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Liberalisation of the Russian power sector

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Abstract

The paper discusses the Russian power sector reform plan, approved by the government in July 2001, which outlines the framework for competition and changes in ownership structure. The paper focuses on the following issues related to the plan: restructuring of regional energos and large generating companies; restructuring of transmission and system operation; the mechanism for introducing competition; competition for residential consumers; and reform sequencing. A key message of the paper is that the restructuring of energos should not create companies with market power. Ideally, local generation and distribution companies would be owned separately with multiple generators in each region. At a minimum, commonly owned companies should keep separate accounts. Regarding transmission and dispatch, common ownership would not be a problem given that transmission and generation are separately owned. On competition, a fully-fledged pool may not be appropriate in the case of Russia, with the alternative of a market based on bilateral contracts functioning better in a context of non-payment, and providing security for investments. Regarding competition for residential consumers, this is not a priority in the short to medium term. Lastly, on sequencing, it is key that price re-balancing to erode cross subsidy from industrial to residential consumers takes place before competition begins.

Keywords: power sector; ownership; competition, reform sequencing.

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INTRODUCTION

Reform of the power sector is one of the key policy challenges currently facing Russia. If the sector is not reformed, it is likely that the present inefficient performance will decline further due to lack of finance available for necessary investments. If reforms are successfully implemented then finance should become available to support development of an efficient and high-quality power supply. After various stalled reform efforts, the Government recently endorsed a plan for radical industry restructuring. In particular, the plan focuses on ownership restructuring, market liberalisation and regulation; this paper focuses on the first two of these areas.¹

There is a growing body of theory and evidence regarding power sector reform suggesting that privatisation in a context of liberalisation and effective regulation can bring efficiency gains that may benefit consumers.² The Government-approved reform plan for the Russian power sector is consistent with objectives to form a competitive and well-regulated industry. Principles in the plan remain broadly stated, however, and it is in the detail of implementation where success or failure of reforms lies. Going forward, the main issues that need to be addressed include the extent to which ownership of various industry assets remains integrated and the market model to be chosen.

A key message of this paper is that the restructuring of regionally integrated generation and distribution companies should not create companies with market power. Ideally, local generation and distribution companies would be owned separately with multiple generators in each region. At a minimum, commonly owned companies should keep separate accounts. Regarding transmission and dispatch, common ownership would not be a problem here given that transmission and generation are separately owned. On competition, a fully-fledged pool³ may not be appropriate in the case of Russia, with the alternative of a market based on bilateral contracts functioning better in a context of non-payment, and providing security for investments. Regarding competition for residential consumers, this is not a priority in the short to medium term. Lastly, on sequencing, it is key that price re-balancing to erode cross subsidy from industrial to residential consumers takes place before competition commences.

The paper is laid out as follows. Section 1 presents a list of definitions of the various components that make up a power sector. Section 2 describes the present organisation and performance of the Russian power system. Section 3 outlines some basics of power sector reform. Section 4 summarises the reform plan. In Section 5, issues relating to market liberalisation under the reform plan are discussed. These include: ownership of generation and distribution companies; ownership of transmission and dispatch; the market mechanism; competition for residential consumers; and lastly, issues related to sequencing.

¹ For a discussion of power sector regulation in transition economies, see Kennedy (2002).

² For evidence on UK power sector reform, see Newbury and Pollitt (1997). Elsewhere in the world, there were over 900 private infrastructure projects worth US\$ 300 billion of investment in Africa, Latin America, Asia and the transition economies between 1985 and 1995. For more information, see the World Bank Private Infrastructure Database. For evidence on restructuring in transition economies, a summary is provided in Commander, Dutz and Stern (2000). Evidence suggests privatisation and liberalisation give the greatest impetus to industry restructuring and productivity increase. Such reform helps to eradicate corruption within the company and introduces new (commercial) skills.

³ Defined in Section 5.3 below.

1. DEFINITIONS

Power generation is the conversion of primary energy to power (or heat). This can occur through a variety of generation processes including thermal (coal, gas, oil), hydro and nuclear. In Combined Heat and Power plants, heat used in the process of power generation is supplied to local district heating networks for consumption by residential and industrial customers. Generation capacity is measured in watts (or kilowatts [kW, 1,000 watts], megawatts [MW, 1,000 kilowatts], gigawatts [GW, 1,000 megawatts]), and relates to the potential rate of energy production.

Transmission is the transportation of power over long distances across high-voltage networks.

Distribution is the local transportation of power across low-voltage networks to the consumer.

Supply is the sale of power to consumers and involves billing and metering. The unit of supply is kilowatt-hour, that is, the rate of energy consumption multiplied by the time over which consumption takes place.

Market operation comprises the forming of a merit order – ranking of plants from least to most expensive – of generators in an idealised setting; i.e. one in which there are no system constraints that might in practice prevent generators from operating. Market operation also comprises organisation of financial settlement of system, that is, payments from consumers to generators.

System operation largely involves reconfiguring merit order *dispatch* (ordering plant to supply the system), taking into account system constraints, particularly transmission congestion. In *real* – rather than *ideal* – dispatch scenarios, high-cost generators near to demand centres may be called upon when transmission capacity constraints are binding.

2. CURRENT INDUSTRY STRUCTURE AND PERFORMANCE

The Russian power system comprises 210 GW of installed capacity,⁴ 70 per cent of which is thermal, 21 per cent hydro and 9 per cent nuclear, and 700,000 km of high- and low-voltage lines. The dominant player in the industry is RAO UES, a 52 per cent state-owned company, with 30 per cent of shares foreign-owned and the remaining shares held by employees, management and local investors. RAO owns the transmission network and dispatch facilities, together with 22 large thermal power generators and five hydroelectric generators. In addition, RAO owns majority stakes in 50 of the 70 regional integrated generation and distribution companies (“energос”) and has minority (49 per cent) stakes in all but three of the remainder.

A wholesale power market – called the “FOREM” and organised by RAO – is in place in Russia. This should function on the basis of a centralised merit order dispatch, with the market operator taking bids from generators to supply, ranking these from the least to the most expensive, and dispatching the cheapest plant to meet demand. A fundamental problem is that RAO plays a dual role as market operator and market participant, and thus has a vested interest to diverge from merit order dispatch, selecting its own plants over competing plants even though this might not be the least-cost option. In practice, dispatch has not been according to merit order, with political and social factors influencing decisions, and with RAO units dispatched before lower-cost alternatives (e.g. energo-owned hydro plant). Though the central wholesale market may potentially be bypassed through bilateral contracts between generators and large consumers, these have been undermined by difficulties in gaining access to the RAO-owned network.⁵

By any standard definition, regulation of the power industry is not independent.⁶ There is no legal stipulation that tariffs should cover cost, and lobbying (e.g. by large industrial groups and government ministries) is important in tariff determination.⁷ Average tariffs for the Russian power sector at 1.2 cents / kWh remain low relative to long-run costs, and cross-subsidy remains prevalent with an industrial / residential consumer price ratio of 1.8.⁸ These price distortions support ongoing high energy intensity relative to western Europe, with power consumption of 3 kWh per \$ GDP.⁹ High intensity is explained both at the level of the end consumer, where incentives to cut back on consumption are limited, and in production, where there are only weak incentives to invest. Regarding investment, there are clearly potential

⁴ This is around 3.5 times the size of the system in England and Wales.

⁵ See Opitz (2000) for a description of the functioning of the wholesale and contracts markets.

⁶ For example, the regulator is not appointed for a fixed term, and is funded by the government rather than through licence fees.

⁷ See Opitz (2000) for elaboration.

⁸ Price data are taken from the EBRD (2001).

⁹ At PPP exchange rates, this ratio falls to just under 1 kWh / \$. This may be compared with England and Wales, for which the ratio is 0.3 kWh per \$ GDP. These figures are derived from IEA (2000) and IEA (2001). Though England and Wales would be expected to have higher consumption per capita than Russia, given the higher income in the former and a substantial body of evidence to suggest that income elasticity of demand is positive, the reverse is actually true (i.e. consumption per capita is slightly higher in Russia than in England and Wales). Energy intensity in transition economies is discussed in detail in EBRD (2001).

gains here, with thermal efficiency in generation¹⁰ averaging 17.5 per cent (compared with 40 per cent in western Europe and 60 per cent for plants based on more modern technology)¹¹ and losses in distribution and transmission equal to around 12 per cent (relative to an average of around 5 per cent in western Europe).¹² In fact it is estimated by RAO that the Russian power system will require investment of US\$ 15-30 billion over the next ten years if increasing system operation costs and declining system security are to be prevented.

¹⁰ Thermal efficiency relates to the conversion of primary energy (coal, oil, gas) into power.

¹¹ Figures for thermal efficiency are taken from European Commission (2000).

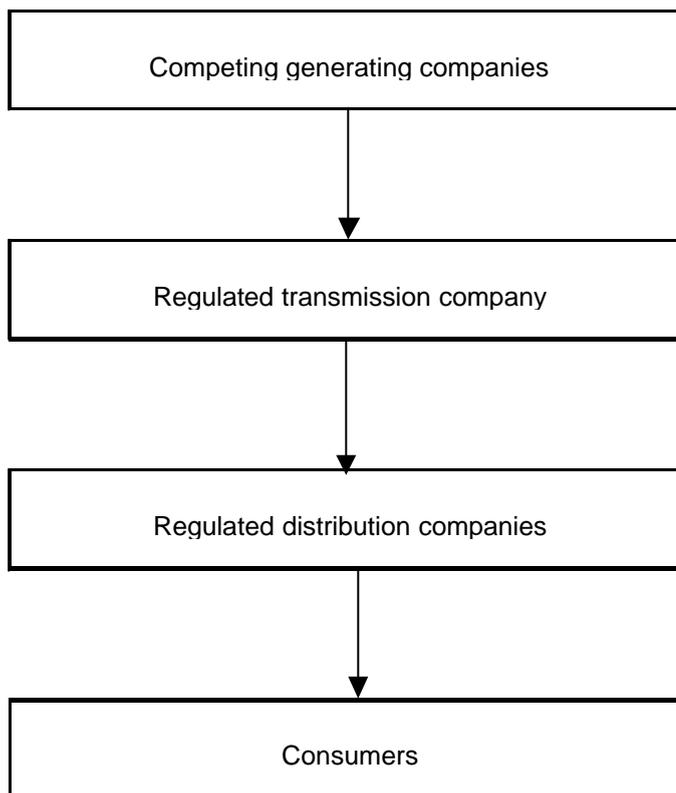
¹² Figures for losses are derived from IEA (2000).

3. BASICS OF POWER SECTOR REFORM

Traditionally the electricity supply industry in its entirety was viewed as a naturally monopolistic industry. More recently, it has been recognised that scale economies are limited to certain aspects of the business. A new principle for power sector organisation has emerged, stating that competition should be introduced where possible. Natural monopoly functions should be separated out from the rest of the industry and privatised within a context of effective regulation.¹³

Power generation is not characterised by large economies of scale, particularly as regards new technologies (e.g. combined cycle gas turbine [CCGT]) and is a potentially competitive market segment. Transmission and distribution are not candidates for competition, given that this would require wasteful duplication of fixed costs. These parts of the business should be regulated to ensure that competing suppliers are granted equal network access at a price that reflects underlying costs. They should be owned separately from generation in order to ensure that there is a level playing field for competition. This industry structure is represented in Chart 1.

Chart 1:
Reformed electricity structure



¹³ See, for example, Riechmann and Schulz (2000).

Power sector reform was pioneered in England and Wales where privatisation started in 1990. As part of privatisation, old area electricity boards were succeeded by Regional Electricity Companies, each with a local monopoly over electricity distribution. Competition for large user supply was phased in, starting in 1990 with the 1 MW and above market and extending to the 100 kW market from 1994, with full retail competition (i.e. including for residential customers) from 1999. The Central Electricity Generating Board of England and Wales was split into three generating companies, two of which (National Power and PowerGen) were privatised in 1991 and the third (Nuclear Electric) in 1996, and a separate transmission company (the National Grid) privatised in 1995.¹⁴

Privatisation and liberalisation in England and Wales were successful in bringing industry costs down, through the pressure that this put on coal prices, the introduction of new technologies, and labour restructuring. In generation, cost reductions worth £2,300 million per annum were realised, while significant cost savings in transmission and distribution contributed to a real reduction of around 10 per cent in the typical residential bill and 7 per cent real reduction in the typical industrial bill over the first six years of privatisation.¹⁵ Following this positive experience, power sector reform has been the focus of policy in Europe, with a Power Directive in 1996 requiring separation of the different industry functions and phased liberalisation. At the same time, power market liberalisation has been embraced in the United States, with mixed results in the short term.¹⁶ Recent moves towards power sector reform in transition economies have been driven by EU accession requirements and by the need to raise off-budget finance for investments.¹⁷

¹⁴ The National Grid was owned jointly by the regional distribution companies from 1990 and floated in 1995.

¹⁵ These figures are taken from CRI (1997).

¹⁶ For a discussion of liberalisation and related problems in the United States see Falk (2000).

¹⁷ See EBRD (2001). Privatisation has had a short-term impact through higher cash collections in Georgia, Moldova and Kazakhstan.

4. THE REFORM PLAN

Following long discussions between various factions in and around the industry, a reform plan for the Russian power sector was adopted by the government in July 2001. The broad objectives underpinning the plan are to separate out natural monopoly components of the industry, identified as being transmission and dispatch, and to promote competition in generation and supply, with the transition to a new industry structure being made in a manner consistent with protecting rights of minority shareholders. The intention is that these reforms will attract finance for necessary sector investments and that these will be implemented in an efficient manner.

Section 1¹⁸ of the plan proposes development of a wholesale market. It is envisaged that initially 5-15 per cent of the market will be open to competition on the basis of an auction. That is, generators will bid to supply the competitive market and large consumers (industrial, regional distribution companies) will bid to purchase from the market. Over time, and reflecting the phased way that markets in western Europe have been liberalised, an increasing proportion of the market will become competitive. Going forward, instruments for hedging risk (relating to dispatch and to price volatility) will be developed, for example, futures markets may be developed. Further down the line, the plan is to introduce competition for all retail consumers (so, for example, residential consumers will choose between competing companies for supply of power). As with the wholesale market, there will be a stepped introduction of retail competition, with energos having an initial monopoly over supply, and multiple supply companies emerging over time.

Section 2 of the plan covers issues relating to industry structure and ownership. Under the plan all high-voltage lines will belong to one company which will initially be formed as a subsidiary of RAO. Over time, RAO will revert to 100 per cent state ownership and focus on transmission, with private interests becoming concentrated in generation companies and energos. A separate state-controlled system operator will be set up, and then merged with the transmission company after RAO has divested its generating assets. In addition, a separate market operator will be set up. Generation companies will be created, the size of which will be limited by (to be determined) a capacity threshold designed to limit market power, and with the possibility that these may be regulated depending on the depth of competition. Regarding energos, generation and distribution assets will be subject to financial separation (e.g. through accounting separation or within a holding company structure), and there will possibly be some consolidation where companies are currently too small to be of interest to private sector investors.

Reforms are to be implemented in three stages and are planned to take place over the next ten years. The first phase of stage 1 will last 18 months and will include the setting up of a national grid subsidiary, a system operator, and a number of generating companies to be held as RAO subsidiaries. Also during this phase, a market operator will be set up, market rules will be developed, a small portion of the market will be opened to competition on an auction basis, and there will be some energo restructuring (the nature of restructuring is not detailed in the plan). In phase 2 of stage 1, also lasting 18 months, market rules will be further developed, merit order dispatch will begin, and there will be further energo restructuring with possible mergers between regional companies. In stage 2 of the reforms, set to last two or three years, RAO will be split into transmission and generating companies, market rules will

¹⁸ The next two paragraphs summarise the sections of the plan that are central to a discussion on liberalisation. Arrangements for the strengthening of regulation are not covered in this summary. Transition economy power sector regulation is discussed in Kennedy (2002).

be finalised and implemented, and regional markets will be developed. In stage 3 (by far the most vaguely defined reform stage), lasting three to four years, retail competition will develop, and transmission will be merged with dispatch. It is hoped that competition will be fully functioning and investment finance will begin to flow into the sector at this time.

One early reform measure that has already been implemented is the setting up of a market operator on 23 November 2001. The operator will have responsibility for developing the market rules, as well as payment settlement and clearing. The 28-member Board of the operator comprises representatives of RAO, other power generators, government officials and major consumers.

5. REFORM PLAN ISSUES

5.1 COMPETITION AND THE STRUCTURE OF GENERATION / DISTRIBUTION

The reform plan does not refer in detail to the post-reform ownership structure that is envisaged for the industry. In particular, the plan does not elaborate on the extent to which assets will be unbundled. Under the plan, it is a possibility that energy generation and distribution assets will retain common ownership within a holding company structure. Furthermore, there is no mention of how many generating companies there will be overall, or in each of the envisaged regional markets. These ownership issues are key to the evolution of a competitive market.

One of the lessons to come from liberalisation of the market in England and Wales – often used as a model for sector restructuring – is that this can be undermined if there is too much market power in generation. Clearly, if there is only one generator in the market, then there will be scope for monopoly pricing. This holds in a context where there are a small number of generators, demand is uncertain, and total capacity is restricted relative to demand. Then each generator can cause a capacity deficit by withholding its plant from the market. The profit-maximising strategy for such a generator is to offer supply at a price above what would prevail in a competitive market; this happened in practice in England and Wales where the two dominant generators (National Power and PowerGen) offered to supply power at high price-cost margins.¹⁹ Where there are a large number of small generators, there is less scope for individual generators causing system capacity deficit, and thus less incentive to raise price above cost. In the case of England and Wales, it is likely that if there had been five generating companies formed when the industry was privatised rather than two, then market prices would have been substantially lower in the following years. Though new entry²⁰ can exert competitive discipline on incumbent generating companies, this is likely to be small scale in the short to medium term and thus of limited importance in this context.

This argument may be applied to the case of Russian power restructuring in determining how best to package existing generation assets for sale to strategic investors. In discussing this problem it is useful to distinguish between energy-owned CHP plant and RAO-owned large power generating plant. Regarding CHP, this comprises 35 per cent of total generating capacity. Depending on the way that CHP plant is bundled in the restructuring, companies with market power might be created, for example, if all CHP assets within a region subject to transmission constraints (i.e. with restricted import capacity so that competition from national power suppliers is limited) are commonly owned. In other words, a situation might be created where certain companies are able to dominate regional markets, offering to supply to what could effectively be a captive market at a high price relative to cost.

The way to avoid this situation would be to create multiple generators within regions. Clearly this should be within the bounds of what is technically feasible; i.e., no generating company should be smaller than the minimum efficient scale. Companies should also be sufficiently

¹⁹ For analysis of this situation see Green (1991), Greene and Newbery (1992), von der Fehr and Harbord (1993). These papers show that in order to enjoy market power a generating company need only control a significant proportion of marginal plant as opposed to total installed capacity. For example, a generator owning all mid merit and peaking plant in a system but no base-load plant would have market power even though its share of overall system capacity might be low. CHP plant in the discussion above can be regarded as equivalent to the marginal plant in these papers.

²⁰ For example, in England and Wales, new entry occurred through Independent Power Producers: stand-alone generating companies in long-term off-take agreements with regional distribution companies.

large to attract investors; this might require bundling of assets across regions (i.e. a generating company may own a number of subsidiaries each competing in a different regional market).

Table 1 shows the size of various privately owned power generating plants / projects in transition economies.²¹ By comparison, it would seem that Mosenergo with an installed capacity of 15 GW could potentially be broken into a number of generating companies. If United States competition rules were to be applied, which prevent any company from having a market share exceeding 20 per cent,²² then Mosenergo would be broken into (at least) five companies each with 3 GW of generating assets. The desirable extent of unbundling for other energos should be determined on a case-by-case basis taking into account potential market power, this being dependent on regional market size, transmission (import) constraints, and energy installed capacity.

Table 1: Size of private power plants in transition economies

Country	Plant	Size (MW)
Hungary	Bakonyi	180
	Budapesti	120
	Dunamenti	1,900
	Martra	800
	Paksi	1,840
	Pecsi	196
	Taszai	1,300
	Vertesi	375
	Poland	Patnow
Polaniec		1,800
Bulgaria	Maritsa East 1	670
	Maritsa East 3	900

Source: EBRD internal data.

If generating assets within a region are to be commonly owned, then the potential for abuse of market power can be reduced by regulation. For example, the regulator might benchmark CHP plants against each other and impose a price ceiling. This is not ideal, as the regulator cannot match the market in terms of discipline exerted on companies.²³

The regional markets proposed in the plan should, wherever technically feasible (depending on configuration of the transmission network), cover an area currently served by a number of energos (for example, there might be five or six regional markets) in order that there are multiple market players. It is envisaged that restructuring will result in the formation of 40 energos relative to the current 74. This proposed consolidation would lead to an even greater concentration of local generating assets if these were to remain commonly owned with

²¹ There has been limited privatisation of generating companies in transition economies, hence the narrow country coverage of the table.

²² See US Department of Justice Merger Guidelines, issued 14 June 1984. In the European Union, the European Commission may regard a market share in excess of 25% as a problem.

²³ The result would likely be inefficient dispatch, manifest in plants operating at the wrong capacity factor and / or with the wrong power / heat mix.

distribution. In such a situation, regulation of generation would be appropriate. To repeat the above, however, this would not be ideal, and would limit the pressure on generating companies to perform efficiently. More desirable would be to unbundle energos' generating assets and sell these off as competing generation companies.

There are additional arguments for separating ownership of generation and distribution assets which relate to the ability of integrated companies to foreclose markets and thus to prevent the evolution of competition. For example, an integrated company can raise the relative costs of its generating competitors and thus gain a competitive advantage by allocating some generation costs to the distribution business.²⁴ Competing integrated energos within a regional market might engage in this type of behaviour and in doing so would undermine competition.

The best way to prevent market foreclosure is not to allow integrated ownership of generation and distribution.²⁵ Actually the European Power Directive does allow integrated ownership of generation and distribution and relies on regulation to prevent anti-competitive behaviour. In the case of Russia, as elsewhere, there is the possibility of regulatory failure, which might allow market foreclosure and thus prevent competition between energos. On top of this, the CHP dimension – if heat and CHP are integrated, and assuming that there is not retail competition in the heat sector, then there is no heat off-taker for potential new entrants in generation – provides a strong argument for separate generation and distribution ownership. If separate ownership is not feasible then accounting separation of generation and distribution provides a basis for regulation, and is an improvement on the present situation, where accounting information is not conducive to effective regulation.²⁶

Regarding large generating companies currently owned by RAO, these will potentially form the national competitive market (i.e. they would provide the basis for regional power imports). Power sold on these markets would make up the deficits in demand and supply in regional markets. The points above in the context of CHP competition apply in the case of the large generating companies: there should be a sufficient number of companies that no one company enjoys market power and the ability to manipulate the market price. As in the case of CHP, companies should be as small as possible subject to technical and financial constraints. One possibility is that large generators could be bundled with CHP assets in different regions to make companies sufficiently large to interest investors, yet still provide multiple players in the national and regional markets.

Progress has been made in restructuring of the large generating companies with submission of a proposal by RAO to the government on 19 November. The proposal is to create ten generating companies, four of which would be hydro and six thermal. The thermal companies would comprise five-six plants (with combined capacity 8-10 GW) in different regions, this in order to limit market power of any one company within a region. Mosenergo would be required to divest 5 GW of plant – four large power stations – as part of the proposed restructuring. RAO has not yet published analysis underpinning company formation to demonstrate that the proposed configuration would indeed support competition. Regarding restructuring of energos *vis-à-vis* CHP plant, this is not mentioned in the restructuring plan. In this regard, RAO is unable to force any proposals under current legislation; though it typically owns 50 per cent of each energo, 75 per cent Board approval is required before an energo can be restructured.

²⁴ See Kennedy (1997) for a discussion.

²⁵ Newbery (1999) is a strong advocate of this point of view.

²⁶ It is likely that heat production would be inefficient in this context. Though there might evolve some competition with gas, this is not currently used for purposes of heating.

5.2 TRANSMISSION: OWNERSHIP AND PRICING

The reform plan contains clear proposals for the restructuring of transmission ownership and system operation; these will be separately owned for an interim period, with integration at a later stage, and continuing independence of both functions from generation.

From a theoretical point of view, an integrated generating company and system operator may depart from merit order dispatch and instead send out its own high-cost producer. The solution here is to prevent integrated ownership of generation and system operation. This may imply that generation and transmission should be separately owned, to the extent that transmission and system operation are integrated. One argument for integration of transmission and system operation is that this type of company is straightforward to set up from a state-owned, fully integrated industry. The alternative, to set up a separate system operator, typically involves high transaction costs. Against the argument for integration is that transmission and system operation companies, driven by the commercial objective to maximise investment,²⁷ may favour transmission-based rather than generation-based solutions to congestion (i.e. increasing transmission capacity into a region rather than increasing generation capacity in the region). Integrated transmission and generation companies may take a more global view of investment. It has also proved hard in practice to provide integrated transmission and system operation companies with incentives to minimise generation costs when departing from the ideal merit order, whereas this can be written as an objective for a (non-profit-making) system operator.²⁸ Where transmission pricing reflects congestion, there may be incentives for integrated companies to manipulate dispatch in order to gain congestion rents; this is an argument for separation of transmission and system operation.

Both models (integrated and separate transmission and system operation) have been implemented in various countries as part of power sector reform and there is no clear evidence as yet to support one over the other. Each model can function in the correct institutional setting.²⁹ The important point is that system operation should be impartial. If transmission and generation are integrated, then system operation should be separate from transmission. If transmission is separate from generation, then there is no reason to separate transmission and system operation, provided that effective regulation of transmission is in place.³⁰

The Russian power sector reform plan is consistent with these principles of transmission and system operation ownership. The plan envisages that ownership of transmission and system operation will remain separate while RAO still has interests in generation. This is particularly important given the experience to date where RAO has used its position as system operator to inhibit potential competitors' network access. Going forward, the planned integration of transmission and system operation after RAO has disposed of its generating interests will not be problematic as there will be no incentive for the integrated company to favour certain generators. The proposal to keep transmission as a state-owned company, while this may not affect the evolution of competition, may raise transmission prices. It is important that transmission and system operation are organised along commercial lines if operating and investment functions are to be carried out efficiently, and it is likely that the best way to achieve this is through introduction of the private sector. To the extent that this is appropriate

²⁷ This applies more to a system where there is not free entry in generation.

²⁸ See Newbery (2001) for a discussion of how to provide incentives to transmission companies.

²⁹ Arizu, Dunn and Tenenbaum (2001) elaborate this view.

³⁰ See Newbery (2001).

only when a regulatory framework is in place, there is a case for delaying privatisation in the medium term.

Another important aspect relating to liberalisation is transmission pricing; depending on how prices are set, dispatch / new entry in generation may not be economically desirable. For example, transport of power over long distances will be encouraged where transport costs are averaged over all generators in the system. In fact, traditional pricing mechanisms have been based on some form of averaging. If economically optimal dispatch and entry decisions are to be made, then transmission prices should reflect underlying costs. More recently pricing mechanisms have been developed that capture underlying costs and that can be implemented in a straightforward manner.³¹ In the case of Russia, cost-based pricing is particularly important given the long distances over which power may potentially be transported. The reform plan envisages that a transmission tariff mechanism will be developed during the first stage of reform, though no principles for the mechanism are stated.

5.3 MARKET RULES

There are various models for market liberalisation, each of which could be implemented in Russia under the reform plan. One of these models – featuring in the European Power Directive – is to allow bilateral contracting between generators and large consumers (including power distribution companies / suppliers). Competition on a contracting basis is reasonably straightforward to implement and is suitable where institutional capacity is constrained. It is attractive for these reasons, and also because the possibility of long-term contracts in such markets provides adequate security for investors to go ahead with projects. Incentives for cash payment are strong under bilateral contracts; a generator will not continue to supply a non-paying customer.

In England and Wales, the United States and Scandinavia, competition has been introduced in the form of a power pool. A pool normally involves a market operator taking bids to supply from generators and demand-side bids from large consumers and dispatching and plant where supply and demand-side bids are equal.³² The market operator subsequently collects revenues from distribution companies and large consumers and makes payments to generators accordingly. Pools may operate at the national or regional levels or both simultaneously.

Advocates of power pools argue that they are more competitive than contract-based markets due to lower transaction costs.³³ However, there are substantial and often prohibitive technical (for example, data, communications and software equipment) requirements. The number of transactions that takes place in a pool may be taxing from an institutional point of view, and when the market operator acts as a clearing house, this can provide opportunities for corrupt behaviour. Prices in power pools are typically volatile, and though related risks may be hedged through futures markets, these are not always deep in the early stages of liberalisation. Incentives for collection of payment in a pool may be muted given that the market operator typically does not suffer financially for a failure to collect.

In the case of transition economies, where there may be institutional capacity constraints, where payments discipline is a problem, and where investors are subject to a possibly prohibitive multitude of country and sector risks aside from those associated with the market (i.e. market risks should be minimised to secure investment), contract-based competition may

³¹ See Kennedy (2002) for a discussion of alternative forms of location marginal pricing.

³² In order to ensure impartial dispatch, and as with transmission, system operation, and distribution, market operation should be independent from generation.

³³ Hogan (1998) compares pools and contract-based markets.

be more appropriate than a pool, at least in the medium term. The extra expense associated with developing a power pool cannot be justified where this would be undermined through poor performance due to institutional failure.³⁴

In the case of Russia, although the phrase “power pool” is not mentioned in the reform plan, it appears that competition through a pool mechanism may be envisaged. The plan states that “market pricing should be carried out based on the comparison of price bids of buyers and sellers”. In addition, the settlement and clearing functions of the newly formed market operator are consistent with the pool model. Allowing contract-based competition would be more practical in the short term and would offer the benefits above relating to payments collection and investor security. Even in the medium to long term, off-take contracts are likely to be required in order to provide security to mobilise finance for necessary investments. Some contract-based competition would not seem to be inconsistent with proposals in the plan.³⁵

5.4 SUPPLY COMPETITION

Liberalisation of supply is proposed under the reform plan. Generally supply is regarded as being competitive for large users (typically above 100 kW). In this market segment, the distribution company provides the distribution service at a specified cost, and any supplier (either a generating company or a wholesaler) can then negotiate contracts with the customer to cover the purchase of power, use of the transmission system, use of the distribution system, and metering / billing.

Metering and billing of residential customers is typically organised as a regulated monopoly operated by the local distribution company. The reason for this is that in most countries (particularly transition economies) substantial investments in metering, data communication and software (for financial settlement between retail suppliers and generators) would be required in order to make this function competitive.

Though some countries have liberalised metering and billing (e.g. England, Finland, Norway), there is no evidence yet available to suggest that such investments are economically justified. The cost reductions that would ensue from competition may not cover the required investment costs (which are passed on to the consumer in the form of a system levy). For example, the cost of introducing competition in England and Wales amounted to £720 million, this to be set against the £600 million total operating cost of the power retail supply businesses. In light of this, many countries have opted to delay opening the market for small consumers until a later stage (e.g. Germany, Netherlands and Spain are planning to open small-consumer markets in 2007).

In the case of Russia, though there are potential benefits available in metering and billing, these are small relative to the overall tariff (because metering and billing costs are small relative to total costs), and it is likely that these can be unlocked (largely) through effective regulation rather than competition. If this holds, the priority should be to introduce effective competition in generation and large-user supply, and effective regulation in other parts of the business. Liberalisation of the small-consumer market should not be a short-term priority given the huge institutional demands of these other reform challenges. The reform plan is

³⁴ Besant Jones (1996) argues that power pools are unsuitable for developing countries. In a transition context, the power pool implemented in Ukraine has not functioned properly, while bilateral contracts in Kazakhstan have worked reasonably well, see EBRD (2001).

³⁵ This is not to rule out the possibility of balancing pools, that is, pools to clear uncontracted demand and supply.

consistent with this approach, envisaging that supply competition for large users will be introduced in the second stage of reform whilst supply competition for small users will start from the third reform stage.

5.5 SEQUENCING

Sequencing will be key to the success of the reform programme. Given the experience of competition in the Russian power sector to date – and as noted above – a separate system operator should be set up to ensure that all generators have access to the transmission network on equal terms. Phased opening of the market would be undermined if a separate system operator is not in place first. This point applies equally to market operation, where a separate company should be set up to avoid RAO dispatching its own plant before that of its competitors.³⁶ The pilot competition proposed for the first stage of reform has the potential to bring efficiency gains based on the experience in other transition economies where this has been implemented successfully. Before more widespread competition is introduced, market rules and institutions should be fully developed, including: trading rules (pool rules, bilateral contracts), grid code (terms and conditions of network access for generators) and transmission price methodology. Failure to develop rules is likely to undermine competition. For example, in the absence of a cost-based transmission pricing methodology, dispatch may not be geared to minimise system cost. Without a well-defined set of market rules, investment finance to the sector may be limited. Without a grid code, not all market players may have equal network access. The plan recognises these potential problems and envisages that rules and institutions will be in place before markets are liberalised.

Liberalisation will lead to the reduction of cross subsidy from industrial to residential consumers as prices for large users are reduced to match cost. This could be problematic if an adequate regulatory framework is not in place. In particular, if the regulatory framework does not permit increases in tariffs, then the financial viability of energos will be jeopardised. To counter this problem, a tariff methodology should be in place before liberalisation that allows costs to be passed on to each category of customers. In addition, a mechanism for subsidy to poorer consumers should be in place as tariffs increase in order that this is socially and politically acceptable. In the absence of a regulatory framework, which should also have the potential to counter abuse of market power, it is questionable whether investors will be prepared to put funds into the industry.

The reform plan recognises the need for development of regulations and states that a consumer tariff methodology and a social protection mechanism will be developed in the first stage. There is no mention of an independent regulator in the plan, however, and little in the way of details regarding tariff methodologies. Failure to address these issues prior to liberalisation could reduce the success of the reform process.

³⁶ To repeat Section 4 above, a market operator was set up in November 2001. This will remain separate from other industry functions, something that is consistent with industry best practice based on evidence from deregulated markets; see Barker et al (1998) for a discussion.

6. CONCLUSION

There are many good aspects of the Government-approved reform plan for the Russian power sector. These include the proposals to create separate market and system operators and to separate transmission from generation and distribution. There remain a number of areas, however, where proposals are not fully specified, with the possibility of outcomes that would not support the objective to successfully liberalise the power market. In particular, it is not yet clear whether generating and distribution assets of energos will become separately owned. For the larger energos, it is not clear whether generating capacity will be divested to reduce potential market power. This paper has argued that ideally generation and distribution should be separately owned, and that breaking up the generation assets of some energos should be considered. Regarding market rules, it was argued that there is a strong case for allowing bilateral contracts between generators and consumers. Moving to a fully fledged power pool without the possibility of off-take contracts might undermine the reform effort. With the appropriate industry structure and market rules, and in a context of effective regulation, then evidence from power sectors in other countries suggests that the objective to achieve a high level of competition in generation and supply, and to secure inflow of investments, can be achieved.

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