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**RESTRUCTURING RUSSIA'S ELECTRICITY SECTOR: TOWARDS EFFECTIVE COMPETITION OF FAUX LIBERALISATION?****ECONOMICS DEPARTMENT WORKING PAPERS No. 403****by William Tompson**

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## ABSTRACT/RÉSUMÉ

### **Restructuring Russia's electricity sector: Towards effective competition or *faux* liberalisation?**

Russia in 2003 embarked on the restructuring of its electricity sector. The reform is intended to introduce competition into electricity production and supply, leaving dispatch, transmission and distribution as regulated natural monopolies with non-discriminatory third-party access to the networks. The ultimate aim of the reform is to create conditions that will encourage both investment in new capacity and greater efficiency of both production and consumption. The overall approach embodied in the reform is promising. However, there remains a serious risk that its aims could be subverted by special-interest lobbying during the lengthy implementation phase. If the reform is to succeed, the marketised segments of the sector must be characterised by real competition based on economically meaningful prices. There are two dangers here. The first is that private-sector interests will secure strategic holdings that allow them to exercise market power or even local monopoly power. The second is that, even after the wholesale market is liberalised, the state will retain considerable capacity to hold down electricity prices, if it so chooses, and it could do so in ways that unduly distort the signals the market is sending and deter the very investment that the reform is meant to attract.

*JEL Classification:* L94, O52, P28, P31

*Keywords:* Russia; economy; electricity; infrastructure; grid; monopoly; competition; state ownership; privatisation.

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### **La restructuration du secteur de l'électricité : vers une véritable concurrence ou une fausse libéralisation ?**

En 2003, la Russie a entrepris de restructurer le secteur de l'électricité. L'objectif de ces réformes est d'instaurer la concurrence aux stades de la production et de la fourniture, en laissant le dispatching, le transport et la distribution sous le régime de monopoles naturels réglementés assortis d'un accès non discriminatoire des tiers aux réseaux. Le but ultime de la réforme est de créer les conditions pour encourager l'investissement dans de nouvelles capacités de production aussi bien que l'augmentation de l'efficacité de la production et de la consommation. La stratégie générale de réforme est prometteuse. On ne peut cependant négliger le risque que les objectifs fondamentaux de la réforme soient relégués au second rang par les pressions exercées par des groupes d'intérêt spéciaux pendant tout le temps qui sera nécessaire à sa mise en œuvre. Pour que la réforme puisse réussir, la concurrence doit pouvoir véritablement jouer dans les segments du secteur ouverts aux forces du marché, sur la base de prix économiquement rationnels. Il existe deux dangers à cet égard. Le premier est que des intérêts privés ne s'approprient des participations stratégiques leur permettant d'exercer un pouvoir de marché ou même un pouvoir de monopole au niveau local. Le second est que, même après la libéralisation du marché du gros, l'État sera encore largement en mesure de maintenir les tarifs de l'électricité à un bas niveau si tel est son choix, et il pourrait pour ce faire utiliser des moyens qui fausseraient indûment les signaux envoyés par le marché et décourageraient les investissements que la réforme vise précisément à attirer.

*Classification JEL:* L94, O52, P28, P31

*Mots-clés:* Russie; économie; électricité; infrastructure; réseau; monopole; concurrence; entreprises d'État; privatisation.

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## TABLE OF CONTENTS

RESTRUCTURING RUSSIA’S ELECTRICITY SECTOR: TOWARDS EFFECTIVE COMPETITION OR <i>FAUX</i> LIBERALISATION? .....	4
Overview of the electricity sector .....	4
Reform plans .....	10
Implementation issues .....	13
Asset restructuring .....	14
Generation and supply: creating competitive markets.....	16
Transmission and distribution: monopoly regulation .....	18
Related reforms.....	20
Social impact .....	21
Conclusion.....	22
The legislative framework.....	24
Asset restructuring.....	26
The ‘federal’ restructuring.....	26
Restructuring the energos .....	27
Formation of a nuclear generating company .....	28
The transition to the market .....	28
<b>Boxes</b>	
Box A1. Major milestones in power-sector reform.....	30

## **RESTRUCTURING RUSSIA'S ELECTRICITY SECTOR: TOWARDS EFFECTIVE COMPETITION OR *FAUX* LIBERALISATION?**

**William Tompson<sup>1</sup>**

In 2003, after many years of debate, Russia embarked on the restructuring of its electricity sector, launching one of the most far-reaching and technically complex reforms of the post-Soviet era. The reform will involve the corporate restructuring of the country's massive electricity monopolist, RAO UES, and the implementation of legislation that will provide 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 stand and raises a number of issues that will need to be addressed as the reform is implemented. 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. The major conclusions that emerge from this analysis are, first, that realising the objectives of reform will depend on achieving a combination of effective competition and effective regulation and, secondly, that meeting these requirements is likely to require some correction of the reform plan as it is implemented.

### **Overview of the electricity sector**

Russia's power sector is currently 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.<sup>2</sup> Like the country's other major energy 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. This is a major reason for the

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  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.

second striking difference between the two monopolists: where Gazprom's management has long resisted gas-sector reform, the management of UES has been in the forefront of the drive to restructure the sector. The third key difference is that UES 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 per cent) stake in UES, but the almost feudal structure of UES greatly complicates any restructuring of the company.

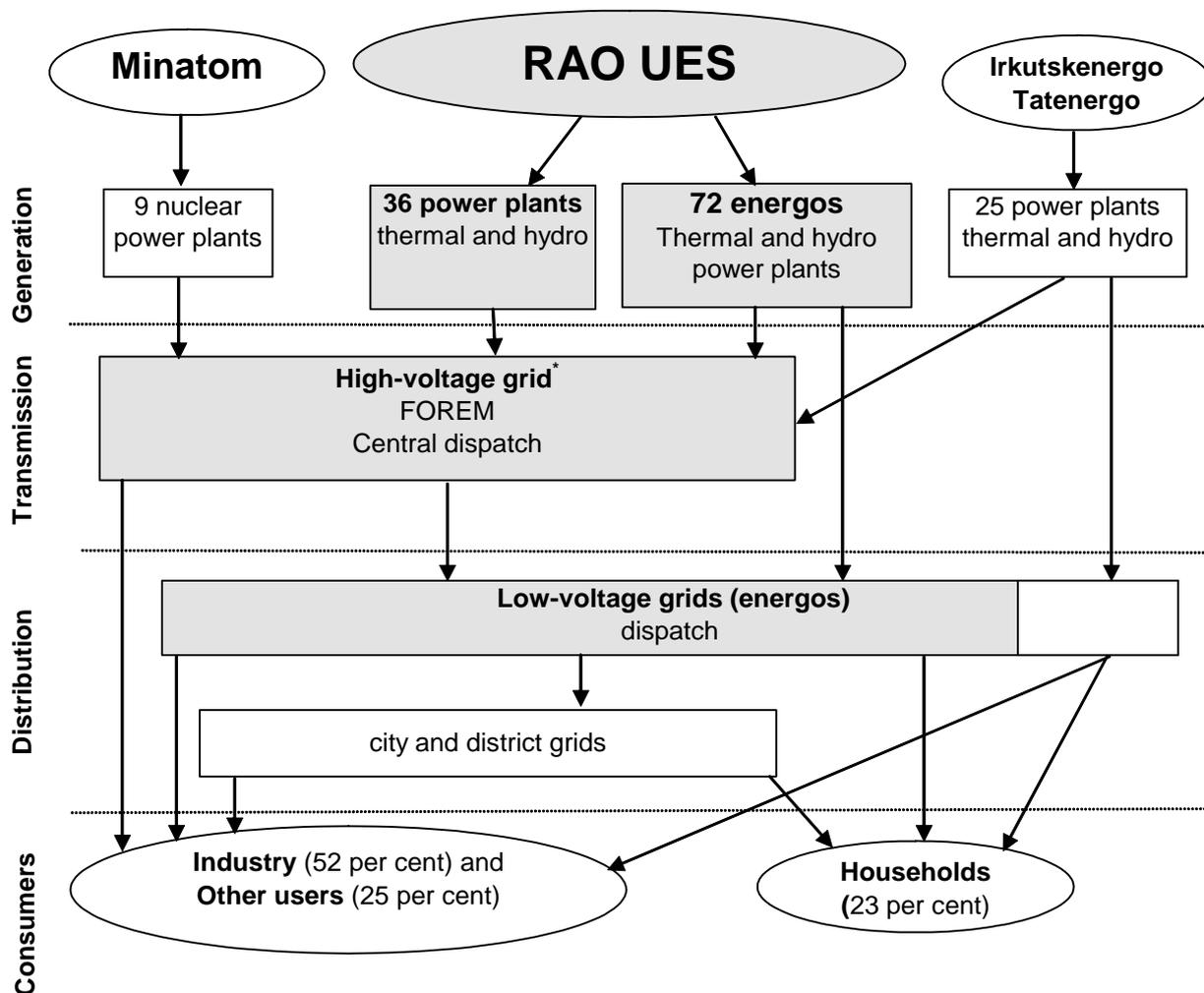
The Russian government established UES in 1992 as a transitional structure to manage the high-voltage grid and the most important power stations pending a more comprehensive reform of the electricity sector. At the same time, vertically integrated regional energy companies (the so-called AO-energos) were established in almost every region of the federation to manage smaller power stations and the low-voltage grid. UES was to hold at least 49 per cent of the equity, including a majority of voting shares, in every energo. In the event, political compromises between Moscow and the regions resulted in a more complex structure. Two energos remained entirely outside the UES system<sup>3</sup>, and UES secured controlling stakes (of 49-100 per cent) in only 63 and minority shareholdings in the remaining nine. Privatisation meant that UES's own share structure grew more complicated, as did those of the energos, with UES, regional administrations and private investors all acquiring stakes in them. Apart from its energo stakes, UES owns the central dispatch administration (TsDU), the Federal Network Company (FSK), 36 power plants (including nine under construction), around 57 R&D institutes and stakes in more than 70 construction, maintenance and service companies (see Figure 1).<sup>4</sup> Altogether, UES and its daughter energos control 96 per cent of Russia's high- and low-voltage grid, as well as 72 per cent of installed generating capacity. The UES system accounts for almost 70 per cent of electricity output. The balance is generated by the nuclear power sector, which is run by the Ministry of Atomic Power (Minatom) and is wholly state-owned, and by the two independent energos, Irkutskenergo and Tatenergo.

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3. These were Tatenergo and Irkutskenergo.

4. See Renaissance Capital (2004:102) and RAO UES web site at [http://www.rao-ees.ru/ru/investor/obsh/show.cgi?c\\_str\\_finvnew.htm](http://www.rao-ees.ru/ru/investor/obsh/show.cgi?c_str_finvnew.htm).

Figure 1. The structure of the Russian electricity industry, 2002



\* 408 power stations are connected to the high voltage grid

Source: OECD estimates from various sources

The energos are largely controlled by regional administrations rather than UES, particularly because 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 energy reform, therefore, is to reduce the ability of regional and local politicians to interfere in the running of the power sector.

The electricity sector is highly regulated, with a number of state bodies playing different roles, including the Federal Tariff Service (FST), the successor to the Federal Energy Commission (FEC), the RECs and the Federal Anti-monopoly Service, which replaced the Ministry for Anti-Monopoly Policy

(MAP) in early 2004.<sup>5</sup> Until April 2004, the central regulatory roles were assigned to the FEC and the RECs, which controlled electricity tariffs. The FEC regulated a wide range of activities in the sector, as well as reviewing the economic activities of the entities it regulated. Its most visible role, however, was in setting tariffs in the Federal Wholesale Market in Electric Power (FOREM), which was set up in 1996 to facilitate the redistribution of surplus electricity; this function has been retained by its successor, the FST. 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.<sup>6</sup>

Neither the FST nor the RECs are independent. The most important decisions at federal level are taken by the government, while the RECs are dominated by regional administrations. Tariff policy therefore remains highly politicised: decisions often reflect electoral concerns, social policy and inflation targets, not to mention pressures from consumer lobbies. There is little competition in the sector as it is currently constituted, nor do consumers have choice of suppliers.<sup>7</sup> Even the FOREM wholesale market is not really a market, since FOREM tariffs are also regulated. Until the adoption of the electricity reform legislation in early 2003, it was UES that really regulated the FOREM, as the owner of 80 per cent of the FOREM's commercial operator and the owner of the TsDU. To a significant extent, UES controlled generators' access to the FOREM, which prompted accusations that it was favouring its own producers.<sup>8</sup>

Tariff reform remains a critical issue. During 1991-2000, electricity tariffs rose only half as fast as industrial producer prices.<sup>9</sup> Moreover, effective tariffs were often far lower than their nominal levels, owing to the use of barter and other forms of non-monetary settlement in the sector to offer large *de facto* discounts to customers who could not, in any case, be cut off for non-payment.<sup>10</sup> 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, if one excludes the subsidy provided by cheap gas supplied to power producers.<sup>11</sup> This is because electricity tariffs allow the sector to cover its short-run costs; what they do not allow for is the recovery of capital cost, and estimates of the sector's capital investment needs vary widely, between a low of about USD 2.0 billion and a high of around USD 6.0 billion per annum.<sup>12</sup> However, even the lower of these figures is around double the actual capital expenditure level observed since 1990. This implies that UES has been under-investing by between USD 1 billion and USD 5 billion per annum in recent years. In short, the electricity sector has been subsidising the rest of the economy by running down its capital base. Depreciation rates in 1990-2000 are estimated to have been more than twice the rate of new capital formation.<sup>13</sup>

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5. The FEC is also to be reorganised under the restructuring of federal executive bodies undertaken in March 2004. As of this writing, however, the MAP has already been transformed into the Federal Anti-monopoly Service, while the FEC has yet to be reorganised.

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

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

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

9. IEA (2003a:22).

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

11. See Ahrend and Tompson (2004).

12. For the lower figure, see Arthur Andersen (2001); the higher is from Nash, *et al.* (2002). See also OECD (2002:136).

13. 'Prezidentu sovetuyut' (2001).

In recent years, the authorities have taken steps to raise tariffs towards cost-reflective levels. Since 1999, electricity tariffs have risen substantially faster than the PPI or the CPI (see Table 1), although they remain well below pre-crisis levels in real terms.<sup>14</sup> At the same time, payment discipline has continued to improve. Average producer prices for electricity, which fell to Rb0.282/kWh (USD 0.01) after the crisis, had reached Rb0.760/kWh by the end of 2003, around USD 0.026 at the then prevailing exchange rate.<sup>15</sup> Wholesale prices had thus reached the bottom of the USD 0.025-0.030 range which the World Bank estimates to be the long-run marginal cost of electricity production in Russia.<sup>16</sup> This, in turn, is very close to the USD 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. These figures compare with an average figure for actual electricity prices in OECD member states in 2002 of around USD 0.09 for households and USD 0.048 for industry.<sup>17</sup>

**Table 1. Increase in regulated producer prices for electricity**

	December/December, per cent					
	1998	1999	2000	2001	2002	2003
<b>Average electricity tariffs</b>	<b>2.2</b>	<b>19.7</b>	<b>41.7</b>	<b>28.8</b>	<b>28.3</b>	<b>13.9.</b>
<i>CPI inflation</i>	<i>84.5</i>	<i>36.6</i>	<i>20.1</i>	<i>18.8</i>	<i>15.1</i>	<i>12.0</i>
<i>PPI inflation</i>	<i>23.0</i>	<i>71.4</i>	<i>31.6</i>	<i>10.6</i>	<i>17.5</i>	<i>13.0</i>

Source: Goskomstat RF.

The aggregate subsidy provided at the expense of the sector's capital is only part of the problem. Differential electricity tariffs have 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.<sup>18</sup> 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 per cent of this. Even household tariffs have risen closer to the average.

14. This is true with respect to both consumer and producer price indexes: average electricity tariffs at end-2002 were 286 per cent of the levels of December 1997; the corresponding measures for the CPI and the PPI were 543 and 361 per cent respectively.

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

16. Pryadilnikov (2003:8). This figure is consistent with estimates given to the survey team by a number of Russian experts.

17. IEA (2003b:I.70-1).

18. In OECD countries, households tend to pay almost twice as much as industrial consumers; see IEA (2003b:I.70-1).

**Table 2. Regulated wholesale tariffs for electricity, 1996-2002**

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

Source: Goskomstat RF.

These data, of course, concern wholesale prices only. The final cost to consumers 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).<sup>19</sup>

**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 energo	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'.

Higher tariffs are necessary, but they are not enough 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 to prevent the emergence of possibly severe capacity constraints over the medium to long term. At present, there is substantial spare capacity, even at peak load, because electricity consumption fell sharply in the early 1990s and remains about 15 per cent below the 1990 level. Operational capacity is estimated at around 190GW, while current system peaks are around 133GW.<sup>20</sup> 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.<sup>21</sup>

19. Individuals belonging to such protected groups typically pay around 50 per cent of the charges paid by others.

20. 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.

21. Golikova (2002).

Indeed, electricity output rose just over 9 per cent during 1999-2003, while real GDP rose by more than 38 per cent over the same period. 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. The government expects consumption to rise from 915 billion kWh in 2003 to 1015-1070 billion kWh by 2010 (which would still leave it below the 1990 peak).<sup>22</sup> 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 be quite serious in a few years' time. Excess capacity is increasingly concentrated in regions east of the Urals, while demand is growing faster to the west.

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 (more likely in many cases) substantially refurbished in the coming years. The authorities estimate that the industry's fixed assets are around 65 per cent amortised – 75 per cent in the case of the rural distribution networks – and the government believes 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.<sup>23</sup> 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 intended to ensure 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 an approach to utility restructuring similar to that implemented in many other countries over the last decade or two.<sup>24</sup> 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 comprises two basic pillars: 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).<sup>25</sup> 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

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22. 'Energeticheskaya strategiya' (2003:35).

23. 'Energeticheskaya strategiya' (2003:36).

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

25. 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.

primarily with asset restructuring. The legislation and the '5+5' plan are closely linked, since 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.<sup>26</sup>

The electricity laws provide the legal framework for the development of a market in electricity and define the parameters for some continued regulation of transmission and distribution. The legislation 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 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. There is also to be a capacity mechanism. 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.

The '5+5' restructuring plan is to be implemented during the period to 2008. On current plans, 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 producers 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. 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 had broken 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 have been established as 100 per cent UES subsidiaries, but they will eventually be spun off into entirely separate companies. 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 local monopolies. 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, at which time the structure of the sector is to resemble that shown in Figure 2. The state will retain 100 per cent ownership of the country's nuclear generation capacity and of the SO. It will hold a super-majority (75 per cent+1 share) stake in the FSK indefinitely<sup>27</sup> and will retain majority stakes in the hydro generating companies at least until the end of the transition period. It will also retain 52 per cent 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 per cent 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. With some exceptions (see below), the

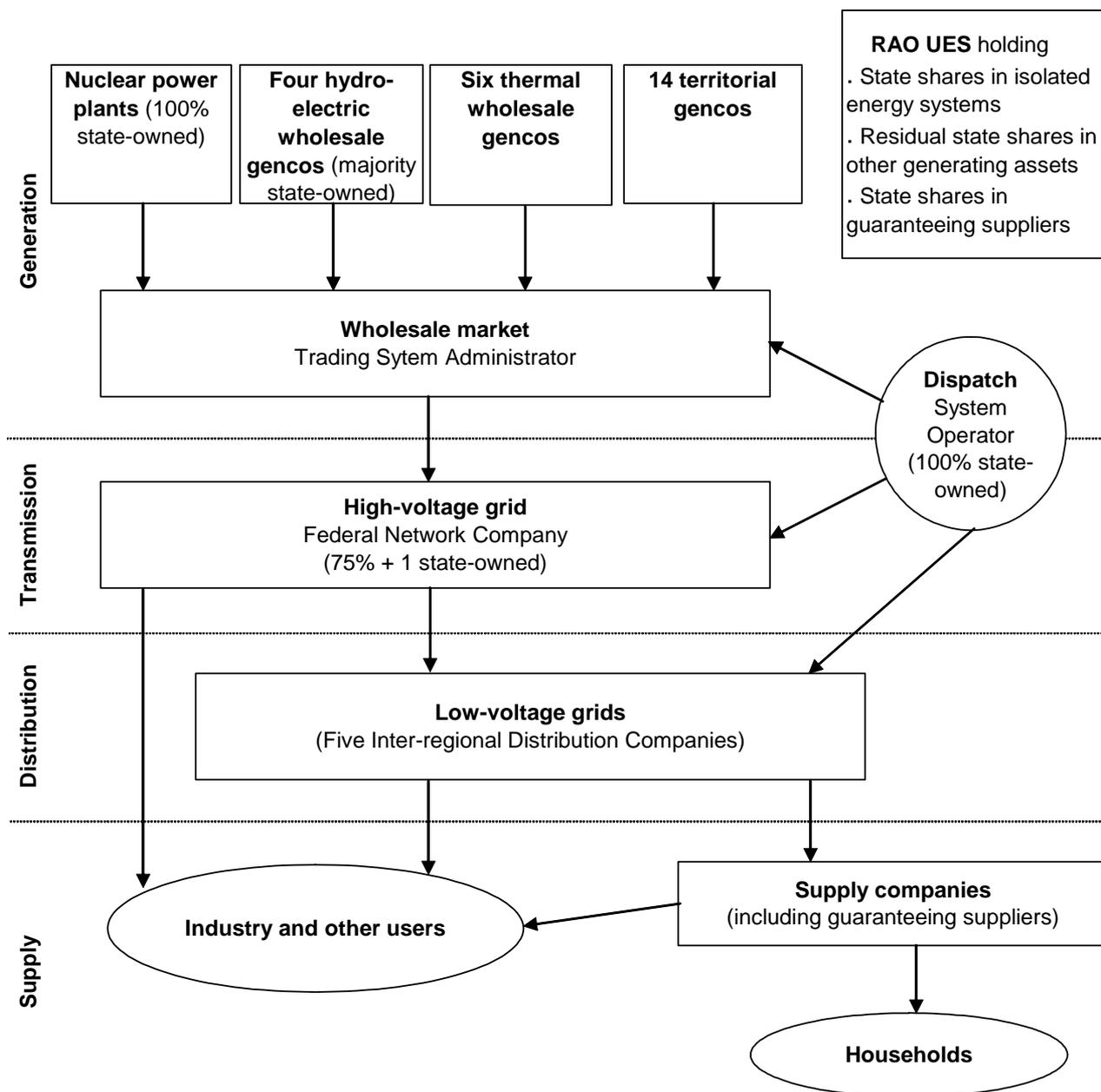
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26. For a more detailed description of the reform plans, see the annex to this paper.

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

supply business will also be liberalised, while transmission and distribution via the high- and low-voltage grids will be regulated as natural monopoly activities, with tariffs based on rate-of-return regulation.

**Figure 2. The structure of the Russian electricity industry, 2008-09**



Source: OECD from various sources

The reform legislation includes a number of elements designed to ensure a disruption-free transition. First, a 'trial' market, consisting of between 5 and 15 per cent 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.<sup>28</sup> Fully liberalised 'pilot' wholesale markets may in due

28. 'Ob osobennostyakh' (2003), art. 6.

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 from year to year.<sup>29</sup> Thirdly, regional and federal authorities will have the power to approve or 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 (see below). 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 to decide and constitutes 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 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 scope economies between generation and transmission in the electricity sector.<sup>30</sup> However, 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. 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. Moreover, 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.

### **Implementation issues**

The complexity of the reform plan and the lengthy period over which it is to be implemented reflect the authorities’ determination to proceed with due caution and to draw lessons from the experience of power-sector liberalisation elsewhere. The legislation also leaves the government to take a large number of key decisions at a later stage. These include the timing and extent of liberalisation, the rules governing access to the grid, the operation of the market and the prevention of discrimination. The ‘5+5’ plan likewise leaves many issues open, including the specific mechanisms for spinning off the wholesale gencos and creating the territorial gencos. The open-ended character of the laws and the restructuring plan should

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29. ‘Ob osobennostyakh’ (2003), art. 6.

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

allow the authorities freedom to adapt and adjust the reform as it is rolled out, which may well be necessary in implementing such a complex, far-reaching reform. However, the complexity of the plan and the length of the transition raise the risk that the aims of the reform could be subverted, or at least substantially altered, as a result of special-interest lobbying during the implementation phase. Such lobbying has been evident since the reform process was launched in 2001 and shows no sign of abating.

The risk that special-interest lobbying will distort the reform is all the greater in view of the fact that the asset restructuring and the creation of the liberalised sector's architecture are proceeding in parallel. It would in principle have been preferable to create a new regulatory framework and market institutions prior to privatising UES's assets. The problem is that the value of assets to be allocated as UES is broken up will depend in many cases on the institutions and rules that are eventually created to govern the market. Participants in asset-control contests thus have powerful incentives to lobby for specific outcomes with respect to questions of regulatory reform and market design. One of the most important developments in this regard was the drive by a number of Russian industrial interests to acquire large blocs of UES shares in anticipation of restructuring. Some industrial groupings had already acquired large stakes in selected energos. By early 2004, Russian legal entities held around 32 per cent of UES, up from 5 per cent in mid-2000.

Russian industry's move into UES shares was a significant moment in the reform process, but its meaning was ambiguous. It did reflect confidence that electricity reform was, after much delay, to proceed. Also encouraging was the fact that these powerful groupings had to buy large stakes in UES in order to shape the process. Initially, they had apparently hoped to buy the specific assets they wanted for cash, outside the framework of the restructuring plan. Only after such sales were banned in September 2002 did the industrialists embark on their share-buying spree. However, their behaviour also suggested a significant disjuncture between the government's plans and private-sector expectations about the results of reform. Many, if not most, of the groups appear to be chiefly concerned with vertical integration – with securing key assets upstream or downstream of their core businesses in order to protect themselves as the reform unfolds.<sup>31</sup> This suggests a high degree of confidence that reform will go forward but little faith that the outcome will be a well functioning market. It may, indeed, reflect the hopes of some actors that the market will not function well at all, creating opportunities for well positioned players to exercise market power.

### *Asset restructuring*

Although the '5+5' plan is relatively detailed, the mechanisms for allocating UES and energo assets in the course of restructuring are still to be finalised. It was initially planned that all UES shareholders would simply be allocated shares in all successor entities proportional to their stakes in UES. While widely seen as the surest way to protect minority shareholders' rights during restructuring, the *pro rata* approach would have left small shareholders with a large number of small stakes in successor companies, which, given persistent concerns about corporate governance, could have left them even more vulnerable than before. Moreover, while the law requires strict separation of generation and transmission activities – no UES-successor entity may own both generation and transmission assets except in specified circumstances – the successor entities would, if the *pro rata* principle were strictly applied, have exactly the same owners in exactly the same proportions, at least initially. Also relevant is the state's desire to increase its stakes in the infrastructure businesses (chiefly the FSK and the SO) while reducing its ownership of generating capacity; most private investors wish to do the opposite. This is particularly true of the major Russian industrial groupings, which lobbied aggressively for a relaxation of the *pro rata* principle after they began moving into UES shares in late 2002.

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31. Most industries are, of course, 'downstream' of electricity and thus are concerned with ensuring access to low-cost supplies; however, some producers of coal, gas and other fuels are also interested in securing stakes in electricity generators.

In 2003, these concerns prompted UES and the government to move towards adopting a two-stage restructuring procedure involving both UES shares and cash bids. Under such a scheme, UES shareholders would have the right to exchange their UES shares for equal shares in the successor entities created by the restructuring. Shareholdings in the wholesale gencos that were not taken up on a *pro rata* basis, including government stakes, would then be put on sale in an auction, with a mix of UES shares and cash used for bidding (some stakes might have been reserved for 'shares-only' bidding). Thus, investors who did not exercise their *pro rata* right in phase one would, in phase two, be able to use their UES shares to acquire specific assets. This would enable non-shareholders to participate in the auctions via cash bids, something the authorities favour, on the grounds that restricting the auctions to shareholders could lead to the creation of an electricity oligopoly dominated by a few large industrial groupings. Cash bidders could be made to pay a significant premium to participate, based perhaps on the average UES share price for some period before the auctions; in this way, the interests of UES shareholders would be protected.

Such a two-stage restructuring would enable the government to raise its stake in the FSK from 52 per cent (its *pro rata* share) to the 75 per cent+1 share it is required by law to secure. It would also facilitate the increase in the state's stake in the System Operator (SO). By encouraging the diversification of ownership of the wholesale gencos, it might also foster the development of competition in the sector and make the vertical separation required by law more meaningful. However, the state's stake in *all* residual UES assets would increase as a result of these auctions. Thus, the state would end up with many assets that it does not want to own, including inefficient, second-tier generating assets that investors find unattractive and that the authorities might feel political and social pressure to run. This would represent a potential conflict of interest, given the state's role in controlling dispatch via the SO.

At present, the issue remains unresolved. As of this writing (August 2004), no auction scheme has yet been adopted by the government. A decision was to have been taken in early 2004, but the government repeatedly postponed consideration of the matter by the UES board until late June, when the prime minister announced that a final decision would be taken only at a government meeting in December. The announcement of such a long delay unsettled the market and raised doubts about the future of the entire reform process. While government officials were at pains to stress that the reform would proceed according to plan (albeit on a revised timetable), the length of the delay, coupled with the statement that the auction mechanism would be selected only after a thoroughgoing review of the results of reform to date, raised the prospect of more substantial changes.<sup>32</sup> The delay also risked creating legal difficulties for the government, because under the electricity legislation, the ban on cross ownership of generation and transmission assets will come into force from 1 January 2005.

There is also uncertainty about exactly how the territorial gencos and inter-regional distribution companies will be created when the energos are restructured. The '5+5' plan anticipates a three-stage process for breaking up the energos and then merging their generating assets into the new companies. This could take up to four years to complete. Long delays between the unbundling of the energos and their 'rebundling' into new companies would represent a corporate governance risk, as the former energos would be replaced by hundreds of much smaller companies, whose shares would be illiquid and whose managers would be more difficult to monitor, not least for the state. A lengthy transition phase could offer insiders significant opportunities for asset-stripping.<sup>33</sup> Various proposals have been put forward to accelerate this transition, and it now appears that the territorial gencos, at least, will be created by means of a somewhat faster 'co-creation' process. Whatever restructuring option is chosen, it would be desirable to keep the transition period as short as is possible while still respecting shareholders' rights. This is true of the formation of wholesale gencos and inter-regional distribution companies as well as territorial gencos.

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32. *Vedomosti*, 28 June 2004; *Moscow Times*, 28 June 2004; Prime-Tass, 12 July 2004.

33. Renaissance Capital (2003:2-5).

The successful management of the restructuring process would, moreover, build confidence among investors, particularly foreign investors, who may fear that well connected business groups will manipulate the process and dominate the post-restructuring sector. This is thus an important early opportunity to build credibility for the reform.

It would be a mistake to exaggerate the risk that the restructuring will degenerate into an uncontrolled asset-grab. Critics have invoked memories of the shares-for-loans auctions of the 1990s, but such fears are grossly overstated. There will probably, however, be attempts at less blatant insider deals and procedural manipulations. The best way to limit the scope for abuse, whatever the specifics of the final arrangements for restructuring UES and the energos, will be to ensure that asset disposal procedures are standardised, transparent and relatively simple. Complexity and opacity are certain to create opportunities for corruption, while any exceptional or one-off deals are likely to appear abusive even if they are not. Transparency with respect to the disclosure of beneficial ownership, insiders' dealings and relationships among parties will be particularly important in heading off improper manipulation of restructuring procedures.<sup>34</sup> Yet while curtailing attempts to abuse the process should clearly be a priority, their significance should not be over-estimated. Resolving the ownership issue is itself likely to be beneficial. Other sectors in Russia have begun to see a recovery of investment and some progress in restructuring only after asset-control contests were largely settled. Electricity may be no different, provided the market rules are well designed and the worst abuses of local monopoly and other forms of market power are curtailed.

#### ***Generation and supply: creating competitive markets***

The reform plans show a healthy awareness of the need to structure markets in such a way as to facilitate competition. For example, assuming that the planned company structures are not substantially revised, the six thermal wholesale gencos will all be of roughly similar size (in terms of installed capacity), fuel mix and age of fixed assets. The wholesale gencos will also be geographically spread, so as to avoid concentrations in particular markets. The planned territorial gencos will vary more in size (owing to the decision to structure them on the basis of groups of contiguous regions), but they, too, have been organised so as to avoid excessive concentrations of market power in particular price zones. Moreover, the government remains determined to ensure that the UES restructuring does not result in an oligopolitics market structure. Finally, the law stipulates that no legal entity, or group of related entities, may own in excess of 35 per cent of the total installed generation capacity in any given wholesale price zone. Such entities may be subject to price regulation or forced unbundling.<sup>35</sup>

Yet for all the authorities' concern about the dangers of private oligopoly, the state's own rather large role in power generation may be the greatest threat to competition. State ownership of nuclear plants matters little, as these represent base load and do not have much impact on price-formation. Many of the state's other generating assets will be relatively high-cost producers anyway, so they should pose a problem only if they are given preference in dispatch for political or social reasons. The state's control of roughly 40GW of hydroelectric capacity is another matter. Hydro has the lowest short-run marginal costs of any form of non-nuclear generation. Therefore, it cannot directly set the marginal price. However, it could be used indirectly to manage the marginal price: by strategically bidding in hydro capacity, the authorities could displace higher-cost bidders from the order of dispatch, thus lowering the wholesale price. This could prove extremely effective in countering the exercise of market power by private

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34. In 2003, UES adopted a rule requiring company insiders to seek approval for transactions involving UES shares. In April 2004, however, the company decided instead to publish data on insiders' transactions in UES shares on a quarterly basis, having concluded that the original rule was ineffective. Significantly, the company linked the issue explicitly with the problem of related-party transactions. While there remain grounds for concern, the latest step is a welcome development. See *Vedomosti*, 29 April 2004.

35. 'Ob elektroenergetike' (2003), art. 25.6.

producers. However, if used too aggressively, this tactic could depress prices overall and thus discourage needed investment in new capacity. The authorities should guard against the temptation to use hydro to hold down price rises. Managers of the three hydro companies not subordinated to the SO should be given the incentives and the freedom to operate on a sound commercial basis rather than to act as quasi-regulatory instruments. Over the longer term, the privatisation of the state's remaining generation assets would reduce both the temptation and the capacity of the state to manage the market in this way.

Plans for a capacity mechanism raise similar risks. Payments intended to enhance security of supply by ensuring the availability of sufficient capacity are a form of insurance against possible market failure - or, in the Russian case, of reinsurance, since the authorities will own enough generating capacity to ensure that reserve margins remain relatively high. The problem is that, in the absence of clear criteria concerning when such capacity should be dispatched, the SO may dispatch it too readily, thereby distorting the price signals sent by the market and the incentives for investment in new capacity.<sup>36</sup> Capacity payments may also encourage producers to 'game' the system by manipulating their availability declarations to increase the capacity payment. By providing revenue to incumbent generators regardless of whether or not they are selling electricity, capacity payments may also impede new entry.<sup>37</sup> The design of the capacity mechanism, therefore, will need to take account of the need to minimise any distortion of investment incentives or market operation. It appears that the government plans to specify the nature of the capacity arrangements in the course of 2005.<sup>38</sup>

It is critical in this context to appreciate three peculiar physical properties of electricity: it cannot be stored economically (apart from water stored in reservoirs); supply and demand must balance at all times; and demand tends to be inelastic in the very short term, as most consumers lack the information or the means to react rapidly to changes in price. This means that even a well functioning electricity market is likely to be much more volatile than most commodity markets. While market failures and situations involving market power can occur, price volatility *per se* is not a problem. Indeed, it can be a crucial source of information about where constraints are emerging in the system and what new investment may be required. If a liberalised sector is to function efficiently, therefore, the authorities must be prepared to tolerate such volatility, even if this sometimes means accepting sharp price spikes. This means that the state will need to refrain from using the assets it owns or such tools as price caps, for which the legislation provides, to counter unduly the signals the market is sending.

In the initial stages of liberalisation, such restraint may not be difficult, as prices may very well fall after competition is introduced. There is, after all, excess capacity in the system, even at peak demand. There is also scope for improved productivity, as current regulatory arrangements do not allow for the most economically efficient dispatch. However, prices will eventually have to rise, and to rise substantially, to reach levels that make investment in generating capacity attractive. This J-curve price path, involving an initial drop and later price rises, has been observed in other liberalised electricity markets.<sup>39</sup> It is when the curve begins to rise, then, that restraint on the part of the authorities will be needed to avoid artificially depressing prices and muting the market's signals about the need for investment. Moreover, if it is to attract substantial private investment to the sector, the state must be able credibly to commit itself to such restraint *ex ante*.

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36. The IEA (2004a:3) raises this concern in conjunction with Sweden's transitional capacity mechanism.

37. IEA (2001:96).

38. *Renaissance Capital Morning Monitor*, 21 July 2004.

39. On the Scandinavian experience, in particular, see Sillantaka (2002:7-10). Prices initially fell sharply in some other markets after liberalisation, including Australia, Germany, the United States and New Zealand; see IEA (2001:50-2).

Investors will be reluctant to enter the market if they believe the authorities will intervene in heavy handed fashion to hold down prices. Indeed, they are likely to be wary of entering any market in which regulatory authority, control of the infrastructure and the largest share of generating capacity are all concentrated in the hands of the state. An early and credible commitment by the state to withdraw from the generation business after the transition is over would therefore be a reassuring signal to investors. A further important signal would be to clarify the rule regarding price caps, making it clear that they are to be set at very high levels and only to be imposed in very exceptional circumstances. More generally, the creation of a strong, independent regulatory authority, with a clear mandate and clear rules, would greatly reduce the need for the authorities to send such signals of their commitment to refrain from heavy-handed intervention in the market. In the absence of such a regulator, it will be difficult for the authorities to convince investors that the legal and regulatory framework now being put in place will be stable. Investors may fear that, once they are committed, they could be subject to *ex post* exploitation as a result of later revision of that framework.

Electricity supply is to become a competitive business under the reform, with supply companies acting on behalf of consumers too small to access the wholesale market themselves. In an effort to protect the population during the early stages of reform, the legislation provides for the designation of 'guaranteeing suppliers', which will operate within specified regional markets and which will be able to purchase up to 35 per cent of power produced by generators at regulated prices for re-sale to households.<sup>40</sup> Guaranteeing suppliers must serve any other customer who applies to them but such customers will pay the wholesale price plus a regulated supply fee. There may be multiple guaranteeing suppliers within one subject of the federation, but their service areas may not overlap nor may they extend across the boundaries between subjects of the federation. The likelihood is that there will be one guaranteeing supplier in each federal subject and that this will probably be the supply company spun off from the local energe.

These arrangements raise the risk that guaranteeing suppliers may, with the implicit support of regional authorities (which are likely to own large stakes in them), establish *de facto* regional monopolies. Furthermore, there is nothing in the legislation to prevent generators from owning supply companies. This could allow for some efficiencies but, given that the purpose of the supply companies is to act on behalf of consumers *vis-à-vis* producers, it could also be somewhat problematic. As long as consumers have a real choice of suppliers, this should not be a concern, but care should be taken to ensure that generators do not use their ownership of supply companies to suppress competition in local markets. Moreover, the decision to create special purpose retail companies to serve regulated small consumers entails the risk that such suppliers will become relatively inflexible and moribund, with little incentive to innovate or to pass though any benefits of reform to small consumers. This could make any future introduction of customer choice more difficult and serve to entrench the need for price regulation and vesting arrangements.

### ***Transmission and distribution: monopoly regulation***

The efficiency of the wholesale market will depend in large measure on the ability of the grid to support competition. Despite the age of many of the lines, the high-voltage grid appears to be in a reasonable condition overall, and UES and the FSK are trying to tackle the bottlenecks and weaknesses that do exist. Overall, the transmission system still has a lot of excess capacity, although some further de-bottlenecking will be required if it is to support a liberalised wholesale market. Energy Ministry officials have suggested that there is an urgent need to invest up to USD 2.3 billion in new grid capacity in the very near term, but independent analysts take a more sanguine view for several reasons. First, existing assets are

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40. See the annex below; these regulated tariffs are to be linked to market-determined wholesale prices and the gap between the two is to decline over time.

in many cases very inefficiently used.<sup>41</sup> Secondly, some observers overestimate how well the grid must work for the market to function properly (it is neither necessary nor efficient to eliminate locational price differentials altogether). The critical question, however, is how decisions on the development of the grid will be made after the transition is over. Patterns of production and consumption are likely to change radically after liberalisation, and there will be a need not only to reassess the grid's investment needs but also to determine where local generation rather than new power lines might be more efficient. There is plenty of room for lobbying and conflict, since the value of a generating asset can be hugely affected by the grid investments that are or are not undertaken.

Decisions about pricing will have a crucial impact on how decisions about grid investment can or should be taken. The liberalised market is expected to rely, in its initial stages, on zonal pricing, in which prices are set for each market zone and thus average the cost of congestion in those nodes. As a transitional approach, this makes sense. It is likely to give a better reflection of costs and constraints than other forms of tariff, apart from nodal pricing, which is more of a challenge to implement, especially with market participants who have little experience of managing the related risks. Over the long term, however, a shift to nodal pricing could yield significant benefits in terms of more efficient operation of the market in the short term and more efficient investment over time. Because they reflect the relative scarcity of transmission capacity at every point in the grid, nodal prices provide the clearest possible signals as to where constraints are emerging and thus provide incentives for appropriately located investment.<sup>42</sup> Unless and until nodal pricing is introduced, there will be considerable scope for disagreement about the most economically efficient means of resolving transmission constraints. This is why the arrangements for strategic decision-making with respect to the levels and direction of grid investment over the longer term are so important.

At present, the FSK appears to be in charge of formulating proposals for grid investment. The maintenance programme is not controversial and a certain amount of de-bottlenecking is under way. There are still some major cost differentials that could be slashed by building a few new lines or upgrading existing ones. There are also some nationally mandated investments in new interconnections in train.<sup>43</sup> If the FSK continues to make such decisions, however, it may favour grid-based solutions in circumstances where new generation capacity, or even demand-side solutions, represent more efficient means of resolving constraints. Plans for extremely long interconnections, in particular, will need to be carefully evaluated before large-scale investments are made. While strengthening the grid and resolving inter-regional transmission constraints should support both competition and system reliability, there are doubts about the efficiency of interconnections over very long distances.<sup>44</sup>

It might well make sense to organise the investment decision-making process around the SO. The SO probably could not handle the task on its own, but it will possess the requisite information on which to base decisions and it will not face the conflicts of interest that will confront the other market participants. Given an appropriately framed public-service mandate, a special-purpose organ (some have suggested a 'reliability council') involving the SO could take charge of planning grid investments or it could be given a broader authority to resolve transmission constraints, allowing to opt for the most cost-effective solutions possible. Whatever body is charged with this strategic planning role, its mandate should be carefully formulated to ensure that it pursues efficient solutions that meet the needs of the market as a whole. It should also be required to consult widely with interested state bodies and private-sector parties and to act

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41. Mosenergo, for example, has significant of high-voltage assets that are not integrated into the grid and are currently used for distribution.

42. IEA (2001:105-110).

43. See IEA (2002:200) and 'Energeticheskaya strategiya' (2003:36).

44. IEA (2002:200).

transparently in respect of its planning role. Ultimately, however, a shift to nodal pricing will still offer the best prospects for ensuring economically efficient decisions with respect to infrastructure investment.

There are good reasons for concern about the future of the low-voltage grid (LVG). Current plans call for spinning LVG assets off from the energos and then re-merging them into five inter-regional distribution companies. The mechanisms for making this happen have yet to be clarified. The question is whether the inter-regional distribution companies will attract the necessary investment. Much of the LVG is in terrible shape, and the new companies are likely to have dispersed ownership and fragmented management structures. Given that they are to be a regulated natural monopoly, there would appear to be an argument for a process that parallels the UES restructuring, whereby the state trades its stakes in energo generating capacity for increased stakes in the LVG, which might then be overwhelmingly state-owned. This would facilitate its integration with the high-voltage grid for purposes of both investment and operation.<sup>45</sup> It would also reduce the danger of vertical reintegration at one remove emerging as a result of many of the same shareholders owning large stakes in both distribution companies and generating companies. The fate of the LVG has so far attracted little attention, but it is at least as important for ordinary consumers as the high-voltage grid. Moreover, on current plans, the regions are to have freedom to set distribution tariffs, within maxima and minima defined by the FST.<sup>46</sup> The danger here is that the regions will keep tariffs as low as possible, even at the risk of under-investment, because the distribution companies will no longer be 'theirs' and the revenues raised by higher tariffs on their consumers might well be used to finance investment elsewhere.

### *Related reforms*

The final impact of electricity restructuring will also depend critically on developments in two other sectors: gas and heat. Prospects for reform of the natural gas sector are not good.<sup>47</sup> This means that the liberalised wholesale market in electricity could be born in an environment in which the price of its principal fuel-gas-remains artificially low. In the short term, this might not matter, but over the medium to long term, it could distort the development of the electricity market. Holding gas prices too low for too long might encourage too much investment in gas-based generation. At the same time, the lack of long-term supply contracts for gas on the domestic market could have the opposite effect-it is seen as a major deterrent to investment in gas-intensive production.

Some 32 per cent of electricity generation comes from co-generation by CHPs.<sup>48</sup> These are generally regarded as relatively efficient when producing both commodities but highly inefficient when producing electricity only. However, their importance as providers of heat is such that they will have a relatively privileged position in the order of dispatch in the liberalised wholesale market, and the law imposes restrictions on any attempt to decommission them during the transition period or the three years following wholesale market liberalisation. After liberalisation, the CHPs will sell their electricity at free prices and, given their privileged place in the planned merit order of dispatch (which, in turn, reflects their social significance as heat providers), they should not have difficulty in the electricity market. However, heat tariffs will continue to be locally regulated, which raises the very real prospect that local authorities will use their tariff-setting power to support the ailing heat sector. By holding heat tariffs very low, they may well shift an increasing share of the costs of heat production onto electricity consumers. The temptation to subsidise heat production at the expense of electricity generation will be especially great given that the heat

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45. Renaissance Capital (2003:2).

46. 'Ob elektroenergetike' (2003), art. 21.4.

47. See Ahrend and Tompson (2004).

48. 'Energeticheskaya strategiya' (2003:40).

sector, which has been largely under the control of cash-strapped local authorities since 1992, is in even worse condition than other infrastructure sectors.<sup>49</sup>

### *Social impact*

It is clear that households will continue to benefit from artificially cheap electricity for some time. Household tariffs will not be allowed to rise too much during and immediately after the transition period. Households will continue to pay less than industrial consumers, despite the fact that the cost of supplying households is greater. However, household consumption is relatively low, both in comparison to western levels of electricity usage and as a share of total electricity consumption (Table 4). The burden on industry will therefore probably not be as great as one might expect. Nevertheless, the electricity subsidies provided to Russian households via low energy tariffs should be phased out according to a predetermined timetable. Most households could afford to pay more for electricity. On the official data for 2002, Russian households spent an average of 0.8 per cent of household income on electricity bills. Average household expenditure on electricity, gas and heat combined came to around 2.3 per cent. This is slightly below the 2.5-4.0 per cent typical of the most advanced OECD economies.<sup>50</sup> Moreover, in recent years household incomes have risen even faster than electricity bills. However, it remains the case that Russian expenditures on energy are low because tariffs are low, not because incomes are high. Very large increases in electricity, gas and heat tariffs within a relatively short period could push a significant part of the population into 'fuel poverty' (defined as spending over 10 per cent of disposable income on fuel).<sup>51</sup> The transition to fully cost-reflective energy pricing for households is thus likely to take some time.

There also remains a distributional question, given high levels of income inequality in Russia. According to the official data, the poorest 10 per cent of the population in 2002 already spent 5.5 per cent of total expenditures on electricity, gas and heat; such households will be hardest hit as tariffs rise. This does *not*, however, constitute an argument for continuing the use of low tariffs as a means of social assistance: in addition to being economically inefficient, they are socially regressive, as better off households generally consume more electricity. The best option would clearly be targeted subsidies to poorer households. However, targeted subsidies may require more sophisticated management and delivery systems than are available at present. A second-best solution would therefore be to price the first 50-100kWh provided to each household very cheaply, to cover basic needs, and to recoup the cost of this with tariffs above the cost-based average for the rest.<sup>52</sup>

**Table 4. Structure of electricity consumption**

	Per cent	
	Russia, 2002	OECD average, 2001
Industry	52.7	39
Households	23.0	31
Transport	7.7	1
Agriculture	6.8	1
Other	9.8	28

Source: Goskomstat RF, IEA/OECD Energy Statistics of OECD Countries.

49. 'Energeticheskaya strategiya' (2003:41). The government plans to prepare a 'concept' for heat sector reform which will form the basis for an eventual 'Law on Heat Supply' during 2005.

50. See IEA (2004b:54).

51. OTAC (2003:9).

52. Siner and Stern (2000/2001).

## Conclusion

It is difficult to exaggerate the importance of ensuring that the marketised segments of the sector are characterised by robust competition based on economically meaningful prices. If the post-reform sector is characterised by local monopoly or the exercise of market power, most of the reform's objectives will be frustrated. Indeed, a well regulated, vertically integrated monopoly might be preferable to an uncompetitive market. This makes it essential that the break-up of UES result in a market structure that will sustain competition, and that the market rules be transparent, stable and effectively enforced. It is critical, too, that the authorities themselves allow the market to operate, even if this means tolerating higher electricity prices than they might like at any given point in time.

There would appear to be two main dangers to bear in mind with respect to the degree of competition in the post-reform sector.

- The first, of which the government is clearly aware, is the danger of an 'oligarchic oligopoly'. There is a great deal of concern that the asset allocation process may give rise to private oligopoly or local monopolies. Moreover, as we shall see below, the behaviour of many private players suggests that they fear (hope) that the asset allocation process will not create a competitive market.
- The second danger is far less widely debated but no less serious: that the state itself will restrict the scope for competition in the sector. In an effort to limit the risks arising from the reform and to prevent the exercise of market power by private-sector interests, the government has built into the reform a number of mechanisms which could allow it effectively to 'manage' the market in ways that would run counter to the aims of liberalisation.

Effective regulation will also be essential to the reform's success. A stable legal and regulatory framework, with predictable policies on such issues as tariff regulation and access to the grid, is crucial if the sector is to attract investment over the long term, which is one of the stated goals of the reform. However, it will be difficult, within the structures currently envisaged, for the government to make a credible commitment to the stability of the arrangements being put in place.<sup>53</sup> The legislation is vague in many areas and leaves the government tremendous discretion in the field of electricity regulation. The absence from the entire scheme of plans for a strong, independent regulator must give cause for concern. The regulators that currently exist are under-resourced and it is not clear that this will change as the reform unfolds.

The evolution of the reform during 2003 and the first half of 2004 well illustrated the seriousness of the pitfalls outlined above. The contest over whether and how to privatise power sector assets led to repeated delays and much public conflict. While some delay need not be fatal to the reform process, the government's evident vacillation with respect to key elements of the reform and its repeated failure to approve restructuring arrangements by the promised deadlines helped to undermine confidence in the reform as a whole and, in particular, in the government's commitment to the arrangements set out in the electricity reform legislation and the '5+5' plan. By mid-2004, even members of the government were acknowledging that foreign investors, in particular, were backing away from planned projects in Russia on

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53. The March 2004 reorganisation of federal executive bodies subordinated the Federal Tariff Service, which regulates electricity tariffs, to the Ministry of Economic Development and Trade. While the ministry has been a strong supporter of electricity sector reform, this is unlikely to be desirable as a long-term architecture for the regulation of the sector.

account of uncertainty about the direction and pace of reform.<sup>54</sup> If investors and other market participants conclude that the government is no longer really committed to the reform, then opposition to it is likely to grow and confidence to wane, making it less likely that the power sector will attract the badly needed investment that is one of the chief aims of the reform.

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54. See Deputy Minister of Economic Development and Trade Andrei Sharonov's comments on E.ON's withdrawal from a joint project with UES; *Moscow Times*, 22 June 2004.

## ANNEX. THE ELECTRICITY REFORM PLAN

The current reform of Russia's power sector is a complex process involving considerable changes to both primary and secondary legislation, as well as the corporate restructuring of the electricity monopolist RAO UES. The reform plan involves breaking up the existing vertically integrated monopoly of production, transmission and distribution, and separating potentially contestable activities from those that have a substantial natural monopoly element. Electricity generation and supply are to become competitive businesses, in which consumers have a choice of supplier and prices are determined by supply and demand. Transmission and distribution, which are natural monopolies, will continue to be closely regulated and predominantly state-owned. When the process is completed in 2008 or 2009, 68 of Russia's 77 regional energy systems will have made the transition to the market; the remaining nine regions have energy systems that are wholly isolated from the seven large inter-regional systems that now exist. In these regions, the introduction of competition is not regarded as feasible at present and vertically integrated regional monopolies will continue to operate, regulated by the state. This annex provides an overview of the main elements of the reform plan along with a rough timeline for its implementation.

### The legislative framework

The broad outline of the reform was set out in July 2001 in a government decree confirming the 'Main Directions of Reform of the Power Sector in the Russian Federation'.<sup>55</sup> The following year, the federal government submitted to the State Duma a package of electricity restructuring legislation consisting of six bills, two of which were entirely new laws and four of which amended existing federal legislation. All six were, after some significant modifications, signed into law in March-April 2003. The two new laws, 'On electricity' and 'On the peculiarities of the functioning of the power sector during the transition period', are the key elements of the legislative package.<sup>56</sup> Together, they provide the legal framework for the development of a market in electricity and define the parameters for some continued regulation of electricity generation and distribution by the state. Their main provisions are as follows:

- Electricity and heat are freely tradable commodities. The laws provide for three markets in these commodities: wholesale and retail markets for electricity and a market for heat. However, the proposed legislation does not specify mechanisms for creating a competitive wholesale electricity market or the arrangements for generators and consumers making this transition. The liberalisation of the wholesale market will take place at a date set by the government but will not occur earlier than 2005. The legislation provides for the possibility that wholesale market liberalisation will be gradual, beginning with the establishment of fully competitive wholesale markets in one or more regions, with other regions following at a later stage.
- The two laws authorise the creation of the various specialised entities envisaged by the reform plan, including the Federal Network Company (FSK), which is to manage electricity transmission via the high-voltage grid; the Trading System Administrator (ATS), which is to facilitate electricity trading; and the System Operator (SO), which is to control system operation and dispatch. These entities were in fact created prior to the adoption of the legislation, but the new

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55. 'Osnovnye napravleniya' (2001).

56. 'Ob elektroenergetike' (2003); 'Ob osobennostyakh' (2003).

laws provide a legal basis for their activities. The FSK and SO are currently wholly owned UES subsidiaries but they will subsequently be spun off into totally independent companies; the ATS is organised as a not-for-profit co-operative governed by market participants (currently 50 per cent of the board members are state representatives, but this will change as restructuring proceeds).

- The laws state that prices are to be set freely, on the basis of supply and demand, in competitive segments of power markets. They specify the situations in which prices will not be set by the market (*e.g.* the presence of local monopolies in isolated regions). The list of cases not subject to free-market conditions is exhaustive. In other words, the authorities have no power to regulate prices in circumstances not envisaged by the legislation. The laws provide for the establishment of both spot (day-ahead and hour-ahead) markets in electricity and the development of long-term bilateral contracts between suppliers and consumers of electricity.
- The law ‘On electricity’ stipulates that regulated tariffs for natural monopoly functions like transmission will be set at levels that ensure cost recovery and a return on invested capital. Critics argue that the formula for setting distribution tariffs could and should be specified more clearly.
- The legislation authorises the formation of a ‘trial’ market, consisting of between 5 and 15 per cent of the total electricity market, during the run-up to full liberalisation of the wholesale market in order to test and ensure the reliability of the new structures and regulatory arrangements. This market was launched in November 2003. However, the bills provide little detail with respect to start-up arrangements for the competitive wholesale market. The crucial issue to be addressed is how and when the trial market will be enlarged so as to encompass all of the country’s generating capacity and electricity consumers.

The amendments to the other legislation generally seek to remove impediments to the operation of these basic laws:

- Amendments to the law ‘On the state regulation of tariffs’ aim at providing a legislative basis for the transition from regulated tariffs in all segments of the electricity sector to free pricing in some segments and continued tariff regulation in others (namely, transmission, distribution and dispatch). The amendments also empower the government to delegate tariff-setting to a regulatory organ and to define the principles for price-formation in heat and electricity and the methodologies to be employed in setting tariffs for the regulated segments of the industry.<sup>57</sup>
- Amendments to the law ‘On natural monopolies’ remove electricity generation from the list of activities subject to regulation under this law. Operational dispatch of electricity and the transmission of electricity and heat are added to the list of natural monopoly activities. The amendments also add a provision on non-discriminatory access to infrastructure.<sup>58</sup>
- Amendments to the Civil Code were necessary in order to provide a legal basis for contracts in which energy-supply companies do not actually control the distribution network to which the customer is connected. It was also necessary to eliminate restrictions on the right of the supply company to cut off electricity and heat supplies in the event of non-payment.<sup>59</sup>

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57. ‘O gosudarstvennom regulirovanii’ (2003).

58. ‘O estestvennykh monopoliyakh’ (2003).

59. ‘Grazhdanskogo’ (2003).

- Amendments to the law ‘On energy conservation’ merely shifted some powers over (and responsibility for) tariff-setting from regional energy commissions (RECs) to regional administrations.<sup>60</sup>

The implementation of the electricity package is expected to require the adoption of 40-50 pieces of subordinate legislation. Among the most important are the wholesale and retail market rules, the definition of wholesale market price zones and the rules governing non-discriminatory access to the grid, operational management (dispatch), intersystem links among grid companies, and the activities of the ATS. Also important will be the rules and procedures for valuing grid assets. The law stipulates that tariffs are to be based on some form of rate-of-return regulation. This makes the definition of the rate base—in other words, the definition of which grid assets will be included and how they will be valued—a crucial exercise. Since the grid was largely created in the Soviet era, it is extremely difficult to value it or to assess how much will need to be invested (and when) to replace, upgrade or extend it.

### **Asset restructuring**

The nuclear power industry apart (see below), the restructuring of power sector assets will largely be guided by the so-called ‘5+5’ restructuring plan adopted by RAO UES (five years to the market transition and the five years after). The corporate restructuring is to proceed at two levels: the restructuring of assets directly held by RAO UES—the high-voltage grid (HVG), the central dispatch administration and the so-called ‘federal’ power plants—and the restructuring of UES’s regional subsidiaries, the energos. Both processes are technically and legally complex, but the energos present by far the more complicated problem, as the size of UES’s stakes in the energos varies significantly from company to company, as do the structures of their remaining shareholdings. The attitudes of energo owners towards the restructuring process differ markedly across the energos. The completion of the corporate restructuring should see the liquidation of RAO UES itself, although it may in fact continue to exist (perhaps following some reorganisation) as a holding company for residual power-sector assets still held by the state. These will include stakes in guaranteeing suppliers, isolated AO-energos, which will not be broken up, and other non-core and service assets of RAO UES.

#### ***The ‘federal’ restructuring***

The restructuring of UES’s ‘federal’ assets will result in the emergence of ten new wholesale generation companies in the course of 2004, although the final restructuring of their ownership will not be completed until the next phase of the reform. The wholesale gencos are being organised by plant type: six will be based on thermal generating capacity and four will group UES’s hydro stations on a cascade principle. One hydro company will be subordinated directly to the SO, in the interests of system stability. The wholesale gencos are to be of broadly similar size and fuel mix, and they have been allocated ‘federal’ generating assets spread across the country so as to avoid geographic concentrations of market power. Indeed, the law states that no legal entity, or group of related entities, may own over 35 per cent of the installed generating capacity in any given wholesale price zone. If this threshold is breached, price regulation or forced unbundling can be imposed by the authorities.

The FSK already controls UES’s HVG and is also to take control of high-voltage lines outside the UES system (by acquisition or leasing). UES dispatch operations have been transferred to the SO, which has also taken over the energos’ dispatch units.

The main issue still to be resolved in respect of the federal level of the restructuring concerns the mechanism for allocating shares in the new entities to UES shareholders. The original plans called for a

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60. ‘Ob energosberezhenii’ (2003).

simple *pro rata* distribution: every shareholder was to receive shares in all new entities exactly proportional to his shareholding in UES prior to restructuring. This principle will probably not now be observed throughout. It is expected that, in the first phase of restructuring, all UES shareholders will have the *right* to exchange their UES shares for equal stakes in the successor companies created by the restructuring. Shareholding in the wholesale gencos that is not taken up on a *pro rata* basis, including the government stakes in them, will then be put on sale in an auction, involving both UES shares and cash. The exact mechanism for the auctions, including the relative weighting to be given to cash and shares, is still to be determined. These arrangements are intended to enable private investors to concentrate their holdings in the generating companies, while providing the government with a relatively inexpensive way to increase its holdings in the FSK and the SO to the levels required by law-respectively, 75 per cent + 1 share and 100 per cent.

### ***Restructuring the energos***

The energos are to be restructured into 14 territorial generating companies, five inter-regional distribution network companies and a larger number of supply companies. These will vary in size rather more than the wholesale companies, because they are to be constructed along territorial lines, merging together the generation or distribution assets of energos in groups of contiguous regions. Although the restructuring of a small number of 'pilot' energos is already under way, there is still considerable debate over the mechanisms by which this restructuring will be executed. The 5+5 plan envisages a multi-stage process whereby each energo will be broken up into its generation, transmission, distribution and supply components. These will initially be controlled by a single management company in the region served by that energo. HVG assets are to be transferred to the FSK and dispatch assets to the SO. The generation and transmission assets will then be grouped together to form larger, functionally specialised units (territorial gencos and inter-regional distribution companies) rather than smaller local monopolies. Supply companies will not be so amalgamated, and it is planned that the supply business will be opened to competition.

Critics argue that it could be up to 3-4 years from the onset of restructuring until the new companies are consolidated with a single share, especially as minority investors will have considerable ability to block the process until 2005, when the law will make it easier to force the pace of restructuring in 'reluctant' energos. Energo restructuring will require conducting dozens of shareholders' meetings, each of which will be a potential legal, commercial and political battleground.<sup>61</sup> Such a long and complex process would leave investors for some considerable period with holdings in a very large number of small companies, whose shares would probably be fairly illiquid. It could also create opportunities for asset stripping by insider managers, since monitoring the managers of so many very small companies is likely to prove difficult.

These concerns have given rise to alternative proposals for restructuring the energos. The management of the Mid-Volga Inter-regional Management Power Company (SMUEK), a UES subsidiary that manages four energos in the Volga region, proposes organising energo assets into larger inter-regional holding companies *before* breaking up these larger companies by line of business into inter-regional holding companies in generation, distribution and supply. These would then become independent generation, distribution and supply companies. David Herne, then chairman of the UES Restructuring Committee, proposed a 'co-creation' scheme in late 2003. Under the co-creation scheme, the regional energos forming the basis of a TGK would not be split up by line of business in the first phase. Instead, general shareholders' meetings of all the energos involved would vote more or less simultaneously to establish the new TGK on the basis of their assets. UES would not participate in the vote because it is a majority shareholder in almost all the energos that would participate in the co-creation. A majority of the other shareholders would thus have to be persuaded to support the restructuring. Swap offers would then be

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61. Indeed, legal challenges to the pilot energo restructurings were launched in 2002, almost as soon as the process got under way.

made to UES shareholders and energo shareholders, allowing them to own stakes in the TKG directly. Finally, each TKG would hold two auctions, one to auction off to its shareholders that part of its equity not taken up on a pro rata basis and a second to liquidate any residual UES shareholding. In the end, therefore, the TKG would be owned directly by former energo and UES shareholders.<sup>62</sup>

Whatever option is chosen, it would be desirable to keep the transition period as short as possible while still respecting investors' property rights. This is true of the formation of wholesale gencos and inter-regional distribution companies as well as territorial gencos.

### ***Formation of a nuclear generating company***

In April 2002, the government transformed the state concern Rosenergoatom, created in 1992 under the Ministry of Atomic Power (Minatom), into a nuclear generating company with control over all Russia's operational nuclear plants, as well as those under construction. Rosenergoatom also controls the various support enterprises and subsidiaries attached to the nuclear power sector. The plants themselves are organised as 'branches' of the parent company, while the support enterprises are constituted as wholly owned subsidiaries. The reorganisation put Rosenergoatom in charge of the Leningrad nuclear plant, which had previously been managed separately, directly under Minatom. It should be stressed that the reorganisation of Rosenergoatom was not linked to any privatisation plans; on the contrary, the nuclear power industry is to remain 100 per cent state-owned.

### **The transition to the market**

As noted above, the first phase of the reform has already seen the introduction of the '5/15' trial market, initially with strictly voluntary consumer participation. Tariffs otherwise remain regulated at the level of both the Federal Wholesale Power Market (FOREM) and in the regions. A fully competitive wholesale market is to be launched in one or several pilot regions during 2004-05, prior to the transition to a liberalised wholesale market across European Russia and Siberia, which is to take place at a time determined by the government but not before 1 July 2005. The move to liberalisation may, indeed, be gradual, with individual regions or groups of regions following the pilot region or regions and opening up in stages. The legislation does not commit the government to a single 'big-bang' liberalisation of the wholesale market. Nevertheless, the authorities will at some point have to signal that the market has been liberalised and that the transition period is over, as a number of provisions in the legislation either refer to the transition period or to specified periods of time from the end of the transition period.

The transition period preceding wholesale market liberalisation will nevertheless witness a number of important changes in the sector, some of which are already being implemented:

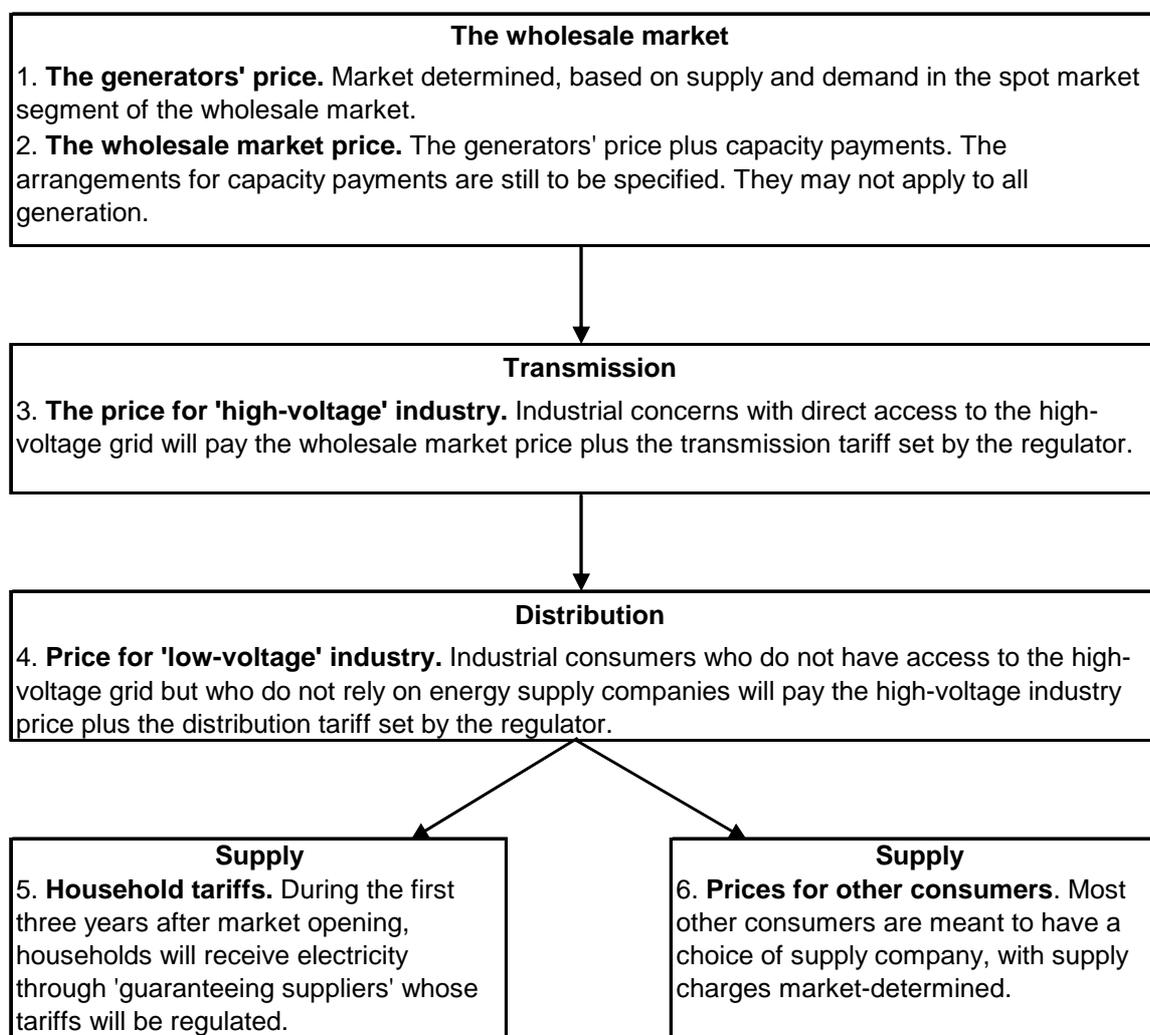
- Numerous intra-corporate relationships which have hitherto existed inside RAO UES are being placed on a contractual basis. While this involves some costs, it is also generating a good deal of information about how the sector works and is forcing those involved to specify more clearly their needs and commitments.
- Tariff formation, though still regulated, must be changed to take account of the need for separate tariffs for generation, transmission, distribution, the services of the SO and ATS, and supply services. This will set the basis for tariff formation after the end of the transition period along the lines shown in Figure A1.

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62. A form of co-creation has indeed been adopted for the formation of the territorial gencos, although few details have yet been made public. See the UES press release on the 23 April 2004 board meeting on the company web site at <http://www.rao-ees.ru/ru/news/pr/show.cgi?pr230404sd.htm>.

- Dispatch is being shifted onto a commercial footing, although co-generation plants producing both heat and electricity will continue to have a privileged place in the merit order of dispatch, owing to the importance of their heat generation.

**Figure A1. Electricity price formation after market liberalisation**



Source: OECD from various sources

As noted in above, full liberalisation of retail markets will take rather longer than wholesale market liberalisation. Specially designated 'guaranteeing suppliers' will provide electricity to households and communal service suppliers at regulated tariffs for three years after the end of the transition period. These tariffs will reflect movements in the average wholesale market price, with the difference between household tariffs and the wholesale market price decreasing from year to year. There can be more than one guaranteeing supplier in a given federal subject, but their designated service areas cannot overlap nor can they cross boundaries between different federal subjects. It is expected that there will in most cases be one guaranteeing supplier in each subject of the federation, in most cases the supply business of the old energy. This involves certain risks. Such guaranteeing suppliers may have local monopolies that are supported by regional authorities and will thus have little incentive to be innovative. This would reduce drastically the degree to which retail customers felt the benefits of liberalisation.

**Box A1. Major milestones in power-sector reform**

**2001-03**

- Government resolution on reform issued (11 July 2001)
- Adoption of electricity reform legislation
- Approval of '5+5' restructuring plan for RAO UES
- Organisation of FSK, ATS and SO
- Launch of trial (5-15 per cent) market
- Launch of pilot energo restructurings (Tulaenergo, Bryanskenergo, Kalugaenergo, Orelenergo)

**2004-05**

- Spin-off of FSK and SO from RAO UES
- Completion of reorganisation of pilot energos
- Reorganisation of remaining energos leading to launch of territorial gencos and inter-regional distribution companies
- Establishment of wholesale generating companies
- Launch of fully competitive pilot market in one/several regions
- End of transition period

**2006-08**

- Operation of liberalised wholesale and retail markets
- Increase in the government stake in the FSK and reduction of its ownership of generating assets

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