

Russia's Power Sector Reform: Creating Robust Competition or a Potemkin Market?

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In 2003, Russia embarked on the long-awaited – and repeatedly postponed – restructuring of its electricity sector. Power-sector restructuring constitutes one of the most far-reaching and technically complex reforms of the post-Soviet era. It involves both the corporate restructuring of the country's massive electricity monopoly, RAO UES, and the implementation of legislation providing a framework for the creation of markets in electricity generation and supply and for a revamped set of regulatory arrangements for transmission and distribution. This paper provides an assessment of the reform plans as they now (October 2004) stand and raises a number of issues that will need to be addressed as the reform is implemented. The analysis presented here is focused specifically on the reform plans as embodied in the electricity legislation and the restructuring plan for UES adopted in 2003. It does not extend to developments in other spheres that may affect, or be affected by, power-sector restructuring. However, the impact of electricity reform will depend, to a significant extent, on developments in the gas, heat and other utility sectors, as well as the success or failure of efforts to overhaul systems of social protection in order to mitigate the impact of reform on vulnerable segments of the Russian population.¹

The discussion begins with an overview of the power sector, followed by a description of the reform plan itself. This is followed by an analysis of various facets of the reform, beginning with general problems of implementation and continuing with discussions of the three broad sets of issues addressed by the reform: asset allocation, the creation of efficient markets, and the construction of new regulatory arrangements for natural monopoly activities such as transmission. Two major conclusions emerge from this analysis. First, realising the objectives of reform will depend on achieving a combination of effective competition and effective regulation. Secondly, meeting these requirements is likely

to require some correction of the reform plan as it is implemented. These conclusions are discussed in greater detail in the final section of the paper.

Overview of the Electricity Sector

Russia's power sector is dominated by a vertically integrated, state-controlled monopoly, RAO UES. There is neither competition in the wholesale market (which in any case is not really a market) nor choice of supplier for consumers. In part because of this and because of the cost-plus basis of most price regulation, the electricity industry has one of the worst productivity records of any major Russian industrial sector.² Like the country's natural gas monopoly, OAO Gazprom, UES has in recent years played an important, albeit diminishing, role in extending subsidies to the rest of the economy. In contrast to Gazprom, however, UES realises almost all its sales on the domestic market; it has almost no export earnings to set against the costs of the domestic subsidies it provides. UES also has a more complicated, less centralised structure than Gazprom, which has a unified share and retains a tight grip on its major subsidiaries. The state has retained a majority (52.5%) stake in UES, but the almost feudal structure of UES greatly complicates any restructuring of the company.

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¹ On the interaction between power-sector reform and these other issues, see OECD (2004:200–02).

² See Ahrend (2004). It is worth noting that the power sector shares this dubious distinction with the natural gas sector, which is also dominated by a state-controlled and vertically integrated monopoly.

The government established UES in 1992 as a transitional structure to manage the high-voltage grid and the most important power stations, pending a more comprehensive reform of the power sector. At the same time, vertically integrated regional energy companies (the so-called AO-energос) were created in almost every region of the federation. These manage smaller power stations and the low-voltage grid. UES was supposed to hold at least 49% of the equity, including a majority of voting shares, in every energo. However, political compromises between Moscow and the regions resulted in a more complicated structure. Irkutskenergo and Tatenergo remained entirely outside the UES system, and UES secured controlling stakes in only 63 energос. It holds minority shareholdings in the other nine. Privatisation further complicated UES's own share structure, as well as those of the energос. UES, regional administrations and private investors all acquired stakes in the energос. UES also owns the central dispatch administration (TsDU), the Federal Network Company (FSK), 36 power plants, approximately 57 R&D institutes, and stakes in more than 70 construction, maintenance and service companies.³ UES and its daughter energос control 96% of Russia's high- and low-voltage grid and account for almost 70% of electricity output. The balance is generated by the wholly state-owned nuclear power sector, which is run by the Ministry of Atomic Power (Minatom), and by the two independent energос.

The energос are largely controlled by regional administrations rather than UES, and the electricity tariffs levied on end users are set by Regional Energy Commissions (RECs). The commissions

are a crucial source of regional power, since they can establish different tariffs for different customers. This has enabled regional governments to conduct local industrial policies, on socio-economic or political grounds, favouring some consumers at the expense of others. One of the priorities of the current electricity reform is to reduce the ability of regional and local politicians to interfere in the running of the sector.

The electricity sector is heavily regulated. Formally, the main actors are the Federal Tariff Service (FST) (the successor to the Federal Energy Commission, or FEC) and the RECs. The FEC/FST regulates a wide range of activities in the sector, as well as reviewing the economic activities of the entities it regulates. Its most visible role, however, is in setting tariffs in the Federal Wholesale Market in Electric Power (FOREM). The RECs, for their part, handle regulatory issues at regional level, setting specific tariffs within their jurisdictions (subject to FEC/FST-determined ceilings) and performing a range of functions similar to those of the FEC/FST.⁴ However, neither the FST nor the RECs are independent. The key decisions at federal level are made by the government, while the RECs are dominated by regional administrations. As a result, tariff policy often reflects electoral concerns, social policy and inflation targets, not to mention pressures from consumer lobbies, rather than any serious economic analysis.⁵ There is little competition in the sector, since tariffs are regulated and consumers cannot choose suppliers.⁶ Until early 2003, UES regulated the FOREM, as the owner of 80% of the FOREM's commercial operator and the owner of the TsDU. UES largely controlled generators' access to the FOREM and was often accused of favouring its own producers.⁷

During 1991–2000, UES played an important role in providing implicit subsidies to the rest of the economy. Electricity tariffs rose only half as fast as industrial producer prices (IEA 2003a:22). Effective tariffs were often even lower than nominal ones, owing to the accumulation of enormous payment arrears and the widespread use of barter and other forms of non-monetary settlement. Many customers could not, in any case, be cut off for non-payment.⁸ It is extremely difficult to estimate with precision the degree of subsidy to the rest of the economy that the power sector provides via below-cost tariffs, because tariffs have in recent years allowed the sector to cover its short-run costs. What they do not allow for is the recovery of capital cost. However, estimates of the sector's capital investment needs vary enormously, between about \$2.0bn (Arthur Andersen, 2001) and around \$6.0bn per annum (Nash *et al.*, 2002).⁹ Even the lower figure is roughly double the actual level of capital expenditure during the 1990s. This implies that UES was under-investing by \$1–5bn per annum. Depreciation rates in 1990–2000 are estimated to have been more than twice the rate of new capital formation ('Prezidentu sovetuyut', 2001). In short, the power sector has been subsidising the rest of the economy by running down its capital base.

Since 2000, the authorities have done much to raise tariffs towards cost-reflective levels. Electricity tar-

³ See Renaissance Capital (2004:102) and RAO UES web site at http://www.rao-ees.ru/ru/investor/obsh/show.cgi?c_str_finnew.htm.

⁴ For a more detailed description of FEC and REC activities, see IEA (2003a:20).

⁵ On the interaction between macroeconomic management and tariff policy, see Tompson (2002:945).

⁶ The '5/15' wholesale market formed in conjunction with electricity reform is an exception and is discussed below.

⁷ The nuclear concern Rosenergoatom, in particular, complained of discrimination.

⁸ This is described in greater detail in OECD (2000:83–112) and OECD (2002:121–32). See also, Tompson (1999) and Woodruff (1999).

⁹ See also OECD (2002:136). This discussion excludes the 'pass-through' subsidy to electricity consumers provided by cheap gas supplied to power producers. See Ahrend and Tompson (2004).

iffs have risen substantially faster than the PPI or the CPI (see Table 1), although they remain well below pre-crisis levels relative to both price indexes. Average producer prices for electricity, which fell to Rb0.282/kWh (\$0.01) after the crisis, had reached Rb0.760/kWh by the end of 2003, around \$0.026 at the then prevailing exchange rate.¹⁰ Wholesale prices had thus reached the bottom of the \$0.025-0.030 range which the World Bank estimates to be the long-run marginal cost of electricity production in Russia (Pryadilnikov 2003:8). This, in turn, is very close to the \$0.023-0.031 range calculated by Nash *et al.* (2002), on the basis of upper and lower estimates of UES's capital expenditure requirements. At the same time, payment discipline has improved dramatically (OECD 2004:172).

Differential electricity tariffs have also made for an elaborate network of cross-subsidies among consumer sectors. In the late 1990s, the average wholesale price of electricity supplied to households was less than half that for industry, despite the fact that households are the most expensive segment of the market to supply.¹¹ Producer prices for agricultural consumers were somewhat higher but still well below the average for industry and transport. As is evident from Table 2, there has been a substantial convergence in recent years, with industry and transport paying roughly the same wholesale price and agriculture paying about 94% of this. Even household tariffs have risen towards the average.

Data on wholesale prices, however, tell only part of the story. What consumers actually pay depends on their means of supply. Direct access to the high-voltage grid, without reliance on a supply intermediary, is generally the cheapest option. Those further downstream, who rely on energy-supply organisations to receive power by low-voltage networks, pay far more – triple the high-voltage price in some cases. Since these networks are usually under the control of regional or local authorities, it is difficult to generalise. The structure of tariffs depends on the willingness and ability of the relevant authorities to subsidise particular consumer groups. While households are largely protected, small businesses and service-sector enterprises, which also rely on the low-voltage grid, often pay the highest tariffs of all (see Table 3). Finally, there is a further tier of subsidies extended to individuals on the basis of either social welfare considerations or membership of particular groups entitled to such privileges (e.g. war veterans).¹²

Higher tariffs are necessary but not sufficient to resolve the sector's problems. More than a decade of under-investment has made electricity reform a matter of some urgency. Otherwise, it is difficult to see how the sector will attract the investment needed

Table 1. Increase in regulated producer prices for electricity December/December, %

	1998	1999	2000	2001	2002	2003
Average electricity tariffs	2.2	19.7	41.7	28.8	28.3	13.9
CPI inflation	84.5	36.6	20.1	18.8	15.1	12.0
PPI inflation	23.0	71.4	31.6	10.6	17.5	13.0

Source: Goskomstat RF.

Table 2. Regulated wholesale tariffs for electricity, 1996-2002 End of period, Rb per kWh

	1996	1997	1998	1999	2000	2001	2002
Average wholesale tariff	0.215	0.254	0.239	0.282	0.416	0.538	0.673
Supplied to industrial users	0.275	0.264	0.257	0.296	0.430	0.548	0.669
Percentage of highest sectoral tariff	100	100	100	100	100	100	94.9
Supplied to agricultural producers	0.137	0.161	0.171	0.213	0.334	0.498	0.664
Percentage of highest sectoral tariff	49.8	61.0	66.5	72.0	77.7	90.9	94.2
Supplied to transport	0.273	413	543	0.705
Percentage of highest sectoral tariff				92.2	96.0	99.1	100
Supplied to households	...	0.113	0.105	0.153	0.235	0.314	0.460
Percentage of highest sectoral tariff		42.8	40.9	51.7	54.7	57.3	65.2

Source: Goskomstat RF.

Table 3. Energy supply arrangements and consumer prices, Samara Oblast' 2003 (Rb/kWh)

Type of purchase	Nature of grid access		
	High-voltage	Medium-voltage	Low-voltage
Direct purchase from energy	0.75	1.11	1.62
Purchase via energy supply organisation	1.40	2.00	2.20
Transmission losses (approximate)	4%	8%	12-30%

Source: Administration for State Regulation and Oversight in the Electricity Sector, Samara Oblast'.

¹⁰ The average for households has been estimated at USD 0.016/kWh; see IEA (2003a:401).

¹¹ In OECD countries, households tend to pay almost twice as much as industrial consumers; see IEA (2003b:1.70-1).

to prevent the emergence of possibly severe capacity constraints over the medium-to-long term. There is currently substantial spare capacity, even at peak load, because electricity consumption fell sharply in the early 1990s and remains about 15% below the 1990 level. Operational capacity is estimated at around 190GW, while current system peaks are around 133GW.¹³ The amount of spare capacity could increase if higher tariffs led to more efficient usage; there is already evidence that recent tariff increases have prompted enterprises to curb their consumption (Golikova 2002). Indeed, electricity output rose just over 9% during 1999–2003, while real GDP rose by more than 38%. However, it is widely believed that rapid economic growth will soak up existing excess capacity by the end of the decade, even if electricity consumption continues to lag real GDP growth ('Energeticheskaya strategiya' 2003:35). Even if the system as a whole retains a good deal of excess capacity for some years yet, changing consumption patterns mean that the situation in specific regions could soon be quite serious. Excess capacity is increasingly concentrated east of the Urals, while demand is growing faster to the west. Moreover, regardless of the rate of demand growth, a good deal of both the generating capacity and the network infrastructure is very old and will need to be replaced or at least substantially refurbished in the coming years. The authorities reckon that it will be necessary to introduce at least 121GW, and possibly as much as 177GW, in new generating capacity by 2010. Most of this would replace assets that will need to be decommissioned ('Energeticheskaya strategiya' 2003:36). This estimate probably understates the ability of power producers to extend the service lives of existing power plants, but it is nevertheless clear that the sector will require substantial capital investment in the coming years, and this is unlikely to be forthcoming in the absence of fundamental reform.

Reform Plans

The Russian electricity reform is aimed at ensuring that supply continues to meet growing demand by creating conditions that will encourage investment in new capacity and foster greater efficiency of both production and consumption. This will mean allowing prices to rise to fully cost-reflective levels, ending cross subsidies and allowing

markets to operate where possible. Broadly speaking, Russia's electricity reform strategy reflects the approach to restructuring adopted in a number of other countries over the last 20 years or so.¹⁴ Its core elements include:

- ! breaking up the vertically integrated monopoly of production, transmission and distribution, and separating the potentially contestable activities from those that have a substantial element of natural monopoly;
- ! introducing competition into those activities where it is feasible, such as generation and supply; and
- ! setting regulated tariffs for transmission and distribution, which are natural monopolies, in such a way as to encourage efficiency and not merely cover costs.

This overall strategy is embodied in a detailed reform programme that includes a legislative framework composed of six laws adopted in March–April 2003 and a plan for the restructuring of UES itself, known as the '5+5' plan (referring to the five years to the market transition and the five years after).¹⁵ The legislation is concerned with the fundamental rules that will govern both liberalised markets and the remaining state-controlled monopolies in the reformed sector, while '5+5' is concerned primarily with asset restructuring. The legislation and the '5+5' plan are closely linked, because the restructuring of UES is essential for the creation of a more competitive market structure during the transition and is, indeed, required by the unbundling provisions of the legislation.¹⁶

The legislation provides the legal framework for the development of a market in electricity and defines the parameters for continued regulation of transmission and distribution. It imposes strict vertical separation between contestable (generation and supply) and natural monopoly (transmission, distribution and dispatch) activities. Owners of assets in the monopoly spheres will be allowed to own generation and supply assets only in specified circumstances. Three specialised entities will handle the market and system operation and the transmission infrastructure. The Federal Network Company (FSK) will manage the high-voltage grid; the Trading System Administrator (ATS) will facilitate electricity trading; and the System Operator (SO) will manage the dispatch of electricity and will coordinate the operation and maintenance of the grid and generators. Electricity and heat are to be freely tradable commodities, with wholesale and retail markets for electricity and a market for heat.¹⁷ There is also to be a capacity mechanism, but

¹² Individuals belonging to such protected groups typically pay around 50% of the charges paid by others.

¹³ IEA (2003a:7, 14). Goskomstat gives a figure for installed capacity of 214.9GW in 2002, which has been more or less constant since 1990; the much lower figure for operational capacity reflects low levels of expenditure on maintenance and investment during that period.

¹⁴ See IEA (2001); and IEA (2002:213-14).

¹⁵ The main laws are 'On electricity' ('Ob elektroenergetike' 2003) and 'On the implementation of the law "On electricity"' ('Ob osobennostyakh' 2003). Amendments to four other pieces of legislation removed impediments to the operation of these two basic laws.

¹⁶ For a more detailed description of the reform plans, see OECD (2004:208-14).

it has yet to be defined. Prices will be set freely, on the basis of supply and demand, in competitive segments of power markets. Regulated tariffs for natural monopoly functions like transmission will be set at levels that ensure cost recovery and a return on invested capital.

Under the '5+5' restructuring plan, to be implemented during the period until 2008, UES's generation assets will be spun off into ten wholesale generation companies (gencos) organised by plant type: six thermal and four hydroelectric. One of the hydro companies will be subordinated directly to the System Operator (SO) in the interests of system stability. In most jurisdictions, this would be done by contract, but it may make sense in Russia's weak contracting environment for the SO to have direct control over dedicated generating capacity. This provision may have to change if the government accepts proposals to form only one hydro generating company in the course of the restructuring. UES transmission assets have already been transferred to the FSK, which is also to take control of high-voltage lines outside the UES system (either by acquisition or leasing). UES dispatch operations have been transferred to the SO, which has also taken over the energos' dispatch units. The restoration of centralised dispatch, which broke down to some extent in the 1990s, must be regarded as one of the important early achievements of the reform. Both the FSK and the SO were established as 100% UES subsidiaries, but they will eventually be spun off. The plan also provides for the restructuring of the energos. These will be broken up into their generation, transmission, distribution and retailing/supply components, which will then be grouped together to form larger, functionally specialised units rather than smaller, vertically integrated ones. When the process is complete, the assets of the former energos will have been reorganised into 14 territorial generating companies, five inter-regional distribution companies and a larger number of supply companies.

The implementation of both the legislation and the '5+5' plan is to be completed by 2008 or 2009. The state will retain sole ownership of the country's nuclear generation capacity and of the SO. It will hold a super-majority (75%+1 share) stake in the FSK indefinitely¹⁷ and will retain majority stakes in the hydro generating companies, at least until the end of the transition period. It will also retain 52% stakes (its current UES shareholding) in the inter-regional distribution companies, the holding company set up to manage UES stakes in isolated energy systems and other residual UES assets. However, the state's stakes

in the wholesale gencos based on thermal plants and in the territorial gencos will fall well below 50% and in some cases these companies could be wholly privatised. Liberalisation of the wholesale market will take place at a date set by the government but not before 1 July 2005.¹⁹ With some exceptions (see below), the supply business will also be liberalised, while transmission and distribution will be regulated as natural monopoly activities, with tariffs based on rate-of-return regulation.

The reform legislation contains a number of provisions intended to ensure a disruption-free transition ('Ob osobennostyakh' 2003). First, a 'trial' market, consisting of between 5 and 15% of the total electricity market, was launched in November 2003 in order to test and ensure the reliability of the new structures and regulatory arrangements and has so far operated successfully. Fully liberalised 'pilot' wholesale markets may in due course be launched in one or more regions prior to full liberalisation. Secondly, the legislation stipulates that specially designated 'guaranteeing suppliers' will provide electricity to households and communal service suppliers at regulated tariffs for three years after the wholesale market is liberalised. These tariffs will be driven by the average wholesale market price, with the difference between household tariffs and the wholesale market price decreasing over time. Thirdly, regional and federal authorities will have the power to veto the decommissioning of combined heat and power plants (CHPs) for three years from the end of the transition period. The fate of the CHPs, which provide heat and hot water to households and industry, remains a problem for the reform: they are very efficient producers when generating both heat and power, but very inefficient when producing power only. However, many aspects of the transition are still to be clarified. The manner and timing of the liberalisation of the rest of the wholesale market have been left to the government and constitute perhaps the single biggest source of uncertainty about the reform.

The case for vertical separation of the potentially competitive and natural monopoly activities of UES is compelling. Pittman (2001) highlights four concerns that should be borne in mind when considering the question of a greater or lesser

¹⁷ The question of a heat market is outside the scope of this paper but it should be noted that there are risks arising from the fact that power-sector reform appears set to proceed much faster than reforms in related sectors such as gas and heat.

¹⁸ In order to protect the rights of minority shareholders, Russia's law on joint-stock companies requires super-majorities of over 75% of the voting shares to authorise certain particularly important decisions, such as those concerning new share issues. See 'Ob aktsionernykh' (2001).

¹⁹ Realistically, liberalisation is unlikely before 2006 or 2007, but the law allows for it as early as mid-2005.

degree of vertical separation in the restructuring of network industries:

- ! the economies of scope that may be lost in the event of vertical separation;
- ! the likely benefits from competition;
- ! the ease or difficulty with which a regulator (or disadvantaged producer) is likely to detect discrimination in network access on the part of a network operator that is also engaged in production, and to be able to act to secure a remedy in a timely fashion; and
- ! the potential welfare losses arising from discrimination in access.

Technological change notwithstanding, there may well remain significant economies of scope between generation and transmission in the electricity sector.²⁰ However, UES's existing structure is so complex and decentralised that it is unlikely that the transaction costs arising as a result of unbundling will be as great as they might in the case of a truly integrated monopoly. Moreover,

few would any longer deny that technical change does mean that electricity

generation is no longer a natural monopoly (if it ever was). There is clearly scope for competition. Consideration of the latter two factors suggests that, if the Russian authorities do wish to open up the sector to competition, then vertical separation will be required. First, it is notoriously difficult for the regulator to prevent discrimination on the part of a network operator which is also in the generating business, not least because of the many forms such discrimination may take. Given the weakness of Russia's courts and regulatory organs, reliance on regulation in any case would appear to be less promising than steps to deprive the monopolist of any incentive to discriminate, which is precisely what vertical separation aims to do. Secondly, the potential economic consequences of discrimination are considerable, as the network operator can effectively exclude some producers from some transactions for which they ought to be able to compete. Given how significantly electricity prices can change from hour to hour, even seemingly minor differences in producers' access to timely information can have significant consequences.

(To be continued in *RusEnergyLaw 2'2005*).

²⁰ See, e.g. Joskow (1997), Newbery (1994) and Hayashi et al. (1997).

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