the future. These include e.g. slower economic growth and lower energy security, difficulties in maintaining energy export volumes, reduced international competitiveness of Russian industry, faster inflation, burden of rising housing utility costs on the public finance, and environmental threats.²¹

Although huge, Russia's natural resources are not unlimited. It will be a real challenge for Russia to develop them in an environmentally sustainable way.²² Indeed, Russia's energy inefficiency, and the related economic and ecological consequences, are one of the greatest challenges Russia is facing. Energy inefficiency has clear implications to Russian energy security as well.²³ By increasing its energy efficiency, Russia has an opportunity to become less energy-dependent.²⁴ To guarantee its future prosperity and sustainable economic development, Russia needs to improve its energy efficiency significantly. It, however, will require strong government policy, significant technological improvements and raising the awareness among the Russian society about the importance of energy saving.

3 Russia's need and potential for increasing its energy efficiency

Russia is increasingly facing difficulties in producing enough energy, especially natural gas, to supply the energy needs of both domestic and export customers. The giant old Soviet gas fields, which have produced the majority of natural gas in Russia, are depleting, and the development of new major gas fields has been delayed, especially because of the lack of investments. Bringing new major gas fields into production as scheduled is crucial in order to avoid a sharp decline in Russia's natural gas

¹⁹ UNPD 2010, 90.

²⁰ World Bank 2008, 6.

²¹ UNDP 2010, 91.

²² Bobylev 2005, 7, 19–20.

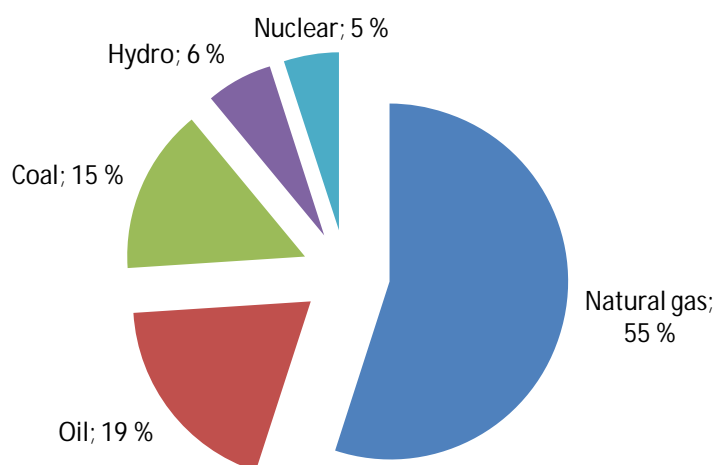
²³ World Bank 2008, 5, 16.

²⁴ McKinsey & Company 2009, 6.

production. The contribution of independent gas producers and oil companies could also increase natural gas production in Russia but this would require facilitating their position in Gazprom-dominated Russian natural gas markets. In addition, guaranteeing the continuation of natural gas imports from Central Asia is essential for filling Russia's gas needs. However, there is a great geopolitical game going on in Central Asia, in which China is eagerly participating, and it is by no means self-evident that Russia will be able to maintain its leverage in the region.

Currently Russia continues to be dependent on natural gas as its most important energy source. The share of natural gas in the country's overall energy consumption in 2008 was 55 % (Figure 1). Other energy sources such as oil and coal come far behind, and the role of renewable energy sources is still insignificant in Russia's overall energy mix. However, Russia's future ability to produce enough natural gas for both domestic and export needs has been questioned. Although the current economic crisis has weakened gas demand both in Europe and in Russia, the gas consumption in both areas is expected to grow in the future along with the economic recovery. At the same time the future of Russian gas production is unclear. Indeed, in the future Russia might find itself in a situation in which it has to choose whether to serve the supply needs of domestic or export customers.

Figure 1 Primary energy consumption of Russia in 2008, by fuel*



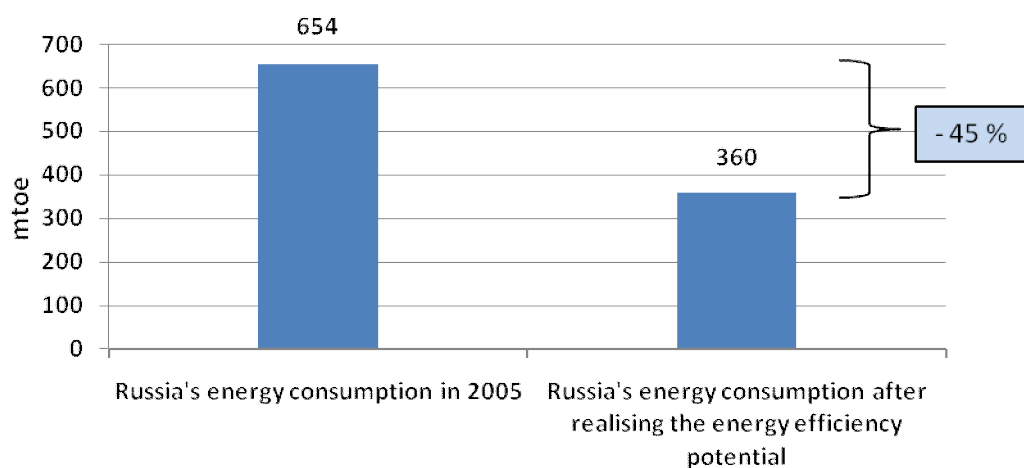
*commercially traded fuels only

Source: BP 2009, author's calculations

If the present development continues, there might emerge a large investment gap in Russia's oil, gas and electricity sectors. Limited production capacity and increasing demand can make it difficult to ensure adequate supply. In this context, reducing energy intensity in Russia could open a new energy resource for the country.²⁵ It is also a renewable resource because scientific and technological progress will always bring along new technologies that can improve energy efficiency.²⁶ In a situation which Russia's energy production is at risk, improving energy efficiency would allow Russia to save large volumes of energy and thus help in meeting the supply needs of both domestic and export customers.

Russia's energy efficiency potential is significant, and the realisation of that potential would translate as remarkable energy saving. According to the World Bank (2008), Russia could reduce its energy consumption by 45 % compared with its total primary energy consumption in 2005 (Figure 1). This potential is equivalent to 57 % of Russia's oil production or 54 % of gas production in 2005. In practise, it is almost equal to the annual primary energy consumption of France, Great Britain or Ukraine.²⁷

Figure 2 Russia's energy efficiency potential



Source: World Bank 2008.

²⁵ World Bank 2008, 15.

²⁶ UNPD 2010, 92.

²⁷ Bashmakov 2009, 64.

By full use of its energy efficiency potential Russia can save 240 billion cubic meters of natural gas, 340 billion kWh of electricity, 89 million tons of coal, and 43 million tons of crude oil and equivalents in the form of refined petroleum products.²⁸

Russia is increasingly facing difficulties in serving the energy needs of both domestic and export customers and has to look for ways to ensure sufficient energy production levels. Investing in new production capacity is one way to meet supply needs. However, by investing in energy efficiency supply needs can be met at lower cost. According to the World Bank, achieving the aforementioned results in energy saving would require total investments of 320 billion USD from the Russian economy. However, it would result in annual cost savings of 80 billion USD to investors and end users, and thus would pay back in four years. Benefits to the total economy – energy cost savings and additional earnings from gas exports – would be even 120–150 billion USD annually. In contrast, it would require investments of at least 1 trillion USD in new energy production capacity to supply as much energy as Russia has potential to save. By investing in energy efficiency Russia will be able to meet growing demand at significantly lower cost than by investing in new supply capacity.²⁹

In addition, if high economic growth rates were attempted to maintain without decreasing energy intensity, it would take away investments from use in other sectors, and the fuel and energy complex could thus turn into an inhibiting factor for the Russian economy. Moreover, Russia's potential for improving energy efficiency is three to four times greater than its resources for increasing primary energy production.³⁰ It is both possible and advisable to make the improvement of energy efficiency as the main contribution of the energy sector to Russia's economic growth.³¹

If all of the oil, gas and oil products that could be saved by realising Russia's energy efficiency potential were exported, Russia would obtain additional revenues of 80–90 billion USD every year. For example, the reduction of natural gas consumption by 240 billion cubic meters, largely exceeding Russian gas exports in 2005–2008, could lead to a significant increase in Russian natural gas exports.³² None of Russia's giant natural gas fields is capable of producing such a volume. In addition, this energy resource is located in more favourable economic, natural and climatic conditions than

²⁸ World Bank 2008, 5.

²⁹ World Bank 2008, 5–6, 15–16.

³⁰ Bashmakov 2009, 64, 74.

³¹ UNDP 2010, 93.

³² UNDP 2010, 92–93.

the natural gas fields of Yamal or the Arctic shelf.³³ It is needless to say that realising Russia's energy efficiency potential would be profitable for Russian economy.

In addition to the economic benefits, achieving Russia's energy efficiency potential would have other advantages as well. It would create positive environmental effects by significantly reducing greenhouse gas emissions. Realising its full energy efficiency potential would help Russia to achieve the goals of Kyoto Protocol. Russia's greenhouse gas emission would stay well below the 1990 threshold level until 2050, even in the case of strong economic growth.³⁴ Moreover, since no practical policies to promote renewable energy sources are in sight in Russia, improving energy efficiency remains the most significant factor influencing the emission trends.³⁵ Transformation to energy efficient economy could create jobs throughout Russia, also in the areas of high unemployment. Russian households and commercial, public and industrial operations would benefit from lower energy costs.³⁶ Improving energy efficiency could also reduce the hardships of Russia's low-income families that currently suffer most from low energy efficiency and reduce subsidies and welfare now paid to help them pay for utilities.³⁷ Indeed, economic, environmental and social benefits achieved by realising Russia's full energy efficiency potential would clearly outnumber its costs.

Russia can significantly improve its energy efficiency in almost all sectors, of which the most important are electricity, heating, fuel production and processing, construction and industry, transportation and buildings (Figure 2). In general, energy efficiency potential is higher in the end-use sectors than on the energy supply side. Building sector, which is the largest end-use sector in Russia consuming more than one third of energy end-use, has the greatest potential for saving energy.³⁸ Residential buildings consume almost 75 % of the building sector's energy, whereas commercial and public buildings consume the rest. Significant improvements in energy efficiency can also be made in the industrial sector, the second largest end-user in Russia.³⁹ The most energy-intensive industries in Russia are ferrous metals, pulp and paper, and cement

³³ Bashmakov 2009, 68.

³⁴ UNPD 2010, 92–93.

³⁵ Novikova et al. 2009, 17.

³⁶ Millhone 2010, 17.

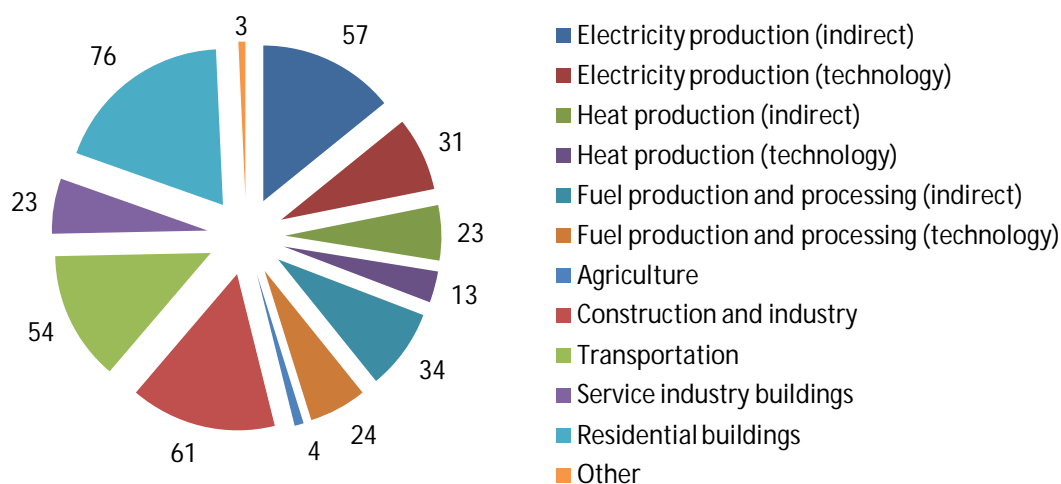
³⁷ UNPD 2010, 96.

³⁸ World Bank 2008, 9, 39.

³⁹ Millhone 2010, 29–30.

industries, which together represent 53 % of energy saving potential in the manufacturing sector.⁴⁰

Figure 3 Breakdown of Russia's energy efficiency potential (million tons of fuel equivalent)



Source: UNDP 2010; from CENEf estimate for the World Bank.

Russia can also significantly improve the energy efficiency of both electricity and heat production and delivery. To begin with, fuel consumed in Russian electricity plants could be reduced by nearly 31 %, according to the World Bank. Reducing losses on electricity distribution and transmission networks could also lead to substantial energy savings. For instance, average electricity distribution losses in Russia in 2005 were 12.2 % of total power production, compared to Finland's 4.0 %. Compared with international standards, Russian heat production and delivery are energy intensive as well. Russian co-generation plants have the greatest potential for improving energy efficiency in heating sector. Significant energy efficiency improvements can also be made at heat generation, gas fired industrial boilers, and heat distribution in municipal heating systems. The distribution losses of Russian heating system are estimated at 20 to 25 % of total heat generation, whereas for example in the district heating network of Helsinki distribution losses are about 6 %.⁴¹

For energy efficiency to gain ground in Russia, it's important that the measures for improving it are economically attractive. According to McKinsey & Company's study, energy efficiency in Russia can be improved in an economically viable way in three

⁴⁰ World Bank 2008, 46.

⁴¹ World Bank 2008, 51–58.

areas: buildings and construction, fuel and energy, and industry and transport. The energy saving potential in the building sector is about 13 % of the total energy consumption in 2030. Installation of thermostats and heat meters and basic insulation measures together with energy efficient light bulbs are the key measures for energy saving in the building sector.⁴²

The energy saving potential of the fuel and energy sector is about 6 % of the total energy consumption in 2030. Improved maintenance, leakage reduction, more even operation of the gas delivery system, reduction of internal consumption within power plants and decrease of losses in heating mains are the key measures for improving energy efficiency in the petroleum, gas, power and heat sectors. In the industry and transport sector, the potential for energy saving is about 4 % of the total energy consumption in 2030. In addition, energy efficiency gains will be achieved through natural replacement of industrial stock.⁴³

One of the most glaring examples of inefficient energy use is the flaring of associated gas, the gas extracted alongside oil. According to some estimates, currently only 25 % of associated gas in Russia is used, and the remaining 75 % is flared. The volume of gas flared every year is at least 20 billion cubic meters.⁴⁴ Besides a waste of money, flaring of associated gas is a significant source of pollutants.⁴⁵ President Medvedev has recently addressed the issue of gas flaring and demanded that fast and decisive action should be taken to put an end to it.⁴⁶ However, transporting the gas extracted alongside oil is a rather complex issue in Russia. The oil company Rosneft doesn't have access to Russia's gas transmission network, which is controlled by Gazprom, and therefore the company claims that it doesn't have any other choice but to flare the associated gas.⁴⁷

Russia has a clear need to improve its energy efficiency. First of all, it will be difficult to maintain economic growth without reducing energy intensity. Moreover, improving energy efficiency would allow Russia to maintain its position as an important and reliable natural gas supplier. Investing in energy efficiency is also economically beneficial for Russia. It stands to reason that the potential is there. Russia can improve its energy efficiency significantly in almost all sectors. Indeed, improving energy

⁴² McKinsey & Company 2009, 11.

⁴³ McKinsey & Company 2009, 11–12.

⁴⁴ EurActive 2009.

⁴⁵ Kristalinskaya 2010.

⁴⁶ Medvedev 2009b.

⁴⁷ Kupchinsky 2009.

efficiency could be made as the main energy resource behind Russia's economic growth. However, it will require overcoming several obstacles and placing the energy efficiency as a national target of the Russian Federation.

4 Improving energy efficiency in Russia

4.1 Barriers and national targets

There are several barriers that Russia needs to overcome in order to improve its energy efficiency. The UNPD's National Human Development Report of Russia introduces four main groups, into which the obstacles to energy efficiency in Russia are divided. They are: 1) Lack of motivation; 2) Lack of information; 3) Lack of funding and long-term investments; and 4) Lack of organisation and coordination.⁴⁸

Lack of motivation. According to Bashmakov (2009), motivation for saving energy is diminished by limited competition, cross-subsidisation, and the lack of ways to keep track of and regulate energy consumption. The lack of financial support for measures to improve energy efficiency diminishes the motivation for saving energy.⁴⁹ As mentioned before, energy efficiency receives little appreciation in Russia and people would need motivation and leadership to change their values and daily habits. For most consumers their energy consumption is visible only in their utility bills and they associate their behaviour (energy consumption) with its relevant costs on daily basis.⁵⁰ However, currently it is hard to say who benefits from energy savings. For instance, if consumers would be able to respond to an increase in their energy expenses by improving their energy efficiency, it would create motivation for energy saving.⁵¹ Thus consumers would see the benefits of energy saving concretely in a form of a smaller energy bill.

On the other hand, resistance to energy efficiency can be worse in business and even in public environment. Adopting energy efficient practises in companies often requires that they would be promoted by company leaders and also generally accepted in the business community. In general, individuals tend to follow the behaviour of those around them. However, in Russia there hasn't yet developed a critical majority that appreciates the values and benefits of energy efficiency.⁵²

⁴⁸ UNPD 2010, 93.

⁴⁹ Bashmakov 2009, 72.

⁵⁰ World Bank 2008, 66.

⁵¹ Bashmakov 2009, 72.

⁵² World Bank 2008, 66.

Lack of information. The lack of information provides a remarkable obstacle for energy efficiency. The lack of statistical data on energy production and consumption at all levels of Russian society prevents Russia from fully understanding the challenges and potential of energy efficiency. The benefits that can be achieved by saving energy can't be understood without relevant information. Lack of general awareness about energy efficiency among Russian companies and consumers forms a great barrier to investments in energy efficiency. Companies don't have enough information and expertise to be able to invest in energy efficiency, banks lack sufficient knowledge to offer financing, and because of the lack of necessary information consumers are not able to evaluate different types of household equipment by their energy efficiency. Because there is not enough accessible and user-friendly information, energy saving is difficult to carry out even if a will for it exists.⁵³ Stimulating research and development work in the field of energy-efficient and environmental-friendly technologies would also be important.⁵⁴

Lack of funding and long-term investments. Inadequate funding for improving energy efficiency and underfunding of the cost of maintaining energy-supply systems in a serviceable condition create a significant obstacle for improving energy efficiency in Russia. According to Bashmakov (2009), large companies and banks make tighter demands for the payback of projects to improve energy efficiency and reduce costs than for new construction projects.⁵⁵

Lack of organisation and coordination. Russia lacks the organisation and coordination for improving energy efficiency. There are no state agencies that coordinate actions to improve energy efficiency and similar problems apply to municipal level as well. According to Bashmakov (2009), Russian leadership has not fully understood the value of energy efficiency as a tool for solving a wide range of economic problems. Indeed, the creation of both financial and organisational resources for improving energy efficiency in Russia would be very important.⁵⁶ Concerted and coordinated action from Russian policymakers will be needed if Russia wants to progress towards an energy efficient future.⁵⁷

⁵³ World Bank 2008, 66–67.

⁵⁴ UNPD 2010, 102.

⁵⁵ Bashmakov 2009, 72–73.

⁵⁶ Bashmakov 2009, 72–73.

⁵⁷ World Bank 2008, 69.

Bashmakov calls for a radical change in the Russian government's attitude towards improving energy efficiency.⁵⁸ However, there are already some signs of an adjustment in thinking, because the latest Russian energy strategy emphasises the importance of improving energy efficiency. The Energy Strategy of Russia until 2030 aims at innovative and efficient energy development, and energy efficiency is mentioned as one of the key priorities in the Russian energy sector, with energy saving as one of its key initiatives. The goals of the strategy include energy and ecological efficiency of the national economy and energy sector, and efficiency of reproduction, extraction and processing of energy resources. The strategy estimates the potential for energy saving in Russia as substantial as the World Bank (2008) in its assessment referred earlier – 45 % of the current consumption of energy resources. In heat supply 20 % of the current consumption of energy resources could be saved, and respectively 30 % in power generation, 40 % in industry and transportation, and 50 % in living apartments.⁵⁹

According to the strategy, expected results of energy saving and increase in energy efficiency in Russia are:

1. Saving of 240 billion cubic meters of natural gas, 340 billion kWh of electricity, 90 million tons of coal and 45 million tons of oil and oil products.
2. Increased competitiveness of national economy under conditions of growing tariffs for energy resources.
3. Additional revenues of 84–112 billion USD from oil and natural gas exports.
4. Decrease of 3–5 billion USD in governmental expenses.
5. Reduction of 790 million tons per year in carbon dioxide emissions and improvement in the country's ecological situation.⁶⁰

Energy intensity of Russian GDP is expected to decrease by 2.1–2.3 times. Total investment directed to energy saving between 2008 and 2030 will be 242–253 billion USD.⁶¹

The real challenge will be to move from words to deeds. In Russia as well, improving energy efficiency is often supported in words, but only actions will bring real results. Achieving energy efficiency goals require development and implementing of a broad range of energy saving measures.⁶² A long step forward towards more energy-efficient

⁵⁸ Bashmakov 2009, 73.

⁵⁹ Gromov 2009.

⁶⁰ Gromov 2009.

⁶¹ Gromov 2009.

⁶² Bashmakov 2009, 73; UNDP 2010, 93, 101.

Russia is the Energy Efficiency legislation of 2009, which introduces several energy-saving measures to be implemented in Russia:

- Introduction of energy performance labels to certain types of goods, such as household goods, computers and office equipment.
- Transition from incandescent light bulbs to energy efficient light bulbs.
- Energy-efficiency standards for new buildings and facilities.
- Energy-efficiency standards for apartment buildings.
- Installation of meters to measure natural gas, electricity, heat and water at all buildings.
- Energy audits are promoted and required for some facilities.
- Introduction of “energy service contracts” to facilitate these changes, in which the cost of the improvements is paid from the resulting energy savings.
- Development of energy-saving programs by state and municipal governments and energy suppliers for their customers.
- Energy saving must be practiced in procurements at all government levels.
- Setting targets for the use of renewable energy sources and secondary energy sources by state programs.
- Investment benefits for stimulating investments in energy efficiency.
- Initiation of a national energy-saving information and education plan. Energy suppliers are required to inform their customers about energy-saving measures. Companies have to report their energy expenses in their annual financial statements.⁶³

The list above appears remarkable with ambitious goals and tight deadlines. Most of the energy-saving measures are to take effect in 2011–2012 – similar measures have taken years to implement in other countries. The legislation, and not to mention the outspoken support of President Medvedev for it, clearly show that improving energy efficiency is taken more seriously in Russia. However, the effective implementation of the legislation will be difficult because very big steps should be taken in a very short time.⁶⁴ The will seems to be there – now the words have to be put in action.

On the other hand, timely action is definitely needed in Russia. According to McKinsey & Company, delaying the implementation of energy saving measures by only five years would reduce the cumulative benefit for Russia in both energy consumption and emissions reduction by almost a half. It will require explicit support from policymakers

⁶³ Millhone 2010, 11.

⁶⁴ Millhone 2010, 9–11.

and strong, coordinated and economy-wide action.⁶⁵ However, it will also require fundamental and nationwide transformation of attitudes, priorities and financing.⁶⁶ A top-down approach is always challenging. Forcing such fundamental changes from above will be hard if the majority of the Russian people remains ignorant about the importance of energy saving. Therefore the real challenge will be to embed the energy-saving attitudes in the whole Russian society.

4.2 *Towards an energy-efficient future?*

Common energy challenges, such as climate change, often foster cooperation among countries. Even so, during the recent years Russia has been placing a greater emphasis on international energy power politics than on international cooperation in the field of energy. It has aimed at regaining its status as a superpower and has been using its abundant natural gas resources as a foreign policy tool.⁶⁷ A strategy of this kind creates conflicts rather than encourages cooperation.

However, attracting international collaboration and financing would be very important for Russia to be able to effectively develop its energy efficiency potential.⁶⁸ Indeed, improving energy efficiency in Russia could open a window of opportunity for the EU–Russia cooperation as well. The EU has traditionally placed great emphasis on sustainable and environmentally friendly development, and compared to that, Russia has a lot of catching up to do. However, there’s a chance for constructive EU–Russia cooperation in the area at issue in the future, as long as Russia will develop a more systematic political approach to energy saving and efficiency.⁶⁹

Indeed, improving Russia’s energy efficiency could be beneficial for both the EU and Russia. For the EU it could potentially mean more hydrocarbons available for its own market. For Russia it would allow it to maintain the competitiveness of its economy.⁷⁰ In addition, the EU could become one of Russia’s key partners in providing Russia with the expertise, technologies, and equipment that it needs to develop its energy efficiency.⁷¹ Common projects in the field of energy saving could be of mutual interest for both the EU and Russia, and create trust and goodwill between the parties.⁷² Thus,

⁶⁵ McKinsey & Company 2009, 15–16.

⁶⁶ Millhone 2010, 16.

⁶⁷ Millhone 2010, 19–20.

⁶⁸ Millhone 2010, 19–20.

⁶⁹ Shadrina 2010, 159, 163.

⁷⁰ Vatansever 2010.

⁷¹ Shadrina 2010, 163.

⁷² Liuhto 2010, 53.

improving Russia's energy efficiency could offer a less controversial way to cooperate in the complex EU–Russia energy relations, which have recently been rather full of conflicts.

Some cooperative initiatives have already taken place. To mention few examples, the U.S. Agency for International Development (USAID) and the Russian Energy Agency (REA) are collaborating on energy efficiency. They signed an agreement on partnership in July 2010.⁷³ Gazprom and the French energy company GDF SUEZ are also cooperating in the energy efficiency area.⁷⁴ Russia and Germany, on the other hand, set up a joint energy agency RUDEA in 2009, which is aimed at improving energy efficiency in the Russian economy relying on advanced Western technology.⁷⁵ In addition, Nordic environment Finance Corporation (NEFCO) is financing various projects intended to improve energy efficiency and develop energy saving in Russia.⁷⁶ Indeed, the areas of energy efficiency and energy saving could offer fruitful possibilities for cooperation between Russia and international partners.

President Medvedev outlined his vision of Russia's future development in his second state-of-the-nation address in November 2009. According to Medvedev, Russia cannot build its future on past Soviet-era achievements but needs to undergo a profound modernisation. Clinging on the past, such as on raw materials, backwardness and corruption will be cast aside and Russia will invest in the development of modern technology, openness and democracy. According to Medvedev, Russia's economic modernisation will require the development of five focus areas: energy efficiency, nuclear energy technology, strategic and information technology, space technology and telecommunications, and medical technology. Energy efficiency will be improved by installing individual meters, switching to energy-saving light bulbs, implementing energy efficiency programmes on public sector and modernising utility systems, reducing gas flaring, developing energy production and transmission technology, and developing innovative technology in renewable and alternative energy sources.⁷⁷

President Medvedev's outlook – the modernisation of Russia – is ambitious. Of course, the talk about openness and democracy can be regarded with suspicion.⁷⁸ Moreover, boosting the modernisation by investing in the development of high technology may

⁷³ USAID 2010.

⁷⁴ Gazprom 2010.

⁷⁵ Blagov 2009. RUDEA 2010.

⁷⁶ NEFCO 2010.

⁷⁷ Medvedev 2009b.

⁷⁸ See e.g. Ioffe 2009.

sound distant for ordinary Russian people who are still struggling for their living. However, technological development often improves the quality of life, which applies to energy efficiency as well. Still, the question remains – how to change the attitudes, values and habits of ordinary people and how the new thinking could be embedded in the whole Russian society?

5 Concluding remarks

Investing in energy efficiency is a rational choice for Russia, both from economic and environmental viewpoint. Reducing the energy intensity of Russian economy is a precondition for the continuation of the country's economic development in the future – and necessary for the sustainable development of Russian economy. Investing in energy saving will bring much more durable benefits than investing in new supply capacity, and in a more cost-effective way. It will generate various positive results – economic, environmental and social alike – such as increase Russia's international competitiveness, increase oil and gas export earnings, lower budget expenditures, channel investments from energy sector to other purposes, reduce greenhouse gas emissions, create jobs, and improve social welfare.

Moreover, it can open a window of opportunity for energy cooperation between Russia and international partners, such as the EU. Russia's need to improve its energy efficiency can create business opportunities for Finnish companies as well. In Russia there is demand for expertise, technologies, and equipment in the field of energy efficiency, which Finnish companies have, and Russia can offer interesting investment opportunities for them. Indeed, both sides can benefit from collaborating and networking in the field in question.

Reducing energy intensity can open a new energy resource for Russia. Russia's future ability to produce enough natural gas to meet the supply needs of both domestic and export customers has been questioned. Maintaining Russia's current natural gas production volumes requires significant and immediate investments in new production capacity – or in improving energy efficiency. By investing in energy efficiency Russia will be able to meet supply needs at significantly lower cost than by building new production capacity.

Although the demand for Russian gas is expected to increase in the future, there are several external factors that could place the country's natural gas production into a

difficult position. Due to the economic crisis, the demand for Russian gas in Europe has at least temporarily decreased. The increased use of Norwegian gas, LNG and alternative energy sources has also reduced the demand. However, the real wild card could be the unconventional gas. The very rapidly increased production of unconventional gas in North America has already led to an oversupply of gas there, which can possibly create an increased flow of LNG to European market as well, further reducing the demand for Russian gas in Europe. Furthermore, if unconventional gas boom spreads to Europe and other continents as well, Russia's position as a dominant natural gas supplier could be challenged. When it is unclear what the future holds, it would be reasonable for Russia to focus its resources in developing energy saving measures and improving energy efficiency instead of making huge investments in developing new energy production capacity.

Finally, the current state of the world cries out for sustainable development. The global economy should be steered onto a sustainable path, which requires contributions from all countries. There is an increasing demand for environmentally sound energy solutions to fight climate change, without sacrificing the economic development. Increasing energy efficiency reduces greenhouse gas emissions and cuts down the consumption of natural resources. In Russia, very favourable environmental effects can be achieved without unrealistically large investments or complicated technology.

The first steps towards realising Russia's energy efficiency potential have already been taken, when the Russian leadership has acknowledged the importance of energy saving and incorporated it into the country's energy strategy. The real challenge will be to proceed from words to deeds – to implement energy-saving measures effectively. Furthermore, it is difficult to create durable results with a top-down approach only. There still remains a general lack of awareness about the concrete benefits of efficient energy use, and therefore Russian consumers and businesses are not motivated to save energy. Indeed, a transition to energy efficient economy in Russia will require embedding the energy-saving attitudes in the whole Russian society.

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