

MANAGING JOINT SYNCHRONOUS OPERATION OF INTERCONNECTED POWER SYSTEMS OF THE COMMONWEALTH OF INDEPENDENT STATES UNDER CONDITIONS OF FORMING MARKET RELATIONS IN POWER INDUSTRY

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SUMMARY

The paper gives the present state and the existing management structures in power industry of CIS countries. Consideration is given of coordination of market relations development and managing joint synchronous operation of interconnected power systems of CIS countries in new conditions.

Keywords: Electric Power Industry – Structure – Management – Operation

1. INTRODUCTION

The formation of independent states on the territory of the former USSR and the division of electric power property between them resulted in the fundamental changes of the structure of electric power industry management. The own management organs and independent working subjects were created in the independent states, while the former principles of centralized management of the power systems work were disrupted that caused the necessity of quick creation of mechanisms of coordination of developing and functioning electric power industry in CIS states. For these purposes the states-members of CIS concluded in February 14, 1992 the agreement "On coordination of interstate relations in the field of electric power industry of Commonwealth of Independent States". In accordance with this agreement the CIS Electric Power Council and its constantly working organ – Executive Committee were formed.

The processes of structural transformations were begun in the electric power industry of CIS states. They resulted in the formation of different owners of electric power objects at the national levels and the formation of wholesale electricity markets.

The changes that took place recently in the structures of CIS states' electric power industry management, the outlined ways of its further reformation as well as managing joint synchronous operation of interconnected power systems of CIS countries in new conditions are considered below.

2. PARTICULAR FEATURES OF REFORMING ELECTRIC POWER INDUSTRIES IN THE SEPARATE CIS STATES

The reformation of electric power industry in CIS states is carried out accordingly to the substantially different schemes. In the same time there are the general tendencies. It should be noted, first of all, that the corresponding laws or the President's decrees and the governmental decisions created the juridical status of the electric power industry reforms in each State. The main rights and responsibilities of electricity producers, suppliers and consumers, the principles of forming and realizing the State policy in the area of electric power industry as well as the directions of market relations development were determined in the normative-legal acts that were adopted in CIS States.

Azerbaijan Republic. The vertically integrated company JSC "Azerenergy" carries out the electricity production, transmission, distribution and the planning of power system development. It includes the repairing and building enterprises, R&D institutes and another subdivisions that are necessary for it. The long-term concept of Azerbaijan electric power industry development as well as the project of this industry restructuring is currently elaborated. The Decree of President of Azerbaijan Republic transformed the electric networks of Baku, Gaingy, Sumgait and Ali-Bajtam, which belonged before to the city authorities, into the joint stock companies for their subsequent privatization.

In accordance with the President decree the Ministry of Fuel and Energy of Azerbaijan Republic was

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established in 2001.

Republic Armenia. The Government of Republic began in 1997-1998 to carry out the reforms in electric power industry. The joint stock companies were formed as a result of restructuring vertically integrated Republican company. They include: electricity producer companies (five large and more than 20 small companies), one transmission company, one distribution company, a single wholesale buyer / seller of electricity and power, operator of power system, calculation center, building, mounting, adjustment and other companies, R&D institutes. The independent Energy Commission of Republic was also established for the regulations of this industry.

Republic Armenia Government began the privatization of electric power industry for attracting the private capital. Practically all small hydroelectric stations as well as the distribution company, the building-mounting and adjustment organizations subdivisions were privatized. The process of design organizations' privatization is carried out.

Republic Belarus. The Energy Ministry of Republic Belarus was created in 2001 and carries out the management of electric power industry in Republic. The State concern "Belenergo" carries out the economy activity of electric power industry in Republic. The concern includes six unitary Republican electric power enterprises as well as the enterprises of construction-mounting complex, the adjusting enterprises, R&D organizations. The Republican unitary electric power enterprises are the vertically integrated energy companies that include the electric power stations, electric networks and heating systems.

The project of a concept of restructuring the Republic Belarus electric power industry has been now considered at the Board of Ministry of Energy. The project envisages three stages of reforms in Republican electric power industry. It is intended to divide accordingly to the kinds of activity into the electricity production, transmission and distribution, to form the market structures and to organize the Republican wholesale electricity market. In the process of reforms the large electric power stations are set apart into the independent company. It is intended to reform the Republican unitary electric power enterprises into the distribution-supplying companies. In prospect the both structures can be associated with the different shares of mixed property. The transmission lines forming the systems will stay as the State property and will not become the joint stock companies. It is supposed to create the independent regulation body, which will control an observance of rules on the wholesale trade of electric energy and the rules of relations between the electricity producers and consumers.

Georgia. The Ministry of Fuel and Energy carries out the management of electric power industry. The separation of electricity production from its transmission and distribution was carried out at the initial stage of Georgian electric power industry reforms. Some small hydroelectric stations were privatized. The joint stock companies were created on the basis of thermal power plants and hydroelectric stations at the second stage of reforms. The privatization of share holdings both of active power plants and those that are under construction is possible on the basis of international tender in accordance with the decision of Government. Nine Regional distribution companies were organized.

Republic Kazakhstan. The structural changes in the electric power industry of Kazakhstan were carried out in accordance with governmental decision that was made in 1996. As a result of these transformations:

- Large electric power stations (excluding Combined Heat and Power Plants (CHP) of less than 100 MW capacity) were set apart in the independent enterprises. They were stock hold, and the most of them were privatized;
- CHP of middle capacity (less than 100 MW) together with heat distribution systems were transferred into the communal property of local management bodies;
- Regional joint stock distribution network companies were formed on the basis of regional electric networks with voltage 110-35 kV and local networks with voltage 6-10 and 0.4 kV. Their functions include the electricity purchase, distribution and realization;
- National Company KEGOG for the electric network control was created on the basis of assets of the main 220 kV and above electric networks. The main goal of company is the transfer of electricity to the subjects of wholesale market. Functions of the system operator of electricity wholesale market were imposed on this company. The market is functioning on the basis of agreements between consumers, power-producing organizations and National company;
- All other enterprises of industry were allocated in the independent enterprises, and then they became the joint stock companies and were privatized.

The National company controlling electric networks and the regional distribution companies as the natural monopolies are being under control of Ministry of Energy and Mineral Resources, while their services on electricity transmission and distribution are controlled by the Republic Kazakhstan Agency on regulation of natural monopolies, protection and support of small business.

The experience of wholesale market functioning revealed a series of unsolved problems during its

organization. The new “Law on electric power industry” was adopted in 1999, while in 2000 the Decree of Government, which envisages the additional measures on increasing the efficiency of electricity wholesale market as well as the creation of new market subject – market operator – the noncommercial organization with 100% capital belonging to the State, was accepted. In future the participants of market will establish it themselves.

The market of bilateral contracts is currently functioning in Kazakhstan. The electricity exchange for a day in advance began to function since February 2002. A volume of sales at the exchange is forecasted in the volume 7-10% from the total volume of electricity consumption in Republic.

Kirghiz Republic. In September 2001 the open joint stock companies “National Electric Network of Kirghizstan” (OJSC “NEN Kirghizstan”), OJSC “Electric Power Stations of Kirghizstan”, four distribution electric networks companies JSC “Electro” and one heating system company JSC “Bishkekteploset” were created on the basis of JSC “Kyrghizenergo”. The transmission lines and substations with voltage 110 kV and higher as well as the functions of system operator are devoted to the OJSC “NEN Kyrghizstan”. The networks and substations with 35 kV and lower are under the jurisdiction of JSC “Electro”. A part of shares in the volume 93.7% of OJSC “NEN Kirghizstan” and OJSC “Electric Power Stations of Kirghizstan” was kept in the State property, and thus the special status of these joint stock companies was determined. The sale of large controlling blocks of shares (up to 70%) of the companies on electricity distribution is envisaged. The relations between companies, and between them and large industrial customers, with the subjects of neighboring States are built on the contractual bases: the agreements for electricity purchase and selling as well as for electricity transmission through the networks and for rendering services on frequency control and others. The Law of Kirghiz Republic “On electric power industry”, “The rules of electricity market”, “The rules of using NEN” and the Kirghiz Republic Law “On electricity market” adopted by Kirghiz Republic Parliament in the end of January 2003 and being under signing of President are the juridical base of concluded agreements.

Republic Moldova. The Energy Ministry created in 2001 carries out the management of electric power industry. The “Law on electric power industry” was adopted in 1998 and foresees the development of competition for the electricity production and power supply and the privatization of electric power enterprises in these two areas. In accordance with this Law the National Agency of Regulation in Power Industry (NARE) was formed, the unbundling of activity on electricity production, transmission, dispatching control and distribution were carried out. The State enterprise “Moldelectrica” was created and fulfills the tasks on electricity transmission and as a Dispatching centre. Republic Moldova Parliament adopted in December 1998 the “Law on individual plan of privatization for the electric power industry”, which foresees the two-stage privatization of electric power objects. It is intended to privatize the electric distribution enterprises at the first stage and then – three CHP. It was permitted for the foreign investors to buy the controlling block of shares up to 100% in one or more electric distribution enterprises. At the second stage the Law permitted to investors to buy up to 70% of each enterprise’s shares in the field of electricity production. In February 2000 the Government of Republic Moldova had sold three from five electric distribution enterprises to foreign investors. The mentioned “Law on electric power industry” determined the main principles of organizing the wholesale electricity market in Republic Moldova. The commercial rules allow to the distribution companies to conclude the bilateral agreements with the companies that produce the electric energy and with those that import it. NARE has developed the project of Electricity Market Rules for providing the legal basis of efficient functioning of electricity market in Republic Moldova. These rules foresee the formation of balancing market together with direct bilateral agreements.

Russian Federation. The reforms in Russian electric power industry were begun in accordance with the Decrees of President of Russian Federation that were confirmed in 1992. The Russian joint stock company of power and electrification (RAO “EES Rossii”) was established in December 1992. The large electric power stations with capacity for thermal power plants - 1000 MW and more, for hydroelectric stations - 300 MW and more, the main HV transmission lines forming Russian UPS, the central and regional dispatching control centres, the R&D organizations, the part of shares of each regional joint stock company “AO-energo”, which were established on the basis of regional power systems, were transferred in RAO “EES Rossii” authorized capital. The branch (daughter’s) joint stock companies were formed on the basis of electric power stations, the property of those was transferred to RAO “EES Rossii”. The nuclear power plants are under the control of State concern “Rosenergoatom”, which is responsible for their development and safe functioning. The Federal and regional energy commissions being the regulating bodies have been formed. The Federal wholesale electricity market was created. RAO “EES Rossii” fulfills the control over its development and functioning. The operator of market is the Central Dispatching Centre of Russian Unified Power System. At the present time there are more than 100 subjects of wholesale market including the regional joint stock companies “AO-energo”, the large thermal and hydroelectric stations, nuclear power plants as well as the large consumers that were taken at this market.

The new Statement of Government of Russian Federation was adopted in July 2001 and determined the directions of further reformation of Russian electric power industry. These directions include: the transformation of Federal wholesale electricity market into Federal competitive electricity market, the formation of retail electricity markets, the establishment of Federal network company, system operator, administrator of trade system. It is intended to carry out the reforms of regional joint stock companies by means of separating the functions of electricity production from its transmission and supply. Three stages of reforms with total duration in 8-10 years have been foreseen. The system operator, Federal network company, administrator of trade system have been formed at the present time. The reforms of regional joint stock companies JSC-energo was begun in 2003. The Law "On electric power industry" was adopted and installed the legal basis of economic relations in the sphere of electric power industry under condition of the further reforms in this industry.

Republic Tajikistan. The Ministry of Energy was established in Tajikistan in accordance with Decree of President. It includes the electric power industry (the open holding company "Barki Tochik) and the gas-oil industry (the State enterprises "Tajikneftegaz", "Tadjikgaz", "Tajiknefteproduct"). The Ministry of Energy is responsible for power engineering policy and the development of standards. The program of electric power industry reforms was developed. The consumers will receive a possibility to choose among the competitive power suppliers. The stockholding of twenty-four power objects has been recently carried out. Ten of them are the distribution companies, and fourteen are repairing-building ones. The preparatory work was fulfilled for the beginning of investment process by means of realization of the shares of newly established joint stock companies.

Turkmenistan. The Ministry of Energy and Industry carries out the management of electric power industry. The Turkmen Energotechnological Corporation "Kuvvat" carries out the power supply of consumers. The corporation includes 5 regional production associations, electric power stations as well as repairing and some other enterprises.

Republic Uzbekistan. In 2001 the Decree of President transformed the Republican Ministry of Energy and Electrification into the State joint stock company "Uzbekenergo", which includes the coal and electric power industries.

The reforms of economy and financial system in Republic Uzbekistan concerned greatly the electric power industry. *The reforms in this industry and the improvements of managing structure of this many-functional industry are carried out since 2001 in order to realize the Republic Uzbekistan President's Decree. The shareholding of 4 thermal power plants including the largest Syrdaryanskay TPP, 9 regional distribution-supplying enterprises of electrical networks, 18 enterprises fulfilling the designing, construction-mounting, repairing and other works has been made in electric power industry.*

The transformation of property's forms for enterprises of electric networks will be complete within the frameworks of restructuring up to the end of 2003 and for the thermal power plants – up to the end of 2005.

The Ukraine. The Ministry of Fuel and Energy carries out the management of electric power industry. The reforms in Ukrainian electric power industry were begun in 1994 in accordance with the Decrees of President that foresaw the unbundling of 8 vertically integrated territorial power systems into several generating power companies (4 – with thermal power plants, 1 – nuclear power plants, 2 – with hydroelectric stations), the formation of 27 regional distribution power supply companies, the creation of National Dispatching Centre and State Enterprise "Ukrelectroperedacha"; the creation of National commission on regulations. The Agreement between the participants of wholesale market that determined its organizational structure was signed in 1996. In 1999 the amalgamation of National Dispatching Centre with the state enterprise "Ukrelectroperedacha" and the creation of a single company "Ukrenergo" took place. The company "Ukrenergo" provides the functions of dispatching control, organization of the wholesale electricity market and electricity transmission through the HV line. The state enterprise "Energorinok" was set apart from the "Ukrenergo" in 2000. The functions of this enterprise include: organization of wholesale market work, wholesale electricity sale and purchase, economic dispatching control, fulfillment of settlements between the wholesale market participants and import of electricity. The privatization program developed in the Republic foresees the privatization of power supply companies and the privatization of energy production companies. The concept of three-stage reforms of current wholesale electricity market was developed. It foresees the introduction of free competition at the third stage.

CIS Electric Power Council carried out the large work on developing and strengthening the integrating processes between CIS countries in the area of electric power industry. Some fundamental Interstate documents, which are necessary for the organization of joint functioning of power systems was prepared and approved. In addition a series of bilateral and multilateral agreements between power companies and State bodies of CIS countries' authorities was signed.

The active actions of States-members of CIS Electric Power Council helped to stabilize the situation and to begin to restore the interconnected power system of Commonwealth of Independent States, which was divided in 1998-

1999 into a few separately working parts. The parallel work of UPS of Russia and National power system of Kazakhstan was restored in June 2000, while in September 2000 the connection for parallel work of power systems of Kirghizstan, Tajikistan, Turkmenistan, Uzbekistan entering in the interconnected power system of Central Asia first took place with the national power system of Kazakhstan. The power systems of Moldova and the Ukraine were connected to the parallel work with interconnected power systems of CIS States in August 2001. Thus, the power systems of 11 countries from 12 countries are working in parallel as one interconnected power system of CIS. The power systems of Lithuania, Latvia and Estonia as well as the power system of Mongolia are also working in parallel with interconnected power system of Commonwealth States. The electricity transmission and exchange with power systems of neighboring States - Norway, Finland, Poland, Slovakia, Hungary, Turkey, Iran and China is carried out. All technical problems of Armenia power system joining to the interconnected power system of Commonwealth States can be solved in the in the shortest possible time.

The data on electricity production in 1991-2002 are presented in Table 1.

Table 1

CIS COUNTRIES	Electricity production in Commonwealth of Independent States											
	IN PERIOD OF 1991-2002 (BILLION KWH)											
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Azerbaijan Republic	23,5	19,8	19,0	17,6	17,0	17,0	16,8	18,0	18,2	18,7	18,9	18,6
Republic Armenia	9,6	9,0	6,3	5,7	5,6	6,2	6,0	6,2	5,7	6,0	5,7	5,5
Republic Belarus	38,7	37,6	33,4	31,4	24,9	23,7	26,1	23,5	26,5	26,1	25,1	26,2
Georgia	13,4	11,5	10,2	7,0	7,1	7,2	7,2	8,1	8,1	7,4	6,8	7,2
Republic Kazakhstan	86,0	82,7	77,4	66,4	66,7	59,0	52,0	49,1	47,5	51,6	55,4	58,2
Kyrgyz Republic	14,2	12,0	11,3	12,9	12,3	13,8	12,6	11,6	13,2	14,9	13,7	11,8
Republic Moldova	13,1	11,2	10,4	8,3	6,2	6,2	5,4	4,8	4,1	3,6	4,9	4,4
Russian Federation	1068,2	1008,5	956,6	875,9	860,0	847,2	834,1	827,2	846,2	877,8	891,3	889,4
Republic Tajikistan	17,6	16,8	17,7	17,0	14,8	15,0	14,0	14,4	15,8	14,2	14,4	15,0
Turkmenistan	15,0	13,2	12,6	10,5	9,9	10,1	9,4	9,3	8,8	9,8	10,5	10,5
Republic Uzbekistan	54,1	50,9	49,1	47,7	47,4	45,5	46,0	45,9	45,3	46,8	47,9	49,3
Ukraine	278,7	252,5	229,9	202,9	194,0	183,0	178,0	172,8	172,1	171,4	173,0	173,0
Total:	1632,1	1525,7	1433,9	1303,3	1265,9	1233,9	1207,6	1190,9	1211,5	1248,3	1267,6	1269,1
% RELATIVELY TO THE PREVIOUS YEAR	-2,5	-6,5	-6,0	-9,1	-2,9	-2,5	-2,1	-1,4	+1,7	+3,0	+1,5	+0,2

As seen from the data presented in Table 1, the electricity production was reduced on the whole for Commonwealth States almost by 30% since 1991 to 1998. This reduction took place most in Moldova, Georgia and Kazakhstan. The stabilization of electricity production occurred in 1998, while the growth of electricity production took place first in the whole for CIS in 1999. The installed capacity of electric power stations in Commonwealth States exceeds 320 million kW. A share of thermal power plants constitutes 70%, nuclear plants - 10% and hydro plants - 20%.

3. COORDINATION OF MARKET RELATIONS DEVELOPMENT IN ELECTRIC POWER INDUSTRY AND MANAGING JOINT SYNCHRONOUS OPERATION OF INTERCONNECTED POWER SYSTEMS OF CIS COUNTRIES IN NEW CONDITIONS.

The Interstate electricity market should be established within the frameworks of free trade zone in accordance with Statement of CIS States heads' Council that was adopted in June 21, 2000. The plan of measures on fulfillment of Agreement on securing parallel operation of power systems of States-CIS participants signed by CIS governmental heads' Council in November 25 1998 envisaged the preparation of Concept draft on the formation of interstate electricity market. The responsibility for development of Concept draft was imposed on CIS Electric Power Council.

The constantly active Working Group "Formation and development of Interstate electricity market" was established accordingly to decision of the 19th meeting of Electric Power Council for realization of raised problem. The representatives of power engineering organizations and companies of Commonwealth States became the members of this Working Group.

The members of CIS Electric Power Council signed in March 22, 2002 in Warsaw the Protocol "On deepening the integration of CIS countries' power systems". Accordingly to this Protocol it was charged to Working group to develop the draft "Basis principles of organizing the Interstate electricity market of States-CIS participants". A group of experts of Executive Committee and the Working Group of Council on electricity market developed taking into account the remarks and proposals of States-CIS participants the Basic principles of Interstate electricity market.

The main propositions of Basic principles of Interstate electricity market are presented below. They were worked out additionally taking into account the remarks and proposals of the Council members.

1. The Basic principles of organizing the Interstate electricity market of States-CIS participants (further –CIS IEM) determine the basic rules of organizing CIS IEM and are based on the active Interstate documents of States-CIS participants regulating the Interstate relations in the area of electric power industry. They take into account the international documents used as the base for formation of European electricity markets including the Energy Charter, Treaty to Energy Charter, Directive of European Community on liberalization of relations on European electricity market and so on.

2. The objective of CIS IEM is to create a unified electricity market place based on parallel operation of power systems of States-CIS participants. It is aimed to improving efficiency and reliability of power supply to customers. It should also promoted to bringing together the reform processes connected in electric power industry of States-CIS participants; the creation of technical, legal and economic base for unification of electricity markets of CIS and European countries and furthermore – of the countries of South-East Asia.

3. The participants of CIS IEM comprise the subjects of electric power industry in the States-CIS participants carrying out the activity on the electricity production, transmission and distribution, operative-technological control, organization of electricity trade and rendering the system and other kinds of services, electricity purchase and/or sale and obtain the access to CIS IEM accordingly to the inside legislation of States-CIS participants.

4. The States-CIS participants are free to choose an organizational and legal form of managing the electric power industry in their countries. At the same time the States-CIS participants create the conditions, when their participants of market could work in accordance with Basic principles aimed at the creation of CIS IEM. The participants of CIS IEM have the same rights. A right of equal access to the electrical networks of States-CIS IEM participants is presented to them. The presentation of a right to transport electricity through the electrical networks of CIS IEM participants in accordance with the Rules of CIS IEM and the agreements concluded for electricity transmission and/or transit is understood as the conditions of equal access. The States-CIS participants must create the efficient mechanisms of regulations, control and ensuring the transparency of monopoly structures – the systems of operative-dispatching control, electricity transmission and distribution.

5. Each potential investor has a right to construct and operate the new electric power station in any place of Commonwealth of Independent States on the basis both the permissible and tender procedures and accordingly to the inside legislation of States-CIS participants.

6. The States-CIS participants establish the minimal technical requirements for connecting to the transmission system of the State generating facilities, distribution systems, the intersystem lines and the equipment of directly connected consumers. These requirements must provide the interaction of CIS States' transmission systems, be objective, not discriminative and officially published.

7. The States-CIS participants appoint the system operators in their countries. These operators provide the operative-dispatching control and are responsible for providing the reliable functioning of the control zones as well as for the control of electricity flow exchange with other control zones. The system operators carry out the on-line control of intersystem lines on the basis of rules coordinated by the States-CIS participants.

8. The States-CIS participants appoint or demand from the owners of electricity transmission systems as well as from the owners of distribution networks appointing the operators of corresponding networks, which should provide the safe, reliable and efficient work of electrical networks and their development.

9. The vertically integrated enterprises carry out the accounting in their reports and have the separate financial documentation for the different kinds of activity (electricity production, transmission and distribution). If it is necessary they have also the general documentation on other kinds of activity not connected with electric power industry accordingly to the inside legislation of the country.

10. CIS States make the necessary measures promoting to the following:

- * Opening inside electricity markets should take place with the gradual reduction of the threshold of openness;
- * Electricity sellers located at the territory of any State have a right for access to the transmission system and conclusion of the contracts for electricity delivery to buyers at the territory of other State accordingly to the legislation of these countries;
- * Buyers of electricity located at the territory of any State have a right to choose the electricity seller on the territory of other State.

11. In the limits of available technical possibilities the States-CIS participants provide the electricity transit through their territories independently of place of origin, destination and owner of electric energy by the coordinated tariffs in accordance with the CIS IEM Rules and the concluded agreements. The electricity transit is carried out by the operators of transmission networks by the lists of transmission lines, transit routes and points of customs control of electricity, which were approved by States-CIS participants.

12. The economic relations in CIS IEM are carried out on the basis of rules and agreements concluded accordingly to these rules between the participants of market including:

- Bilateral agreements for purchase-sale of electricity in the different periods of time;
- Agreements for participation in the auction at electricity exchange of hourly electric energy;
- Agreements with network companies for transmission and/or transit of electricity purchased/sold at CIS IEM by buyers/sellers;
- Agreements on rendering the system services;
- Other agreements connected with functioning CIS IEM.

Interstate electricity market of States-CIS participants includes:

a) Market of bilateral agreements concluded between the participants of Interstate market. These agreements can be concluded by means of direct negotiations between the participants of market as well as by means of juridical and physical persons organizing the assistance in carrying out the negotiations;

b) Electricity exchange, where there is the functioning of:

- * spot market – a market of physical power supplies for each hour for the next day;
- * financial market (forward, futures, option contracts);

c) Market of real time (balancing market) for providing the balance of electricity production and consumption in real time with ensuring the agreed standards of reliability and quality of electric energy.

The principles of pricing at CIS IEM including the pricing for electricity transmission and transit (taking into account a country of origin or country destination) and the payment for system services as well as the principles of controlling the network restriction are determined by the Rules of CIS IEM.

13. The work of interconnected power systems of States-CIS participants under conditions of CIS IEM is regulated by technological rules and normative documents, which are developed and coordinated in the installed order. When the pointed documents are developed, it is necessary to be guided by the following main principles:

* A ensuring of the electricity generation and consumption balance taking into account the necessary power reserve at any time of day and any period of year is carried out in each control zone by means of its own electric power stations and/or power deliveries from other control zones on the contractual basis. The reserve, which is sufficient for covering the emergency disconnection of any power unit or generating installation being in each control zone as well as the emergency violation in power delivery from any neighboring control zone, should be provided in each control zone. The quantities of power reserve, its characteristics, and the order of using as well as of obtaining insufficient part of reserve are established on the basis of agreements between the CIS IEM participants.

○ Support of frequency level in the interconnected power systems of States-CIS participants in the acceptable range is carried out by regulating each control zone of power balance-transfer with the correction on frequency, which is coordinated and takes into account the agreements in CIS IEM.

○ A support of installed voltage levels in the controlled points of electrical network in the control zone is primarily the local problem and should be provided by economic subjects being in this zone.

○ The planning of regimes in each controlled zone and in the interconnected power system of States-CIS participants in the whole is carried out taking into account the agreements between CIS IEM participants for delivery, purchase, transmission and transit of electric energy and power as well as the transactions at the electricity exchange. The coordinated daily schedules of power exchange, which are formed by system operators and can't be changed in unilateral order, represent the main working documents.

○ The taking into account the deviations in power exchanges between control zones from the values foreseen by daily schedules should be organized in CIS IEM for the subsequent payment or compensation of these deviations.

○ The structure and operating regimes of electrical networks in interconnected power system of States-CIS participants must be developed in such way that they should exclude the appearance in control zone of not coordinated operating restriction with losing any one element (transmission line, transformer, power unit) in other control zones. In this case the sufficient transmission capacity should be provided for delivery the primary power reserve in the control zones, where the emergency deficits can appear.

○ The control zones are equipped with the complex of automatic control and relay protection devices providing the reliable and selective disconnection of emergency elements of electrical networks or electric power stations with the rate sufficient for preventing the development of emergency processes. The principles of constructing the systems of relay protection, anti-emergency automatics (including the automatic frequency shedding) in all control zones must be identical.

○ The power systems of Commonwealth States can have the electric ties and operate in parallel with power systems of neighboring States not being the members of the interconnected power system of States-CIS participants. A widening of the space of parallel operation must not decrease reliability of the interconnected power system of States-CIS participants and must be coordinated with CIS Electric Power Council.

* The participants of CIS IEM are exchanged all operative-technological, accounting, statistical and other information, which is necessary for realizing their functions by them. The kinds of this information, the frequency and forms of its presentation are determined in the installed order.

* The control zones are equipped by automatic systems of hourly accounting of electricity and rendered services as well as certified systems of collection, transfer and processing of accounting information that provides the full-fledged functioning and development of market.

14. The coordination of functioning and development of CIS IEM is carried out by CIS Electric Power Council and its structures, which exist and are created new for these purposes.

This activity is carried out in the following main directions:

* Choice of optimal CIS IEM structure and prospects of its development;

* Developments of the rules for CIS IEM;

* Coordination of the programs for developing the inside markets of States-CIS participants within the frameworks of CIS IEM;

- * Solution of technical problems of securing the reliable and stable work of CIS IEM.

At the 23 meeting of Electric Power council it was adopted decision to continue the work on the concept of CIS electricity market.

CONCLUSION

The formation of independent states at the territory of the former USSR and the structural transformations that are carried out in the power industry of CIS states resulted in the radical changes of power industry management structure.

Large work on developing and strengthening the integrating processes between CIS states has been carried out. These actions assisted to stabilize the situation and to begin the restoration of the interconnected power system of Commonwealth of Independent States. In 2000 the parallel operation of Russian UPS and National power system of Kazakhstan was restored, and the connection of power systems of Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, entering in the Central Asian interconnected power system with the whole National power system of Kazakhstan took place for the first time. In 2001 the parallel operation of Ukrainian and Moldavian power systems together with the interconnected power system of Commonwealth of Independent States has been restored. Thus, the power systems of 11 from 12 countries are now working in parallel as one interconnected power system of Commonwealth of Independent States. The power systems of Lithuania, Latvia and Estonia as well as the power system of Mongolia are operating in parallel with the interconnected power system of Commonwealth of Independent States. The transfer and exchange of electricity are carried out with the power systems of neighboring states: Norway, Finland, Poland, Slovakia, Hungary, Turkey, Iran and China. All the technical problems of Armenian power system joining to the interconnected power system can be solved in the near future.

The stabilization of electricity production took place in 1998, while the growth of electricity production occurred first in 1999 on the whole for CIS by 1.7% and in 2000 – by 3.0%, in 2001 – by 1.5%, in 2002 – by 0.2%.

In the same time many problems should be solved for increasing the efficiency of functioning and providing the sustainable development of interconnected power system of CIS states and, first of all, the harmonization of normative-legal base in their electric power industry and the creation of efficiently working interstate electricity market as well as the coordination of plans for future development of CIS states' power systems. It is expedient to consider the complex of technical and economic issues of the further widening of power pools integration on the Euroasian continent and the creation of the single energy space.