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The Long March to Energy Efficiency

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Editor's note: This is the third of five articles about President Medvedev's efforts to modernize the economy.

Residents of the Veshnyaki neighborhood in southeast Moscow were in for a surprise last month when the radiators in their apartments started heating at full blast while it was nearly 40 degrees Celsius outside.

No problem, district authorities told reporters, we're just checking the system.

These and other problems with the way Russians produce and consume energy make the country among the world's biggest energy wasters, using 2.5 times more energy to produce a given amount of goods and services than the world average. This dramatic inefficiency has led President Dmitry Medvedev to set a goal of lowering the amount of energy spent per unit of economic output by 40 percent by 2020, compared with the 2007 level.

Doing so won't be cheap. The current programs directed toward this end will require 800 billion rubles ($26 billion) of state funds — and that's not counting money channeled through state-run firms such as Rusnano and the Russian Venture Fund.

Modernizing the country's energy infrastructure and promoting energy efficiency is one of the five priority areas for modernization established by Medvedev in June 2009 and overseen by his presidential commission for modernization.

The agenda includes programs to incentivize both conservation and the development of alternative energy sources. And while there is much to be gained by upgrading the Soviet-era energy infrastructure, plans to develop new sources of energy continue to be held hostage to a slow-moving bureaucracy and mixed signals from high-ranking officials.

Reducing Consumption

Theoretically, there is much to be gained by programs to help reduce consumption. As part of the "New Light" program, the government has pledged 100 billion rubles to start phasing out wasteful incandescent light bulbs in favor of compact florescent lights, which use five times less energy, by 2014.

The program is estimated to save as much as 10 billion kilowatt hours per year — or approximately the yearly electricity consumption of Lithuania.

Nevertheless, the energy used for lighting constitutes only a small percentage of all energy used at a company or a household, said Vladimir Baskakov, deputy director at Tsentr Teplovidenia, a Moscow-based heat imaging and energy audit company, with some estimates putting the figure at only 2.6 percent of the country's total domestic energy consumption.

"Take an apartment, for example. There are several types of energy consumers there. You can replace the light bulb, but you also have a washing machine that eats a lot of energy, especially when there is an infant in the family, and there is a fridge that is constantly working," Baskakov said. "So, of the total 300 [kilowatts] per household, 100 is used for light. Replace the bulb, and you will still be using 220 kilowatts," he said.

If domestic energy consumption is to be reduced, the 800-pound gorilla that needs to be addressed is heating, which accounts for 70 percent of the total.

The key challenge to reducing residential energy consumption is to turn residents into more discriminating energy consumers. Consumers need to be given an incentive to turn down their radiator rather than open up a window when their apartment gets too hot in the winter.

The law on energy conservation, which went into effect in November, requires owners of all residences to install energy metering equipment on the premises: a heat meter for each building and meters for electricity, water and gas for each apartment.

Economic Development Minister Elvira Nabiullina has estimated that switching all residences over to modern metering systems will help reduce domestic energy consumption by as much as 20 percent.

But with an aging, inefficient energy infrastructure, there is only so much that can be done on

the consumer's end to increase energy efficiency. Policy needs to be coordinated on the municipal and regional levels.

To get the point across, Medvedev signed a decree in May ordering all municipal governments to issue yearly reports on how their energy efficiency strategies are progressing, including per capita consumption of electricity, heat, gas and water.

"Money needs to be spent correctly," Medvedev wrote on Twitter after a meeting in late June, where he fumed that his energy efficiency ideas are seen too abstractly.

"What is energy efficiency in schools? It's not just some checkmarks in documents," he said at the meeting. "We have to understand that lowering energy consumption by 30 percent in the school means additional money for books and equipment." He added that the law on energy efficiency should be fashionable for social institutions.

While it may take time for the whole country to get used to this new fashion, over the past year, several have adopted energy efficiency programs aimed at revamping their aging energy infrastructure.

In the frigid and sparsely populated Murmansk region, 90 percent of the fuel, which consists of coal, diesel and fuel oil, is imported from other regions, according to the Murmansk region's energy efficiency strategy, published in June. All of the region's energy infrastructure is at least 15 years old, and 53 percent is more than 25 years old. Carrying out the strategy to modernize the system will save 1.1 million metric tons of fuel per year, the document says.

The region also has estimated that it can reduce electricity consumption by 5 percent and heat consumption by 3 percent by implementing an "efficiency propaganda" program, which will include brochures, 10-second television advertisement clips and essay contests for schools.

Small Producers

But making far-flung regions like Murmansk more energy efficient requires changing the way they produce energy as well. Using biomass, for example, to produce energy would be much more efficient in a big timber-producing region than would importing huge quantities of coal and diesel to light and heat the region.

Enormous volumes of timber currently go to waste in Russia because small timber producers throw out as much as 50 percent of the initial product. Out of 130 million cubic meters of timber produced in Russia last year, 13 million was bark that has no commercial value, and millions more are floating logs in Russian reservoirs, where forests had not been cut before being flooded.

"Inefficient municipal heating stations would benefit the most from new equipment that permits the use of plentiful timber rather than diesel or fuel oil brought from hundreds of kilometers away," said Denis Sokolov, managing director of the Timber Confederation of the Northwest.

A study Sokolov participated in estimated that converting 100 out of 700 power plants in the northwest to run on wood chips would save money. But these plants belong to municipal

governments, which cannot afford to re-equip, and purchasing fuel other than what is customarily supplied by the state may be construed as a misuse of state funds, Sokolov said.

Another hindrance to a more widespread use of biomass as an energy source is the law on state purchases, he said. The law, which governs the sale of state assets, provides no incentive for federal agencies to make efficient use of the natural resources at their disposal.

"Vast natural resources that legally belong to the government — like timber cut to make way for roads built by the Federal Road Agency or floating logs in Russian reservoirs — are most likely to get thrown away because the state, in the form of the Federal Property Management Agency, has no incentive to organize the sale of this timber to others," he said.

"The law has to be amended, not least because its loopholes leave a lot of room for corruption," Sokolov said. "But that's exactly the reason why many people don't want it to change," he added.

Waiting on the Law

And biomass isn't the only renewable energy source being held back by restrictive legislation. Turning renewable energy sources into consumable energy requires huge amounts of capital investment, and investors may be hesitant to get involved in such projects unless the government irons out the kinks in its legislation and clarifies the rules for operating in the sector.

State industrial holding Russian Technologies, state-owned hydroelectric company RusHydro and German technology firm Siemens signed a preliminary agreement last month to create a joint venture to make wind turbines in the Volgograd region. RusHydro would then use the turbines to build a 1,000 megawatt wind farm on the Volga River, the sides tentatively agreed upon last month.

But the project won't materialize unless the government finalizes a set of rules that clarify the alternative energy market for investors, said Mikhail Kozlov, head of the department for renewable energy and innovations at RusHydro, a former subsidiary of Unified Energy Systems that has inherited a hodgepodge of alternative energy projects.

"One thousand megawatts is a very big project, and we cannot launch it on a whim," he said in an interview. "No large company is going to enter the Russian market without substantial guarantees," he said.

Since 2007, the renewable energy industry has been waiting for new rules and regulations that would make it possible for alternative energy producers to compete with gas or coal. A so-called feed-in tariff would guarantee grid access and allow producers to charge prices high enough to generate a competitive return on investment.

"There have been many deadlines for introduction of these additional rules since 2008, but we are really counting on the latest date set by the authorities, and signing the partnership agreement with Siemens is a promising sign that this time it will really happen," Kozlov said. "Over the past few months, many have come to the understanding that Russia should introduce subsidies based on installed capacity — it would be the easiest to realize and more

understandable in our country," Kozlov added.

Other alternative energy producers are also waiting not so patiently for these legislative reforms as well.

"I would be very happy if they are discussing these mechanisms right now," said Alexei Bakharev, director of Nord Hydro, a company investing in small hydroelectric plants in the northwestern part of the country.

"Unless the rules of the game are established for investors, the renewable energy market will never be born," he said by telephone from St. Petersburg.

Nord Hydro bought some 35 small hydroelectric plants and is renovating 16 of them. But rebuilding them is 30 percent to 100 percent more expensive in Russia than in Europe, and investment per unit of capacity is so high that it takes up to 40 years to generate profit, Bakharev said.

"No bank will ever finance such a project," he added.

If the government allowed hydroelectric plants to charge five to eight rubles per kilowatt hour, prices in the Northwest Federal District would rise by only 0.5 percent, Bakharev said. Meanwhile, regions like Karelia would benefit tremendously — Karelia already buys 40 percent of its energy from other regions.

But while fostering the development of renewable energy may require higher energy prices in some regions, in some of the more remote areas it could lower prices by reducing dependence on rare oil and gas.

"There are settlements in Russia where one kilowatt hour costs 60 rubles, since it comes from diesel fuel brought in by helicopters," said Andrei Kotenko, director of the polysilicon division at solar energy firm Nitol Solar. "A combined solar/wind power station would pay for itself in two years in such places," he said.

Solar power becomes 8 percent cheaper every year while traditional power is becoming more expensive, Kotenko said, adding that with the right government support, solar panels could produce up to 12 gigawatts in Russia by 2020, accounting for up to 35 percent of the total power produced from renewable sources.

But government support is a fickle thing. Theoretically, it should exist: In 2009, the government instituted a long-term goal to increase the share of electricity generated from renewable sources to 4.5 percent by 2020.

While 4.5 percent may seem like a small share of the total electricity production, it would mean that a full 10 percent of the country's electrical capacity would come from renewable sources, Kozlov of RusHydro said, citing company calculations. "That is about 25 gigawatts — or roughly another RusHydro — in 10 years," he said.

But despite the optimistic goals, the government has been slow to implement the legislation necessary to support the sector, and many officials don't really see the point.

"I am cautious regarding massive application [of renewable energy] and think that it is not a very good fit for Russia," Energy Minister Sergei Shmatko said last month in Yekaterinburg as Siemens and Russian Technologies were reaching the agreement on the wind farm. "This technology can be used in Russia locally, but, to speak frankly, we will never use it on a large scale," he said.

Small energy producers remain undeterred, however. Asked why his company is engaged in what is currently a loss-making business, Bakharev of Nord Hydro said, "Renewable energy is still the future."

Olga Razumovskaya contributed to this report.