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Overview of Electricity Market in Ukraine

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List of abbreviations

AWPP	average wholesale price from producers
AWPS	average wholesale price to suppliers
CC	communal company
CEGE	communal electricity generating enterprise
CJSC	closed joint-stock company
CHPP	combined heat and power plant
FSU	Former Soviet Union
LLC	limited liability company
LMCC	Lviv Municipal Communal Company
MIP	minimum indicative price
MPE	Ukrainian transliteration of the Ministry of Fuel and Energy of Ukraine
MSP	marginal system price
n/a	not applicable
n/d	no data
NAC ECU	Ukrainian transliteration of "National Joint-Stock Company "Energy Company of Ukraine "
NEC	national energy company
OJSC	open joint-stock company
PFTS	Ukrainian transliteration of First Securities Trading System, a Ukrainian stock exchange
SC	subsidiary company
SCM	"System Capital Management" company, one of the largest holding companies in Ukraine
SE	state enterprise
SPFU	State Property Fund of Ukraine
TPP	thermal power plant
UAH	Hryvnia (Ukrainian currency); official exchange rate in the beginning of 2008: 1 USD = 5.05 UAH
UCTE	Union for the Co-ordination of Transmission of Electricity
USD	United States dollar
WEM	Wholesale Electricity Market

Units

kWh	kilowatt per hour (or 10^3watt per hour)
GW	gigawatt (or 10^9 watt)
TWh	terawatt per hour (or 10^{12} watt per hour)

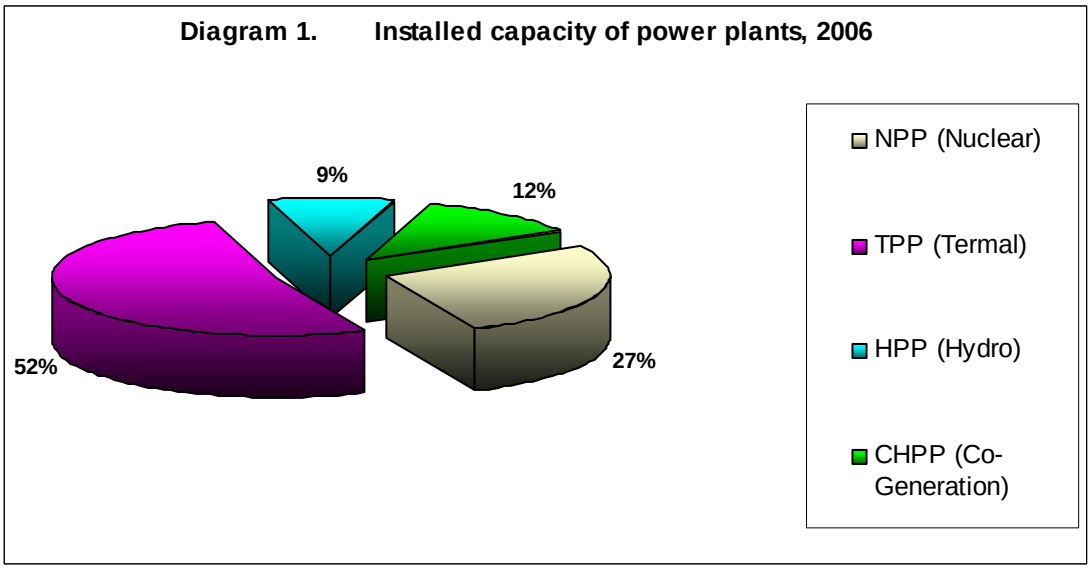
Contents

1. General description of electricity sector

Energy markets in Ukraine have inherited the production capacities and technologies from Soviet times, but since Ukraine's independence they underwent a number of substantial changes in organisational and ownership structure.

Ukraine depends on three types of generation facilities i.e. thermal power plants (steam turbine and diesel types), hydroelectric plants (hydroelectric proper and hydroelectric accumulating plants) and nuclear power plants. The role of wind and helium power plants is minor; however it is increasing gradually. Capacity distribution among different types of power plants is shown in Diagram 1.

Diagram 1. Installed capacity of power plants, 2006

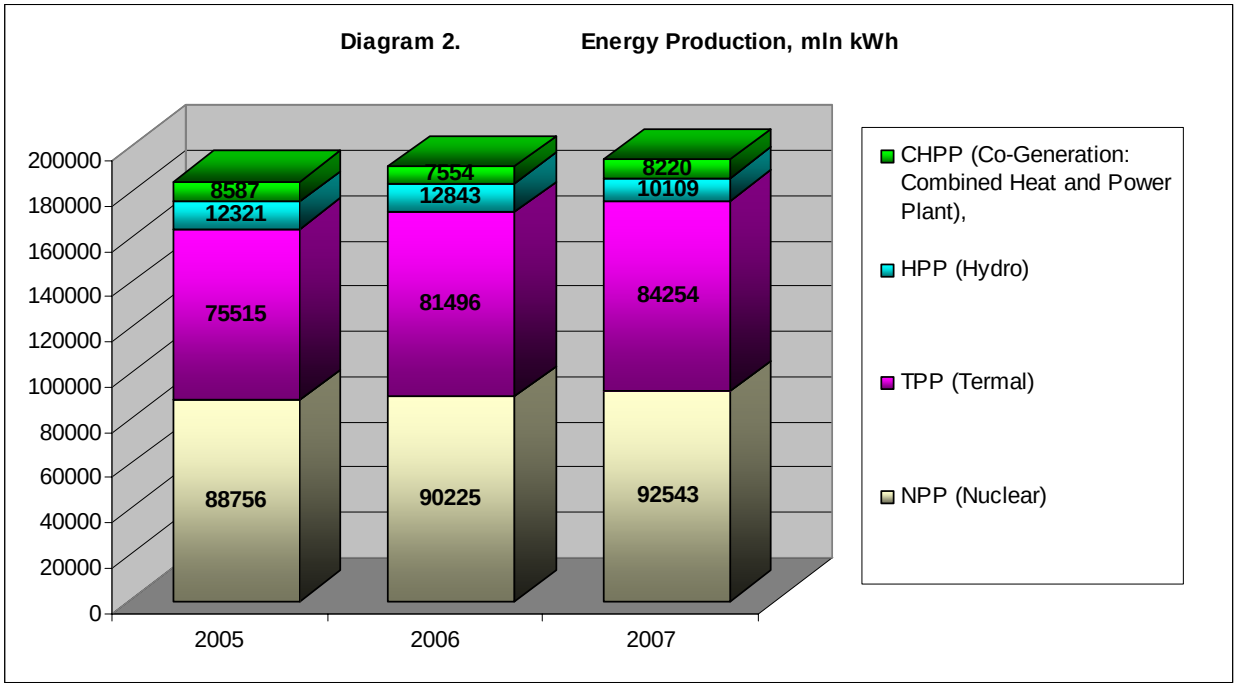


Source: Ministry of fuel and energy

The level of electricity production in Ukraine in 2007 reached 195 130 mln kWh, which is 3 006 mln kWh or 1.6% more in comparison with 2006. However the structure of electricity produced differs much from that one of the installed capacity. Thus second in terms of capacity, the nuclear generators were first in terms of the electricity output and after a 2.5 bln kWh increase in production took a 47.4% share of total electricity output in 2007. Nuclear plants in Ukraine are used exclusively for baseload as their nature does not permit rapid changes of output. Moreover, the cost of electricity produced by nuclear plants is much lower, which is an additional stimulus for restricted usage of thermal produced electricity.

Thermal power plants in 2007 increased output by 3.4% up to 2757.2 mln. kWh. However their capacity utilisation rare stayed low at one third of maximum capacity, which was due to the fact that TPP were often used for peak demand, although being initially designed for baseload work.

Energy generation by hydro power plants fell by 21.3% and accounted for 5.2% of the total electricity production



Source: Ministry of fuel and energy

Since 2000 electricity production and consumption have been growing due to economic recovery. Electricity production surplus enabled export to neighboring countries. The Integrated Energy System of Ukraine in 2002 was partly integrated into the UCTE (Union for the Co-ordination of Transmission of Electricity) after the connection of "Burshtynskiy Energoostriv" (Burshtynska CHPPP and Dobrotvirska CHPPP) to UCTE. The export potential of "Burshtynskiy Energoostriv" is estimated in 6-7 TWh a year. However, export capabilities are limited by the lack of investments in modernization of the power networks and, therefore, low quality of electricity. Also in 2001 Integrated Energy System of Ukraine was connected to Russian Energy Systems by establishing of "Slobozhanskiy Energoostriv" (Kharkiv, Sumy and Poltava oblasts). The export of power to Russia heavily depends on the political relations between Ukrainian and Russian authorities.

Table 1. Export of Electricity in 2002-2007, TWh.

	2002	2003	2004	2005	2006	2007
Belarus	less 0.001	less 0.001	less 0.001	less 0.001	2.5	0.69[d]
Hungary	2.1	3.2	2.96	3.3	3.53	3.17
Moldova	0.5	0.9	0.9	0.8	2.48	2.93
Poland	0.5	0.9	0.85	0.98	0.88	0.64[e]
Russia	-0.2	-0.2	0.25	2.9[a]	0.5[c]	0.97[e]
Slovakia	0.09	0.2	0.36	0.35	0.5	0.35
Romania	–	–	–	0.13[b]	0.005	0.045

a- exported during January-June 2005 (was planned to export 6 TWh).
b - exported during March-December 2005.
c – exported during November-December 2006
d – exported during January-June 2007
e – exported during January-July 2007

Sources: Ukrinterenergo, Ministry of Fuel and Energy

Ukraine decreased its export of electricity by 11.8% in 2007. Although export decreased to the majority of the economic partners, reasons for reduction and sometimes suspension of expert were different. Thus export to Belarus and Russia was suspended because of lack of cheap energy due to increased internal demand, while two months closure of Burshtynska CHPP for

modernisation, which lead to 230 mln kWh decrease in output, reduced export to Poland, Hungary and Slovakia However the price of export in January-November 2007 increased by 30.4% in comparison with the same period of 2006 and reached USD 349.4 mln.

Production capacities in electricity sector are badly outdated. Currently 95% of power units have already worked out its useful life (100,000 hours), more than a half have been working for 200,000 hours. 80% of power plants have been operating for 30 years. According to official estimations, residual life of thermal power plants is 5-7 years. Given high depreciation level of power plants the future of Ukrainian electricity sector is ambiguous. Such deterioration was stipulated by low quality fuel (with high sulfur and ashes content), fickle regime of work of TES capacities due to poor maneuverability and lack of funds for reconstruction. Nuclear power plants will run out of the designed life in 2011-2030.

Modernization of thermal power plants production capacities is outlined in the National Energy Program of Ukraine until 2010, Plan of CHPP rehabilitations and Energy Strategy of Ukraine until 2030. But those documents do not define the mechanisms of modernization and sources of financing. The only funding source is a surcharge to electricity tariff produced by CHPP, which was introduced in 2004 by the National Energy Program of Ukraine until 2010.

Table 2. Electricity consumption, 2007

	TWh	**%**
Gross electricity consumption	186.13	95.3%
Export	9.2	4.7%
Total	**195.33**	**100%**

Source: Ministry of Fuel and Energy

Technological losses of electricity amounted to 19.9 TWh in first eleven months of 2007 which is 12.5% of total electricity volume in network. In comparison with 2006, the level of losses is decreased by 1.0%, however the current volume of losses is 1.6 times higher than in 1990 and 2-2.5 times higher than in developed countries.

2. Structure of electricity market: generation, transmission, distribution

In the mid 90s power sector of Ukraine underwent a substantial reform. Ukraine became the first country among FSU countries, which introduced competitive electricity market.

In May 1994 the president of Ukraine issued a decree requiring the liberalization of the power sector and the development of a competitive national wholesale electricity market (WEM). Restructuring took place in 1995-96, and was supported by the extensive technical assistance from multilateral and bilateral donors.

As of 2005 the Ukraine's electricity sector was organized in the following way (see Table 3).

Table 3. Structure of Ukrainian electricity sector in 2006

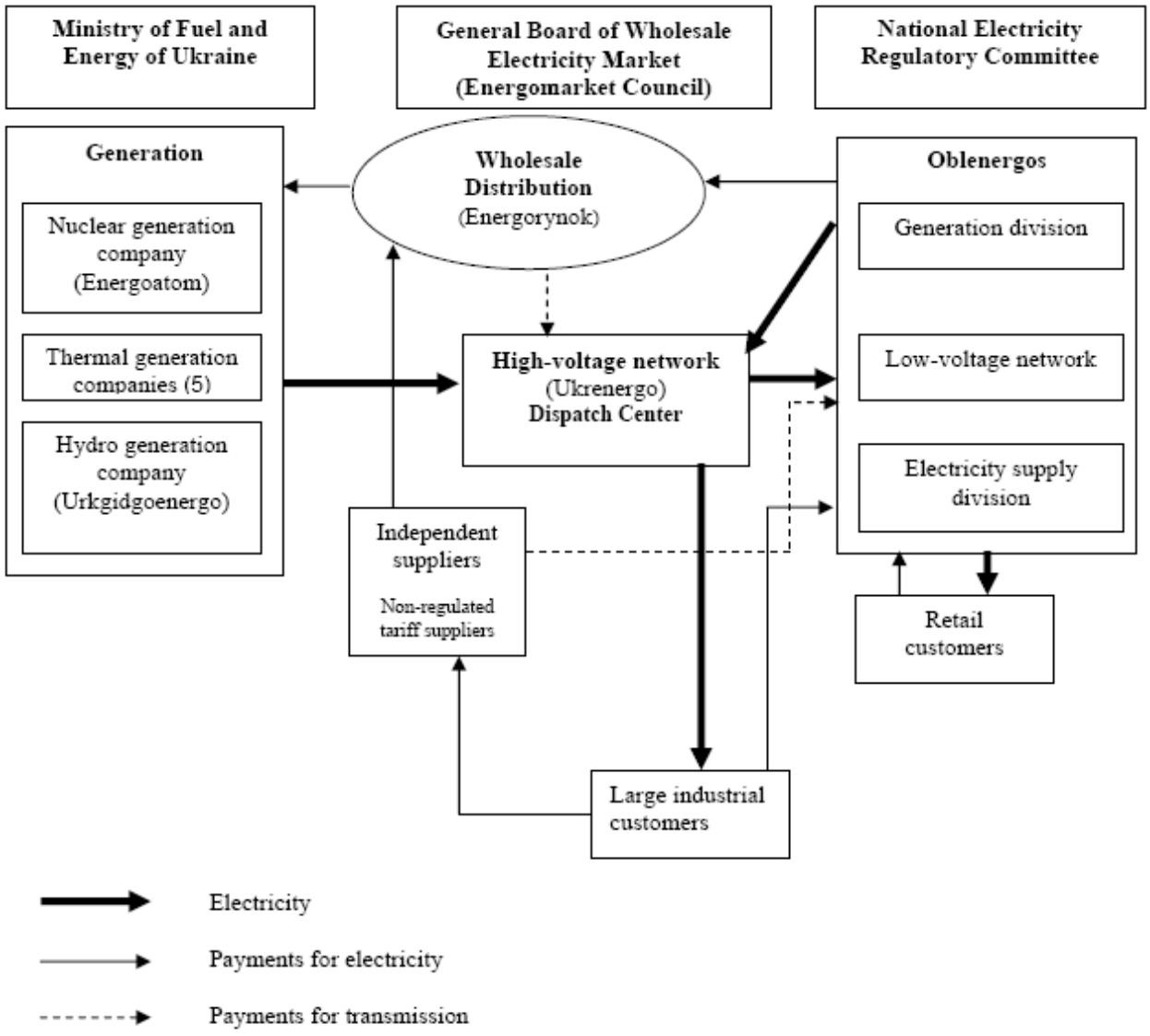
		Company
Generation		
Fossil-fueled	TPPs	Centerenergo, Dniproenergo, Donbasenergo, Zakhidenergo (state controlled)
		Shidenergo (private)
	CHPPs	About 30 large CHPPs (see section *Property structure of electricity sector*)
Hydro		Ukrgidroenergo, a state company, operates 9 hydropower stations.
Nuclear		Energoatom, a state-owned nuclear generation company, owns and operates 4 nuclear plants.
Transmission		Ukrenergo, a state company, is an administrator of the National Dispatch Center. The company owns and operates the high-voltage network.
Distribution	Regulated tariff distributors	27 JSCs regional distribution companies 'oblenergos' own and operate the low-voltage networks and some generation capacity (mostly CHPPs) in the twenty-five regions and two city administrations (Kyiv and Sevastopil). The state owns the majority of the shares in most oblenergos. As regulated tariff suppliers, oblenergos have an obligation to serve all customers who wish to buy electricity at the regulated retail price.
	Non-regulated tariff distributors	Independent non-regulated tariff distributors purchase electricity from wholesale market and resell it to large consumers. They pay to regulated tariff distributors for low-voltage networks utilization.
Export		Ukrinterenergo, a state-owned enterprise, exports electricity produced by Burshtynska TPP to Hungary and Slovakia, Dobrotvirska TPP – to Poland and electricity from wholesale market to Moldavia.
Wholesale market administration		Energorynok, a state-owned company, is an operator of the Wholesale Electricity Market (WEM). The company operates as an administrator of payment system of WEM, manager of the money funds of WEM, and a chief operator of the electricity accounting system in Ukraine. In addition Energorynok operates as a regulatory body of WEM.
Energy construction		Holding company Energobud coordinates enterprises of energy construction complex

Source: compiled by CASE Ukraine from Energy Strategy of Ukraine till 2030, Renaissance Capital: Ukrainian Utilities: Reforms as Hopscotch, expert consultations

Generating companies produce electricity and transmit it to Energorynok, a wholesale market administrator, which buys total electricity produced and sells it to distributing companies i.e. 'oblenergos' and independent suppliers. Technical support of the wholesale electricity delivery is provided by Ukrenergo, while Energorynok is engaged in electricity accounting and administration of the payment system. Oblenergos and independent suppliers distribute

electricity to retail customers and large industrial customers.

Figure 1. Structure of the Wholesale Electricity Market



Source: compiled by CASE Ukraine from Energy Strategy of Ukraine till 2030

On November 28 2007 Cabinet of Ministries adopted an action plan[1] aimed at electricity market liberalization. The main idea of the reform is to allow electricity producers to enter in agreements with consumers without intermediary Energorynok. According to the instruction it is planned to draw up general rules and principle of market functioning during in 2008, organise an electricity exchange market until 2011 and complete the reform in 2015.

[1] Cabinet of ministries of Ukraine. Order on approval of the action plan on realization of the Conception of functioning and development of electricity market in Ukraine № 1056 of 28.11. 2007

3. Regulating bodies

The basic document that defines market rules for technical and financial market operations is Energomarket Members Agreement. The agreement was signed by generators, regulated tariff suppliers, non-regulated tariff suppliers and Ukrenergo on 11 November, 1996.

The Ministry of Fuel and Energy of Ukraine

According to the President's Decree[2], the main function of the Ministry (which includes the Department of Electricity) is the implementation of the state policy in the energy sector of Ukraine, as well as regulation and restructuring of power industry and energy market. The Ministry is also responsible for keeping integrity and reliability of Ukrainian energy system. It participates in forecasting and scheduling of energy generation, development of technical, social, financial and other areas, as well as development and implementation of investment policy in the industry. It exercises state control and supervision over companies' adherence to reliability requirements in power generation, distribution and technical exploitation of the power stations and grid.

The Ministry of Fuel and Energy manages the public stakes in energy companies by appointing its representatives to the Boards of Supervisors in NAC ECU and oblenergos. Also the Minister of Fuel and Energy appoints a director of Ukrenergo. The Ministry of Fuel and Energy of Ukraine was reorganized in 2000 (on the base of the Ministry of Power, the Ministry of Coal Industry, State Committee of Oil&Gas Industry).

National Electricity Regulation Commission (NERC)

NERC was established in 1995. The commission issues and monitors licenses for electricity generation, high-voltage transmission, low-voltage distribution, wholesale market operations, and tariff and non-tariff supply. The licenses stipulate the methodology for calculating high- and low-voltage network fees, the National Dispatch Center's margin, wholesale tariffs for nuclear and hydro power stations and retail tariffs applied by oblenergos.

Starting from 2006 the Head of NERC and its members are appointed for 6 years and dismissed by the Cabinet of Ministers.

General Board of Wholesale Electricity Market (Energomarket Council)

Energomarket Council consists of 10 voting members (5 of them from generation companies and 5 of them from distributors) and 4 non-voting members, one representative from NERC, the Ministry of Fuel and Energy, Ukrenergo and Energorynok.

NAC ECU (part of Ministry of Fuel and Energy) is represented by 7 of voting members, one voting member is Energoatom representative and 2 are representatives of privately-controlled companies. The Head of Energomarket Council is elected once a year by a majority votes of voting members.

General Board of Wholesale Electricity Market provides general supervision over Energorynok activity and Energomarket Members Agreement execution. Meetings are held no less than once a month. Amendments to Wholesale Market Rules, developed by Energomarket Council, are to be considered and approved by NERC.

[2] President's Decree №598 as of 14 April, 2000

Energorynok

The company (SE "Energorynok") was created in 2000. The executive director of Energorynok is appointed and dismissed by the Cabinet of Ministers. The company serves as an administrator to payment system on electricity market.

The payment system of the WEM is organized as follows. All the cash payments are channeled through an authorized bank that allocates funds according to the mechanism approved by NERC. Part of the cash is directed to the so-called 'special' accounts of the Ukrainian government, such as the State Investment Fund. In this case, the funds are collected from all electricity consumers in the form of a non-tax surcharge and placed at Energorynok account, then transferred to the state and later distributed according to a list of companies approved by the Ukrainian government as mandated by the Verkhovna Rada. Since members of Energomarket council are representatives of state-controlled NAC ECU and Ministry of Fuel and Energy, in this way the Ukrainian government ensures control over the electricity market and associated cash flow

Ukrenergo

The company (NEC "Ukrenergo") was established in 1994. Its activity is supervised by the Ministry of Fuel and Energy. Executive director is appointed and dismissed by the Minister of Fuel and Energy. After Energorynok was created in 2000, political weight of Ukrenergo decreased substantially.

Ukrenergo incorporates the following regulating bodies to electricity market:

State Supervision on Electricity and Heat Consumption (*Derzhenergonaglyad*)[3]. The main functions of Derzhenergonaglyad are to assign the regimes and rates of electricity consumption, to control over strict adherence to legislation on electricity.

State Supervision on Electric Power Stations and Networks (Derzhinspektsiya)[4]**.** The main function of Derzhinspektsiya is to enforce strict adherence to technical requirements in exploitation of electricity generating and transmitting capacities.

In November 2005 the Ministry of Fuel and Energy declared probable incorporation of Derzhenergonaglyad and Derzhinspektsiya in a separate subsidiary, which in future will probably be subordinated to the Ministry of Fuel and Energy.

[3] Operates according to the Law of Ukraine "On Electricity" and the regulations on State Supervision of Electricity and Heat Consumption, approved by Cabinet of Ministers' Decree as of 17 May ,2002 No.665.

[4] Operates according to the Law of Ukraine "On Electricity" and Cabinet of Ministers' Decree as of 15 February, 1999 "On Approval of Procedure of State Supervision in Electricity"

4. Ownership structure

As of today a larger share of the sector remains in public hands despite attempts to introduce various programs of restructuring.

4.1. Generation facilities

Thermal power plants (TPPs)

Currently there are five open joint-stock companies that own and operate thermal power plants.

Four of them are state-controlled and one is privately controlled. State-controlled companies Donbasenergo, Dniproenergo, Centrenergo and Zahidenergo were created in 1995[5]. In 1996-1997 about 10-20% of shares were sold to the companies' management and employees. Later most of the shares were bought on secondary market and listed in Ukrainian stock exchange along with small shareholdings sold by State Property Fund of Ukraine in 1997-1998. Starting from mid 1999 capital assets (thermal power plants) of the companies are under moratorium of privatization[6]. In 2004 public stakes of these companies were transferred to NAC ECU.

Private company Shidenergo was established in 2001 and in 2002 took on lease three TPPs, which initially were under control of Donbasenergo. Despite moratorium on privatization of thermal power plants three TPPs of Donbasenergo were placed under control of private owner Tekhrempostavka (intermediary company) through the bankruptcy mechanism. Shidenergo was the first private company that obtained a license on electricity production and supply from NERC. Currently more that 50% of the shares of the company are owned by SCM.

Combined heat and power plants (CHPPs)

There are about 30 large CHPPs in Ukraine. They should be considered according to ownership and operational control criteria. Nominally the majority of CHPPs are in state and local community ownership, but in fact about one third of them are operated by private companies (see Table 4).

Half of Ukrainian CHPPs is owned by state company NAC ECU; they are operated either by NAC ECU or private companies. The plants were handed under private operational control through bankruptcy mechanism. All state-owned CHPPs are under moratorium of privatization and can be corporatized.

About 10 CHPPs are owned by local communities. They are either operated by local communities or taken in long-term leasing by private companies.

About 5 CHPPs are privately owned. During 1996-2006 they were acquired through bankruptcy or transferred to private ownership for debts.

[5] President's Decree "On Restructuring in Energy Sector in Ukraine" as of 4 April, 1995 No. 282/95

[6] According to the Law of Ukraine "On List of State Property Objects That Are Under Moratorium of Privatization" as of 7 July, 1999 No. 847-XIV

Table 4. CHPPs breakdown according to ownership and operational control

Operational control / Ownership	State	Local community	Private
State	1. Dniprodzerzhynska CHPP 2. Mykolaivska CHPP 3. Khersonska CHPP 4. Kharkivska CHPP 5. Odes'ka CHPP 6. Lysychanska CHPP 7. Zuivska Eksperymentalna CHPP 8. Kharkivska CHPP-2 "Eshar" 9. Severodonetskaya CHPP 10. Kyivska CHPP-5 11. Kyivska CHPP-6		1. Simferopolska CHPP 2. Sevastopolska CHPP 3. Sakska CHPP 4. Cherkaska CHPP
Local community		1. Kirovogradska CHPP 2. Lvivska CHPP-1 3. Lvivska CHPP-2 4. Shostkinska CHPP 5. Kamyanets-Podilska CHPP 6. Odes'ka CHPP-2	1. Chernigivska CHPP 2. Kramatorska CHPP 3. Kalus'ka CHPP 4. Kharkivska CHPP-3
Private			1. Darnytska CHPP 2. Bilotserkivska CHPP 3. Sumska CHPP 4. Kremenchutska CHPP 5. CHPP of Okhtyrski Teplovi Merezhi

Source: compiled by CASE Ukraine on the base of expert estimates

Nuclear plants

Four Ukrainian nuclear power plants are operated by Energoatom, a state company established in 1996. The company is owned directly by the state. Privatization of nuclear power stations is banned by law.

Hydropower plants

Hydropower capacities (9 plants) in Ukraine are operated by Ukrgidroenergo, a state company established in 2003. Starting from 2004 the company is under operational control of NAC ECU.

Dnistrovska GAES is a separate legal entity. A hydropower station that belongs to this company is being constructed for about 10 years. Due to inconsistencies and long term of construction process, in 2005 General Board decided to liquidate the company and transfer capital assets to Ukrgidroenergo.

4.2. Distribution facilities

There are regulated tariff suppliers ('oblenergos') and non-regulated tariff suppliers.

Regulated tariff suppliers

27 oblenergos were established in 1995[7]. Currently the state owns 50% + 1 share or more in 14 oblenergos, from 25% +1 share (blocking shareholding) up to 50% shares in seven oblenergos, and six oblenergos are privately owned. In 2004 all the public shares in distribution companies were transferred to NAC ECU. Since then NAC ECU is authorized to manage corporate rights and appoint Board of Directors and Supervisory Board[8] in those oblenergos where it has controlling shareholding.

A number of attempts were made to privatize distribution companies. In 1996-1997 up to 30% in each oblenergo were sold to company's management and employees on preferential basis, sold via certificate auction in exchange for privatization and compensation property certificates, and traded on Ukrainian stock exchange. In 1998 20-35% shares in six oblenergos were put on sale via auction. But in 1999 public stake in 12 oblenergos was fixed in between of 25% +1 share and 40%[9].

In 2000-2001 controlling stakes in six Ukrainian distribution companies were sold via auctions. Two oblenergos were acquired by US company AES Washington Holdings and four ones by state-owned Slovak distribution company, Vychodoslovenske Energeticke Zavody (VSE). In 2002 VSE transferred the shares to a subsidiary, VS Energy (Netherlands). At present AES Washington Holdings owns 75% stake in Kievoblenergo and Rivneoblenergo, and VS Energy consolidated up to 92-98% in Khersonoblenergo, Kirovogradoblenergo, Sevastopolenergo and Zhytomyroblenergo.

In February 2006 the State Commission on Securities and Stock Market banned clearing and contractual sale operations and for 6 oblenergos for the period of 6 months. Official version claims intention to protect public stake, resolve corporate conflicts and eliminate "double register".

As of beginning 2006, private shares in distribution companies were represented primarily by Russian businessman K. Grigoryshyn, VS Energy International (the Netherlands), Privat Group and AES Washington Holdings. K. Grigoryshyn, a Russian businessman, acquired stakes in oblenergos via a number of offshore companies registered in Virginia Islands and Cyprus. VS Energy International (the Netherlands) is controlled by a group of Russian businessmen (one of them is allegedly a Russian parliamentarian A. Babakov). Privat Group acquired controlling shareholding in five Ukrainian oblenergos in 2004 acquiring a number of offshore companies from K. Grigoryshyn. US company AES owns energy businesses all over the world.

Non-regulated tariff suppliers

Non-regulated tariff suppliers purchase electricity from WEM. As of 18 October 2007, 94 suppliers concluded agreement with Energorynok[10] (12 more than 15 months before). The volume of electricity purchased from WEM in January 2008 accounted for 11.25%[11]. The majority of non-regulated tariff suppliers are industrial enterprises that purchase electricity for their own needs. Another group, intermediary companies, purchase electricity from wholesale market and resell it to large consumers, electricity volumes traded by them are insignificant.

[7] According to President's Decrees "On Restructuring in Power Sector in Ukraine" as of 4 April, 1995 No.282/95 and "On Measures on Market Reforms in Power Sector of Ukraine" as of 21 April, 1995 No.244/94
[8] According to the Cabinet of Ministers' Decree No.794
[9] President's Decree as of 2 August, 1999 No.944/99
[10] www.er.gov.ua/doc.php?f=12
[11] http://www.er.gov.ua/doc.php?f=2022

5. Tariffs and payment discipline

5.1. Non-payment crisis

Currently Energorynok is the largest debtor in the electricity market. In 2006 its payables to generation companies and Ukrenergo reached UAH 17,587 mln. But company's net debt accounted for only UAH 2,308 mln, whereas UAH 15,279 mln was owned to Energorynok by distribution companies. Consumer debt to distribution companies constituted UAH 9,590 mln as of 1 January, 2007. After many years of continuing increase of the accrued amount of non-payments, debt amount decreased in 2006.

Table 5. Debt dynamics in power sector of Ukraine, 2000-2006

Date		**1**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Consumer debt to distribution companies, mln UAH		**2**	**6,711**	**8,431**	**9,559**	**10,108**	**10,417**	**10,496**	**9,590**
Increase/ decrease	mln UAH	3	n/d	1,720	1,128	550	309	79	-906
	%	4	n/d	25.6	13.4	5.7	3.1	0.8	-8.6
Gross debt of distribution companies to Energorynok, mln UAH		**5**	**9,006**	**12,264**	**14,027**	**15,138**	**15,730**	**15,962**	**15,279**
Increase/ decrease	mln UAH	6	2,312	3,258	1,763	1,111	592	233	-682
	%	7	34.5	36.2	14.4	7.9	3.9	1.5	-4.3
Net debt of distribution companies to Energorynok, mln UAH (5-2)		**8**	**2,295**	**3,833**	**4,468**	**4,829**	**5,312**	**5,465**	**5,689**
Gross debt of Energorynok to creditors, mln UAH		**9**	**11,301**	**14,651**	**16,180**	**17,293**	**18,106**	**18,323**	**17,587**
Increase/ decrease	mln UAH	10	2,588	3,350	1,529	1,113	813	217	-736
	%	11	29.7	29.6	10.4	6.9	4.7	1.2	-4.0
Net debt of Energorynok to creditors, mln UAH (9-5)		**12**	**2,295**	**2,387**	**2,153**	**2,155**	**2,377**	**2,361**	**2,308**

Source: NERC Annual Report, 2006

The main reason to debt accumulation was the non-payment crisis of the late 90s. At its worst in 1998, the level of payment for electricity bills in cash was 7-10% with 77% paid by barter and the rest not paid at all. To eliminate barter settlements and clear up cash flows for electricity, in 2000 Energorynok was created. Until now, Energorynok serves as a clearing house on WEM. Besides, a system of 'special accounts' was introduced to prevent misuse of energy funds.

After elimination of barter schemes, the government introduced legislative measures to resolve the non-payment crisis. A system of reconciliation of debts for fuel supplying and energy supplying companies was introduced by the Cabinet of Ministers in 2002[12]. In January 2005 the Verkhovna Rada abolished official differential scheme on cash allocation and equalized the percentage of cash payments to electricity producers[13].

In 2005 the roadmap for the restructuring of intercompany debt was approved[14]. It stipulated debt relief, a centralized reconciliation of accounts payable/receivable between market participants and restructuring of remaining debts without penalties and indexation. However, the government has already fallen behind in the implementation of its own schedule.

[12] Cabinet of Ministers' Decree "On Energy Settlement System" as of 14 February, 2001 No.45-p , valid until 1 April, 2002; NERC Decree "On Transfer of Payments" as of 17 May, 2002 No.493

[13] Law of Ukraine "On Amendments to the Law of Ukraine on Electricity" as of 18 January, 2005 No.2352-IV

[14] Law of Ukraine "On Measures for Providing Stable Work of Energy Companies" as of 23 June, 2005 No.2711-IV

5.2. Tariffs structure

5.2.1. Wholesale tariff

WEM can be divided into two submarkets – wholesale market where wholesale price for producers is defined (‘generators’ market) and wholesale market where price for suppliers is defined (suppliers’ market).

Generators’ market

Generators’ market is divided into ‘regulated’ (68% of the market, including electricity output from nuclear, hydro, combined heat and power plants and wind power plants) and ‘competitive’ (32% of the market, consisting of the output from the wholesale thermal generators and a number of CHPP – Kyiv CHPP-5, Kyiv CHPP-6 and Kharkiv CHPP).

Wholesale tariffs on regulated market are set by NERC Decrees. Usually NERC advances tariffs along with cost increase.

Wholesale tariff on competitive market is calculated every day for each producer on the base of marginal system price and a number of fees.

Marginal system price (MSP) is the price that is considered in calculation of average wholesale price from producers (AWPP). It is the highest of the bids submitted by generators to Energorynok every day. MSP is the same for all the producers and usually covers variable costs of the most expensive power generating unit. According to the bids administrator also chooses those power units who will operate the following 24 hours (those ones whose bids are the lowest). There is a temptation for the power plants to understate the bids to guarantee permanent performance, but market administrator imposes fines if submitted bids are more than 10% lower than real costs of power unit.

Fees differ from producer to producer. There are fees for operational capacity, maneuverability, start-up fees and other system related fees that are designed to cover generators’ fixed cost.

The competitive and regulated electricity is purchased, bundled together and AWPP is calculated.

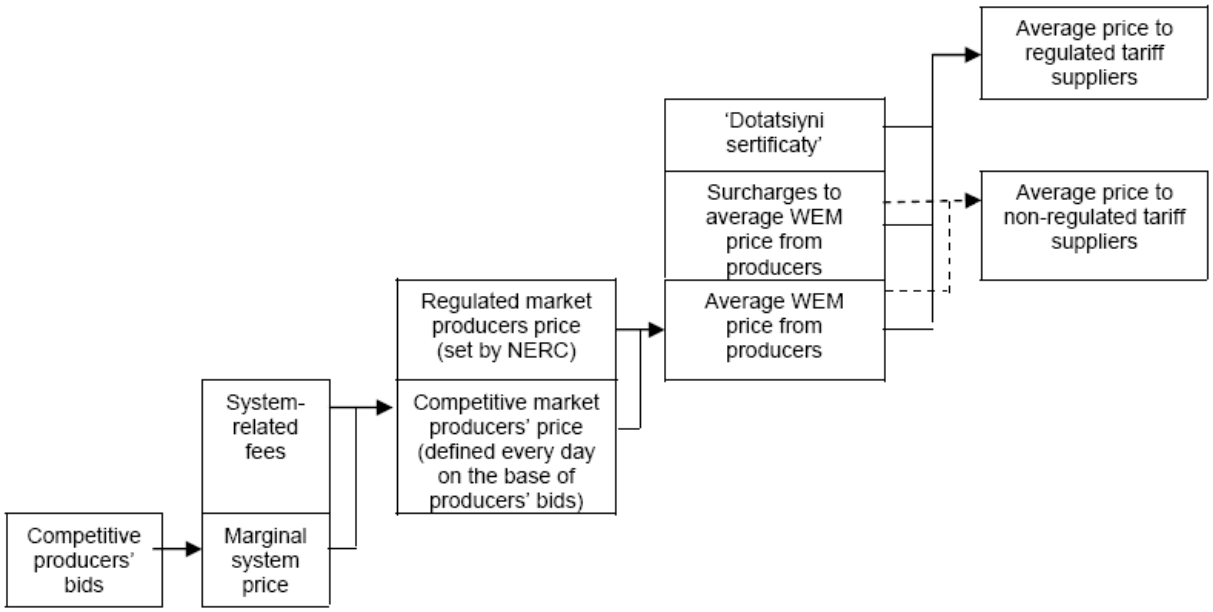
Suppliers’ market

Average wholesale price to suppliers (AWPS) is calculated on the base of AWPP with consideration of ‘special’ surcharges and ‘dotaciyni sertificaty’.

‘Special surcharges’ are fees to Energorynok for administration services, Ukrenergo for high-voltage transmission and system dispatching, and fees to investment fund of wind energy fund development (these surcharges are defined by NERC).

‘Dotatsiyni sertificaty’ is a kind of compensation fees to regulated price electricity suppliers for losses from deliveries to preferential groups of consumers (agricultural producers, households etc.) Each regulated tariff supplier defends in NERC the volume of ‘dotatsiynyi sertificaty’ depending on the structure of it consumers. The final price that regulated tariff supplier should pay for electricity from WEM is decreased by the cash covered by ‘dotatsiyni sertificaty’. AWPS for regulated tariff electricity suppliers is lower than to non-tariff electricity suppliers by the total volume ‘dotaciyni sertificaty’. Despite the fact that non-regulated tariff suppliers do not get that compensation fees, they provide their profitability due to higher consumer tariffs, since they are industrial consumers who buy electricity for their own needs or intermediaries who supply electricity to large industrial consumers.

Figure 2. Structure of the wholesale electricity price



Source: compiled by CASE Ukraine from www.er.gov.ua

Profitability of power plants that operate on 'regulated segment' is defined by NERC with consideration only fair rate of return, which is in turn determined by investment program of each CHPP. Profitability of thermal power plant depends largely on their individual bargaining power.

5.2.2. Retail tariffs

Consumer tariffs are ranged according to voltage category and customer groups.

Voltage category differentiation

First category (35 kV and above) and second category retail tariffs (up to 35 kV) are set by supply companies on the base of AWPS and transmission tariffs defined by NERC. That is why at present there is a significant difference in these tariffs all over Ukraine. Retail tariffs for other categories are regulated by NERC[15].

Consumer groups differentiation

During 1999-2006 there was no change in electricity tariffs for households. In 2005 average weighted electricity tariff for non-households accounted for UAH 0.198 per kWh, for households – UAH 0.156 per kWh. These were the world's lowest tariffs for electricity. In 2006 power tariffs for households were raised twice, by 25% in May and by 25% in September (see Appendix 5). But still, NERC claims it is not sufficient to cover the production cost, which is currently covered by households for 60% only. For this reason, the Head of NERC has already announced that household power tariffs are going to be increased in 2007 by 10% in June, September and December.

One more measure, which is going to be introduced by NERC, is the differentiation of household power tariffs starting from April 2007, depending on the amount consumed. According to the suggested scheme, the first 125 kW*h will be charged at the current price, and what is above it,

[15] According to "Methodology and Procedure of Setting Retail Electricity Tariffs, Low-Voltage Transmission and Regulated Electricity Supply Tariffs"

will cost 60% more. Although the declared aim of the projected measure is social justice, there are several logical inconsistencies: firstly, it makes no sense if basic tariff remains at the same level; secondly, such a mechanism stimulates rather power saving than provides preconditions for social justice.

6. Key problems of electricity market

1. Despite of the fact that currently Ukraine is a net exporter of electricity, the production capacities in electricity sector are outdated: 95% of power units have worked out their useful life; the residual life of thermal power plants is 5-7 years. This poses a problem for the future electricity supply in Ukraine.
2. There is a lack of maneuverability capacities in Ukraine; a share of electricity produced by hydropower stations accounts for about 5%. Currently in order to increase the maneuverability, Tashlykska hydropower accumulating power station is being constructed; the government is planning to complete the construction in 2009.
3. The level of technological losses constitutes 12.5% of the electricity produced, which is 2-2.5 times higher than in developed countries. In order to decrease the losses, it is necessary to invest in modernization of transmission and distribution networks.
4. Despite constant increase of electricity production and consumption since 2000, Ukraine may soon face a technical problem of electricity supply to final consumers, especially in large cities. The growing demand for electricity cannot be satisfied using the old transmission and distribution networks.
5. Due to electricity market reform, which took place in 1996, the structure of electricity production and distribution is quite transparent. However, the privatization of production and distribution capacities is not over.
6. The level of accumulated arrears in electricity sector is very high. Up to 2006 the gross debt of Energorynok to its creditors amounted to UAH 17.5 bln, with UAH 9.5 bln owned by consumers to distribution companies. The government has approved a roadmap for debt restructuring, but it has already fallen behind in the implementation of the scheme.
7. Electricity tariffs for households are still below cost coverage level. In 2006 they were raised twice by 25%, but remained at the same level during 2007; now, according to our estimates, they cover around 50% of electricity cost.

Appendix 1. Electricity balance in Ukraine, 1996-2005, TWh

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005*
Total electricity production	**183**	**177**	**172**	**172**	**171**	**173**	**180**	**180**	**181**	**185**
Fossil (TPPs)	77	71	63	69	66	67	66	67	59	60
Fossil (CHPPs)	17	16	18	16	16	17	19	22	24	24
Total fossil	95	88	81	85	82	84	85	89	83	84
Hydro	9	10	16	15	11	12	10	9	12	12
Nuclear	80	80	75	72	77	76	78	81	87	89
Transmission losses	(3)	(3)	(3)	(4)	(5)	(5)	(5)	(4)	(5)	(4)
Total industry production net of losses	180	174	169	167	166	168	168	175	177	181
Self-consumption by electricity producers	(12)	(12)	(12)	(12)	(12)	(11)	(12)	(12)	(12)	(13)
Mistakes and losses	(2)	(6)	(4)	(1)	1	0	1	(0)	(1)	(2)
Total production available for distribution	**165**	**156**	**154**	**155**	**156**	**157**	**158**	**163**	**163**	**166**
Electricity consumption										
Industry	74	73	69	66	69	70	70	74	78	78
Households and housing services	41	38	37	38	36	36	37	38	39	42
Other	25	23	23	21	19	17	17	18	18	19
Distribution losses	21	22	24	27	28	31	31	29	24	20
Gross domestic consumption	161	156	153	152	152	154	155	158	159	158
Net export	4	0	1	3	4	3	3	4	4	7
Total consumption, incl. net export	**165**	**156**	**154**	**155**	**156**	**157**	**158**	**163**	**163**	**166**

* - 11 months annualized

Source: Renaissance Capital: Ukrainian Utilities: Reforms as Hopscotch

Appendix 2. Thermal, hydro and nuclear power plants ownership structure as of August 2006

Type	Company	% state shares	% privately owned shares	Governing bodies	Notes
Thermal	Centrenergo	78% NAC ECU	10% -Alfa Bank. In 2005 depositary receipts were listed on Frankfurt Stock Exchange	Supervisory Board consists of 4 NAC ECU, 3 MPE, 2 representatives of private shareholders. Board of directors (9 members) is elected by Supervisory Board.	Starting from February 2006 is under legal proceeding on bankruptcy.
	Dniproenergo	76% NAC ECU	In February 2006 depositary receipts were listed on Frankfurt Stock Exchange	No data	In 2004 the Administrative Court without MPE's and NAC ECU's agreement approved readjustment plan that was later abolished by the Superior Court Decree. Currently the Decree is contested in the Supreme Court.
	Donbasenergo	86% NAC ECU	5% are listed on PFTS	Supervisory Board is appointed by NAC ECU (3 members delegated from NAC ECU, 3 from MPE, 1 from Donetska Municipal Administration). Board of executive directors is approved by Supervisory Board.	-
	Zakhidebergo	70% NAC ECU	12% - ING Bank 10% - listed on PFTS	Head of Supervisory Board is MPE representative. Supervisory Board consists of 4 NAC ECU, 2 MPE, 1 Lviv Municipal Administration. No data on Executive Board.	The only Ukrainian exporter of electricity to Eastern and Western Europe.
Hydro	Ukrgidroenergo	100% NAC ECU	n/a	Head of the Board and Supervisory Board is appointed by NAC ECU. NAC ECU is authorized to manage corporate rights.	-
Nuclear	Energoatom	100% Ministry of Fuel and Energy	n/a	Board (правление) is approved and dismissed by Minister of Fuel and Energy. Executives: President, First Vice-presidents and Vice presidents are appointed and dismissed by Cabinet of Ministers. Executive directors of nuclear power stations are appointed by decrees of "Energoatom" President.	-

Source: compiled by CASE Ukraine

Appendix 3. CHPPs ownership structure as of August 2006

No. total	No. in group	Company	% state shares	% privately owned shares	Ownership (state, private, local community)	Operational control (state, private, local community)
		State ownership (100%) and state operational control				
1	1	Dniprodzerzhynska CHPP, OJSC	100% NAC ECU	-	State, NAC ECU	State, NAC ECU
2	2	Mykolaivska CHPP, OJSC	100% NAC ECU	-	State, NAC ECU	State, NAC ECU
3	3	Khersonska CHPP, OJSC	100% NAC ECU	-	State, NAC ECU	State, NAC ECU
4	4	Kharkivska CHPP, OJSC	100% NAC ECU	-	State, NAC ECU	State, NAC ECU
5	5	Odes'ka CHPP, OJSC	100% NAC ECU	-	State, NAC ECU	State, NAC ECU
6	6	Lysychanska CHPP, SE		n/a	State, NAC ECU	State, no data
7	7	Zuivska Eksperymentalna CHPP, SE		n/a	State, NAC ECU	State, no data
8	8	Kharkivska CHPP-2 "Eshar", SE		n/a	State, NAC ECU	State, no data
9	9	Severodonetskaya CHPP, SE		n/a	State, NAC ECU	State, no data
10	10	Kyivska CHPP-5		-	State, a part of Kyivenergo	State, Kyivenergo
11	11	Kyivska CHPP-6		-	State, a part of Kyivenergo	State, Kyivenergo
		State ownership (under NAC ECU jurisdiction) and private operational control				
		Krymsky gereyuchi systemy, SE		n/a		
12	1	Simferopolska CHPP		-	State, NAC ECU	Private, Krymkommunenergocentral, LLC
13	2	Sevastopolska CHPP		-	State, NAC ECU	Private, SGS, LLC
14	3	Sakska CHPP		-	State, NAC ECU	Private, Krymkommunenergocentral, LLC
15	4	Cherkaska CHPP, SE		n/a	State, no data	Private, Cherkaske Himvolokno, OJSC
16	5	Kryvorizka CHPP, SE			State, no data	n/d
		Local community ownership and private operational control				
17	1	Chernigivska CHPP, CEGE		n/a	Local community	Private, TehNova, OJSC (Nasha Ukraina)
	2	Kramatorska CHPP, LLC		n/a	Local community	Private, TD "Megaresurs" (ISD), Energoholding, LLC
18	3	Kalus'ka CHPP, SE		n/a	Local community	Private, Oriana, OJSC
19	4	Kharkivska CHPP-3, CJSC		no data	Local community	Private, Basis, OJSB

No. total	No. in group	Company	% state shares	% privately owned shares	Ownership (state, private, local community)	Operational control (state, private, local community)
20	5	**Private ownership and private operational control**				
21	1	Damytska CHPP (ZAT "EK "Ukr-Kan-Power")	34.3 - SPFU	14.7 - employees 24.46 – Introstyle Consult Ltd. (Great Britain) 24.46 – Markshell Enterprises Ltd. (Britain Virgin Islands) 1.127 – "Oksident"	Private control shareholding State block shareholding	Private
22	2	Bilotserkivska CHPP, CJSC	n/d	n/d	Private, Naftohimimpex, LLC (Finance and Credit)	Private, Naftohimimpex, LLC (Finance and Credit)
23	3	Sumska CHPP (LLC "Sumy TEKo")		n/a	Private, Sumyteploenergo, LLC	Private, Sumyteploenergo, LLC
24	4	Kremenchutska CHPP, SE		n/a	Private, Poltavaoblenergo, OJSC	Private, Poltavaoblenergo, OJSC, Private Group
25	5	CHPP of Okhtyrski Teplovi Merezhi		n/a	Private, Pravex concern	Private, Pravex concern
26	6	Kamyshburanska CHPP	n/d	n/d	n/d	Private, Krymteplocentral, LLC (under long-term leasing – 49 years)
		Local community ownership and local community operational control				
27	1	Kirovogradska CHPP, CC		n/a	Local community	Local community
28	2	Lvivska CHPP-1		n/a	Local community, Lvivteploenergo, LMCC	Local community
29	3	Lvivska CHPP-2		n/a	Local community, Lvivteploenergo, LMCC	Local community
30	4	Shostkinska CHPP (LLC "Sumy TEKo)		n/a	Local community	Local community
31	5	Kamyanets-Podilska CHPP, CC		n/a	Local community	Local community
32	6	Odes'ka CHPP-2		n/a	Local community	Local community

n/a – not applicable

Source: compiled by CASE Ukraine

Appendix 4. Ownership structure of distribution companies as of August 2006

	Company	% state-owned (NAC ECU)	% privately owned, owners
	Non-privatized distribution		
	State-controlled distribution		
1	Chernivtsioblenergo	70	22 - VSE
2	Dniprooblenergo	75	16 - K. Grigoryshyn
3	Donetskoblenergo	65	7 – A. Kluev &R. Akhmetov 20.58 – a group of offshore companies
4	Kharkivoblenergo	65	29 - K. Grigoryshyn
5	Kievenergo	50 + 1 share	26 – A. Ivanov & V. Khmelnitsky (Block of Y. Timoshenko) 13 – Kyiv Municipal State Administration (I. Plachkov)
6	Krymenergo	70 +1 share	n/d
7	Luganskoblenergo	60	35 – Verrona Plus (K. Zhevago)
8	Mykolaivoblenergo	70	30 - K. Grigoryshyn
9	Khmelnitskoblenergo	70	12 – VSE 4 – Atlanta Capital
10	Ternopoloblenergo	51	40 - K. Grigoryshyn
11	Virmitsaoblenergo	75	20- K. Grigoryshyn
12	Volynoblenergo	75	11 - K. Grigoryshyn
13	Zakarpattyaoblenergo	75	11 - VSE
14	Zaporizhyaoblenergo	60	29 - K. Grigoryshyn
	Privately-controlled distribution		
15	Cherkassyoblenergo	46 25 – state company Ukresko	23 - K. Grigoryshyn
16	Chernigivoblenergo	25 + 1 share	Privat group > 50%, Grigoryshyn < 20%
17	Lvivoblenergo	27	Privat group > 50%, Grigoryshyn < 20%
18	Poltavaoblenergo	25	Privat group > 50%, Grigoryshyn < 20%
19	Prykarpattyaoblenergo	25	Privat group > 50%, Grigoryshyn < 20%
20	Sumyoblenergo	25 +1 share	Privat group > 50%, Grigoryshyn < 20%
21	Odessaoblenergo	25	64 - VSE
	Privatized distribution		
22	Kievoblenergo	-	75 - AES
23	Khersonoblenergo	-	98 - VSE
24	Kirovogradoblenergo	-	94 - VSE
25	Rivneoblenergo	-	75 - AES
26	Sevastopolenergo	-	95 - VSE
27	Zhitomyroblenergo	-	92 - VSE

Source: compiled by CASE Ukraine

Appendix 5. Household electricity tariffs in 1999-2006

	Decree	Service	Current tariff, UAH per 100 kWh	Previous tariff, UAH per 100 kWh	Inrease, %	Effective date
1.	NERC Decree No. 309 as of 10 March, 1999 "On Tariffs on Electricity Delivered to Households and Communities" Registered in the Ministry of Justice on 10 March, No. 152/3445					no data
		1. Electricity delivered to:				
		1.1. Households[16]	15.6			
		1.2. Households in rural areas	14.4			
		1.3. Households who live in the buildings (in the cities and rural areas), which are equipped with electric cookers and electric heaters	12.0			
		2. Electricity delivered to:				
		2.1. Communities[17]	15.12			
		2.2. Communities in rural areas	13.92			
		2.3. Communities with buildings (in the cities and rural areas), which are equipped with electric cookers and electric heaters.	11.52			
2.	NERC Decree No. 401 as of 30 March, 2006 "On Revision of Tariffs on Electricity Delivered to Households and Communities, and Amendments to the Procedure of Application of Tariffs for Households and Communities" Registered in the Ministry of Justice on 11 April 2006, No. 413/12287					1 May, 2006
		1. Electricity delivered to:				
		1.1. Households	19.5	15.6	25%	
		1.2. Households in rural areas	18.0	14.4	25%	

[16] Electricity is used for domestic needs in houses, apartments, hostels, farms, electric lighting in garages and workshops.
[17] Electricity is used by communities, punitive institutions, patient care institutions, housing associations etc., which pay to electricity supply companies according to the general calculation counter.

	Decree	Service	Current tariff, UAH per 100 kWh	Previous tariff, UAH per 100 kWh	Inrease, %	Effective date
		1.3. Households who live in the buildings (in the cities and rural areas), which are equipped with electric cookers and electric heaters.	15.0	12.0	25%	
		2. Electricity delivered to:				
		2.1. Communities	18.9	15.12	25%	
		2.2. Communities in rural areas	17.4	13.92	25%	
		2.3. Communities with buildings (in the cities and rural areas), which are equipped with electric cookers and electric heaters	14.4	11.52	25%	
3.	NERC Decree No. 926 as of 30 July, 2006 "On Revision of Tariffs on Electricity Delivered to Households and Communities, and Amendments to the Procedure of Application of Tariffs for Households and Communities" Registered in the Ministry of Justice on 2 August 2006, No. 918/12792					1 September, 2006
		1. Electricity delivered to:				
		1.1. Households	24.36	19.5	25%	
		1.2. Households in rural areas	22.5	18.0	25%	
		1.3. Households who live in the buildings (in the cities and rural areas), which are equipped with electric cookers and electric heaters.	18.72	15.0	25%	
		2. Electricity delivered to:				
		2.1. Communities	23.64	18.9	25%	
		2.2. Communities in rural areas	21.78	17.4	25%	
		2.3. Communities with buildings (in the cities and rural areas), which are equipped with electric cookers and electric heaters	18.0	14.4	25%	

Source: Ukrainian legislation