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## **Kazakhstan: Power Sector Reform**

### The Electric Power Sector of Kazakhstan Status Report

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## ELECTRICITY SECTOR BACKGROUND

Kazakhstan has over 17,000 MW of installed generation capacity and possesses substantial reserves of vital fuels (petroleum, natural gas, coal, and uranium) for power generation. Kazakhstan has a total of 54 thermal power stations, five large-scale hydroelectric power stations and one nuclear power station/desalinization complex. Of these power plants, 30 are over 100 MW and 4 are over 1,000 MW (see attached table). Only 76% of the installed capacity in the electric power industry of Kazakhstan is currently in working condition. However, these figures may even be overly optimistic. Electricity output has been falling for several years and has yet to show signs of recovering. Total domestic electricity production within Kazakhstan in 1997 was 52.2 billion KWh, compared with production of 66.7 billion KWh for 1995. About 80 percent of Kazakhstan's electricity is generated by coal-fired power plants that utilize the vast coal fields of northern Kazakhstan. In addition, a significant amount of electricity is imported into the country. The high voltage transmission system is interconnected with two foreign grids: the Russian electricity network in the north and west and the Central Asian system in the south. Through these interconnections, Kazakhstan imports approximately 30 percent of its electricity requirements.

Since independence, Kazakhstan's power sector has experienced numerous problems. Because of its history as part of the former Soviet Union, its transmission and distribution networks rely heavily on both the Russian and Central Asian power grids. In addition, the domestic interconnections between the northern, southern, and western grids within Kazakhstan are very weak, severely limiting the power flows among these regions. Thus, while Kazakhstan currently generates enough electricity to meet most of its domestic demand, the weak interconnections among the domestic networks does not allow for a balancing of domestic electricity production among these regions. This has resulted in Kazakhstan becoming both an exporter (1.7 million kilowatt-hours in 1995) in the northern region of the country and importer (8.6 million kilowatt-hours in 1995) in the southern and western regions.

Non-payment by retail customers has also been a major problem for Kazakhstan's power sector. The government has undertaken several initiatives to increase payments, but none of these have been successful in significantly reducing non-payments. The retail non-payment problem is at the root of many of the other problems in the power sector. Non-payment for imported power has caused Russian suppliers to frequently cut off power to Kazakhstan, so that large areas of the country have often been forced to ration electricity through rolling blackouts. In addition, non-payment has reduced the funds available for fuel purchases by the thermal power plants, leading to both heat and electricity shortages during past several winters. The lack of cash in the sector also limits the ability of the power enterprises to properly maintain their equipment and to invest in new equipment and technology. Maintenance and investment is essential since more than 94 percent of the gas turbines, 57 percent of the steam turbines, and 33 percent of the steam boilers have been in place for 20 years or more. The majority of the power plants as well as the

transmission and distribution systems are reaching the end of their working life span and are rapidly deteriorating.

Because of the high percentage of obsolete power generation plants and deteriorating transmission and distribution lines, the system incurs large technical energy losses during transmission and distribution and also faces serious environmental problems. In 1996, electricity losses reached over 10 billion kilowatt-hours, or over 15 percent of power produced. The lost electricity presents a major business cost to the entire power industry, including consumers. Since most of the generating equipment in Kazakhstan is old, inefficient, and lacking in modern pollution controls, the thermal power industry produces substantially high levels of airborne and other pollutants.

In an effort to resolve these problems, the electricity sector undertook major reforms starting in 1995, including a major push to privatize the entire system, from generation to distribution. As a result of these efforts Kazakhstan's largest generating plant, the coal-fired 4,000 megawatt Ekibastuz No.1 plant, was purchased by AES in June 1996. Other major deals include the purchase of the Karaganda 1 plant by Ispat-Karmet, a major London-based metals company, and the purchase by Japan Chrome of a majority share (53%) of the 2,100 MW Yermakovskaya thermal plant; both in April of 1996. The coal-fired Karaganda 1 and 3 combined heat and power plants were sold to Samsung (South Korea) in 1997. AES just concluded the purchase of the thermal and hydro generating plants that are within the area of Altaienergo Regional Electric Company (REC). On the distribution side, Tractebel (Belgium) purchased Almaty Power Consolidated (formerly Almatyenergo REC). Recently bids for the Ekibastuz 2 thermal generating plant and the Altaienergo REC were withdrawn because the Government decided to give the state owned transmission company, KEGOC, management control of these enterprises. The net result of these privatizations is that more than 90% of the generating capacity and one REC have been sold to private companies.

## CURRENT STATUS

### ELECTRICITY SECTOR RESTRUCTURING, CORPORATIZATION, AND PRIVATIZATION

The aggressive program of restructuring, corporatization and privatization was begun under Minister of Energy Krapunov. Minister Krapunov convinced the Government that the generating companies and distribution companies were not national assets, but national liabilities, and that the sooner the Government got rid of them, the sooner the financial drain on the national budget would stop. He also believed, and convinced the Government, that these companies should not be given away, as was done in Russia, but should be sold to strategic investors who would be able to provide the management skills and investment in these facilities which would enable them to be rehabilitated and produce reliable electric power and heat for the people of Kazakhstan.

This vision was the basis of the Government's plan for the sale of the assets in the power sector. They would be sold, not for their as-built asset value (factoring in depreciation), but for their market value to an investor, which is based directly on their ability to produce cash flow. Since all of these companies were losing money, their cash value was negative. The negative value resulted from the fact that non-payments were so high, tariffs were significantly below those required to cover the costs of producing power, and costs from technical and non-technical (theft) losses were extremely high.

The plan for privatizing the companies under these conditions meant accepting very little cash as a down-payment from the buyers, but requiring them to invest in these facilities over several years to make the facilities fully operational according to modern benchmark specifications. If the buyer successfully met his commitments on investments and meeting the stated benchmarks, he would obtain majority ownership in the companies. This plan was difficult to sell to the Government because many of the privatizations around the world have enriched the national treasury, but in this case almost no money would be coming into the treasury. The benefit would be in the long-term rehabilitation of the power sector. It was unknown whether the government would forgo a short-term cash inflow for a longer term national benefit. In the end Minister Krapunov persisted and convinced the Government that these liabilities were draining the budget and would continue to deteriorate unless they were sold to experienced international strategic investors.

Early in 1996 privatization began with the sale of several of the large coal and oil-fired

generating stations to private companies. These sales took the western community by surprise because the usual steps leading to privatization - commercialization, asset valuations, and accounting normalization - had not occurred. Critics warned that the results would be lower prices for the assets and a potential loss of income for the GOK, compared to what could have been obtained if the normal procedure had been followed. Minister Krapunov and the Government continued with this aggressive program, stating that the worsening situation in the power sector demanded immediate action. As a result, buyers of these assets were required only to make initial payments to cover certain outstanding debts, and to commit to a future investment program to bring the purchased assets back to their initial design capabilities. Through this strategy, over 90% of the generating capacity in Kazakhstan has been privatized, as well as the largest of the 18 local distribution companies, Almatyenergo.

Minister Krapunov also knew that the national grid company, Kazakhstanenergo, was in critical need of investment for rehabilitation and expansion. He advised the Government to privatize it as well. The Government was not willing to sell the national grid company, arguing that it must be retained as a government-owned asset. However, to meet the investment needs, since the Government could not supply any money for investment, they agreed to offer the grid company for a long-term concession to an outside investor. In 1996 the GOK reorganized Kazakhstanenergo into a new entity, the Kazakhstan Electric Grid Operating Company, or KEGOC. All of the assets and capabilities of Kazakhstanenergo were transferred into KEGOC, with the old company remaining as a shell containing only the multi-billion dollar debts owed for wholesale power purchased from Russia and the other countries of Central Asia.

In mid-1996 the Government issued a request for bids for concession operation of KEGOC, attracting serious offers from ABB, the large Swedish/Swiss concern, bidding with VEAG, the eastern German electric utility, and from National Grid Company, the transmission grid company in the UK. Negotiations broke down in the spring of 1997, because the Government increased its demands for coverage of liability during the negotiations, and neither company was willing to meet these new demands.

In the winter of 1996/1997, Minister Krapunov resigned. This was a major setback to the reform plan of the power sector because he was the leading reformer. Fortunately, most of the generating companies and Almaty Power Consolidated had already been privatized, and much work had been achieved on the reform of the wholesale market for electricity. However, the new leadership in the Ministry did not continue to support the reform effort with the same vigor and vision. This change had several effects, the largest being that negotiations with the concessionaires ceased, and a new management team was brought into KEGOC.

KEGOC's new management convinced the Government that they could raise the money needed for rehabilitation and modernization without bringing in an outside concessionaire. In return for committing to raise this money and to implement a wholesale market, the new management requested that they be given most of the distribution companies (REC=s), and the remaining

large thermal generating company, Ekibastuz 2; thus reestablishing KEGOC as a vertically integrated company. (Ekibastuz 2 and one of the large REC's were in negotiations to be purchased by western investors at the time.) By obtaining these companies, KEGOC said that they could solve the non-payments problem, which is a necessity for the successful operation of a wholesale market

The Government agreed to make this change in the organization of the sector, and told KEGOC's management that they had until March 1998 to raise \$100 million, to solve the non-payments problem and to create an operating wholesale market. If the new management is not successful, the Government has said that they will go back to a concession for KEGOC and continue to privatize the REC's.

This change in the strategy of the Government causes concerns to USAID and its advisors, Hagler Bailly. We were strongly supportive of Minister Krapunov's reform plans, and worked closely with him to implement them. The privatizations to date have been successful as far as they have gone. New management teams with western accounting have replaced the old Soviet-style accounting systems in all of the privatized companies. These companies now understand market economics and are working to get them started. Of course, problems still exist. Tariffs are still too low, but progress is being made. Non-payments are still a severe problem in most of the country, and the methods which are being tried by the new KEGOC management team will not work.

However, the biggest success of the reform plan is the one that has obtained the worst press. The purchase of Almatyenergo by Tractebel has done the most to solve the two economic problems mentioned above - tariffs which are too low and non-payments. Along with the efforts of USAID/Hagler Bailly working with the AMC on tariff reform, Tractebel has lobbied the GOK and Almaty Oblast (whose Akim is ex-Minister Krapunov), and retail tariffs in Almaty are now at cost-based rates. Non-payments for electricity, which were running at 80% before Tractebel took over, are now at less than 10%. As an added benefit, they have cut the work force by 20%.

This change was brought about by Tractebel's instituting better management of collections, by educating the public, and most significantly, by instituting a cut-off policy for non-payers. This cut-off policy has been across the board - retail, commercial, public institutions, government organizations and industry. Of course, this tough policy has made Tractebel very unpopular with the public and with the press, but the Government has supported them because it realizes that the public must be educated to understand that electricity is a commodity which must be paid for, not a right of everyone.

The success of Almaty Power Consolidated after its privatization is dramatic, but is not unexpected compared with the effect of privatization of other distribution companies around the world. The privatization of distribution companies is without exception the proven best method of solving non-payment problems. It is for this reason that USAID is now recommending that

distribution companies be privatized first in other countries, such as Georgia and Armenia, both of which have severe non-payments problems.

It is also for this reason that we believe that the remainder of the REC's should be privatized in Kazakhstan, not be integrated as part of KEGOC. KEGOC's method of solving the non-payments problem is to introduce a cut-off policy at the wholesale level, and they intend to do nothing about management changes at the REC level. Therefore, they will cut off whole areas of the country, both payers and non-payers, if payments aren't received. This will not be politically acceptable. It will take private ownership of local companies to be able to have the will to introduce a successful collections policy.

## **ELECTRICITY SECTOR LEGISLATIVE AND REGULATORY REFORM**

### Electricity Law

During the past six months the Ministry of Energy has worked on drafting a new Electricity Law to replace the existing version that was adopted in 1995. The existing Law is out of date with the industry as it exists today, and does not embody any of the structures that are being put in place to create a market in electricity in the privatized industry.

To assist and advise on the process of developing the new Electricity Law and to add to its content, USAID/Hagler Bailly has been requested by the Ministry to work with KEGOC on producing a draft version of this new law. KEGOC formed a working group to address this issue and invited us to participate. In late 1997, we produced a version of the new electricity law based on international legal standards and examples of electricity laws recently adopted in other NIS countries to support power sector reform. The USAID/Hagler Bailly draft established the foundation for the creation and operation of a wholesale electricity market, including the establishment of an independent regulatory commission, licenses for sector participants and service providers, tariff principles, and transition provisions. This draft was presented to KEGOC and the Ministry of Energy in the fall of 1997.

At the same time, KEGOC produced a draft of its own and presented this to the Ministry of Energy. The KEGOC draft law called for the creation of a board of industry representatives to self-regulate the industry. KEGOC would also become the focal point of all wholesale electricity trading, would act as a central purchasing entity, and would control access to the transmission grid through the actions of its subordinate Dispatch Center. This law was found unacceptable by the Ministry of Energy, which asked KEGOC to work with us to rewrite the law and to submit a new draft for consideration.

We continue to work from within KEGOC through the Electricity Law Working Group, and directly with the Ministry to influence the final version of the new Electricity Law. Currently the issue of creating a separate regulatory agency for the electricity sector is a major issue. KEGOC

officials feel that this may be too politically difficult and that the regulatory function should remain with the Anti-Monopoly Committee. We are lobbying strongly in support of creating a separate regulatory body to handle the substantial duties that will come with the introduction of a wholesale market pool. The Ministry has been too involved with its move to Akmola to spend the required time and effort on it. They are just now starting to agree to become involved in review and discussion.

### Tariff Reform

The introduction of new tariff principles and methodology is also on the agenda for reform. We have recommended new tariff methodology for transmission tariffs, and the first stage of these changes was introduced last fall. These only went part way toward the final methodology which we have recommended, and so we are now working with KEGOC and the AMC to implement the remaining recommendations. KEGOC has proposed maintaining the old transmission tariff structure based on distance, whereas we are proposing a two-part methodology with a capacity charge and a loss component. This method more accurately measures the true cost of transmission while ensuring all the transmission company's operating and capital costs are met regardless of the transmission volume through the system.

### Regulatory Reform

A major aspect in the creation of a wholesale electricity market and the adoption of a new Electricity Law is the reform of the current regulatory system in the power sector. The electric power sector is currently regulated by the AMC (tariffs) and the Ministry of Energy (licenses and other management activities). While the 1995 Electricity Law called for the creation of an independent regulatory commission for the electricity industry, one was never created. We are working to have language inserted in the new Electricity Law that clearly spells out the structure and duties of an independent regulatory commission. We have proposed that a five-member commission with adequate support staff and subordinate only to the President of Kazakhstan be established to regulate the power industry.

This commission will be responsible for all licensing, monopoly tariff rate making, and market oversight in the electricity sector. The Ministry of Energy would move into a purely policy role while the AMC would concentrate on anti-trust issues. The creation of such an independent commission has met considerable resistance from KEGOC, one of the monopoly service providers that would be most closely regulated. We continue to work with the Electricity Law working group of KEGOC and directly with the Ministry of Energy to make the creation of an independent regulatory body for the power sector a part of the new draft law. In addition, we have made such a regulatory body a major component of our recommendations on the wholesale market pool design. .

## **WHOLESALE ELECTRICITY MARKET FORMATION**

Integral to Minister Krapunov's reform vision for the electricity sector in 1996 was the creation of a wholesale market and a competitive power pool. He had visited several power pools in the world, and wanted a pool in Kazakhstan in which market forces would replace the old command system of operation of the power sector. The Minister requested that we take the lead in working with the Ministry and the industry experts in the creation of such a pool. He set a very aggressive schedule for this work, and requested that we have all of the technical, organizational and legal documents which would be necessary for the creation of a power pool finished by the end of 1996.

The Minister created a Working Group of Ministry, Grid Company (then still Kazakstanenergo), Dispatch Center, and Hagler Bailly personnel to perform these tasks, and others necessary for the creation of the pool. By the end of 1996, we had produced the required documents, including Market Rules, Settlements Procedures, Funds Management, Security Systems, Membership Agreement and the Pool Charter. During the first quarter of 1997 the Working Group worked through these documents so that they understood them and adapted them to their terminology and their technical systems.

In January 1997 the Ministry brought together all of the market members who would participate in the power pool. These entities became the Founding Members of the Pool and signed the Founders Agreement. At that Founders' Meeting they also approved of the Pool Charter and the Market Rules which we had developed and discussed in the Working Group. There were approximately twelve Founding Members of the Pool.

With the resignation of Krapunov and the reorganization of the Government and of the management of KEGOC, the work on the Pool took a different turn. The new management team at KEGOC are young entrepreneurs and bankers with no experience in the power sector. Their main concern has been on the financial front - obtaining a \$100 million Eurobond. To qualify for this they had to show that they can solve the non-payments problems. They have proposed to do this by their previously described scheme of wholesale power disconnection and by the introduction of a payment method which requires pre-payment for all electricity.

The pre-payments would be accomplished by introducing a sophisticated electronic commodities trading system for electricity futures and options. These futures and options would be purchased for any electricity demand which a wholesale buyer would want to purchase, and if they were not purchased, the buyer would have no access to electricity. The credit for these purchases would be supplied by the banking system and by intermediary traders. This is a very unrealistic approach to solving non-payments because it doesn't tackle the basic problem at the customer level where the problem exists, and the entire banking system in Kazakhstan doesn't have the assets to support this scheme.

In the KEGOC proposal, trades would be made on an hourly basis with KEGOC serving as the central point of market operations, collecting, processing and even approving trades. All

settlements and payments would flow through KEGOC.

Some of the problems which are apparent with this proposal are:

- ▶ Such a trading system would require world-class telecommunications and computer networks, hourly metering, and advanced telemetry systems, none of which are currently in place in Kazakhstan. A large amount of capital would be required to properly equip the industry with the technology required.
- ▶ The market does not address the need for long term bilateral contracts between generators and wholesale customers. This is an important consideration since reliability varies widely throughout the system and payments differ greatly among consumers.
- ▶ The market structure places too much control in KEGOC's hands. This is potentially dangerous for many reasons, the greatest being that KEGOC is not a disinterested party in the market. KEGOC currently manages a major thermal power plant as well as ten REC's. Thus KEGOC is still a vertically integrated player in the market and has monopoly control over the transmission network. Even if KEGOC were forced to divest its generation and distribution interests, some system services (e.g.: the Dispatch Center) should be separated from the transmission company to provide greater transparency and accountability to the market members.
- ▶ Addressing the non-payments problem at the high voltage grid level is misdirected and even dangerous. The sudden loss of load following the disconnection of an entire region or REC from the electricity grid can cause transient instability in the power system. However, such drastic measures do not even touch the root of the problem: collections problems at the retail level. Non-payment begins at the retail customer level within the RECs. Because many of the non-privatized RECs are still largely under the control of the regional governments, they are guided by social policy, not business practices. The only reliable way to solve the non-payments problem is through improving collections at the retail level and the best method for accomplishing this is through the privatization of the REC's.

Although the new Ministry officials have directed KEGOC to prepare a set of market rules to support their proposals, both the Ministry and KEGOC requested that we assist in this process, advising KEGOC and the Ministry in their work. We are participating in numerous working groups on issues including: electricity contracting and trading, system reliability, transmission tariffs, and market design. The technical staff at KEGOC is still trying to maintain the Market Rules that were produced by our team last year, as they describe the way the wholesale market should operate. We are trying to bridge the gap between these rules and the new objectives of KEGOC management so that we ultimately have a system that is functional.

# KAZAKHSTAN ELECTRIC POWER INDUSTRY DATA

## POWER PLANTS

Facility	Location	Regional Energy Company (REC)	Plant Type	Fuel Type	Nameplate Generation Capacity (MW)	Available Generation Capacity (MW)	Commissioned	Owner	Privatized (Date)	Privatized (Terms) conflicting reports given as (a) and (b)
Akmola No. 1	Akmola	Akmola	CHP	Coal	26	10	1961-1977	Regional Committee	Jul-96	
Akmola No.2	Akmola	Akmola	CHP	Coal	240	207	1979-1992	GOK		
Aktybinsk	Aktybinsk	Aktybinsk	CHP	Natural Gas	73	67	1943-1993	Regional Committee	Jul-96	
Almaty No 1	Almaty	Almaty	CHP	Coal/Natural Gas	145	120	1957-1966	Tractebel	Aug-96	
Almaty No.2	Almaty	Almaty	CHP	Coal/Mazut	510	410	1980-1988	Tractebel	Aug-96	
Arkalyk	Arkalyk	Kustanai	CHP	Mazut	6.5	6	1958-1980	GOK		
Atyrau	Atyrau	Atyrau	CHP	Natural Gas	215	196	1962-1985	Energoprojekt Ltd (was Vitol Munai)	Sep-97	
Balkash	Balkash	Karaganda	CHP	Coal	120	120	1937-1964	Balkashmys		
Dzhezkazgan	Dzhezkazgan	Karaganda	CHP	Coal	177	152	1959-1993	Samsung	Aug-96	a) \$107m b) T420m plus 10yr investment program
Ekibastuz CHP	Ekibastuz	Pavlodar	CHP	Coal	12	10	1956-1988	GOK		
Karaganda (Karaganda Metallurgical Embedded)	Karaganda	Karaganda	CHP		132	70	na			
Karaganda No 1	Karaganda	Karaganda	CHP	Coal	32	32	1960-1969	Enro Energy Ltd.	May-97	
Karaganda No 2	Temirtau	Karaganda	CHP	Coal	435	384	1973-1982	Ispat-Karmet	Apr-96	\$42m
Karaganda No 3	Karaganda	Karaganda	CHP	Coal	440	395	1977-1994	Enro Energy Ltd.	May-97	
Kentau No.5	Kentau	S Kazakhstan	CHP	Coal	18	15	1951-1973	GOK		
Kustanai	Kustanai	Kustanai	CHP	Natural Gas	12	12	1958-1980	GOK		
Kyzyl-Orda No 6	Kyzyl-Orda	Kyzyl-Orda	CHP	Coal	146	58	1964-1989	Regional Committee	Jul-96	
Leningorsk	Leningorsk	Altai	CHP	Coal	47	45	1956-1980	AES operation concession	Jul-97	
Pavlodar No 1	Pavlodar	Pavlodar	CHP	Coal	350	320	1964-1989	Whitesman Ltd.	Jun-96	\$1m plus 7480m Tenge invest
Pavlodar No.2	Pavlodar	Pavlodar	CHP	Coal	110	104	1961-1969	CCL Oil Refinery	Jun-97	
Pavlodar No 3	Pavlodar	Pavlodar	CHP	Coal	440	385	1972-1979	CCL Oil Refinery	Jun-97	

Petropavlosk No.2	Petropavlosk	N. Kazakhstan	CHP	Coal	380	315	1961-1986	Regional Committee	Jul-96	
Rudnevsk	Rudny	Kustanai	CHP	Coal	123	100	1961-1981	Regional Committee	Jul-96	
Semipalitinsk No 1	Semipalitinsk	Altai	CHP	Coal	6	6	1934-1981	AES operation concession	Jul-97	
Semipalitinsk No.2	Semipalitinsk	Altai	CHP	Coal	na	na	1961-1983			
Shimkent No.1	Shimkent	S. Kazakhstan	CHP	Natural Gas/Mazut	30	20	1944-1981	Regional Committee	Jul-96	
Shimkent No.2	Shimkent	S. Kazakhstan	CHP	Natural Gas/Mazut	12	8	1944-1954	Regional Committee	Jul-96	
Shimkent No 3	Shimkent	S. Kazakhstan	CHP	Natural Gas/Mazut	160	125	1981-1984	Regional Committee	Jul-96	
Sogrinsk	Sogrinsk	Altai	CHP	Coal	50	50	1961-1987	AES operation concession	Jul-97	
South Kazakhstan		S. Kazakhstan	CHP	Natural Gas/Mazut	6	3	1989-1991			
Tekely No.1	Tekely	Taldykorgan	CHP	Coal	na	na	1944-1950			
Tekely No 2	Tekely	Taldykorgan	CHP	Coal	24	24	1959-1962	GOK		
Tentek	Tentek	Karaganda	CHP	Coal	18	18	1964-1989	GOK		
Uralsk	Uralsk	W. Kazakhstan	CHP	Natural Gas	18	18	1960-1969	Regional Committee	Jul-96	
Ust-Kamengorsk	Ust-Kamengorsk	Altai	CHP	Coal	242	232	1952-1991	AES operation concession	Jul-97	
Zhambyl No.4	Zhambyl	Zhambyl	CHP	Natural Gas/Mazut	60	58	1963-1987	Regional Committee	Jul-96	
Aksuskaya No.1	Aksu	Almaty	Hydro	Hydro	0.8	na	1959	GOK		
Almaty Cascade	Almaty	Almaty	Hydro	Hydro	48	17	1943-1963	Regional Committee	Jul-96	
Antonovskaya No.3		Almaty	Hydro	Hydro	1.6	na	1960	Tractebel	Aug-96	
Buhtarminsk	Ust-Kamengorsk	Altai	Hydro	Hydro	675	672	1960-1966	KazZinc		
Ekibastuz Hydro No.2	Ekibastuz	Pavlodar	Hydro	Hydro	na	na	na			
Kapchagai	Almaty	Almaty	Hydro	Hydro	384	180	1970-1971	Tractebel	Aug-96	
Karaganda Hydro No.1	Temirtau	Karaganda	Hydro	Hydro	na	na	na			
Karaganda Hydro No.2	Temirtau	Karaganda	Hydro	Hydro	na	na	na	Independent Power Co.	Nov-96	
Karatau		Almaty	Hydro	Hydro	10	1	1963	Tractebel	Aug-96	
Khariuzovsk	Leninogorsk	Altai	Hydro	Hydro	10	na	1923-1928	KazZinc		
Shulbinsk	Leninogorsk	Altai	Hydro	Hydro	702	585	1987	AES operation concession	Jul-97	
Talgar	Taldy	Almaty	Hydro	Hydro	4	1	1959	Tractebel	Aug-96	

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Tishinsk	Leninogorsk	Altai	Hydro	Hydro	10	na	1949	KazZinc		
Ulbinsk	Leninogorsk	Altai	Hydro	Hydro	10	na	1937	KazZinc		
Urdzarsk	Leninogorsk	Altai	Hydro	Hydro	9	na	1949	GOK		
Uspenovskaya		Almaty	Hydro	Hydro	2.5	na	1963	Tractebel	Aug-96	
Ust-Kamengorsk Hydro	Ust-Kamengorsk	Altai	Hydro	Hydro	312	312	1952-1959	AES operation concession	Jul-97	
Zaisan	Leninogorsk	Altai	Hydro	Hydro	14	2	1965	GOK		
Zhambyl Hydro	Zhambyl	Zhambyl	Hydro	Hydro	100	50	na	Energoprojekt Ltd. (was Vitol Munai)	Sep-96	
Mangeshlak Atomic Desalinization and Electric Station	Aktau	Mangystau	Nuclear	Nuclear	630	450	na	Regional Committee	Jul-96	
Almaty	Almaty	Almaty	Thermal	Coal	173	165	1962-1972	Tractebel	Aug-96	Part of sale of the Almaty REC
Ekibastuz No.1	Ekibastuz	Pavlodar	Thermal	Coal	4,000	3,200	1980-1984	AES (70%)	Jun-96	35yr ownership contingent on investment of \$500m over 6 years
Ekibastuz No.2	Ekibastuz	Pavlodar	Thermal	Coal	1,050	490	1990-1993	KEGOC	Fall97	
Karaganda No.1	Temirtau	Karaganda	Thermal	Coal	151	75	1942-1956	Ispat-Karmet	Mar-96	\$42m
Karaganda No 2	Topar	Karaganda	Thermal	Coal	608	608	1962-1983	Samsung	Oct-96	
Yermak	Aksu	Pavlodar	Thermal	Coal	2,400	2,200	1968-1975	Euro-Asian Power Corp. (53%) (was Japan Chrome)	Apr-96	a) \$259m b) \$1.5m with \$58.2m invest
Zhambyl	Zhambyl	Zhambyl	Thermal	Natural Gas/Mazut	1,230	1,105	1967-1976	Energoproect Ltd (was Vitol Munai)	Aug-96	\$124m
Total Capacity					17,350	14,208				

na = data not available

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# KAZAKHSTAN ELECTRIC POWER INDUSTRY DATA

## Regional Energy Companies (RECs)

Power Supply Company	Location	Owner	Privatization (Date)	Privatization (Terms)
Akmola	Akmola	KEGOC		
Aktybinsk	Aktybinsk	KEGOC		
Almaty Power Consolidated	Almaty	Tractebel	Aug-96	na
Altai	Altai	KEGOC	Nov-97	management concession
Atyrau	Atyrau	KEGOC		
Dzezkazgan	Dzezhazgan	State Property Management Committee		
Karaganda	Karaganda	State Property Management Committee		
Kokshetau	Kokshetau	State Property Management Committee		
Kustanai	Kustanai	KEGOC		
Kyzyl-Orda	Kyzyl-Orda	KEGOC		
Mangystau	Aktau	KEGOC		
Northern Kazakhstan	Petropavlovs	KEGOC		
Pavlodar	Pavlodar	KEGOC		
Southern Kazakhstan	Shimkent	KEGOC		
Taldycorgan	Taldycorgan	KEGOC		
Torgay	Arkalyk	KEGOC		
Western Kazakhstan	Uralsk	KEGOC		
Zhambyl	Zhambyl	KEGOC		