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Reforming the Russian Electricity Sector

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In early 1997 the Russian government approved in principle the now common model of electricity sector reform: vertically separating generation, transmission, and distribution; introducing competition where possible; strengthening the regulation of functions less amenable to competition; and divesting government ownership. This model has been implemented in many countries, and the story of the reform would be relatively routine if not for special characteristics of the Russian power system: its size, diverse ownership, high level of nonpayments, and the combined heat and power role of many generating plants. This Note outlines the challenges posed by these characteristics and reports on reform achievements so far.

The first challenge to reform is the sheer size and scope of the network. The Russian power system consists of more than 200 gigawatts of generation capacity, most of it interconnected by 2.5 million kilometers of high-voltage transmission lines spanning an area only slightly smaller than the United States and Canada combined (table 1). Most of the generation capacity is thermal (70 percent), with hydro (20 percent) and nuclear (10 percent) making up the balance. Regionally, however, there are major differences. More than 50 percent of the hydro capacity is in Siberia and the far east, while 80 percent of the nuclear capacity is in the central (Moscow) and northwest regions.

TABLE 1 THE RUSSIAN ELECTRICITY SECTOR

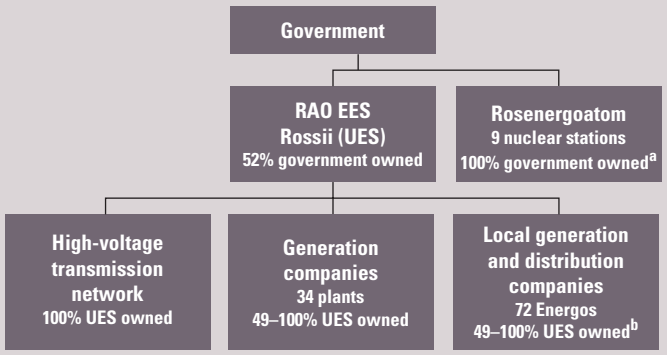
Size	More than 200,000 megawatts.
Generation	827 billion kilowatt-hours (kWh) (1996).
Fuel mix	45% gas, 20% hydro, 18% coal, 10% nuclear, 7% oil.
Demand mix	50% industrial, 11% residential, 39% other (including services and agriculture).
Tariffs	Industrial: more than US$0.05/kWh, residential: US$0.02/kWh, with large regional differences.
Investment	Low, financed through cash flow. Almost no debt or external equity finance or private project development.
Collections	11% cash, 59% noncash, 30% unpaid.
Employees	921,000 (1996).

Note: Data are for 1997 except where otherwise specified.
Source: UES and Russian Federal Energy Commission.

The regions jealously guard their hydro capacity. They regard it as a source of low-cost power for local industries and have little desire to see it blended into a national power supply. Moreover, the system was originally designed to provide a fairly high degree of regional self-sufficiency (transmission links between regions are often weak), and in many cases large parts of these self-sufficient regions are now in other countries. The main dispatch center for the northwest region, for example, was in Riga (now in Latvia), and one of the primary transmission lines from the central region to the Caucasus region passes through Ukraine.

Consequently, restructuring generation to create a competitive market is not a straightforward

FIGURE 1 OWNERSHIP STRUCTURE OF THE RUSSIAN ELECTRICITY SECTOR



a. One nuclear plant is owned directly by the government.
b. UES ownership in three Energos is less than 49 percent. UES and the federal government have no ownership in two Energos.

process. Regional opposition, combined with serious risks that technical constraints will allow generators to game the system and extract monopoly prices, has led the government to adopt a cautious timetable for moving to a competitive market.

Diversified ownership

The second challenge lies in the electricity sector's ownership structure. While many countries began reform with a vertically integrated, state-owned monopoly, the Russian government in 1996 faced a sector that had already been partially restructured and privatized. Until 1992 the electricity sector had been organized in vertically integrated companies, called Energos, in each of the seventy-two oblasts or regions. But when mass privatization began that year, the federal government moved to maintain its control over the power sector.

The government formed a new company, RAO EES Rossii (commonly referred to as Unified Energy Systems, or UES), and gave it ownership of the country's largest hydro and thermal generating stations (nuclear excepted), the high-voltage transmission network, and the dispatch systems. The Energos were set up as separate companies to own and operate the smaller generating plants and the distribution networks, and some of their stock was sold to employees and managers under the voucher privatization program. UES retained at least a 49 percent interest in most of these new enterprises, however. The government also divested part of its holding in UES. It now owns about 52 percent of the shares, foreign companies hold about 28 percent, and Russian companies and individuals, including company employees and managers, own the balance (figure 1).

As a result of this decentralized ownership, the restructuring program requires the support of a wide range of stakeholders. The Energos in particular need to be persuaded of the benefits of change, since they own or manage more than 60 percent of installed capacity. The Energos regard the move to a competitive wholesale market as a threat to their autonomy, a change that will end their control over dispatch and oblige them to purchase high-cost power from the market rather than distributing low-cost power from their own plants. Some of the Energos understand that their power would be dispatched first and that they would receive the system marginal price for it. But they remain concerned about nonpayments on the wholesale market and about having to pay market service charges to sell and repurchase what they regard as their own power.

Outside shareholders of UES also will have to be persuaded of the merits of restructuring, particularly with regard to any divestiture of generation assets. While these shareholders would theoretically retain an equivalent ownership stake in newly formed generation companies, they might not perceive these holdings as equivalent in risks or returns to their existing holdings in an integrated UES.

Nonpayments

The third challenge is nonpayments. The root causes are many. They include tax avoidance, profiteering on barter settlements, legal and political barriers to cutting off supply to "strategic" customers, and simple failure by the government to collect adequate taxes or introduce sufficient spending discipline to ensure that energy supplies to budget-funded agencies can be financed. The lack of cash payments has jeopardized the

financial viability of many power sector enterprises, hampering their ability to introduce or maintain efficient operating systems or to respond to changing market conditions. Moreover, barter and other noncash instruments are an inefficient and costly basis for market transactions.

Restoring payment discipline is key to moving forward with the proposed restructuring and unbundling of the sector. Without this discipline, many of the newly formed enterprises would risk financial failure, which would both discredit the reforms and invite renewed government intervention. Nonpayments can be fully resolved only at the interface with the customer, however, which is typically through the regional distribution company. Thus the federal authorities cannot unilaterally address the problem, but must work through local entities.

Competition and regulation

The fourth challenge lies in the fact that many of the generation assets controlled by the Energos are combined heat and power plants. These plants were built primarily to meet local heating demands and are an integral part of the extensive district heating networks that in many large cities serve the majority of the population. In the absence of competitive heating markets, heat prices for these plants are regulated by local authorities, generally at a level equivalent to the cost of heat-only boilers. Regulators and municipalities are concerned about the integration of competitive and regulated activities in a single entity, about the implications of this under the current procedures for allocating joint and common costs, and about their ability to ensure that the Energos do not use the regulated heat market to extract windfall profits from electricity cogeneration. With the system of regional regulation still in its infancy and many of the local regulators lacking experience and expertise, this added complexity is a serious concern.

Achievements to date

Despite these challenges, the government has taken meaningful steps toward reforming and restructuring the electricity sector and has defined further steps as part of its 1998 program for economic reform. In 1997 the emphasis was on consolidation at the center, with the federal government strengthening its governance of the electricity sector and bringing new management into UES. The new management team has focused its initial efforts on restoring the company's financial viability. To this end,

- New financial controls and audit procedures were introduced. UES and ten of the Energos are being audited, and UES is moving to full IAS accounting.
- The investment program has been reviewed and rationalized, and funding withdrawn for about forty projects deemed nonviable.
- Collections have been improved, increasing cash payments to the UES transmission division by 250 percent and overall cash payments from 5 to 20 percent of revenues.
- New sources of capital are being explored, including private sector participation in planned new investment projects and a possible convertible bond issue for placement in international financial markets.

The government has also taken initial steps to introduce competition. It created an independent financial operator to establish a competitive wholesale market among large industrial customers and generators. Model contracts were established for transactions, using the network as a common carrier. Principles for access to the transmission and distribution networks and for regulation of wheeling tariffs are being established. A wholesale market, being piloted in one region, counted two generators and four customers among its participants by the end of the year. To participate, buyers must agree to pay cash, in advance, and to eliminate payment arrears. In return they receive a 35 percent discount on tariffs.

The government has also undertaken to reorganize generation, to boost operating efficiency while laying a foundation for a competitive generation market. It has evaluated several restructuring options in recent months, and the 1998 program calls for finalizing and initiating

the reorganization plan. Among the options is grouping the existing plants into generating companies, or Gencos, to create enough potentially viable, independent entities for a competitive market. Finally, the government has begun removing electricity pricing distortions, increasing tariffs to households by 32 percent and making a commitment to eliminate cross-subsidies by 2000.

Next steps

In 1998 reform efforts will be extended outward from the center, and pilots will be expanded to more regions. The four target areas of the 1998 program are increasing cash collections, improving dispatch of generators to lower average fuel costs, boosting operating efficiency, and reducing pricing distortions.

The government views financial viability of the sector, particularly increased liquidity, as key to the success of the reform. While UES more than tripled its cash collections in 1997, further improvements can be achieved only by resolving the nonpayment problem at the customer interface, that is, at the Energo level. Initial efforts in 1998 will be mainly diagnostic, though arrangements have been made for the private sector to run the commercial operations of one Energo under a management contract. Diagnostic efforts initially will focus on ten regions. Consultants will work with the Energos to identify the causes of the nonpayments in each region and test solutions. Actions to complement these initiatives will include increasing the electricity traded for cash on the wholesale market and improving payment discipline among budget-funded agencies.

Improving dispatch could save an estimated US$1 billion or more a year in fuel costs, and initial steps to realize these benefits will take place in 1998. UES, the federal regulatory agency, and consultants are developing an improved incentive system, including dispatching guidelines and procedures. New guidelines are to be in place in at least one zone (of seven) by the end of June. If the pilot efforts are successful, they will be extended to other zones.

The reorganization of generation, particularly the increased focus on competition among suppliers, is also expected to reduce electricity prices. As new generating plants begin to compete with existing plants, investment proposals are expected to become more rational and out-of-date, inefficient units are expected to close (plans for their closure are to be developed, including programs to mitigate social impacts).

Electricity prices still need to be adjusted to better reflect the economic cost of supply. Wholesale and industrial prices need to fall, and prices to households to rise. Efficiency improvements (in dispatch and operating practices) should help to bring down wholesale and industrial prices, as will rebalancing when household tariffs are increased. Improved access to investment financing is another potential source of tariff reductions. Because of limited access to capital markets, electricity tariffs currently incorporate full self-financing of new investments. But with improved financial viability, UES and the Energos should be able to attract debt financing for at least part of the investment program. That would allow prices to fall and would subject proposed investments to the discipline of review by the financial community.

Many problems remain to be resolved, and the commitment to reform periodically loses steam as pressing political issues arise. But on balance the Russian government has taken impressive steps toward creating a more efficient and effective electricity sector.

The World Bank has been a partner in the Russian electricity sector reform program for more than two years. It mobilized grant financing to help the government formulate the reform, provided technical assistance loans to support restructuring programs, and extended adjustment loans to encourage sustained commitment to reform.

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