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# Power sector regulatory reform in transition economies: Progress and lessons learned

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## **Abstract**

Regulatory reform in the power sector of most transition economies has progressed. Regulatory independence, however, is still limited with direct (statutory) and indirect political input influencing decision making. Further reform is required to secure power tariff increases and private sector participation. Both should improve sector performance, notwithstanding current market sentiment towards the sector and the region.

This paper discusses the advances made in regulatory reform, with a focus on end user regulation rather than network access. It suggests that regulatory rules, enforceable in an independent forum such as international arbitration, should be written into contracts to ensure investor security. However, arbitration should not be seen as a substitute for strong government commitment to the reform process. Tariff mechanisms from western Europe or North America, if adopted into contracts, should also be adapted to reflect the specific characteristics of transition economies. For example, poor payments discipline and exchange rate risk are significant problems in CIS countries. Going forward, the challenge in all transition economies will be to strengthen regulatory independence and mechanism design. And, perhaps most importantly, implementation must be enhanced to improve sector performance.

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## 1. INTRODUCTION

The quality of regulation within the power sector is key to the investment climate. It determines the rules for investment finance and private participation. Effective regulation mobilises investment finance at minimum cost and ensures good performance, the benefits of which can be passed on to consumers. The alternative to effective regulation is sovereign finance, but this is neither desirable from an incentive point of view, or, in many cases, practical.

Regulation is most likely to deliver benefits to private participation. However, given the low appetite for power sector investment in the region and the significant changes in global power markets over the past twelve months, whether regulatory strengthening is a pressing issue at the current time is questionable.

Some of the factors affecting the global power markets include:

- the collapse of Enron, which resulted in electricity companies retrenching, focusing on domestic markets and increasing equity backing to restore credit ratings
- low electricity prices in the US and UK markets, which resulted in losses for investors
- the currency collapse in Argentina, which adversely affected US and European investors, and
- the failure of investments (e.g. backed by Power Purchase Agreements in Pakistan), which raised perceptions of sector risk.

As a result of these events, US investors, and some European investors, have changed their strategy towards transition economy power sectors. For example, the American utility AES considered selling its interests in the Georgian Telasi distribution company and in its distribution assets in Ukraine. However, the company has now decided to remain in these countries, but has shelved plans for further expansion. Elsewhere, the American utility Entergy has sold part of its interest in a Bulgarian power generation rehabilitation project.

Nevertheless, three power distribution companies in the Slovak Republic were successfully privatised at the end of 2002. In addition, new investors in the region have emerged, the most notable being Barmek, the Turkish utility responsible for turning around the Baku (Azerbaijan) distribution company. Distribution company privatisations in Romania and Bulgaria are also planned for this year, with privatisations in Croatia, the Czech Republic, Georgia, Latvia, Lithuania, Moldova, Poland, Russia and Slovenia expected in 2003/04.

Should these privatisations not occur, regulation remains paramount for good sector performance. (The privatisations may be delayed for political reasons or because market sentiment is demonstrably against investment in the current climate.) The importance of regulation will be particularly pertinent in markets where the private sector is already involved (Georgia, Hungary, Moldova, Kazakhstan) and where it determines how privatised companies fare. It can also play a role in securing alternative forms of private participation, such as management contracts.<sup>1</sup>

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<sup>1</sup> During 2002, two management contracts were successfully concluded in the Georgian power sector. These related to the wholesale market (Spanish utility, Iberdrola) and the transmission network (Irish utility, ESBI).

Furthermore, effective regulation can potentially contribute to the commercialisation of state-owned power<sup>2</sup> and its development may serve as a catalyst for encouraging investment in the region.

This paper reviews progress in regulatory reform in transition economy power sectors. It draws from a survey of regulators undertaken by the EBRD and the World Bank. It focuses on two dimensions of regulation: governance, the institutional framework for regulation; and content, regulatory rules, tariff rules in particular. Detailed case studies are presented, from which lessons are drawn.

The main message of the paper is that progress in regulatory reform has been achieved in most transition economies. Regulatory independence, however, is limited, with direct (statutory) political input to regulatory decision-making in some countries. Elsewhere, regulators may be nominally independent, but subject to political influence through, for example, reliance on central government funding. Regulatory rules (e.g. tariff mechanisms) are often only loosely specified, with resulting regulatory discretion providing scope for political influence in tariff setting. In some cases, well-written regulatory rules are not implemented in practice. A means to provide security in these contexts is to write regulatory rules into contracts that are enforceable in an independent forum (e.g. international arbitration), though this should not be seen as a substitute for strong government commitment. Finally, when importing tariff mechanisms from western Europe or North America, these should be adapted to reflect the specific characteristics of transition economies, such as poor payments discipline and significant exchange rate risk, both of which are problems in CIS countries.

An overview of power sector pricing in transition economies, focusing on residential and industrial prices, together with cash collection and commercial losses, is provided in Section 2 of this paper. It is argued that effective tariffs are not sufficient to sustain power sectors, whether this be in the short term, as is the case in some CIS countries, or the medium term, when investments are required. Affordability concerns and ways to mitigate these have been discussed at length elsewhere and are not considered in the current paper, though clearly this is a fundamental area in any power sector reform programme.<sup>3</sup> Section 3 sets out the optimal regime in broad terms and compares the results of a regulatory survey against this benchmark. Section 4 outlines the experience of regulatory reform in Hungary, Moldova and Kazakhstan, three countries which have been at the forefront of radical industry reform in the region. The section goes on to discuss issues raised from these experiences, including routes for investor recourse, asset denominations, calculation of the cost of capital, treatment of poor payments discipline, allowable costs and the length of the regulatory review period. Concluding remarks are contained in Section 5.

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<sup>2</sup> See Kennedy (2002) for a discussion of regulation in a context of private sector management contracts, and commercialisation of state-owned companies.

<sup>3</sup> See EBRD (2001) for an overview and Lovei et al (2000) for a detailed discussion of affordability and the social safety net in the transition economy power sectors.

## 2. OVERVIEW OF EFFECTIVE POWER TARIFFS

Under communism, high energy consumption was facilitated by tariff levels far below the long-term supply cost and below levels in western Europe and North America. The price structure was further distorted by cross subsidies from industry and business to residential customers. This pattern has been largely maintained during the transition period, particularly in the CIS countries, as is evident from the data in Table 1.

The average residential power price for the region is 6 USc / kWh. Most progress in tariff reform has been made in central and eastern Europe and the Baltic states, where the average residential price is 6.4 USc / kWh. Less reform has occurred in south-eastern Europe, where the average tariff is 3.9 USc / kWh, and the CIS, where the average is 2 USc / kWh.

The extent of power sector under-pricing in transition economies is illustrated in Table 1. The optimal pricing rule, where demand is stagnant and excess capacity often exists, sets price somewhere between marginal operating cost and long-run marginal cost (LRMC).<sup>4</sup> The price could be expected to rise above marginal operating cost and towards LRMC as demand picks up and investments are undertaken.

Further work is required to establish the LRMC for the transition economies. LRMC is specific to each (national or regional) power network, and depends on factors such as technology, fuel prices and transmission links. For example, LRMC is likely to differ according to whether power generation is based on hydro, gas or coal. Similarly, the LRMC for a hydro facility operating in a regional system that includes thermal capacity is likely to be different from LRMC for the same hydro system operating in isolation.<sup>5</sup>

LRMC for residential consumers is around 8 USc / kWh in the United States, and slightly higher in Europe; this value provides a measure for LRMC in south-eastern and central Europe and the Baltic states. LRMC is likely to be lower in the CIS countries because of lower economic fuel prices,<sup>6</sup> and hydro-based production (in Georgia and some of the Central Asian countries). However, the price, in practice, might have to rise above LRMC to recoup past debt.<sup>7</sup> On this basis, and though it is not possible to discuss country specific tariff reforms due to limited data or analysis, prices will need to increase in most countries over time, and more so in some of the CIS countries, to cover LRMC.

The average industrial price for the region is 3.8 USc / kWh. The average ratio of residential to industrial prices is 0.96, suggesting that some tariff rebalancing, to erode cross subsidy, has taken place. This has been driven by reforms in central and eastern Europe, where residential tariffs are 79 per cent of industrial tariffs. Cross subsidies still exist in south-east Europe, where residential tariffs are 110 per cent of industrial tariffs, and in the CIS, where the same ratio is 124 per cent. Further tariff rebalancing

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<sup>4</sup> Marginal operating cost is defined as the cost of producing an extra unit of output using existing capital stock. Long run marginal cost is marginal operating cost plus the cost of additional capacity required to increase output.

<sup>5</sup> See Turvey and Andersen (1977) for analysis of long run marginal cost pricing in the power sector.

<sup>6</sup> That is, fuel valued at opportunity cost in the face of export constraints.

<sup>7</sup> This depends on a number of factors, including rents to existing capital under LRMC pricing and terms of debt rescheduling. It is not discussed here in detail. Notwithstanding this, LRMC pricing would help to ensure viability of power sectors on a forward-looking basis.

between industrial and residential consumers is required in these regions if the maximum economic benefits are to be gained.

Another important aspect of tariff reform relates to payments discipline, more specifically to cash collection and commercial losses. Cash collection is the ratio of cash collected to the total amount billed. Commercial loss is defined as non-billed consumption through illegal connection and meter tampering. Cash collection and commercial losses are not major problems in central and eastern Europe. In south-eastern Europe, cash collection is lower, at an average of 80 per cent. Payments discipline is worst in the CIS, where average cash collection is 60 per cent and commercial losses are 19 per cent.

**Table 1: Prices, cash collections and commercial losses**

	Residential price (USc / kWh)	Industrial price (USc / kWh)	Cash collection (%)	Commercial losses (%)
Albania	2.9	7.2	84.5	11.2
Armenia	4.4	2.9	87	30
Azerbaijan	2.1	6.3	30	15
Belarus	1.3	5.2	50	-
Bosnia and Herzegovina	5.6	6.1	95	11.5
Bulgaria	3.7	3.9	85	10
Croatia	9.8	6.7	100	-
Czech Republic	6	4.3	-	-
Estonia	4.9	4.1	97.1	1.1
FYR Macedonia	4.1	2.5	80	7.4
Georgia	4.2	3.3	32	27.5
Hungary	6.8	5.7	90	-
Kazakhstan	2.6	1.3	-	25
Kyrgyz Republic	0.6	1.4	45	17.2
Latvia	5.6	5.2	99.5	-
Lithuania	5.3	3.8	91.1	-
Moldova	5.2	5.2	97.5	27.8
Poland	7.8	4.5	97	-
Romania	5.2	4.8	62	2
Russia	0.9	1.6	97	3
Serbia and Montenegro	1.8	1.3	73.6	3.5
Slovak Republic	6	4.2	100	7.6
Slovenia	6.4	7	99	-
Tajikistan	0.2	1.1	-	14
Turkmenistan	0.5	0.5	30	-
Ukraine	2.2	2.5	78	7.4
Uzbekistan	0.7	0.7	25	-

Source: EBRD (2001).

A number of countries have experienced supply shortages when tariffs were unable to cover operating costs. Interruptions to supplies occurred in Georgia (which imports gas from Russia) and Moldova (which imports power from Ukraine). In 2001, an energy crisis in Ukraine loomed when there was insufficient funds to stockpile fuel for winter power generation.

Low effective tariffs are manifest in the energy debt of CIS countries. This typically forms a major component of total sovereign or quasi-sovereign debts. The problem for these countries is that sovereign debt is often at an unsustainable level, thus threatening macroeconomic stability. Low prices will exacerbate this problem, either by adding to external debt, or because continuing energy imports will not be viable.

Investments in the power sector are required in all the transition economies. These investments may be in generation, transmission or distribution, depending on the country's priority. Investments supporting generation include the rehabilitation of ageing power stations and the introduction of modern, environmentally-friendly technology. Investments in metering and data communication will be required as these markets develop, with the possibility of new transmission links between networks. These will help reduce technical and commercial losses and increase system reliability and cash collection.

At current effective tariff levels, these investments will not be financially viable, at least in the absence of a sovereign guarantee. Tariff levels should be increased to secure off budget project finance, given the incentive problems associated with sovereign guaranteed projects, the negative resource and environmental implications of continuing low power prices, and the constraints on government spending. From an implementation point of view, tariff increases are also required to secure the participation of strategic investors.<sup>8</sup>

During communism, regulatory regimes for the power sector were non-existent. However, given current political and commercial risks, tariff reform is required if power sectors are to be made sustainable. Without regulatory reform, government commitments to tariff reform are not credible from an investor perspective and, indeed, tariff reform may stall.

The remainder of this paper considers progress in regulatory reform and attempts to outline appropriate regulatory frameworks for transition contexts.

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<sup>8</sup> See EBRD (2001) for a discussion of benefits associated with private sector participation in transition economy power sectors. Private participation has had a demonstrable impact on payments discipline in power sector transition economies, particularly in Albania, Georgia, Kazakhstan and Moldova

### 3. PROGRESS IN REGULATORY REFORM

This paper uses a regulatory framework that mobilises finance at minimum cost as its benchmark. Such a framework should allow regulated firms to confidently cover all their costs, including the cost of capital (interest on debt plus a return on equity), assuming they operate efficiently. These firms should also be able to obtain finance more easily and at a lower risk premium than is available under a regime characterised by uncertainty (for example, where the probability of a shortfall in net revenues is greater). Within such a regulatory framework, there should be greater private sector interest and privatisation receipts should be higher, therefore contributing to the increased likelihood of successful privatisations. In contrast, low receipts often occur in more restricted regulatory frameworks and result in governments backtracking and failing to close privatisations, as witnessed in the sale of the Polish power generation company.

In discussing regulatory frameworks, it is useful to follow the distinction made by Levy and Spiller (1996) between regulatory governance and regulatory content. Regulatory governance refers to the institutional context for regulation (for example, whether or not a regulator is independent), whilst regulatory content covers regulatory rules (for example, tariff methodology).

Regulatory governance is key to monitoring regulatory or political risk, given the varying degrees of discretion that regulators have in setting prices. For example, regulators may underestimate the cost of capital with a view to holding prices down for political reasons, or set over-ambitious targets for cost reduction or service quality improvement, or to claw back profits. There is also risk associated with tariff adjustments, with tariffs being increased following an increase in operating cost, or an over-spend in the investment programme, or when demand out-turn is below forecast. To reduce these risks, regulation must be distanced from the political process. Failure to do so will result in a higher cost of capital and higher tariffs. Lower cost of capital and tariffs can be achieved by setting up an *independent* regulator.

There are various criteria for assessing whether a regulator is independent.<sup>9</sup> An independent regulator should be appointed for a fixed term with dismissal only possible in a narrow range of circumstances. This prevents the government from using the threat of dismissal to influence regulatory decision making. Funding for an independent regulator should come from the regulated industry (through license fees, for example) rather than from a government budget. This prevents the government from threatening to reduce the regulator's budget if it fails to pursue political objectives. And, possibly the most important criterion, an independent regulator should have the power to approve tariffs without sanction from government officials, thereby preventing direct political input into the tariff setting process.

Though an independent regulator may be removed from the political process, this opens the possibility of *regulatory* – as opposed to *political* – risk. That is, regulatory decision making that adversely impacts upon regulated companies, though not driven by political objectives. Regulatory discretion and risk can be limited through both informal and formal accountability. Informal accountability includes consultation of all relevant parties as part of the regulatory process, followed by justification of any decision. Formal accountability refers to what is laid down in legislation, typically the accountability of the regulator to parliament or the government, and to the judiciary.

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<sup>9</sup> See Stern (1997), (1998) for a discussion.

Competition authorities or other similar bodies may also have a role to play in the regulatory process, providing regulated companies with an alternative route for recourse to the courts.

Tables 2-4 show the results of a survey carried out by the EBRD, in conjunction with the World Bank, of regulators across transition countries. The tables summarise the aspects of the survey focusing on the regulatory institutional framework as outlined above (regulatory independence, accountability, etc.).

The survey found that regulatory independence only features in its purest form – a regulator separate from government, appointed for a fixed term, funded from industry, and with full tariff setting power – in Latvia, Moldova and Slovenia. More common is a regulator separate, but open to indirect influence from the government. Most of the central-eastern and southern European and Baltic countries fall into this category. In several countries from the region, the government has retained direct control over tariff setting, most notably in Bulgaria and Hungary, where tariffs recommended by the regulator must be approved by the government. Amongst the CIS countries, Armenia, Georgia and Ukraine have made progress towards independent regulation, in conjunction with the privatisation of the distribution company. In Russia and Central Asia separate regulatory bodies have been set up, though these cannot yet be regarded as fully independent, with various potential routes for government influence. The exceptions are Tajikistan and Turkmenistan, where power tariffs remain very low and there has been limited regulatory reform to date.

**Table 2: Regulatory institutions in central and eastern Europe and the Baltic states**

	Separate regulator <sup>10</sup>	Fixed-term appointment	Industry funding	Full tariff setting power	Transparency	Redress
Croatia	✓	✓	✓	✓	✓	✓
Czech Republic	✓	✓			✓	✓
Estonia	✓			✓	✓	
Hungary	✓		✓		✓	✓
Latvia	✓	✓	✓	✓	✓	✓
Lithuania	✓	✓	✓	✓	✓	✓
Poland	✓	✓	✓		✓	✓
Slovak Republic	✓	✓		✓	✓	✓
Slovenia	✓	✓	✓	✓	✓	✓

Source: EBRD / World Bank survey of regulators.

<sup>10</sup> Defined as a regulator not part of a ministry.

**Table 3: Regulatory institutions in south-eastern Europe**

	Separate regulator	Fixed-term appointment <sup>11</sup>	Industry funding <sup>12</sup>	Full tariff setting power <sup>13</sup>	Transparency <sup>14</sup>	Redress <sup>15</sup>
Albania	✓					
Bosnia and Herzegovina	✓	✓	✓	✓	✓	✓
Bulgaria	✓	✓			✓	✓
FYR Macedonia						
Romania	✓	✓	✓		✓	✓
Serbia and Montenegro						

Source: EBRD / World Bank survey of regulators.

**Table 4: Regulatory institutions in the CIS**

	Separate regulator	Fixed-term appointment	Industry funding	Full tariff setting power	Transparency	Redress
Armenia	✓			✓	✓	✓
Azerbaijan	✓					✓
Belarus						
Georgia	✓	✓	✓	✓	✓	✓
Kazakhstan	✓			✓	✓	✓
Kyrgyz Republic	✓			✓	✓	✓
Moldova	✓	✓	✓	✓	✓	✓
Russia	✓			✓		✓
Ukraine	✓	✓		✓	✓	✓
Uzbekistan	✓					
Tajikistan						
Turkmenistan						

Source: EBRD / World Bank survey of regulators.

With regards regulatory accountability, the survey found that consultation as part of regulatory discretion does not play a significant role. The regulatory process typically consists of regulated companies applying for a tariff under a given set of rules and the regulator making a decision. In most countries surveyed, these decisions are backed by some form of justification, with Uzbekistan a notable exception. In nearly all countries surveyed, regulated companies can take recourse to the judiciary to contest decisions made by the regulator. In countries where privatisation has taken place –

<sup>11</sup> Legislation is in place that appoints the regulator for a fixed term and states that the regulator can only be dismissed in specified circumstances (typically gross misconduct).

<sup>12</sup> The regulator is funded by the power industry through license fees rather than from the central government budget.

<sup>13</sup> The regulator has the final say on tariffs rather than the government approving tariffs proposed by the regulator.

<sup>14</sup> The regulator has a statutory obligation to explain the basis for its decisions.

<sup>15</sup> Investors have recourse to a third party – competition commission, judiciary, international court - to appeal decisions made by the regulator.

Kazakhstan and Moldova are notable examples – companies sometimes have additional recourse to international arbitration. In Bulgaria and Poland, companies also have the option to seek a referral to the competition office.

Another way in which regulatory discretion can be limited is through publication of legally binding and detailed regulatory rules, for example, regarding tariffs. Primary legislation (approved by parliament) may contain detailed specification of tariff setting rules, as is the case in Armenia. However, primary legislation usually states that tariffs should cover all economically justifiable costs. Detailed specifications are then written into secondary legislation, either government decrees, regulatory orders, or contracts between regulators and regulated companies. Table 5 shows the results of the survey reviewing the existence of published tariff methodologies and shows that these exist in the majority of EBRD countries.

**Table 5: Power tariff mechanisms in transition countries**

	Published tariff methodology	Price cap regulation
Albania		
Armenia		
Azerbaijan		
Belarus		
Bosnia and Herzegovina		
Bulgaria	✓	
Croatia		
Czech Republic	✓	
Estonia		
FYR Macedonia		
Georgia	✓	✓
Hungary	✓	✓
Kazakhstan	✓	
Kyrgyz Republic		
Latvia	✓	
Lithuania	✓	
Moldova	✓	✓
Poland	✓	
Romania	✓	
Russia	✓	
Serbia and Montenegro		
Slovak Republic	✓	✓
Slovenia	✓	
Tajikistan	✓	
Turkmenistan		
Ukraine	✓	✓
Uzbekistan		

Source: EBRD / World Bank survey of regulators.

Two main tariff methodologies, regarding regulatory content and the details of the secondary legislation, are widely used. Traditionally, utility regulation is *cost plus*, under which tariffs are reset on an annual basis so that revenues and costs, including a return on capital, are equal. Under *price cap* regulation (otherwise known as *RPI-X* or *incentive*), prices are set over a number of years on a forward looking basis. The present value revenues and costs – the latter net of any efficiency gains forecast by the regulator – are equal. Once tariffs are set, the incentive for the regulated company is to outperform forecasts by the regulator and thus generate above forecast profit. This is passed on to consumers in the form of lower prices when tariffs are reviewed, typically at five year intervals.

Table 5 shows that regulation in most transition countries is based on the *cost plus* approach. Where there has been more sector reform and, typically where private investors have entered the sector, price cap regulation has been adopted. Notable examples of this have occurred in Armenia, Georgia, Hungary, Moldova, Slovak Republic and Ukraine. The benefits of price cap regulation in a transition context are discussed in Section 4.4.

## 4. DETAILED REFORM EXPERIENCES

This section focuses on three countries – Hungary, Kazakhstan and Moldova – where radical power sector reform has been undertaken. First, regulatory reform in each of these countries is described. Next, reform experiences are discussed, and lessons for other transition economies aiming to attract non-sovereign finance are drawn.

### 4.1 Hungary<sup>16</sup>

The power sector in Hungary was reformed under the *Act on the production, transport and supply of electric energy* adopted in 1994. Following this, the power industry was vertically and horizontally unbundled. This included the separation of generation, transmission and distribution and the establishment of a number of generation and distribution companies. Thermal generation assets and distribution companies were sold through international tenders to strategic investors. The market model for privatisation was a single buyer arrangement, under which the state-owned transmission company purchased power from generators under long-term off-take agreements and sold this on to the distribution companies.

Under the 1994 Act, a regulatory body – the Hungarian Energy Office (HEO) - was set up. Although a separate body (i.e. not part of the Ministry), the HEO does not qualify as independent under various standard criteria: the Director of the office is not appointed for a fixed term and conditions for dismissal of the Director are not specified. Perhaps more importantly, the Minister of Industry has the final say over prices, even though the regulator establishes the tariff setting rules. These factors have combined to politicise the regulation of privatised power companies in Hungary.

The first regulatory review of tariffs took place in 1996. This suggested a 35 per cent end user tariff increase to cover costs, including an 8 per cent return on equity. This level of tariff increase was rejected by the government. In 1997 a 25 per cent tariff increase was adopted, accommodated by the rejection of equity returns for non-privatised assets and some expenses (e.g. insurance), and the postponement of reserves for nuclear decommissioning, the closure of coal mines and fuel stockpiling. From 1997 tariffs were indexed to inflation, less an amount to reflect potential efficiency gains (i.e. the regulatory regime was RPI-X or incentive regulation).

A second price review started in 2000. As a result of this, generation prices were increased but were not reflected in end user prices. This squeezed the margin for distribution companies and jeopardised their financial viability. Following protests from the distribution companies, the gap between generation and end user prices was met by the state-owned transmission company, which was able to purchase power from generators and sell to distribution companies at a discount through a subsidy from the central government.

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<sup>16</sup> See World Bank (2000) for a detailed discussion of power sector reform in Hungary.

## 4.2 Kazakhstan<sup>17</sup>

Starting in 1996, Kazakhstan began radical reform of the power industry and made more early progress than any other CIS country. Power generation, transmission and distribution have been partially unbundled, the private sector introduced in some areas, and the market for large users (including distribution companies) liberalised.

The power sector regulatory framework derives from the *Law on natural monopolies*, which also covers municipal, transport and telecommunications sectors, adopted in July 1998. The law states that an authorised agency selected by the Kazakhstani government is responsible for industry regulation. In the case of power, the authorised agency is called the Agency for Regulation of Natural Monopolies, Protection of Competition and Support of Small Business (the “Anti-Monopoly Agency”).

The Law defines the functions of the authorised agency as setting tariffs, approving investments, and determining allowable costs. It is silent with respect to the terms and conditions for the appointment and dismissal of key members of the Anti-Monopoly Agency (AMA) and the basis for funding of the regulator (whether from the government budget or industry revenues). The regulator has no obligation to consult industry players prior to making a decision and has no obligation to justify any decision that it makes. Hence, there is more scope for the exercise of regulatory discretion with antecedent regulatory and political risk. The more recent *Law on electricity*, dated 16 July 1999 and amended in 2002, does not address these areas. The AMA functions at national and local levels, developing the national policy framework and undertaking regulatory price reviews locally. The Agency experiences a high degree of political interference at both levels, with politically driven reorganisations of key personnel occurring frequently (there have been over 10 chairmen of the AMA since the beginning of 1998) and, invariably, disputes at each quarterly tariff review.

The law provides a route for appeal, though this is not to a third party (e.g. a competition authority), but rather back to the Agency. Although there is a route for recourse to the judiciary, in practice the courts do not have the experience to make the detailed judgements necessary on regulatory issues. Furthermore, given the looseness of the legislation, it is not clear upon what basis any judgement would be made. The *Law on natural monopolies* states that “prices must not be lower than the costs incurred during the provision of services and must provide the possibility for the natural monopoly entity to gain profits”. Though this permits tariffs sufficient to cover costs, it does not guarantee that this will be the case, given that costs and profits are not further defined. The secondary legislation then becomes the main source of security for investors. In this respect, limited security is provided because the form of the secondary legislation (an *instruction*) is easy to change, and the primary legislation (as it relates to tariffs) would permit a change for the worse.

Secondary legislation relating to tariff regulation was drafted by the Anti-Monopoly Agency in the form of *Administrative Order No. 03-2 OД on approval of the instructions concerning the special procedure for calculating costs included in prices (tariffs) on production and rendering of services (goods, works) by natural monopolist*, dated 15 August 1998, which is based on *Resolution No. 1171*,

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<sup>17</sup> For a detailed discussion of power sector reform in Kazakhstan see Kennedy (2002).

*concerning regulation of prices of natural monopolist's product*, dated 19 October 1994.

Under Resolution No. 1171 prices are set to cover most costs (excluding insurance) plus profit, the latter defined as revenue net of all expenses including interest payments and depreciation. In practice, profit is allowed for in the tariff calculation through a gross margin of between 10-30 per cent. This is at the discretion of the regulator. This methodology is not necessarily consistent with financing the cost of capital (which requires tariff setting to allow a rate of return on the asset base). Depreciation of assets is straight line applied to the book value of assets denominated in local currency.

On losses, the Anti-Monopoly Agency assumes that technical losses are equal to an industry norm and that there are no payments problems (i.e., that revenue collection is 100 per cent and there is no theft from the system). In reality, cash collection relative to total billings is low and commercial losses are high. The extent to which this situation can be turned around – through re-metering, changing billing practice, and educating customers regarding the benefits from payment of bills - is limited in the short term.

In this situation, private sector operators have found it difficult to sustain businesses. The most high profile example of this is in Almaty, the largest city and former capital, where power and heat assets were privatised in 1996 to a subsidiary of the Belgian power company Tractebel. The privatisation deal involved a twenty-five year concession over the Almaty power and heat distribution networks, and five heat and power plants, purchased for US\$ 7 million. At a later stage, Tractebel was awarded a fifteen year concession on gas transmission for a price of US\$ 30 million. Tractebel believed it had contractual commitments over tariff increases which were not honoured and began legal proceedings against the government of Kazakhstan early in 2000. In April 2000, a deal was reached under which Tractebel left the country with compensation of US\$ 100 million and privatised assets reverted to public ownership.

In Karaganda, Kazakhstan's second largest city, power generation and distribution facilities were sold to a consortium headed by a subsidiary of the Israeli utility company Ormat. Though performance of the Karaganda Power Company improved after privatisation – with increased security of supply, and increased collection – tariffs were consistently below the level required to cover costs. The ability of the company to service debt became precarious – and its investment programme was scaled down accordingly. In addition, no returns on equity were realised. Following protracted tariff disputes with the AMA, Ormat exited the country in 2002, selling its interests to International Power (an English company). The prospects for International Power will depend on whether draft improvements to the regulatory framework – developed by the AMA with the support of the EBRD – are adopted and implemented.

In the Altai region, situated in the north-eastern part of Kazakhstan and encompassing approximately one-quarter of all land in the country, virtually all power generation facilities are owned (or managed under long-term concessions) by subsidiaries of AES Corporation. Some power distribution facilities in the region are also managed by AES and an AES subsidiary owns the large Ekibastuz GRES-1 generating plant. Tariffs for these companies are insufficient to mobilise finance, and AES has been restricted to lobbying the AMA for improvements to the regulatory framework before any of the necessary investments are undertaken.

### 4.3 Moldova

The power sector in Moldova during the 1990s suffered poor cash collections (around 25 per cent) and commercial losses (largely due to illegal connections and tampering with meters) of around 25 per cent.<sup>18</sup> This situation was not sustainable, particularly given Moldova's dependence on imported energy together with tight fiscal constraints. As a result, external arrears grew and supplies were interrupted. In response, an industry restructuring and privatisation programme was undertaken to improve payments discipline. An independent regulator was set up in 1997, an energy law passed in 1998, and privatisation commenced in 1999. In February 2000, the Spanish utility Union Fenosa acquired three distribution companies and has since been successful in reducing commercial losses and increasing collections beyond what was envisaged when the tariffs were first set. Two companies were not sold due to lack of commercial interest and may be re-tendered in 2003.

Of particular interest in Moldova is the regulatory framework for power distribution companies, which provides both incentives for efficient performance and security for investors. The tariff-setting mechanism is enforceable outside Moldova through potential recourse to international arbitration. The basis for any potential judgement here is provided by a well specified set of tariff rules featuring:

- tariffs set on a forward looking basis for seven years
- a guaranteed 23 per cent return on all investments undertaken

This is supposed to approximate the cost of capital for Moldova. Should the cost of debt for the power sector in Moldova fall, this will be reflected in a lower return. An equity return consistent with 23 per cent – the average for equity and debt finance – should hold for the first seven years after privatisation.

- application of the return to a dollar denominated asset base with an opening value – less than book value – set during the privatisation negotiations and updated for investments and depreciation.
- an allowance for technical and commercial losses, which declines over time
- targets for operating cost reduction (X factors)
- adjustment of tariffs for inflation, movements in the real exchange rate and for differences in forecast and out-turn demand
- Partial generation cost pass through

For example, only a percentage of the generation cost increase is reflected in end user tariffs. Likewise, if the generation cost falls, this benefits consumers, but also increases profits for the regulated company.

One clause in the methodology stated that base values for operating costs and for losses would be reviewed after one year. This has been problematic for Union Fenosa, with disputes between the regulator and the company over both these variables. In addition, the regulator has disallowed 30 per cent of investments undertaken by Fenosa from the tariff calculation. On generation cost sharing, the cost has gone down, and the regulator is reluctant to allow the benefit prescribed under the methodology to accrue to Fenosa. In addition, the regulator will not allow certain

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<sup>18</sup> Taken from (unpublished) EBRD project data.

costs (legal, audit, repairs, security, training) to enter the tariff calculation. Disputes here are ongoing and could result in arbitration.

#### **4.4 Discussion and lessons learned**

##### *4.4.1 Independence of the regulator and investor recourse*

In both Kazakhstan, and to a lesser extent Hungary, tariff disputes have arisen when regulation is not independent. The solution to this problem is not, however, *just* to set up an independent regulator as defined by the standard criteria in Section 2 of this paper. Though a regulator may provide security over time, experience in Moldova shows that tariff disputes arise even when a (nominally) independent regulator is in place.

Recourse to a third party – whether a competition authority or the judiciary<sup>19</sup> – is unlikely to provide a solution. This is because these institutions are unlikely to have the requisite expertise and may not be perceived by investors as impartial. The case in Kazakhstan has shown the effectiveness of recourse to international arbitration as a sanction against adverse regulatory behaviour. The opportunity for international arbitration has also been incorporated into the regulatory framework in Moldova. In the accession countries, recourse to European courts should provide adequate investor security.

In all cases, recourse to a third party should not be seen as a substitute for strong government commitment to the implementation of a regulatory framework. Without this commitment, it is likely that investors will seek recourse and exit their investment, as was the case with Tractebel in Kazakhstan; this defeats the purpose of introducing the private sector and setting up a supporting regulatory framework. The current dispute in Moldova, possibly caused by a lack of political support for regulation, could also lead to arbitration. If Union Fenosa were to subsequently exit, then the hard won benefits (and potential benefits) would be lost.

The parameters of the legal agreement should be clearly defined. In Kazakhstan, however, the threat of arbitration in the context of a vaguely defined tariff rule was enough to reach a settlement. The inclusion of arbitration as an option for investors should also increase as regulatory rules are better specified. In Moldova, privatisation was closed due to the difficult investment climate and little interest from international strategic investors.<sup>20</sup>

The legal form of the regulatory rules should prevent potential changes that are not supported by both the regulator and the regulated company. Such a requirement is likely to preclude writing rules solely in the form of secondary legislation (decree, order, etc.) as this can easily be changed. Rather, tariff rules should be written or referenced in (legally binding) privatisation contracts, as is the case in Moldova.

##### *4.4.2 Payments discipline*

How payments discipline should be reflected in tariff setting is unclear. The failure to pass through any commercial losses in Kazakhstani tariffs has been critical in undermining sector financial viability and investor appetite. Where commercial losses

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<sup>19</sup> See EBRD (2002) for an overview of legal implementation in transition economies.

<sup>20</sup> Other factors (e.g. lease agreements) compensated for shortcomings in the tariff methodology in the case of Ormat's dispute with the government of Kazakhstan.

are not allowed for by the regulator, investment may be forthcoming in re-metering, which can still yield adequate financial returns. Other investments, for example in generation/network rehabilitation to increase system security, are not financially viable where payments discipline is a problem and no allowance has been made for tariff setting. The incentive for a regulated company is to delay any investment until payments discipline has improved, even if an investment plan has been agreed with the regulator.

The appropriate remedy here will be country-specific and depend on a variety of factors. These include the magnitude of the payments discipline problem; the level of tariffs and whether these provide adequate support for re-metering and other investments improving payments discipline; the urgency of rehabilitation investment; and, government budget requirements from privatisation proceeds. Where tariffs are low, a tariff increase prior to privatisation may be required to ensure assets are saleable without allowance for bad payments discipline. Where urgent investments are required, or where the government's objective is to maximise privatisation revenues, then allowance for poor payments discipline should be made.

Whether the allowance reflects commercial losses and or low cash collection, as is the case in Moldova, only the former should be passed through to the consumer. The rationale here may be that commercial loss reductions are harder to achieve than cash collection improvements. This holds true when legislation supports enforcement of payments discipline and where investors have security over payment by state-owned companies and budget organisations. Without these conditions, and given a need for urgent investment, finance might not be forthcoming if both commercial losses and cash collections are not allowed in the tariff calculation.

From an incentive point of view, the important thing is to set out a schedule for commercial losses or cash collections in advance. For example, commercial losses could be set at 0 per cent or above, and cash collection at 100 per cent or below. Once a schedule has been set, the incentive for the regulated company is to beat this, for example, by reducing commercial losses, and thus generating profit. This has been adopted into Moldova's regulatory framework, where a schedule for the reduction of commercial losses has been fixed in advance.

#### *4.4.3 Valuation of assets*

When valuing existing assets, regulators have the option to use book value, replacement value or marked down book value. This choice is important for the investor as it will determine their return (allowed rate of return multiplied by the asset base [RAB]). The difference between alternative methods of asset valuation shows up in the sale price of the assets (e.g. assets valued at book value will sell for more than assets valued at a fraction of book value) and future power tariffs. Economics does not necessarily suggest one method of valuation over another, only that there is an announcement of the chosen method prior to privatisation. This reduces the degree of uncertainty over future tariffs and thus increases privatisation sale receipts.<sup>21</sup>

For transition economies, where affordability is often a problem, writing down assets by valuing them at pre-privatisation discounted cash flow minimises the impact of privatisation on prices. It may also be the most appropriate solution from a political economy point of view. (This valuation method minimises the impact of privatisation

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<sup>21</sup> See Grout and Jenkins (2001) for a discussion.

on end user prices.)<sup>22</sup> With regards new assets – arising through investment - these must be fully valued if finance is to be mobilised (otherwise revenues for finance of capital would be insufficient to pay interest on debt and an adequate equity return).

There is no set way of calculating depreciation of existing assets. As with the RAB, the alternatives are to write-down depreciation (i.e. scale book value depreciation according to the ratio of the RAB to the total book value of assets) or to fully depreciate assets. The choice between these two may have implications for the time profile of prices, which may be an important consideration for some companies. Full depreciation of assets provides adequate funds for maintaining the system, something that is likely to be crucial in transition economies where ongoing investments are needed to preserve system integrity. The danger in allowing full depreciation is that this revenue is not reinvested, with investors recovering far more in depreciation charges than they paid for assets. (This concern was recently voiced by the power sector regulator in Kazakhstan.) To counter this, depreciation can be calculated at full asset value, but there needs to be safeguards in the regulatory framework – obligations on regulated companies and monitoring by the regulator – to ensure that this money is reinvested.<sup>23</sup>

Currency denomination of assets – whether these be assets existing at privatisation, or new assets - is also important as it impacts both privatisation receipts and future prices. Asset valuation in local currency should yield lower privatisation receipts than valuation in international currency. This is due to the possible decline of local currency value, resulting in reduced US dollar returns and US dollar depreciation. Alternately, the increased value of the local currency will reduce the extent of future tariff increases, contingent on real exchange rate depreciation. As new investments are undertaken over time, the associated cost of capital (debt and equity) will be higher for local currency denominated assets should the exchange rate depreciate and investors are risk averse.

The most important economic factor regarding currency denomination of asset value is to achieve the optimal risk allocation between consumers and investors. Evidence from the region – the lack of local currency finance both in general and in the power sector – would suggest that investors are unprepared to bear foreign exchange risk at the moment, or will only do so at a premium that exceeds expected exchange rate movements. It follows that assets should be denominated in international currency (or local currency with revaluation following currency movements against the dollar, in tandem with an allowed cost of capital based on international currency denominated investments). Based on these considerations, asset denomination in Moldova was in US dollars. In accession countries, where there is less exchange rate uncertainty, denomination of assets in foreign currency may be less important.

#### *4.4.4 Return on capital*

Once questions over the value of the regulatory asset base have been settled, questions arise over what rate of return should be applied. The margin on cost allowed in Kazakhstan may be, but is unlikely to be, consistent with providing a return on capital

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<sup>22</sup> There is an additional argument for marking down asset values: in a transition context, where there is often excess capacity in the power system, pricing assets at book value / replacement value would lead to deviation from the optimal price (short run marginal cost). Marking down assets values would allow prices closer to optimal levels.

<sup>23</sup> See Newbery (1997) for a discussion of alternative asset valuation methods for purposes of depreciation.

commensurate with debt and equity returns available in alternative investment opportunities (the cost of capital). In practice, the allowed margin has been out of line with the cost of capital for the power sector in Kazakhstan.

A widely used approach in utility regulation is to allow a return equal to the weighted average cost of capital (WACC).<sup>24</sup> WACC is a weighted average of debt and equity returns where the weights are derived from the gearing ratio of the regulated company. In calculation of appropriate debt and equity returns to a regulated company, a premium is added to a risk free rate. The latter is typically taken to be the annual yield on government bonds, and the debt premium is derived from yields on bonds issued by the regulated company. The equity return is often derived using the Capital Asset Pricing Model (CAPM), which uses statistical techniques applied to market data to estimate the equity risk premium over the risk free rate for the regulated company.

The problem in applying this model to transition economies comes from the lack of financial data, given the limited development of capital markets, particularly in CIS countries. The risk free rate can be calculated based on Eurobond spreads (for countries which have issued Eurobonds).<sup>25</sup> Though regulated companies in transition economies have not often issued bonds, there is usually enough information on lending rates to calculate the debt premium. The difficulty comes in estimating the equity return given that there is not enough information to estimate the market premium relative to the risk free rate, or the premium of the regulated company relative to the market, given the thinness of stock markets.

The solution is to use international data to estimate the return, comparing similar regulatory regimes in terms of the type of regulation (whether this is price cap, cost plus or a variant of the two) and the track record of the regulator or regulation.<sup>26</sup> For transition economies, the appropriate comparators are emerging markets rather than western Europe and the United States. Adopting this approach will lead to returns which approximate the WACC for transition economies.

If the regulator commits to a specified WACC derived from international data for the first few years of a new regime, as was the case in Moldova, a divergence from the true WACC is not as problematic. Any difference between the specified value and the true WACC should show up in privatisation receipts (which are higher if the internationally derived WACC is over estimated and lower if it is under estimated). There may be incentives to deviate from desirable levels of investment– for example, if the WACC is over estimated, then there is an incentive to over-invest – and the regulator should bear this in mind when approving investment plans and monitoring their implementation. When prices are reviewed some years later it is likely that the financial information in many transition economies will be adequate to estimate country-specific equity returns.

#### *4.4.5 Allowable cost*

There have been disputes in Hungary, Kazakhstan and Moldova regarding which costs should be passed through in the tariff calculation. If costs are not passed

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<sup>24</sup> Countries using this approach include Argentina, Australia, Columbia, Holland, Hong Kong, India, Philippines, UK and US.

<sup>25</sup> This is the appropriate rate, rather than the return on domestically denominated bonds, and assumes that the regulatory asset base is dollar denominated.

<sup>26</sup> See Alexander, Mayer and Weeds (1996) for a discussion.

through, then regulated companies cannot make adequate returns. At a minimum – assuming that disputes can be resolved – this provides a bad signal about the sector investment climate and raises the cost of capital for future investments. In extreme cases, and when compounded with other problems, it can result in investors exiting from the sector, as happened in Kazakhstan.

To avoid such a situation, it seems appropriate to fully specify all allowable cost categories in the tariff methodology. The cost categories should cover any costs incurred by a company when undertaking commercial business. Therefore, insurance, administrative expenses and training – contentious in the case of Kazakhstan and Moldova – should legitimately be reflected in tariffs, at least within reason.

With regards generation and transmission costs, the experience in California shows that if these are not fully passed through, then the financial viability of distribution companies becomes jeopardised.<sup>27</sup> This experience was repeated following the second price review in Hungary; the solution in this case, namely for the government to subsidise electricity consumption, will often not be an option in many transition economies where government finance is highly constrained. Again this calls for full cost pass through.

The alternative to full cost pass through written into the methodology – sharing of any generating cost changes between the regulated company and the consumer – shifts generating cost risk to the regulated company. This may jeopardise the financial viability of the regulated company in the event of sustained generation cost increases. In any event, financial viability will definitely be jeopardised if, or when, there is a generating cost reduction that does not benefit the regulated company, as is the case in Moldova. Whether this mechanism should be more widely applied is questionable, given that it is designed to ensure efficient purchase – from Romania and Ukraine – when there is little domestic generating capacity. This, however, is not the case in many countries.

#### *4.4.6 X factor*

A key area in incentive regulation relates to the efficiency or “X” factor set during a price review. In setting prices to cover cost, a regulator might forecast potential cost reductions and factor these into the revenue calculation. One way to forecast potential cost reductions in the water industry is to use benchmarking (i.e. analysing performance relative to similar companies). The “X” factor is the annual efficiency gain – measured as a percentage of cost reduction - set as a target by the regulator for the regulated company through a price cap. The target applies for the period of the price cap (i.e. five years) and is re-set during a price review. Failure to make the target gain will result in a realised return on equity, less than the equity cost of capital. In the event of out performance – making efficiency gains over and above the target (and the incentive for the company is to out-perform) – will result in a return on equity above the cost of capital.

Though X factors are commonly used in developed market economies, they add risk to the process of regulation, making the level of potential efficiency gains difficult to estimate accurately. This is particularly important in the case of transition economies because (i) there is a multitude of other risk factors for investors; (ii) the ability of regulators in transition economies to accurately calculate the X factor may be limited, due to constraints on information flow (e.g. on the relative performance of companies)

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<sup>27</sup> See Besant Jones and Tenenbaum (2001) for analysis of the California situation.

and / or institutional capacity (e.g. how to process this information); and, (iii) setting the X factor provides scope for regulatory discretion, which may be exploited to further political objectives.

Given these factors, X may best be set (close) to zero, at least where private participation is new and regulatory frameworks untested (i.e. for the first and possibly the second price periods). With zero X, companies will have the incentive to make efficiency gains which can then be passed on to the consumer at the price review; in present value terms, the bulk of an efficiency gain occurs after the first five years. Setting a higher value of X, thus increasing the likelihood that the target is unreachable, is likely to reduce investor appetite for participation and raise the cost of capital unduly. This approach was adopted in Moldova, where the value of X was set at around 2 per cent for the first seven years after privatisation.

#### *4.4.7 Price review and adjustment*

Evidence from Kazakhstan shows that frequent tariff reviews lead to frequent disputes, which undermine the investment climate. In Moldova, on the other hand, the long-term (seven year) tariff methodology has secured private participation and finance for investment in a difficult environment. Since then, the review of base values for the seven year tariffs has been problematic, with a dispute currently unresolved.

Following on from this, long-term tariff methodology can help to reduce regulatory uncertainty. Based on the Moldova experience, the benefits of adopting a long-term methodology would seem to be undermined if it includes a short-term price review. At a minimum, the rules for such a review should be clearly spelt out, though there is a question over the necessity of such a price review. Adequate information at the time of privatisation should allow for the setting of base values. Assuming that this can be done, the long-term tariff methodology has attractive incentive properties with regards to the reduction of operating costs and commercial losses (see Section 4.4.2).

A long-term tariff methodology does not specify a tariff schedule over a number of years. Rather, it specifies a set of base tariffs (applicable in the first year) and a set of rules for updating these tariffs. On an annual basis, tariffs are updated for movements in the general price level and for differences between forecast and out-turn in key variables. Typically, these include the real exchange rate and demand as well as input prices, to the extent that these move at a different rate to the general price level. Tariffs are increased on this basis in Hungary and Moldova.

Between annual adjustments, there should be provision for further adjustments for events which have a significant impact on the cash flows of a regulated company. For example, if there is a macroeconomic crisis resulting in a real exchange rate depreciation then, assuming that exchange rate risk is borne by consumers (see Section 4.4.3), there is a need to adjust tariffs for the financial viability of the regulated company. There is a question over how many of this type of adjustments should be allowed during a year. For volatile economies, quarterly tariff revisions may be required; in less volatile economies, two may suffice. In Moldova, a revision is allowed every time supply costs increase by 3 per cent for reasons outside control of the regulated company.

## **5. CONCLUSION**

This paper has argued that regulatory reform is key to securing power tariff increases and private sector participation. Both should improve sector performance, notwithstanding current market sentiment towards the sector and the region. A survey of regulators has shown that reform in almost all of the transition economies has progressed, though formal and informal limits to regulatory independence remain. Evidence from Moldova, where privatisation to a strategic investor was closed due to the country's difficult investment climate, suggests the introduction of a regulatory framework does benefit the sector. This framework has been characterised by a forward-looking long-term tariff methodology, security in the form of recourse to an independent third party outside the country, and full backing from the government. In Kazakhstan, where the regulatory framework is weak and there is an apparent lack of government commitment to tariff reform, strategic investors have left the sector. In recognition of this, the regulator in Kazakhstan is currently working on a new long-term tariff methodology with a view to improving the sector investment climate. The challenge for Kazakhstan, as in other transition economies, lies in ongoing regulatory implementation to secure improved sector performance.

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