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RIGA, LATVIA STUDY TOUR
VOLUME 1
(ENGLISH LANGUAGE)

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Final Report

Prepared for

U S Agency for International Development
Bureau for Europe and NIS
Office of Environment, Energy and Urban Development
Energy and Infrastructure Division

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March 1997

A

BALTIC EXPERIENCE IN ELECTRICITY TRADE AGREEMENTS

Riga, Latvia
March 17-20, 1997

Volume 1: Baltic Seminar Documents (English)

Prepared for

U S AGENCY FOR INTERNATIONAL DEVELOPMENT
Bureau for Europe
Office of Development Resources
Energy and Infrastructure Division
Washington, DC 20523

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April 1997

B.

CONTENTS

DOCUMENTATION FOR THE SEMINAR

A seminar on *Baltic Experience in Electricity Trade Agreements* was held in Riga, Latvia, on March 17-20, 1997 with participants from the Baltic countries, the Central Asian Republics, and the United States Various documents were copied and distributed during the seminar, including

- documents in Russian that were prepared in Latvia for this seminar, or provided by Latvian participants, or brought from Lithuania, or brought from the Central Asian Republics
- agreements negotiated in Russian or in both languages during the course of the seminar
- translations from Russian into English
- documents in English that were prepared by Hagler Bailly in Latvia, or brought from the United States, or provided by Latvian participants, or brought from Lithuania
- one table on Latvian electricity tariffs, in Latvian

After the seminar these materials were organized into four volumes

Volume 1 Baltic Seminar Documents (English) - consisting of everything that was available in English, other than CAR contracts, plus a translation of the Baltic multilateral agreement and a paper from the December 1996 seminar

Volume 2 Baltic Seminar Documents (Russian) - consisting of everything that was available in Russian, other than CAR contracts, plus a paper that was presented at the December 1996 seminar

Volume 3 Central Asia Contracts (English) - consisting of any CAR contracts that were translated into English before the end of March 1997

Volume 4 Central Asia Contracts (Russian) - consisting of all of the CAR contracts that were shared among the seminar participants

In addition the following materials were distributed at the seminar

- *Interconnection of Power Systems of the Baltic States Facts in Brief, 1995*, published in color in English
- a shorter document similar to *Interconnection of Power Systems of the Baltic States Facts in Brief, 1995*, published in color in Russian
- the annual report of Latvenergo, published in Latvian and English
- the annual report of Lietuvos Energia, published in Lithuanian and English

E

REPORT ON THE SEMINAR OF THE CENTRAL ASIAN REPUBLICS IN RIGA, LATVIA ON 17 THROUGH 20 MARCH, 1997

Representatives from the five Central Asian Countries (CAC) which were appointed by their respective Governments to form a Working Group on Contracts and Pricing issues in the power sector met in Riga, Latvia on 17 through 20 March, 1997 This Seminar was funded by USAID and was arranged by Hagler Bailly Consulting The hosts of this visit to Riga were representatives from D C Baltija, the regional dispatch center for the Baltic countries

The Working Group has found this Seminar to be very helpful in their work to formulate their regional cooperation in electricity trading D C Baltija is the best existing regional analogue to U D C Energia, because these are the only two regional dispatch centers from the former Soviet Union which operate under similar technical conditions Therefore the experience of the Baltics has great relevance to the CAC in providing operating conditions and trading of electricity among the different countries in the region

Besides having the benefit of the leaders of D C Baltija in the Seminar, the CAC representatives also had an opportunity to hear from the power companies from Latvia and Lithuania As a result of presentations of representatives of D C Baltija, as well as those of power companies from Latvia and Lithuania on trading, transiting and pricing electricity and the subsequent detailed discussions of the above problems the Working Group has taken the following actions

- The Working Group agreed that Mr Ametov of the regional dispatch center, U D C Energia, will act as chairman of the Working Group
- An agreement among the CAC Working Group was made to formulate a new multilateral agreement on the parallel operation of national power systems The basic ideas of this agreement are structured after the similar agreement on parallel operation employed by the Baltic countries All paragraphs of the Baltic agreement will be used as a model for the CAC agreement with the exception of the following paragraphs 1 4, 2 2, 3 6, 4 2, 4 3, 5 8, 7 5, 8 3 and 8 4 The final form of this document will be finished in two weeks for presentation to the meeting of the Regional Energy Council of Central Asia for consideration
- An appendix to the multilateral agreement among the energy systems of CAC has been developed by the Working Group regarding compensation of frequency control costs A copy of this appendix is attached
- As a result of discussion the Working Group arrived at the conclusion that it is necessary to form a CAC regional power pool They have prepared a memorandum on this subject, which is also attached

- Additional work on developing a contract between an interconnected power system and an independent producer is required The Working Group requests that Hagler Bailly assist in this effort

The members of the Working Group wish to express their thanks to USAID for their support of this important work, and to Hagler Bailly for their technical support and guidance, and to Messrs Kreslinsh and Pervoushin of D C Baltija for sharing their experiences in developing the basis for international cooperation among Baltic power systems

Iskander J Ametov
Chairman of the Working Group

Riga, Latvia, March 21, 1997

Memorandum

on the results of the international seminar of the Baltic and Central Asian countries "Baltic Experience in Electricity Trade Agreements"

Riga, Latvia 17-20 March, 1997

1 In the framework of the regional project " Electricity contracts and pricing reform on import and export of electric energy in Central Asia" funded by US Agency for International Development (USAID) on 17-20 March, 1997 an international seminar of the Baltic and Central Asian Countries was held on the subject of "Baltic Experience in Electricity Trade Agreements"

2 The representatives of the following organizations and departments participated in the seminar

1 **US Agency for International Development (USAID),**
2 **Company Hagler Bailly Services, Inc (USA),**
3 **Dispatch Center "Baltija",**
4 **United Dispatch Center "Energia",**
5 **Ministry of Energy and Electrification (Uzbekistan);**
6 **Kyrgyzgosenergoholding (Kyrgyzstan),**
7 **Ministry of Finance (Kyrgyzstan),**
8 **State Energy Agency (Kyrgyzstan),**
9 **United Dispatch Center of Kazakstan,**
10 **Joint stock company "KEGOK" (Kazakstan)**
11 **Corporation "Kuvvat" under the Ministry of Energy and Industry of Turkmenistan**
12 **Ministry of Finance (Tajikistan)**
13 **Latvenergo**
14 **National Dispatch Center of Lietuvos Energia (Lithuania)**

2 The participants of the seminar became acquainted with

-experience of work of the Baltic Integrated Power System (IPS) in the conditions of transition to a market economy,

-the operation and structure of Latvian, Lithuanian and Estonian power systems,

- the agreement on parallel operation among the power systems of the Baltic countries,

- agreements on supply of electric power and energy, transit and frequency regulation among national power systems of the Baltic IPS and also with Russia and Belarus,

- principles of design for differentiated electricity tariffs and introduction of multi-tariff billing systems in wholesale and retail power and energy markets,

- visited and got acquainted with Riga hydro power station and DC Baltija

4 In the course of the discussions on the above mentioned problems by the representatives of the Baltic IPS, IPS of Central Asia and Kazakstan, the company Hagler Bailly and USAID, the parties have expressed the opinion and agreed on the following

- The existing agreements on parallel operation among power systems which are part of IPS of Central Asia require a detailed review in order to be presented to the energy council of IPS for consideration,
- The issues related to the compensation of frequency control costs should be reflected in a multilateral agreement which must developed with the participation of UDC "Energia" The draft multilateral agreement on frequency regulation has been developed by the participants of the seminar,
- Existing methodology for the compensation calculation for the costs related to frequency control at this stage of development is acceptable and reflects the conditions of deficiency of capacity in the IPS of Central Asia,
- Transit issues must be reflected in the agreements and agreed upon by UDC "Energia" and, if necessary, with UDA of Kazakstan,
- Agreements on electricity trade among commercial entities, irrespective of their ownership form, should not contradict the agreements on parallel operation and must be agreed upon by UDC "Energia" and, if necessary, with UDA of Kazakstan

On the background of existing market restructuring in the countries of Central Asia, in order to improve electricity trade on the mutually beneficial basis, and in order to utilize fuel, energy and water resources in an optimum manner, it is necessary to consider the possibility to form a power pool in the region

The participants of the seminar agree to direct this Memorandum to the Regional Mission of USAID in Central Asia and also present this document for consideration to the Governments of Central Asian Countries

Members of the working group

On behalf of Kazakstan	A Kirdyasin
	V Pastushkov
	R Khamitov
On behalf of Kyrgyzstan	A Kojobaev
	B Pedan
	M Tashbulatov
On behalf of Tajikistan	N Pirmatov
On behalf of Turkmenistan	M Arazmuradov
	M Ilyazova
	V Kochetov
On behalf of Uzbekistan	I Ametov
	K Abdullaev
	A Khidoyatov

Appendix
to the multilateral agreement signed on February 2, 1993

Rendering of services for frequency regulation

1 The supplying party assumes responsibility
To render frequency regulation services at a tariff determined by the Council of Integrated Power Systems of Central Asia

2 The receiving party assumes responsibility

2 1 To pay to the Supplying party for the frequency regulation services rendered at a tariff for kV of the regulating capacity per month in accordance with the decision by the Council of Integrated Power Systems

2 2 To maintain zero net flow of electric energy

2 3 In case of occurrence of inadvertent (unplanned) flows of electric energy, the payment or return in kind shall be performed in accordance with the bilateral agreement

3 The payment procedure and responsibilities of the parties shall be determined by the bilateral agreement

4 Force Majeure
In case of occurrence of force majeure circumstances which are beyond the control of the contractual parties which hinder the performance of contractual obligations on supply of electric energy and regulating capacity in the billing period, there is no economic penalty applied

The parties agree to notify each other immediately on the occurrence and termination of force majeure circumstances by acceptable means of communication and followed by a written confirmation

5 Applicable law and dispute settlement procedure

5 1 The present appendix hereto is governed by legislation of the Republics

5 2 Disputes with regard to payment arising in the process of rendering frequency regulation are settled by the Supplying party and Receiving party by Arbitration

[Signatures of the parties]

AGREEMENT

by and between Industrial Union of Energy and Electrification "Alma-ataenergo", State Power Company of Kyrgyzstan, State Joint Stock Holding company "Barki Tojik", State Energy and Technology Corporation "Kuvvat", Ministry of Energy of Uzbekistan, Industrial Union of Energy and Electrification "Southkazenergo" and United Dispatch Center (UDC) of Central Asia on the payment for the costs related to frequency regulation in the Integrated Power Systems (IPS) of Central Asia

Undersigned heads of

Industrial Union of Energy and Electrification "Alma- ataenergo",
State Power Company of the Republic of Kyrgyzstan,
State Joint Stock Holding Company "Barki Tojik"of the Republic of Tajikistan,
State Energy and Technology corporation "Kuvvat" of Turkmenistan,
Ministry of Energy and Electrification of the Republic of Uzbekistan,
Industrial Union of Energy of Electrification "Yzhkazenergo" and
United Dispatch Center of the power systems of Central Asia and the Southern Kazakstan

recognizing the necessity to compensate costs related to frequency regulation in the Integrated Power Systems of Central Asia have agreed

1 The payment calculation of the costs related to frequency regulation in the Integrated Power Systems of Central Asia shall be performed based on the methodology approved by the Energy Council of the IPS of Central Asia (Minutes #5 as of 15-16 July 1992)

2 The payment tariff for regulating capacity is adopted by the Council of the IPS of Central Asia and can be reviewed by the statement of the power systems if there are changes in frequency regulation costs and tariffs for the international net flows of electric energy

3 UDC of Central Asia agrees to do daily accounting of the amount of frequency regulation together with dispatch services of the power systems based on the operational records and to do monthly calculation of the payment amounts for the power systems for regulating frequency

Calculation of payment amounts is sent to the power systems by UDC of Central Asia in the form of telegram before the 5th day of the next billing month

4 Power systems agree to transfer the payment amount for the regulation of frequency to the current account of the power systems defined by UDC of Central Asia no later than 10th day of the next billing month based on the calculations presented by UDC of Central Asia

This agreement is concluded in Tashkent on 9th of February 1993

On behalf of Industrial Union of Energy and Electrification "Alma-ataenergo",
On behalf of State Power Company of the Republic of Kyrgyzstan,
On behalf of State Joint Stock Holding Company "Barki Tojik"of the Republic of Tajikistan,
On behalf of State Energy and Technology corporation "Kuvvat" of Turkmenistan,
On behalf of Ministry of Energy and Electrification of the Republic of Uzbekistan,
On behalf of Industrial Union of Energy of Electrification "Southkazenergo" and
On behalf of United Dispatch Center of Central Asian and South Kazakstan power systems

BALTIC EXPERIENCE IN ELECTRICITY TRADE AGREEMENTS

Riga, Latvia, March 17-20, 1997

LIST OF PARTICIPANTS

United States

Douglas Miller	Hagler Bailly Services, Inc
Charles Zimmermann	Hagler Bailly Services, Inc
David Thornton	Director of Transmission and System Control Services CMP International Consultants, a subsidiary of Central Maine Power Company
Rajiv Rastogi	U S Agency for International Development Washington, D C

Dispatch Center "Baltija"

Vilnis Kreslinsh	Director of DC Baltija
Joury Pervoushin	Deputy Chief of Relay Protection and Grid Network Planning

Dispatch Center "Energija"

Iskander J Ametov	Chief Dispatcher, United Dispatch Center "Energia"

Uzbekistan

Khamidulla N Abdoullaev	Head of the Economic and Planning Administration, Ministry for Power Industry and Electrification
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Victor D Kochetov	Head of the Central Dispatch Department, State Energy & Technological Corporation "Kuvvat"
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Alexey N Silantiev	First Deputy President, Barky Tojik
Nasym A Pirmatov	Chief of the Department of Finance and Industry, Ministry of Finance

Latvia

Ivars Liuziniks	Financial Director, Latvenergo
Inese Eglite	Seminar coordinator and interpretor
Juris Plavinsh	Interpreter

Estonia

Kersti Vera	Chief of Economic Department, Eesti Energia

Lithuania

Jan Balinskis	Director of National Control Center, Lietuvos Energia

BALTIC EXPERIENCE IN ELECTRICITY TRADE AGREEMENTS

Riga, Latvia, March 17 - 20, 1997

AGENDA

Monday, March 17, 1997

09 00-09 10	Welcome and introduction Vilnis Krēsliņš, DC Baltija
09 10-09 20	Opening remarks Rajiv Rastogi, U S Agency for International Development
09 20-09 30	Opening remarks Douglas Miller, Hagler Bailly
09 30-10 20	Baltic Interconnected Power System Legal structure of the Baltic Energy Council and its membership and tasks Committees under the Baltic Energy Council DC Baltija and its structure, functions and responsibilities Vilnis Krēsliņš , DC Baltija
10 20-10 40	Estonian power system Structure of the power sector in Estonia The role of government in international electricity contracting Enn Kallikorm, Eesti Energia
10 40-11 00	Coffee break
11 00-11 20	Latvian power system Structure of the power sector in Latvia The role of government in international electricity contracting Ivars Liuziniks, Latvenergo
11 20-11 40	Lithuanian power system Structure of the power sector in Lithuania The role of government in international electricity contracting Jan Balinskis, Lietuvos Energia
11 40-12 30	Control and operation of the Baltic IPS in market oriented conditions New technical requirements Agreements on parallel operation among the power systems of the Baltic States, Russia and Belarus Youri Pervoushin, DC Baltija

Monday, March 17, 1997 (continued)

12 30 -13 00	Discussion of procedure for the implementation of agreements on parallel operation Moderated by the chairman of the Central Asian delegation
13 00-14 00	Lunch
14 00-15 00	Agreements on electricity sales among the power systems of the Baltic states, Russia and Belarus Enn Kallikorm, Eesti Energia Ivars Liuziniks, Latvenergo Jan Balinskis, Lietuvos Energia Moderated by Vilnis Krēsliņš, DC Baltija
15 00-16 00	The principles of electricity tariff design Implementation of time-of-use rates in retail and wholesale markets Enn Kallikorm, Eesti Energia Ivars Liuziniks, Latvenergo Jan Balinskis, Lietuvos Energia Moderated by Vilnis Krēsliņš, DC Baltija
16 00-16 30	Discussion of electricity sales contracts and tariffs Moderated by the chairman of the Central Asian delegation
16 30-16 50	Coffee break
16 50-17 30	Practice of power transit implementation in the Baltic network Agreements on electricity transit among the power systems of the Baltic states, Russia and Belarus Vilnis Krēsliņš DC Baltija
17 30-18 00	Discussion of transit agreements Moderated by the chairman of the CAR delegation
19 30 -21 30	Dinner buffet at the fireplace room of the hotel de Rome

Tuesday, March 18, 1997

09 00-10 00	System of payments for electricity sales, wheeling and power reserves among the power systems of the Baltic states, Russia and Belarus Penalty for non-payment
	Enn Kallikorm, Eesti Energia
	Ivars Liuziniks, Latvenergo
	Jan Balinskis, Lietuvos Energia
	Moderated by Vilnis Krēslinš
10 00-10 30	Discussion of payment issues
	Moderated by the chairman of CAR delegation
10 30-11 20	Practice of providing capacity reserves in the Baltic IPS Agreements about the reserves of generating capacity in the power systems of the Baltic states, Russia and Belarus
	Vilnis Krēslinš, DC Baltija
11 20-11 40	Coffee break
11 40-12 20	Provision of system reliability and stability in the operation of Baltic IPS Application of emergency protection systems affecting facilities and consumers, and agreements on implementation of these systems
	Youri Pervoushin, DC Baltija
12 20-13 00	Existing problems with reactive power and voltage control Experience of the Scandinavian interconnection NORDEL in dealing with reactive power consumption and voltage control
	Youri Pervoushin, DC Baltija
13 00-14 00	Lunch
14 00-15 00	Management of hydroelectric resources
	Enn Kallikorm, Eesti Energia
	Ivars Liuziniks, Latvenergo
	Jan Balinskis, Lietuvos Energia
	Moderated by Vilnis Krēslinš

Tuesday, March 18, 1997 (continued)

15 00-15 40	Experience of Baltic countries in EU international projects on possible interconnections among Central and Easter European power systems
	Youri Pervoushin, DC Baltija
15 40-16 00	Coffee break
16 00-16 50	Possibilities to improve overall optimization of power station operation in the Baltic IPS, and prospects for a power pool
	Enn Kallikorm, Eesti Energia
	Ivars Liuziniks, Latvenergo
	Jan Balinskis, Lietuvos Energia
	Vilnis Kreslinš, DC Baltija
16 50-17 30	Discussion of proposals to create a power pool
	Moderated by the chairman of the CAR delegation

Wednesday, March 19, 1997

09 00-09 30	Presentation by the chairman of the CAR delegation on existing international contracts and agreements in the Central Asian power sector
09 30-10 00	Prioritization of the existing contracts and agreements for further elaboration by the Working Group
10 00-11 00	Working session Development of international contracts and agreements
11 00-11 20	Coffee break
11 20-13 00	Working session, continued
13 00-14 00	Lunch
14 00-18 00	Tour of the DC Baltija control center and facilities of Latvenergo

Thursday, March 20, 1997

9 00-9 15	Review of the previous day's progress Plans for the remaining time
9 15-11 00	Working session Development of international contracts and agreements
11 00-11 20	Coffee break
11 20-13 00	Working session, continued
13 00-14 00	Lunch
14 00-14 30	Next steps regarding the activities of the working group
	Charles Zimmermann, Hagler Bailly
14 30-15 00	Discussion of the proposed agenda and schedule for the next seminar
	Douglas Miller, Hagler Bailly
15 00-15 30	Signing of memoranda on the results of the seminar
15 30-15 45	Closing remarks
	Chairman of the CAR Working Group
15 45-16 00	Closing remarks
	Douglas Miller, Hagler Bailly

Baltic Interconnected Power System
Baltic Energy Council
DC Baltija

Vilnis Kreslinsh
DC Baltija

In October 1, 1991 in the city of Parnu on the background of political processes which were taking place in the Baltic countries (Estonia, Latvia and Lithuania) power sector representatives of these countries decided to form the Union of Baltic power systems A document on parallel operation was signed

Joint operation of the Baltic power systems was legally established when the intergovernmental treaty was signed on the formation of an executive body which would be in charge of the implementation of the parallel operation

On January 7, 1992 ministers who were in charge of the power sector in the Baltic republics signed in Riga an agreement on parallel operation of power systems of the Republic of Latvia, Republic of Lithuania and Republic of Estonia

It is stated in this document that the most effective and reliable operation of power systems in Estonia, Latvia and Lithuania could be implemented by parallel operation The operation must be implemented on the principles of equality, mutual benefit and cooperation

It was also noted in this agreement that the work of the Baltic Interconnected Power system is supervised by the Energy Council, but in order to implement parallel operation of power systems the Dispatch Center of the Baltic power systems (DC Baltija) was formed and also the basic functions of it were determined

All the formation documents for DC Baltija were ready in February 1992 and by the legal part of forming in Riga an international, non-governmental organization - DC Baltija was created

Baltic Energy Council consists of three persons from each party i e from each country

Principle of selection one member of the Council is representing government structures, two members - representatives from power systems All members have equal rights, equally all the parties working in the Council Functions of Energy Council are determined in the bylaws of DC Baltija

Some of them

1 The Council approves the bylaws of DC Baltija and can make amendments in these bylaws

2 The Council considers basic schemes of parallel operation, planned schedules, energy balances of power systems

3 The Council determines the procedure and general amount of information to be interchanged

4 To nominate for the post and discharge from the post the director of DC Baltija

In order to better implement the above functions there are formed three committees

1 **Technical committee** It is dealing with the issues of electric schedules, relay protection and emergency equipment, schedules for power stations and substations, schedules for electric equipment in these facilities, communication, telemechanics, computer equipment, exchange of information etc At present this committee has the greatest work load

2 **Economic committee** It is dealing with tariffs for the wholesale market of electric power on bilateral agreements, provide information on economic values in the power systems and proposes the budget for DC Baltija The committee has a large potential and perspectives in the framework of development of energy market in the Baltic

3 **Committee on perspective planning** It has to deal with perspective development from regional point of view Training is going on to learn progressive methods of perspective planning

DC Baltija has five services

1 **Dispatch services** Part of this is scheduling Goal of this department is system control of the Baltic interconnected power system with mainly directed to the implementation of bilateral agreements on capacity and energy, implementation of wheeling of electric power, prevention and liquidation of emergency situation, implementation of parallel operation among power systems of three Baltic countries, Russia and Belarus

2 **Service of relay protection and electric schedules** Basic work - provision of stability of parallel operation in the Baltic interconnected power system, and Russia and Belarus

3 **Service of tele-mechanics and communication** It is providing DC Baltija and power systems of the Baltic with communication means and exchange of information, necessary to develop and implement schedules

4 **Service of automatic systems of dispatch management** It is managing the integrated information complex, local computer network, communication with power systems and software

5 **Service of information and technological supplies** It is dealing with technical and logistical operation of DC Baltija

Operation of the Baltic interconnected power systems in new market conditions

Joury Pervushin
DC Baltija

Present situation

- Baltic interconnected power systems at present continue to operate in the electric ring 330-750 kW Russia- Baltics-Belarus- Russia by routes which existed before the formation of the Baltic states
- Because 330-750 kW ring was planned and designed based on the principles of optimal development of the North-West Interconnected system, the self sufficiency of separate power system was not considered The construction of power stations and power lines was determined by the interests of the interconnected power system
- Instead of one dispatch center in Riga for the North-West region controlling the operation of the North West region of the Interconnected power systems at present there are three dispatch units scheduling the operation of the ring

  Central Dispatch Department of the Interconnected systems of Russia (DC North -West and Jantarenergo)

  DC Baltija

  Interconnected Dispatch Administration of Belarus

Technical philosophy

In the course of many years there were two technical philosophies prevailing in the operational management of power systems - Western where are combined the technical approaches which are similar in the Western-European systems of UCPTE and interconnected systems of Scandinavia - NORDEL and Eastern - reflecting the philosophy of interconnected system of COMICON countries

- Different technical philosophies had different requirements to the equipment of the power plants and transmission lines, to frequency and capacity regulation, and emergency equipment

Western philosophy is different from the Eastern in the following

- ➪ higher requirements to the capacity reserve,
- ➪ stricter regulations on required frequency,
- ➪ higher requirements with regard to reliability and stability,
- ➪ significant differences in regulation of reactive power and voltage
- ➪ during recent years due to the policy of demonopolization in EU countries in the power sector, new approaches in dispatching appear (provision of electricity deliveries)

- At present the process of reassessment of earlier technical philosophy is going on and formation of a new philosophy is in the process where earlier experience will be taken into account and best experience from USA, Western Europe, Scandinavia with adjustment to our conditions and market relations

- In order to learn from Western experience a series of joint projects and seminars were organized together with European power companies as Preussen Elektra, RWE, BayerWerk (Germany), EDF (France), Vattenfall (Sweden), IVO (Finland) and also with such companies as Siemens, ABB, Harris, Landis &Gir etc

- Since 1992 technical assistance was initiated by USA to share the North American experience in the management of power systems

  In 1992-1993 USAID sponsored a series of five seminars in DC Baltija which implemented by the company Hagler Bailly on contracting, tariffs and other technical issues of interest for the Baltics

- Since 1995 USAID has been sponsoring an assistance program in the Baltics on the development of Regional development program of the power systems which is implemented by a consulting company Electrotec Inc

DC Baltija has gained the following useful experience giving the possibility to improve the work in market conditions

Hagler Bailly seminars

Experience from gained from the reports by Ch Zimmermann, W Dunn (ECC Inc), R Stein (Central Vermont Public Services corp) T Kennedy (NERC) etc
☑ Awareness on necessity to have broader system of contracts and agreements on issues which earlier were treated as technical and formal agreement was not considered necessary For example, development of agreement on reactive power

☑ Awareness that transition period to the organized market economy will require gradual improvement of agreements This transition is a process This was confirmed by a gradual improvement of agreements of parallel operation in the Baltic power systems

☑ Information on joint ownership through the contracts and formation of joint power facilities In the regional development of the new power resources could be jointly owned

☑ Necessity to develop legislation in the field of economics
- The law on power industry has been adopted in Lithuania and in Estonia it is in the final version
- Baltic ring program has a special working group working on legal issues

☑ Understanding of DSM and indirect load management potential by means of time-of-use rate system for electric power to regulate daily energy balances

- All Baltic states introduced multipart tariffs for metering and settling the account with customers
- The issue of introduction of time-of-use tariff on the wholesale market within the Baltics and their neighboring power systems
- Work have been done in DSM introduction, considerable efforts in this question are made by Lithuania

☑ Awareness on the necessity to form government commission on tariff regulation in electric sector

- Based on the reports and materials presented by US experts it was shown the scale of influence of such authorities in the US and its importance for the economy of the countries
- Regulatory commissions are formed in all Baltic states

☑ Knowledge on organization of work on federal and state level with regard to reliability of systems in parallel operation

Experience of NERC (USA) through contracts and agreements in this issue

It is necessary to note that the series of seminars organized by Hagler Bailly were the first, but the most successful due to flexibility and quick response in the choice of subjects presenting the greatest interests to DC Baltija and the Baltic power systems

Regional Baltic development program and dispatching program (Electrotek Inc USA)

☑ The program is sponsored by USAID in 1995 is directed to the creation of the Baltic regional development program together with Electrotek Inc applying modern methods of economic and electric accounting

- This program has not been finished DC Baltija and power systems have received computers and program U-Plan, energy 2020 and PSS/E
- Training in these programs was organized in the Baltics and USA
- It is planned to finish this Program by the end of this year

☑ Electrotek Inc organized two seminars in 1996 on power pools, their benefits and possibilities

A working group is organized in the interconnected power systems of the Baltic states on the issue of power pooling

☑ Electrotek together with other US companies is directing a program on technological improvement of dispatch management in the power systems and in DC Baltija to introduce modern SCADA systems

- At present a tender is being organized to select SCADA systems for the Baltic countries

Cooperation with Scandinavian power systems and NORDEL

☑ Many years of cooperation with the major Scandinavian power systems Vattenfall, IVO which form the part of the interconnected systems of NORDEL has first of all given understanding on the specific dispatch management in these systems based on the principles of flexible and decentralized systems

- Decentralization was possible due to the "primary" precondition of annual capacity and energy self-sufficiency and interdependency which is of a voluntary character
- The high level of decentralization required careful technical calculations in solving technical operational issues and series of field experiments in the power systems
- In order to implement decentralization state-of-art technical tools in dispatching are needed and respectively more investments
- NORDEL experience was useful for our experts, as we gained knowledge on the liberalization of energy market and on energy trade issues where the customer can choose a supplier and sign a contract with him
-

Vattenfall and IVO have specific dispatch personnel to run this market

☑ **Cooperation experience** with such leading power Western systems as Siemens, ABB, HARRIS, Landis & Gir and others gave us the possibility to get acquainted with the most progressive dispatch management SCADA systems and information on technical implementation of direct load management in the power systems to introduce DSM

☑ **Experience in cooperation with EU** on the project of interface of Central and Eastern Europe Apart from the participation in these project we have the possibility to establish contacts with the power systems of all European countries and both Western European and Central European experience in the transition to new market conditions

unofficial translation

LAW ON REGULATION OF ENTREPRENEURSHIP ACTIVITIES IN ENERGY INDUSTRIES

The Law is passed by the Parliament in September 6,1995
and announced by the State President in September 27, 1995

Chapter 1
General Conditions

Article 1 Terms used in the Law

Energy supply - entrepreneurship comprising production, storing, transmission, distribution and sales of energy resources where license is needed.

License - for the purposes of this Law the license in energy supply

License area - territory stated in the license where the licensed energy supply enterprise and consumer or a consumers group has rights to operate

Energy supply enterprise - an entrepreneur dealing with energy supply and being licensed in compliance with the terms of the present Law

Energy supply enterprise plant - buildings or premises or equipment meant for production, storing, transmission, distribution or sales of energy resources, owned or operated by an energy supply enterprise

Energy production - entrepreneurship of energy resources transformation into another kind of energy

Storage of energy - entrepreneurship that comprises storing of energy resources in stocks , reservoirs, yards or storages for further sale

Energy security reserve - a certain volume of energy resources stored at the energy supply enterprise and ensuring continuous energy supply to consumers

Energy transmission - entrepreneurship that comprises energy resources transportation via main networks pipelines, power transmission lines and any other type of transport roads up to distribution

Energy distribution -entrepreneurship that comprises energy resources transportation via local networks pipelines, power transmission lines and any other type of transport roads from main network up to sales

Energy sales - entrepreneurship that comprises selling of energy to consumers

Energy consumer - for the purposes of this Law it is a physical or legal entity who buys energy to be used for carrying out energy supply or consumed for its own needs

State reserve in energy supply - certain volumes of energy resources kept in energy supply enterprise and at the disposal of the state ensuring the functioning of important objects of the Republic of Latvia as set in the legislation (first aid medicine, state defence, emergency services, heat supply, transport) in cases of interruption of energy supplies

6) representative from the Committee of Monopoly Supervision,
7) representative from major energy supply monopolies,
8) two representatives from Latvia Municipalities Union,
9) representative for protection of energy consumers- households interests

5 The Board shall issue the necessary decisions and norms to ensure fulfilment of the tasks entrusted to the Board

6 The executive institution incorporated in the Board shall be the License Office which is supevised by the Committee of Monopoly Supervision The License Office shall be financed from the state budget The License Office shall perform all necessary activities to arrange for fulfilment of the decisions passed by the Board and prepare documents for review by the Board

7 The Board has a status of the legal entity The Regulations of the Board and the executive institution - the License Office - shall be approved by the Cabinet of Ministers

Article 5 Tasks of the Board

1 In order to ensure regulation in the energy supply, the Board and its executive institutions shall have the following tasks

- to carry out licensing of energy supply enterprises,
- to approve the tariffs calculated by energy supply enterprises,
- to develop methodology for calculation of tariffs,
- to set the procedure for tariffs approval,
- to protect the interests of energy consumers,
- to promote efficient operation of energy supply enterprises,
- to encourage use of indigenous renewable energy resources in energy supply,
- within the limits of its competence to monitor whether operation of any energy supply enterprises complies with the requirements of legislation and regulations passed by the Cabinet of Ministers,
- to provide the required information on its operation and passed decisions to the Cabinet of Ministers,
- to review disputes between energy consumers and suppliers and make decisions that are binding for both parties and that can be appealed to the Court in the procedure set by the Law,
- to develop regulations on energy production and supply,
- to promote efficient use of energy supplied to consumers,
- to promote competition in energy supply,
- to publish a report on its operation and information in the official newspaper of the Republic of Latvia "Latvijas Vestnesis",

2 In carrying out the tasks set by this Law the Board shall comply with the National energy policy and the national Energy Development Program

Chapter 3
The Minister Responsible for Energy in the Energy Supply Regulation

Article 9 Duties of the Minister Responsible for Energy in the Energy Supply Regulation

The Minister responsible for energy shall have the following duties within the terms of this Law

1) develop the State Energy Policy,
2) protect the interests of energy consumers,
3) promote efficiency and economy in the use of energy supplied to consumers,
4) promote attraction of investments in energy sector, as well as in modernisation and construction of plants of the energy supply system,
5) set the volume of security reserve of energy in energy supply enterprises

Article 10 Powers of the Minister Responsible for Energy in the Energy Supply Regulation

The Minister responsible for energy shall have the following powers within the terms of this Law

1) to set the procedure of energy supply in periods when supplies of energy are or are likely to become irregular and ensure the recover of additional costs incurred to energy supply enterprises as a result of it,

2) to set the volumes and procedure for establishing and maintaining state reserve stocks of energy in energy supply enterprises taking into account recommendations of the Ministry of Finance and the Board and ensuring the recover of additional costs incurred to energy supply enterprises as a result of it,

3) to define rational use of energy and fuel, complying with the economic conditions and requirements for environment protection as well as changes in the world and republic energy supply market,

4) to set quality characteristics of energy resources that are imported to Latvia and exported from it,

5) to require from the Board an information on energy supply enterprises and their operation

1 The license in energy supply shall be issued by the Board for a charge that is transferred into the state budget

2 The license for energy production, transmission, distribution and storing shall be issued for a period of 20 years, but the license for sales - for a period of 5 years The issued license shall be reviewed every five years and amended if necessary

Article 15 Terms of License

The license issued to energy supply enterprise shall determine the following

1 Rights and duty of the energy supply enterprise to deal with energy supply
2 License area where the energy supply enterprise has the right to operate
3 License validity term.
4 Type of energy supply the enterprise is dealing with
5 Environment protection (ecological expertise)terms
6 Volume of energy security reserve in an energy supply enterprise
7 Procedure of payment for the license
8 Duty of the energy supply enterprise to provide the Board with the information on energy supply that is being carried out and changes in energy supply
9 Terms of amendment and annulment of the authorisation
10 Task for reduction of energy losses every year
11 Directions on fuel purchases by tender
12 Directions on equipping energy system with commercial meters

Article 16 Licensing of Heat Supply Enterprises

The license for heat supply shall be needed for the following activities

1 For production of heat in equipment with total installed capacity exceeding 1 MW,

2 For transmission and distribution of heat via pipelines with diameter exceeding 200 mm,

3 For sales of heat to any consumers exceeding 20 000 MWh per year

Article 17 Licensing of Power Supply Enterprises

The license for power supply shall be needed for the following activities

1 For generation of power in power plants with installed capacity exceeding 1 MW,

2 For transmission and distribution of power with voltage 1000 V and higher,

3 For sales of power to any consumers exceeding 4000 MWh per year

5 To participate in the planning and development of an efficient and coordinated energy supply system as well as in solving question regarding energy supply regimes

Article 22 Terms for Interruption of Operation of Energy Supply Enterprises, Construction or Extension of its Plants

1 All licensed energy supply enterprises shall inform the Board and the Minister responsible for energy of any proposals
- to close or otherwise cease to operate existing energy supply plant where its installed capacity exceeds 1 MW,
- to begin construction of new plants where the installed capacity exceeds 1 MW,
- to extend the existing plant where its installed capacity exceeds 1 MW

2 Giving effect without the consent of the Board and the Minister responsible for energy to the proposals listed in the 1st part of this article shall be prohibited

3 Information on the proposals listed in the 1st part of this article shall be submitted to the Board by energy supply enterprises in accordance with the procedure specified by the Board and shall be published in the official newspaper of the Republic of Latvia "Latvijas Vestnesis" in the volume defined by the Board

Article 23 Procedure of Approval of Construction and Extension Projects of Energy Supply Enterprises

1 The Energy Regulation Board shall give its consent for carrying out projects listed in the Article 22 1 within 30 days if
- the proposed project is consistent with the legislation,
- the project is consistent with the development of stable and efficient energy supply system and the State Energy Policy,
- technical and economic appraisals of the project have been conducted in accordance with the guidelines laid by the Board and the results of appraisals show that the project is justified on technical and economic grounds

2 If the Board withholds its consent for the project it shall give a notice to the enterprise within 30 days giving reasons for refusing the approval and publish the notice in the official newspaper of the Republic of Latvia "Latvijas Vestnesis" in the manner and amount determined by the Regulation of the Board

Article 24 Energy supply enterprises obligation to provide energy supply upon energy consumers' request

1 Energy supply enterprises shall ensure energy supply of the relevant quality and volume to all existing energy consumers as well as to those consumers who have requested energy supply to be provided in the license area of the energy supply enterprise in accordance with the procedure specified by the Board

5 A special control tariff of heat shall be defined for those energy supply enterprises which are equipped with commercial purpose heat meters, electricity meters and gas meters (if natural gas is used for heat production) Control tariffs shall be defined for heat supply systems whose total annual heat supply volume does not exceed 300 000 Gcal Heat shall be sold at the control tariff or lower This tariff shall be revised every year taking into account only the changes in the prices of energy resources The profit gained by the enterprise additionally to the provided profit by means of reducing production costs shall be used for further modernisation of production and provision of bonuses to employees involved in energy saving activities

6 Differentiated tariff for natural gas shall be applied to enterprises taking into account consumption of fuel for each sold unit of heat and the volume of gas used for heat production

7 Those heat production and supply enterprises for which the control tariff of heat has been defined in accordance with the 5th part of this Article shall obtain tax releases if they sell heat at a lower tariff than the control tariff

8 Heat tariff may be increased by 20% after year 1996 for those consumers who buy heat and do not have commercial purpose heat meters at the feeding points The decision on increase of the heat tariff upon the enterprise's recommendation shall be taken by the institution who is authorised to approve the tariff

9 Spare power which corresponds to the national power standard from renewable energy resources (minihydropower plants with installed capacity up to 2 MW and wind power plants) as well as from little capacity cogeneration plants (with installed capacity from 1 MW up to 12 MW) shall be purchased into the national power transmission grid at a higher tariff

10 The power purchase price from power plants mentioned in the 9th part of this Article shall correspond to double average sales tariff of power and shall be valid for eight years from the starting day of operation of the power plant After that the purchase price shall correspond to the average sales tariff of power

Article 28 Publicity of Tariffs

In order to ensure publicity of tariffs and their calculations an energy supply enterprise shall published them in the official newspaper of the Republic of Latvia "Latvijas Vestnesis" within a time period before their entering into force as set by the Board

Chapter 8
Liability for Breaches of Legislative Acts Passed in Connection with Energy Supply Issues

Article 29 Liability for breaches of energy supply terms

unofficial translation

Cabinet of Ministers of the Republic of Latvia
Regulations No _____

On Energy Regulation Board and it's Executive Institution

Chapter I
General Conditions

1 The Energy Regulation Board (further referred to as the Board) is a state institution which operates under supervision of the Ministry of Economy and implements tasks determined by the Law on Regulation of Entrepreneurship Activities in Energy Industries (Latvijas Vēstnesis, 1995, nr 147 , 1996, nr 62) The Executive Institution of the Board is the License Office

2 The Board shall operate in accordance with the Constitution, the rules, this regulation and other legislative bills The Board shall collaborate with other state and municipal institution

3 The Board consisting of 11 members shall be established by the Cabinet of Ministers

4 The Board is a legal entity The Board shall have a stamp with small State Emblem of Republic of Latvia and name of the Board on it

5 The Board and its operation shall be financed from state budget

Chapter II
Tasks of the Board

6 The Board shall regulate entrepreneurship activities in energy industries in accordance with the Law on Regulation of Entrepreneurship Activities in Energy Industries as well as the National Energy Policy and National Energy Development Program

7 The Board shall issue licenses to energy supply enterprises which are engaged in commercial activities in accordance with Articles 16 , 17 , 19 and 20 of the Law on Regulation of Entrepreneurship Activities in Energy Industries, review issued licenses and make amendments in their conditions as well as cancel issued licenses

resources and competition in energy supply taking into consideration capability of energy supply enterprises to provide permanent energy supply in needed quality

18 The Board within it's competence shall control accordance of any energy supply enterprise activity to laws, legislative acts and resolutions and acts of the Board

19 The Board shall determine order in which energy supply enterprises shall present to the Board annual report on accomplished and planed activities

20 If it is necessary for acceptance of resolution the Board can require any energy supply enterprise to provide additional information of it's activities In this case energy supply enterprise present required information within 10 working days from receiving day of request

21 The Board shall determine order in which energy supply enterprises shall present to the Board reports on projects enumerated in the first section of the Article 22 of the Law on Regulation of Entrepreneurship Activities in Energy Industries as well as requirements for technical and economical estimate of appropriate projects Simultaneously the Board shall determine information on named projects which shall be published by energy supply enterprises in the official newspaper "Latvijas Vestnesis"

22 The Board shall determine order in which energy consumers require energy resources supply to appropriate energy supply enterprise within place of action of license

23 The Board shall determine order and term in which energy supply enterprises shall present in accordance with the Article 25 of the Law on Regulation of Entrepreneurship Activities in Energy Industry testified duplicate of (with special conditions) signed agreement

24 The Board shall work out the projects of regulations on energy production supply and use and submit them to the approval of the Cabinet of Ministers

25 The Board shall review disagreements between energy consumers and suppliers and within 30 days after receiving of appropriate application adopt resolution binding for both parties Mentioned resolution can be appealed to the Court in the order determined by the Law

26 The Board shall provide to the Cabinet of Ministers the required information on it s activities and adopted resolutions

27 The Board shall inform not rarely than once in a quarter in the official newspaper Latvijas Vestnesis on following

27 1 issue of licenses indicating a name of energy supply enterprise, a manner of energy supply, license area and term,

32 The meetings of the Board shall take place not rarely than once a quarter The meetings of the Board shall be convened and conducted by the Chair of the Board The extraordinary meetings of the Board shall be convened if it is demanded by the Chair of the Board or at least 3 members of the Board

33 The time and agenda of the meeting of the Board shall be announced to all member of the Board not later than 5 working days before the meeting of the Board The copies of documents introduced by energy supply enterprises, which shall be reviewed in the meeting, and prepared by the License Office shall be added to the agenda

34 The Board shall have the rights to pass resolutions if there are not less than 8 members of the Board participating at it's meeting The Board shall carry a resolution by simple majority vote of present members of the Board voting publicly If number of votes divide equally decisive vote shall have the Chair of the Board The results of the voting shall be registered into minutes

35 The Chair of the Board shall have the rights to determine repeated voting on appropriate issue and in the case of necessity to demand additional information if the Chair of the Board or at least 3 members of the Board considers that the carried resolution does not correspond with public interests and can cause unfavorable economical effect

36 The meetings of the Board shall be minuted The minutes of meeting of the Board shall be signed by all member of the Board who participated at the meeting

37 Tne resolutions of the Board are compulsory to all energy supply enterprises

38 The Chair of the Board and the members of the Board are responsible for accordance of accepted resolutions with laws and legislative bills National Energy Policy and National Energy Development Program

39 Officials operating in the Board or the License Office, or being connected with their activities shall be prohibited to divulge information on economical activities of person applying for license if presentation of such information is not prescribed by law or other legislative bills

40 The Chair of the Board shall receive payment and extra payments for state civil service in special conditions in accordance with the Law on Civil Service (Latvijas Vēstnesis 1994, nr 52 1995 nr 82 , 1996 nr 49 , 64) as well as other payments in accordance with legislative acts of the Cabinet of Ministers If the position of the Chair is held by person under employment contract the payment shall be prescribed by the employment contract

48 9 to work out projects of regulations on production and supply of energy,

48 9 to cooperate with the Energy Consumers Committee

48 10 to send energy consumers applications and complaints to the Energy Consumers Committee to review summarize and analyze and after receiving the opinion of the Energy Consumers Committee to give appropriate information to the Board

48 11 to supervise the implementation of delegated functions of the Board in self-governments,

48 12 to gather and systematize information on energy supply necessary for the Board

48 13 to provide open activities of the Board (publishing of reports in newspapers)

48 14 to carry out functions of the Secretariat of the Board,

48 15 to carry out duties given by the Board

49 The License Office in the name of the Board shall have the rights

49 1 to demand and receive without hindrance from energy supply enterprises as well as form state and municipal institutions information necessary for implementation of its tasks which amount, manner and introduction term is determined by the resolution of the Board

49 2 to organize inspections in energy supply enterprises to control correspondence of their activities to requirements of issued license, resolutions, approved methods and determined standards of the Board,

49 3 to form work units for implementation of separate tasks if necessary appealing independent experts

50 The License Office shall be conducted by the Director which is appointed and dismissed by the Chair of the Board in accordance with resolution of the Board

51 The Director of the License Office shall be selected by the Board on the competition system in accordance with requirements of the Law on Civil Service The Director of the License Office is official (candidate of official) and is directly subordinate to the Chair of the Board

52 The Director of the License Office

52 1 shall represent the License Office in energy supply enterprises as well as in state and municipal institutions

52 2 within its competence shall deal with property and finances of the License Office and is responsible for use of its material and financial means,

52 3 after co-ordination with the Chair of the Board shall approve a list of staff of the License Office

52 4 shall approve regulations of units of the License Office

52 5 in accordance with the Law on Civil Service shall appoint and dismiss officials (candidates of official) of the License Office and in accordance with the Labor

unofficial translation

Cabinet of Ministers of the Republic of Latvia
Regulations No _____

On Energy Consumers' Committee

Chapter I
General Conditions

1 Energy Consumers' Committee (further referred to as Committee) is collaboration organization which shall implement tasks determined by the Law on Regulation of Entrepreneurship Activities in Energy Industries (Lavijas Vestnesis, 19995, nr 147, 1996, nr 62)

2 The Cabinet of Ministers shall establish the Committee in accordance with the Law on regulation of Entrepreneurship Activities in Energy Industries and approve the members of the Committee as well as make amendments in it

3 The Committee shall operate according to laws, this Regulations, resolutions of the Energy Regulation Board (further referred to as the Board) and other legislative bills

4 The technical and financial means necessary for activities of the Committee shall be provided by the Ministry of Economy accordingly to allocated means of state budget

Chapter II
Tasks and rights of the Committee

5 The Committee shall have the following tasks

5 1 to ensure protection of the interests of all groups of consumers in energy supply and regulation of energy supply,

5 2 to provide information and reports to the Board on situation in Energy Supply Enterprises as far as it concerns the interests of energy consumers,

5 3 to cooperate with the public organizations of protection of consumers interests which have been established and operate in accordance with the Law on Protection of Consumers Rights (Latvijas Republikas Augstākās Padomes un Valdības Zinotājs 1992 nr 46 /47 /48), the Law on Public Organizations and their Unions (Latvijas Republikas Augstākās Padomes un Valdības Zinotājs 1993 nr 1 /2 16 /17 20 /21 Latvijas Vēstnesis, 1993 nr 108 , 1995, nr 61) and the Law on Trade - unions (Latvijas Republikas Augstākās Padomes un Valdības Ziņotājs, 1991, nr 3 /4),

5 4 to review energy consumers complaints and proposals,

10 The Committee shall begin the rights provided by section 6 1 and 6 2 of this regulation after establishment of the Board and when the License Office begins its activities

11 Untill adoption of appropriate resolutions of the Board, determination of standards and approval of methods the Committee shall carry out its activity in accordance with valid standsrds and methods regulating energy supply

ACCEPTED
by Decision No 11 made by
Energy Regulation Council
on November 12,1996

Amendments made by Energy Regulation Council decision No 2 on January 28,1997 and decision No 6 on February 11,1997

REGULATIONS "FOR LICENSING OF POWER SUPPLY ENTREPRENEURIAL ACTIVITY"

The following Regulations shall determine the order of licensing of the power supply entrepreneurial activity in the Republic of Latvia The licensing shall apply to power supply entrepreneurial activity pursuant to the Law "On Regulation of Entrepreneurial Activity in Power-Supply", paragraph 16,17,19 and 20

1 TERMS USED IN PRESENT REGULATIONS

1 1 All terms defined in the present Chapter shall have the same meaning throughout all and any chapters of and appendices to the Licensing Regulations

1 2 The following words and terms used in the text hereof shall have the following meaning

Power	within the meaning of the present Regulations - electrical, power, heating power, natural gas and liquefied gas
Production of electrical power	the process during which the electrical power is obtained in a power station for supply to either transmission or distribution network, or directly to consumers
Production of heating power	the process during which the heating power is obtained from the heating source for supply to either transmission or distribution network, or directly to consumers
Power station	a power generator or whatsoever kind, or an industrial equipment delivering the surplus power produced by it to either transmission or distribution network, or directly to consumers on commercial basis
Heating source	a boiler - house, heating plant, co-generating power station, as well as industrial or technological equipment delivering the surplus heating power produced by it to either transmission or distribution network, or directly to consumers on commercial basis
Co-generation	the technological production process during which

2 GOALS AND TASKS OF THE LICENSE

2 1 The goal of the licensing is to provide power-supply in accordance with the law of the Republic of Latvia "On Regulations of Power-Supply Entrepreneurial Activity"

2 2 The tasks of power-supply licensing include the following

1) to provide continuous and unhindered supply of consumers with electrical, heating power and gas,

2) to promote entrepreneurial activity in the branch of power - supply and protection of the consumers' interests,

3) to provide power-supply in accordance with the Government power-supply policy

3 GENERAL PROVISIONS

3 1 The licenses for performance of power-supply entrepreneurial activity are issued by the Regulator in accordance with the law "On Regulations of Power-Supply Entrepreneurial Activity" and Regulations No 163 "The Rules of Power-Supply Regulation Council and its Executive Bodies" made by the Cabinet of Ministers on 07 05 96

3 2 The licenses are issued for performance of entrepreneurial activity set forth in the law "On Regulation of Power-Supply Entrepreneurial Activity", paragraph 16,17,19 and 20

3 3 The licenses for performance of entrepreneurial activity in the branch of power-supply are issued to the power -supply enterprises carrying out entrepreneurial activity covering either the whole power-supply cycle or separate stages of the cycle, and possessing or renting the fixed assets necessary to provide power-supply

3 4 The licenses for production, storage, transmission or distribution of power resources are issued for 20 years, and the licenses for sales - for 5 years The issued licenses are reviewed every 5 years, and the necessary amendments are introduced in them

3 5 The licensed enterprise shall submit annual account to the Regulator, a report on compliance with provisions of the license and the business plan covering the next year on annual basis as well as it shall pay the annual part of charge for the license in accordance with the provisions thereof

3 6 The Regulator shall, in order set forth by the Cabinet of Ministers, determine the amount of annual charge for the license The license charge shall be paid in bank account indicated by the Regulator

3 7 The state for the license shall be deducted to the state budget by payment thereof in the bank account indicated by the Regulator prior issue of the license

4 2 3 The bearer of exclusive license may not eliminate the licensed manufacturers' access to transmission or distribution networks, provided that it is technically available

4 3 Description of some kinds of power-supply entrepreneurial activity and the effective areas of corresponding licenses

4 3 1 Production of electrical power

1) Production of electrical power is subject to licensing, provided that the active power supplied by the power station to consumers exceeds 1,0 MW measured at the outlet of voltage increasing/reducing (network) transformers or at the place of connecting to transmission/distribution network

2) The entity applying for the license determines the purpose of production

3) The effective area of the license covers the geographical location of the power-station, the description of which is accepted by the Regulator

4 3 2 Transmission of electrical power

1) Exclusive license shall be issued for performance of electrical transmission, provided that the enterprise provides transportation of power by the means of high voltage lines and equipment of nominal voltage exceeding 20 kV, including

a) transportation of electrical power from power-stations either to distribution enterprises or directly to the final consumers,

b) transportation of electrical power from suppliers outside Latvia either to distribution enterprises or directly to the final consumers

c) transportation of electrical power to consumers outside Latvia,

d) transportation of electrical power between more than two distribution enterprises

2) The license shall be exclusive on the territory of Latvia

3) A non-exclusive license for transmission can be issued, provided that the bearer of exclusive license verifies to the Regulator motivated impossibility to carry out transmission where required by the manufacturer and the consumer As the case may be, the new licensed enterprise shall have to comply with reasonable technical requirements of the bearer of exclusive license (security, automation, moods, etc), as well as the technical and economical considerations set forth by the Regulator

4) Transit of electrical via the territory of Latvia shall be carried out in accordance with the European Power Charter, paragraph 7

4 3 3 Distribution of electrical power

4 3 6 Transmission of heating power

1) Exclusive license for performance of heating power transmission shall be issued provided that the enterprise performs transmission via pipelines from the heating source to either the distribution network directly to consumers

2) The license shall be exclusive in the effective area within the limits of which the heating network owned by the transmission enterprise is situated

3) A non-exclusive license for transmission can be issued, provided that the bearer of exclusive license verifies to the Regulator motivated impossibility to carry out transmission where required by the manufacturer and the consumer As the case may be, the new licensed enterprise shall have to comply with reasonable technical requirements of the bearer of exclusive license (security, automation, moods, etc), as well as the technical and economical considerations set forth by the Regulator

4 3 7 Distribution of heating power

1) Exclusive license for performance of heating power distribution shall be issued provided that the enterprise performs distribution via pipelines from either the heating source or transmission network to consumers

2) The license shall be exclusive in the effective area within the limits of which the heating network owned by the distribution enterprise is situated

3) A non-exclusive license for distribution can be issued, provided that the bearer of exclusive license verifies to the Regulator motivated impossibility to carry out distribution where required by the manufacturer and the consumer As the case may be, the new licensed enterprise shall have to comply with reasonable technical requirements of the bearer of exclusive license (security, automation, moods, etc), as well as the technical and economical considerations set forth by the Regulator

4 3 8 Sales of heating power

1) Upon issue of the license the electrical distribution enterprise shall become entitled to obtain the license for sale of electrical Therefore it becomes obliged to meet whatsoever reasonable demand for its services within the effective area of license

2) The effective area of the sales license shall cover the territory within the limits of which the consumers connected to the distribution network are situated

3) The license for sales shall be issued to another enterprise, if

a) the licensed distribution enterprise operating in the effective area of license is unable to meet the quality of services required by the consumers,

5) Given all other conditions equal, the licensed enterprises have priority rights over other potential applicants to obtain the license for storage of natural gas in all perspective natural gas storage facilities

4 3 11 Distribution of natural gas

1) Exclusive license for distribution of natural gas shall be issued provided that the enterprise provides transportation of natural gas by the means of medium and low pressure gas-mains and equipment with designed labor pressure equal to or less than 1,6 MPa, including

a) transportation of natural gas from the storage enterprise or either to the sales enterprise to consumers,

b) transportation of natural gas from the transmission enterprise to either sales enterprise or to consumer

2) The license shall be exclusive on the territory the description of effective area of which has been approved by the Regulator

3) A non - exclusive license for distribution can be issued, provided that the bearer of exclusive license verifies to the Regulator motivated impossibility to carry out distribution where required by the manufacturer and the consumer As the case may be, the new licensed enterprise shall have to comply with reasonable technical requirements of the bearer of exclusive license (security, automation, moods, etc), as well as the technical and economical considerations set forth by the Regulator

4) Transit of natural gas via the territory of Latvia shall be carried out in accordance with the European Power Charter, paragraph 7

4 3 12 Sales of natural gas

1) Simultaneously upon issue of the license, the natural gas distribution enterprise shall obtain the license for sales of natural gas to consumers Therefore it becomes obliged to meet reasonable demand for its services within the effective area of license After 5 years a new sales license is issued, if no factors appear, which require a necessity to revoke the license

2) The effective area of the sales license shall cover the territory description of which is approved by the Regulator

3) The license for sales shall be issued to another enterprise, if

a) The licensed distribution enterprise operating in the effective area of license is unable to meet the quality of services required by normative acts

b) The licensed distribution enterprise operating in the effective area of license reasonably refuses to sell the natural gas to consumers within the effective area of license

4) A licensed sales enterprise shall be obliged to announce the resale prices and rates in the order and terms determined by the Regulator

5 9 A licensed enterprise shall report to the Regulator on extension of licensed entrepreneurial activity construction or dissolution of objects in accordance with provisions of the Law " 'On Regulation of Power-Supply Entrepreneurial Activity"

5 10 A licensed sale enterprise shall be obliged to publish the prices and rates for energy sales in the order and terms set forth by the Regulator

5 11 Should a licensed enterprise intend to cease the licensed power-supply entrepreneurial activity, a notice must be given to Regulator prior to the intended termination of activity in the terms set forth in the license

6 EFFECTIVE PERIOD OF THE LICENSE

6 1 In case of existing power-supply enterprises, the license shall be valid since the moment it is issued In case of new enterprises, the license shall be valid since the moment the power-supply is commenced

6 2 The term of putting power-objects into exploitation shall be determined by the applicant for the license

7 PROVISIONS OF THE LICENSE

Pursuant to the Law "On Regulation of Power-Supply Entrepreneurial Activity", paragraph 21, the power-supply enterprise must meet and comply with all provisions of license set forth in the said Law, paragraph 15, as described in the licensed and approved by the Regulator

8 REVIEW AND AMENDMENT OF LICENSE PROVISIONS

8 1 Provisions of the license can be reviewed and amended at proposal of the licensed enterprise, should the enterprise motivate necessity of the amendments

8 2 Provisions of the license can be amended if the licensed enterprise violates normative acts and technical safety regulations

8 3 Provisions of the license can be amended, if it is otherwise impossible to provide economically reasonable energy supply within the effective area of license

8 4 Provisions of the license shall be reviewed if either the licensed enterprise fails to comply with provisions of the license, or activity of the enterprise has not commenced during one year from the term set forth in the license, or the licensed enterprise has submitted a false information on its entrepreneurial activity

1) application (Appendix 1) showing the list of all attached documents,

2) a copy of Certificate of Incorporation of the enterprise ,

3) a copy of Charter of the enterprise,

4) the latest annual report, with additional statement of
a) explication of debtors and creditors,
b) profit and loss account of the enterprise,
c) the current cash-flow account for the existing enterprises, and the planned cash-flow account for new enterprises,
d) auditor's conclusion about financial position of the enterprise (if required by the law),
e) investment plan covering 5 years,

5) the list of shareholders enlisting all natural and juridical entities with the corresponding capital shares hold by them,

6) copies of the documents verifying the possession or ownership rights towards the estate,

7) the list of senior executive staff of the enterprise (Directors, Chief Engineer, Chief Accountant) together with the data about documents verifying their qualification,

8) description of the area (a map showing geographical locations of the power-supply enterprise, the chart of transmission and/or distribution networks) where the license applicant intends to carry out entrepreneurial activity and provide safe and undisturbed supply of the certain kind of power to consumers,

9) a declaration stating the amount of power produced, stored, transmitted, distributed and/or sold during two previous years, and the amount planned for the current year (both in units of measurement and in Lats) (Appendix 2, report forms 1 to 3),

10) technical description of fixed assets of the enterprise (both physical units of measurement and % of wear-out listed),

11) annotation on re-construction and development plan of the enterprise and prospects for next 5-10 years,

12) distribution of the produced, transmitted and sold power as per groups of consumers (Appendix 2, report form 3, table N-1)
a) population,
b) state budget enterprises,
c) local government budget enterprises,
d) manufacturing consumers,
e) other consumers,

 Previous Page Ide

2) total capacity of gas-mains in the effective area of license (Appendix 3, report form 8, table P-5),

3) gas quality certificate,

12 2 7 For storage of natural gas

1) technical description of equipment used for storage (capacity of each compressor and number),

2) gas quality certificate,

12 2 8 For distribution of natural gas - total number of GRS (Appendix 3, report form 8, table P-6),

12 2 9 For sales of natural gas - total number of GRS,

12 2 10 For storage and barreling of liquefied gas

1) technical description of gas barreling devices,
2) gas quality certificate,
3) storage and barreling places (address),

12 2 11 For distribution, transportation and sales of liquefied gas - gas quality certificate

12 3 The documents issued by power-supply enterprise shall be accepted by Manager of the enterprise

13 THE ORDER OF SUBMISSION, REVISION OF DOCUMENTS AND ISSUING OF LICENSES

13 1 The documents required to obtain the license and other documents required by the Regulator must be submitted to the Licensing Office, and they are registered by official of the corresponding licensing division

13 2 Should the submitted documents fail to contain sufficient data for objective solution of the matter, the Licensing Office send a corresponding notice to the applicant during a week, stating the required data and documents

13 3 The application for licence shall be published in the official magazine "Latvijas Vēstnesis" during one week, provided that all documents required to obtain the licence are submitted The application for licence shall be reviewed not later than 30 days since the publication date of application for licence

13 4 The official of the Licensing Office shall introduce the Regulator with the materials submitted in support of application for, canceling of the license and amendment of license provisions prior to the meeting

17 PUBLICATION OF INFORMATION CONCERNING LICENSE

The Regulation shall publish the following information in official press of Latvia and in international sources of information, if necessary

1) a call to receive the license, stating the conditions applicable to the entity applying for the license

a) to deal with power-supply installing the equipment for production, transmission, distribution or sales of power,

b) to deal with production, transmission, distribution of sales power,

c) to assume the power-supply functions from an acting power-supply enterprise or the one under bankruptcy

2) a notice stating that the license for performance of entrepreneurial activity within certain effective area of license shall be issued to a power-supply enterprise,

3) a notice stating that the application for license has been rejected,

4) a notice stating that the license has been issued,

5) a notice stating that the Regulator intends to revoke the license,

6) a notice stating that the Regulator has revoked the license

Electricity differentiated rates
(without VAT)
for various consumers groups since the
1st July 1996

N	Tanff rate	meansu-rement unit	0,4 kV supplying voltage rate	6,10,20 kV supplying voltage rate	110 kV & more supplyi-ng vol-tage rate
1	2	3	4	5	6
	A.Residents				
	1 T-1				
	charge for electricity	Ls/kWh	0 0285		
	2 T-2				
	charge for electricity according to day/night				
	2 1 during night	Ls/kWh	0,019		
	2 2 during day	Ls/kWh	0 031		
	B.Other electricity consumers				
	3 T-3				
	(if the permitted load does not exceed 60 kW)				
	3 1 subscription charge	Ls/year	10,65	10,65	
	3 2 charge for electricity	Ls/kWh	0,028	0,023	
	4 T-4				
	(if the permitted load does not exceed 60 kW)				
	4 1 subscription charge	Ls year	10,65	10,65	
	4 2 charge for electricity according day/night and wekly zone tariff				
	4 2 1 during night	Ls/kWh	0,019	0,015	
	4 2 2 during day	Ls/kWh	0,031	0,029	
	5 T-5				
	(if the permitted load is 60 1 kW-399 kW)				
	5 1 subscription charge	Ls/year	61 0	61,0	
	5 2 charge for electricity	Ls/kWh	0,025	0,022	
	5 3 charge for the permitted load	Ls/kW year	3,63	2,74	

1	2	3	4	5	6
6 T-6					
(if the permitted load is 60,1 kW-399 kW)					
	6 1 subscription charge	Ls/year	61,0	61,0	
	6 2 charge for electricity according day/night and weekly zone tariff				
	6 2 1 during night	Ls/kWh	0,019	0 015	
	6 2 2 during day	Ls/kWh	0 029	0,025	
	6 3 charge for the permitted load	Ls/kV year	3,63	2,74	
7 T-7					
(if the permitted load 60 1 kW 399 kW)					
	7 1 subscription charge	Ls/year	61,0	61 0	
	7 2 charge for electricity according to there zone day/night and weekly zone tarrif				
	7 2 1 during night	Ls/kWh	0,016	0,015	
	7 2 2 during max hours	Ls/kWh	0 044	0,038	
	7 2 3 during day	Ls/kWh	0,028	0,024	
8 T-8					
(if the permitted load is 400 kW & more)					
	8 1 subscription charge	Ls/year	152,0	152,0	152,0
	8 2 charge for electricity	Ls/kWh	0,020	0,0185	0,016
	8 3 charge for required load during maximal hours	Ls/kW year	25,87	21,30	18 26
9 T-9					
(if the permitted load is 400 kW & more)					
	9 1 subscription charge	Ls/year	152,0	152,0	152,0
	9 2 charge for electricity according day/night and weekly zone tariff				
	9 2 1 during night	Ls/kWh	0,015	0 0146	0,014
	9 2 2 during day	Ls/kWh	0,024	0,022	0,0195
	9 3 charge for demanded load during maximum hours	Ls/kWh year	25,87	21,30	18,26

1	2	3	4	5	6
10 T-10					
(if the permitted load is 400 kW & more)					
10 1 subscription charge		Ls/year	152,0	152,0	152,0
10 2 charge for electricity according to three zone day/night and weekly tariff					
	10 2 1 during night	Ls/kWh	0 015	0,014	0,0127
	10 2 2 maximum hours	Ls/kWh	0 041	0,038	0,030
	10 2 3 during night	Ls/kWh	0 029	0,025	0,019

Charge for reactive power if tgφ is more than 0,4(cosφ=0 929) and permitted load 100 kW & more is 0,003 Ls/kVArh

Pielikums
Energoapgādes regulēšanas padomes
1997 gada 25 februāra rīkojumam Nr 9

Privatizējamās valsts a/s " LATVENERGO" elektroenerģijas diferencētie realizācijas tarifi lietotāju grupām, sākot ar 1997 gada 1 ~~aprīli~~ maija (bez PVN)

Lietotāju grupas	Mērvienība	0,4 kV pieslēguma sprieguma tarifs	6,10,20 kV pieslēguma sprieguma tarifs	110 kV un augstāka pieslēguma sprieguma tarifs
1	2	3	4	5
A Iedzīvotāju sektors				
Tarifs T - 1				
1 Maksa par elektrisko enerģiju				
1 1 Iedzīvotāji, kāpņu telpu apgaismojums	Ls/kWh	0,031356		
Tarifs T - 2				
1,Maksa par elektrisko enerģiju pēc diennakts zonām				
1 1 nakts zona	Ls/kWh	0,02422		
1 2 dienas zona	Ls/kWh	0,03460		
B Pārējie elektroenerģijas lietotāji (izņemot iedzīvotājus)				
I Lietotāji ar atļauto slodzi līdz 60 kW				
Tarifs T - 3				
(ja atļautā slodze nepārsniedz 60 kW)				
1 Abonēšanas maksa	Ls/gadā	11,40	11,40	
2 Maksa par elektrisko enerģiju	Ls/kWh	0,0320	0,0263	
Tarifs T -4				
(ja atļautā slodze nepārsniedz 60 kW)				
1 Abonēšanas maksa	Ls/gadā	11,40	11,40	
2 Maksa par elektrisko enerģiju pēc diennakts un nedēlas zonu tarifa				
2 1 nakts zona	Ls/kWh	0,0274	0,0224	
2 2 diennakts zona	Ls/kWh	0,0391	0,0320	

1	2	3	4	5
II Lietotāji ar atļauto slodzi no 60,1 līdz 399 kW				
Tarifs T - 5				
(ja atlautā slodze 60,1 kW - 399 kW)				
1 Abonēšanas maksa	Ls/gadā	65,40	65,40	
2 Maksa par elektrisko enerģiju				
	Ls/kWh	0,0275	0,0240	
3 Maksa par atļauto slodzi	Ls/kW/g	4 20	3,60	
Tarifs T - 6				
(ja atļautā slodze 60,1 kW - 399 kW)				
1 Abonēšanas maksa	Ls/gadā	65,40	65,40	
2 Maksa par elektrisko enerģiju pēc diennakts un nedēļas zonu tarifa				
2 1 nakts zona	Ls/kWh	0,0260	0 0211	
2 2 dienas zona	Ls/kWh	0,0372	0 0302	
3 Maksa pai atļauto slodzi	Ls/kW/g	4,20	3,60	
Tarifs T - 7				
(ja atļautā slodze 60,1 kW - 399 kW)				
1 Abonēšanas maksa	Ls/gadā	65,40	65,40	
2 Maksa par elektiisko enerģiju pēc 3 zonu diennakts tarifa un nedēlas zonām				
2 1 nakts zona	Ls/kWh	0,0253	0,0208	
2 2 maksimuma zona	Ls/kWh	0,0540	0,0446	
2 2 dienas zona	Ls/kWh	0,0360	0,0297	
III Lietotāji ar atļauto slodzi 400 kW un lielāku				
Tarifs T - 8				
(ja atļautā slodze 400 un lielāka)				
1 Abonēšanas maksa	Ls/gadā	98,40	98,40	98,40
2 Maksa par elektrisko enerģiju				
	Ls/gadā	0,0266	0,0220	0,0183
3 Maksa par pieprasīto slodzi maksimuma stundās				
	Ls/kW gadā	33,60	25,44	20,76
Tarifs T - 9				
(ja atlautā slodze 400 kW un lielāka)				
1 Abonēšanas maksa	Ls/gadā	98 40	98,40	98,40
2 Maksa par elektrisko enerģiju pēc diennakts un nedēļas zonu tarifa				
2 1 nakts zona	Ls/kWh	0,0206	0,0192	0,0179
2 2 dienas zona	Ls/kWh	0,0295	0,0274	0,0255
3 Maksa par pieprasīto slodzi maksimuma stundās				
	Ls/kW gadā	33,60	25,44	20,76

1	2	3	4	5
Tarifs T - 10				
(ja atļautā slodze 400 kW un lielāka)				
1 Abonēšanas maksa	Ls/gadā	98,40	98 40	98,40
2 Maksa par elektrisko enerģiju pēc 3 zonu diennakts tarifa un nedēļas zonām				
2 1 nakts zona	Ls/kWh	0,0237	0 0199	0,0174
2 2 maksimuma zona	Ls/kWh	0,0506	0,0426	0,0373
2 3 dienas zona	Ls/kWh	0,0338	0,0284	0,0248

Skaitītāju noma - saskaņā ar Energoapgādes regulēšanas padomes 1996 gada 16 jūlija rīkojumu Nr 1

Maksa par reaktīvo enerģiju - saskanā ar Latvijas Republikas Ministru kabineta 1995 gada 10 oktobra noteikumiem Nr 299

Priekšsēdētājs A Pakrastiņš

Vanaga 7013 240

JOINT STOCK CO "LIETUVOS ENERGIJA"

ELECTRICITY PRICES

Specified Tariffs	Units	Voltage		
		Low	Medium	High
		0 4 kV and less	6 - 110 kV	110 kV and higher
1 Single Tariffs				
1 1 Residential without stationary electric stoves	USc/kWh	5		
1 2 Residential with stationary electric stoves	USc/kWh	4		
1 3 Agriculture	USc/kWh	3 5		
1 4 Others	USc/kWh	5	3 25	3 13
2. Off-Peak Tariffs (night and weekends)				
2 1 Residential without stationary electric stoves	USc/kWh	3 5		
2 2 Residential with stationary electric stoves	USc/kWh	2 75		
2 3 Agriculture	USc/kWh	2 25		
2 4 Others	USc/kWh	3 5		
3 Double-Priced Tariffs				
- for energy consumption	USc/kWh	4 5	2 95	2 88
- for requested capacity	USD/kW/month	3 75	2 5	2 5
4 Differential Tariffs				
- off-peak (from 11 p m. to 7 a.m)	USc/kWh	3	1 95	1 88
- mid-peak	USc/kWh	5	3 25	3 13
- peak period	USc/kWh	8 5	6 18	5 95
- weekends (from 7 a.m. to 11 p m)	USc/kWh	3 75	2 6	2 5

MULTILATERAL WHEELING AGREEMENT FOR CENTRAL ASIA CONTROL AREA

This Multilateral Wheeling Agreement (this "Agreement") is made and entered into this _____ day of _____, 199_, by and among the Partners signatory to and in good standing with the Dispatch Center Energia Partnership Agreement, collectively hereafter called the "Partners," or individually called the "Partner"

[NOTE This Agreement is written as if there were no Central Asia Power Pool, but rather that DC Energia is governed by a Partnership If the Working Group approves the formation of a Central Asia Power Pool, this Agreement would be modified accordingly]

Whereas, the Partners may own and operate facilities for the generation of electrical capacity and energy and desire to sell electrical capacity and energy to other Partners, and

Whereas, the said purchasing Partners own and operate facilities to serve electrical load and desires to purchase electrical capacity and energy from the selling Partner, and

Whereas, certain Partners own and operate transmission facilities which provide a path for the flow of electrical energy between the selling Partner and the buying Partner and who are willing to provide transmission capacity and to transport said electrical energy,

Now, therefore, the seller, the buyer, and the Wheeler, each in consideration of the mutual agreements set forth herein, agree as follows

1 DEFINITIONS

1 1 **Agreement** shall mean the agreement identified in the first paragraph of this document as the same may be amended or supplemented from time to time

1 2 **Central Asian Republics** shall mean to include the Republics of Kazakstan and Uzbekistan, the Kyrgyz Republic, Tajikistan, and Turkmenistan

1 3 **Central Asia High-Voltage Transmission System** or **CAHVTS,** shall mean the transmission facilities rated 110 kV or higher within the Control Area, including

1 3 1 All transmission lines rated 110 kV and higher, except

1 3 1 1 Those which are required to serve local load only, thereby contributing little or no parallel capability to the interconnected system

1 3 1 2 Lines which are normally operated open

1 3 1 3 Generator leads

1 3 2 Necessary linkages (includes substation facilities such as transformers, circuit breakers, and associated equipment) required to interconnect the lines which constitute CAHVTS

1 4 **Control Area** shall mean the electric power system or combination of electric power systems bounded by interconnection metering and telemetry to which a common generation control scheme is applied The Central Asia Control Area includes the electrical energy systems of Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, and the southern part of Kazakstan

1 5 **Dispatch Center Energia** (or **DC Energia**) shall mean the Central Asia Republics' regional electrical energy dispatch center and any permitted successors and assigns

1 6 **Effective Date** [_____, 199_], shall mean the date upon which this Agreement takes effect

1 7 **Executive Committee** shall mean the Executive Committee of the Partnership which governs the operation of Dispatch Center Energia

1 8 **Force Majeure** shall mean any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment not due to lack of proper care or maintenance, any order, regulation or restriction imposed by a court, or any other cause beyond a Party's control

1 9 **Total System Capability** shall mean the total net generating capability within the Central Asia Control Area as of the last day of the previous calendar year, as determined by the Executive Committee

1 10 **Transmission Fund** shall mean the handling of and accounting for funds by DC Energia (or some other entity as designated by the Partners) resulting from multilateral wheeling transactions

1 11 **Wheeling** shall mean transmitting a contractual amount of power over specified time periods through the system of an electric utility company which is neither the seller nor the buyer of this power

2 PURPOSE

This agreement provides the detailed terms and conditions under which the transport of electrical capacity and energy is achieved among the Partners signatory to the Dispatch Center Energia Partnership Agreement

3 STATUS OF PREVIOUS AGREEMENTS BETWEEN THE PARTIES

3 1 This Agreement is written in accordance with "Agreements on Economic Cooperation" among the Governments of the Republics of Kazakstan, Kyrgyzstan,

Tajikistan, Turkmenistan and Uzbekistan dated [_____, 19__], hereinafter known as the "Agreements on Economic Cooperation" This Agreement is intended to implement the Agreements on Economic Cooperation, which are still in effect

3 2 The Governments of the five Central Asian Republics are each signatories of the Energy Charter Treaty dated December 17, 1994 Therefore this Agreement is subject to the terms and conditions of the Energy Charter Treaty

3 3 Nothing in this section will prevent the Partners from entering into future bilateral or multilateral agreements that may alter the terms of this Agreement

4 TERM OF AGREEMENT

The term of this Agreement shall begin on the Effective Date and continue until _____ This Agreement may be renewed for an additional ___ (years) upon vote of the Executive Committee

5 TERMS OF SERVICE

5 1 **Losses** Unless otherwise agreed among the Partners, the extra transmission losses in the CAHVTS due to wheeling transactions shall be compensated by a percentage reduction in the amount of energy delivered to buyers, relative to the amount received from sellers The amount of the reduction, applied as a percentage of the kWh delivered shall be estimated by load flow studies and agreed upon by the Partners The value of the percentage reduction in delivery, applying to any multilateral wheeling transaction within the CAHVTS, shall be a single number, reviewed and updated as necessary by vote of the Partnership Executive Committee

5 2 **Characteristics of Power and Energy** All electrical power and energy wheeled according to this Agreement shall be in the form of three-phase alternating current at operating voltages and frequencies established by DC Energia or resulting from instructions issued by DC Energia

6 INTERRUPTIBILITY OF FIRM SERVICE

The CAHVTS shall transport Partners' energy service to other Partners in all instances except under circumstances uncontrollable by the Wheeling Partners

7 RATES AND CHARGES

7 1 **Rates** The basis for multilateral wheeling rates shall be the annualized replacement value* of the entire CAHVTS, divided by the Central Asia Control Area's Total System Capability The exact rules for determination of annualized replacement value will be as specified by vote of the Partners' Executive Committee

7 1 1 **Monthly Service** This annual rate shall be applied as a monthly charge (annual/12) against the highest amount of kilowatt-hours delivered during any individual hour of the month under long-term energy service

7 1 2 **Weekly Service** This annual rate shall be applied as a weekly charge (annual/52) against the highest amount of kilowatt-hours delivered during any individual hour of the week under weekly energy service

7 1 3 **Daily Service** This weekly rate shall be applied as a daily charge (weekly/5) against the highest amount of kilowatt-hours delivered during any individual hour of the day under daily energy service

7 1 4 **Hourly Service** This daily rate shall be applied as an hourly charge (daily/16) against the amount of kilowatt-hours delivered during individual hours of the hourly Firm Service or Economy Service

* for purposes of illustration only, the annualized replacement value could be calculated as follows

$R = P \bullet r/[1-(1+r)^{n}]$ where

R = annualized equivalent (over 25 years) to the present value of the replacement cost
P = the one-time replacement cost of the facility (present value)
r = discount rate
n = economic life of the facility

8 BILLING AND PAYMENT

8 1 **Obligation to Pay** The buying Partner agrees to pay a fee into the Transmission Fund at DC Energia (or some other entity as designated by the Partners) for CAHVTS wheeling service in accordance with the rates calculated from the rules in Section 7 1

8 2 **Period Billing and Payment** No later than the 7th day of each month, DC Energia shall prepare an itemized statement for each buying Partner with a precise itemization of current charges and past-due amounts, if any Payment becomes overdue if not received within 30 calendar days of delivering the statement to the buyer

8 3 **Failure to Pay**

8 3 1 A failure of the buying Partner to pay the invoiced charges into the Transmission Fund within the time for payment shall result in interest accruing on such unpaid amounts at a rate equal to __% per annum

8 3 2 If the buying Partner fails to pay into the Transmission Fund any amount required under this Agreement, the DC Energia shall provide notice to the buying Partner of the overdue amounts If, by the due date for payments in the next billing cycle, the buying Partner has not cured the non-payment, including interest, the DC Energia may, by its unilateral decision, withhold the furnishing of wheeling services to the buying Partner

9 DISBURSEMENT OF TRANSMISSION FUND

9 1 Accounting DC Energia shall keep an accurate accounting of multilateral wheeling transactions, including hourly wheeled energy flows, wheeling charges billed, wheeling charges received into the Transmission Fund, and disbursements made from the Transmission Fund The details of these accounts will be made available to all Partners upon request

9 2 Disbursements The receipts into the Transmission Fund from each transaction shall be divided into two equal parts Fifty percent of the transaction receipt shall be paid to the Partner on whose system the transfer originated The remaining fifty percent shall be distributed monthly among the Partners in proportion to the respective amounts of their CAHVTS annualized replacement values relative to the aggregate annualized replacement value of the entire CAHVTS

10 LIABILITIES

In no event shall any of the Partners to this Agreement be liable to the other Partners for any incidental, consequential, multiple or punitive damages, loss of revenues or profits, attorneys fees or costs arising out of, or connected in any way with the performance or non-performance of this Agreement

11 FORCE MAJEURE

11 1 Obligations Excused A Party's obligations under this Agreement shall be excused (except for its payment obligations) to the extent and for the period that the Party's inability to perform is caused by an event of Force Majeure affecting the Partner, and only to the extent of the duration of the same, provided that the Partner claiming Force Majeure shall make all reasonable efforts to cure, mitigate or remedy the effects of the Force Majeure event

11 2 Notice of Event The Partner claiming a Force Majeure event shall give notice in writing to the other Partners as soon as is practicable, but not later than two days after the date on which such Partner knew or should have known of the commencement of the Force Majeure event

12 DISPUTE RESOLUTION

Any dispute among the Partners arising out of or related to this Agreement and which cannot be resolved by informal means among the Partners shall be referred to the Central Asia Energy Council, which shall form a three-member arbitration panel The decision of the arbitration panel shall be considered a final decision and the matter should not be referred to any other panel or court except in accordance with the Energy Charter Treaty

13 GOVERNING LAW

The terms of this Agreement shall be construed and enforced in accordance with the laws of the Republic of Uzbekistan The Energy Charter Treaty shall be used as a guide to international law pertaining to dispute resolution

14 NOTICES

Except as otherwise expressly provided herein, any notice required hereunder shall be in writing and may be given by any of the following means Overnight courier, hand delivery, facsimile or other reliable electronic means, prepaid and addressed to the Partner entitled to receive the same at an address designated by each Partner, provided, however, that each Partner may change its mailing address by giving to each other Partner written notice of its change of address and of such new address Any notice shall be deemed to have been given (i) upon delivery if given by overnight courier or hand delivery or (ii) upon confirmation if given by facsimile or other reliable electronic means

15 SUCCESSORS AND ASSIGNS

The rights and obligations created by this Agreement shall inure to and bind the successors and assigns of any of the Partners, provided, however, that such Partner shall not assign such rights and obligations without the written consent of the other Partners

16 WAIVER

Delay by any Partner in enforcing its rights under this Agreement shall not be deemed a waiver of such rights Any waiver of rights by a Partner with respect to any default or other matter arising under this Agreement shall not be deemed a waiver with respect to any default or other matter arising under this Agreement

17 SEVERABILITY

If any term, condition, covenant, restriction or other provision of this Agreement is held by a court or regulatory agency of competent jurisdiction or by legislative enactment to be invalid, void or otherwise unenforceable, the remainder of the terms, conditions, covenants, restrictions and other provisions of this Agreement shall remain in full force and effect unless such an interpretation would materially alter the rights and privileges of any Partner hereto If any term, condition, covenant, restriction or other provision of this Agreement is held by a court or regulatory agency of competent jurisdiction or by legislative enactment to be invalid, void or otherwise unenforceable, the Partners shall attempt to negotiate an appropriate replacement provision or other revisions to this Agreement to restore the rights and obligations conferred under the original Agreement

18 ENTIRE AGREEMENT

This Agreement, including all schedules, appendices and other attachments hereto and made part hereof, is the Partners' complete and exclusive statement of the terms of the Agreement and the matters contemplated herein All prior written and oral understandings, offers or other communications of every kind pertaining to the subject matter of this Agreement are hereby superseded

19 AMENDMENT

This Agreement may be amended only in writing and as agreed to by and signed by authorized representatives of the Partners

The Partners have caused this Agreement to be executed by the duly authorized representatives as of the date first set forth above

[Partner #1]

By _____ Date _____

Name
Title

[Partner #n]

By _____ Date _____

Name
Title

DISPATCH CENTER ENERGIA
PARTNERSHIP AGREEMENT

This Agreement, made and entered into this _____ day of _____, 199_, by and between [_____, _____, _____, _____, and _____], collectively hereafter called the "Partners," or individually called the "Partner"

Whereas, the Partners own and operate facilities for the generation and/or transmission and/or distribution of electricity, and are engaged in the business of producing and/or transporting and/or selling electric energy, and

Whereas, the Partners believe that mutual benefits have been and will be obtained through the coordinated operation of their electric power facilities, and

Whereas, the Partners desire to achieve optimum coordination in the operation of their electric power facilities, and

Whereas, the Partners desire to provide a means whereby all Partners will realize and share equitably in the mutual benefits which will be obtained thereby, and

Whereas, the Partners intend to maintain a staffed control center facility for the principal purpose of achieving these mutual benefits by dispatching electrical energy as one Central Asia Control Area,

Now, therefore, the Partners, each in consideration of the mutual agreements set forth herein, agree as follows

1 NAME AND PLACE OF PARTNERSHIP

The Partners do hereby form a partnership, initially consisting of __ Partners, under the name of Dispatch Center "Energia" (DC Energia) The principal place of business of the partnership shall be Tashkent, Republic of Uzbekistan, or at such other location within or without the Republic of Uzbekistan as may be agreed upon by the Partners DC Energia shall exist as a non-profit corporation and not engage in for-profit activity

2 PURPOSE

The purpose of this agreement is to provide the detailed terms and conditions under which DC Energia will, among other things, operate the System and administer the multilateral wheeling agreements, all with a view to facilitate least cost operation of the System, consistent with System safety and reliability, non-discriminatory access to transmission service, Good Utility Practice and applicable laws and regulations

3 TERM

The term of this Agreement shall begin on the Effective Date and continue until terminated in accordance with the provisions of Section 14

4 DEFINITIONS

4 1 **Annual System Demand** The highest System Demand of a Partner occurring during the 12-month period ending with the current month

4 2 **Agreement** The agreement identified in the first paragraph of this document, including all schedules thereto, as the same may be amended or supplemented from time to time

4 3 **Control Area** The electric power system or combination of electric power systems bounded by interconnection metering and telemetry to which a common generation control scheme is applied The **Central Asia Control Area** includes the electrical energy systems of Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, and the southern part of Kazakstan

4 4 **Criteria** Criteria, rules and standards for administration and operation of the Control Area, as in effect on the date of this Agreement and as the same may be amended and supplemented from time to time

4 5 **Dispatch Center Energia** (or **DC Energia**) The Central Asia Republics regional electrical energy dispatch center and any permitted successors and assigns

4 6 **DC Energia Control Center** The dispatching facilities used by DC Energia in carrying out its responsibilities under this Agreement, consisting of a portion of a certain building located in Tashkent, Uzbekistan, together with furnishings and equipment contained therein

4 7 **Force Majeure** Any act of God, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, explosion, breakage or accident to machinery or equipment not due to lack of proper care or maintenance, any order, regulation or restriction imposed by a court, or any other cause beyond a Party's control

4 8 **Generating Partner** An entity which has signed this Agreement and which produces electricity for sale on a wholesale basis to a Grid Company, a Supplier, or a Pool

4 9 **Good Utility Practice** Any practice, method, or act engaged in or approved by a significant portion of the electric utility industry in Central Asia during the relevant time period, or any practice, method, or act which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost

consistent with good business practices, reliability, safety and expeditiousness Good Utility Practice is not limited to a single optimum practice, method or act to the exclusion of others, but rather is intended to include acceptable practices, methods, or acts generally accepted in the region

4 10 **Grid Company Partner** An entity which has signed this Agreement and which owns and operates a high-voltage (110 kilovolts or greater) electrical transmission system, transporting electricity (or selling on a wholesale basis) to Suppliers

4 11 **Multilateral Wheeling Agreement** An agreement among the Partners establishing a procedure under which a power system, generating company, or a large industrial customer in one of the Central Asian Republics may submit a request to DC Energia to arrange transmission service

4 12 **Net Generating Capability** The Net Generating Capability of a Partner for any month shall mean that amount of kilowatts, less station use, that all the generating facilities of such Partner could normally supply simultaneously to its point(s) of delivery

4 13 **Operating Procedures** The detailed procedures adopted by DC Energia for operation of the System, as in effect on the date of this Agreement and as the same may be amended and supplemented from time to time

4 14 **Operating Year** A calendar year The first Operating Year shall commence on the Effective Date and continue until the following December 31, and the last Operating Year shall conclude on the date that this Agreement terminates

4 15 **Supplier Partner** An entity which has signed this Agreement and which sells electricity on a retail basis to customers Such a Partner shall be considered as a Supplier irregardless of ownership and operation of generation assets

4 16 **System** All generating facilities in the Control Area which are subject to central dispatch and all transmission facilities rated 110kV or above

4 17 **System Demand** The System Demand of a Partner shall mean that number of kilowatts which is equal to the kilowatt-hours required in any clock hour, attributable to energy to the Partner's consumers, including system losses, and also including any wheeling losses occurring on other systems and supplied by such Partner for transmission of such firm energy, but excluding generating station uses and excluding wheeling losses supplied by another system

5 AGREEMENT ADMINISTRATION

This agreement shall be administered by the Executive Committee of the Dispatch Center Energia

6 EXECUTIVE COMMITTEE

6 1 Establishment of Committee The Partners shall establish an Executive Committee to implement and administer this Agreement and to determine policy with respect to all matters within the scope of this Agreement

6 2 Representation of Partners Each Partner shall designate a representative to serve on the Executive Committee and an alternate authorized to act in the absence of the designated representative (each of whom shall be an employee of the Partner) The initial appointments to the Executive Committee shall be made by the Chief Executive Officer of each Partner by notifying all Partners within thirty days following the effective date of this Agreement The Chief Executive Officer may replace the representative or the alternate to the Executive Committee at any time by notifying all other partners

6 3 Voting Rights For the purposes of determining voting rights within this Agreement, each Republic's total vote will be limited to its share of the annual coincident system peak within the Central Asia Control Area Within a Republic, voting rights will be awarded on a pro rata basis to Supplier Partners, Grid Company Partners, and Generating Suppliers Within this restriction, each member of the Executive Committee shall be entitled to the number of votes determined by the following formula

6 3 1 One vote for each 25 megawatts, or fraction thereof, of Annual System Demand for Supplier Partners, or Annual Wholesale Demand for Grid Company Partners, or Annual Net Generating Capability for Generating Partners up to 300 megawatts,

6 3 2 One vote for each 50 megawatts, or fraction thereof, of Annual System Demand for Supplier Partners, or Annual Wholesale Demand for Grid Company Partners, or Annual Net Generating Capability for Generating Partners from 301 to 600 megawatts,

6 3 3 One vote for each 100 megawatts, or fraction thereof, of Annual System Demand for Supplier Partners, or Annual Wholesale Demand for Grid Company Partners, or Annual Net Generating Capability for Generating Partners over 600 megawatts

Seventy percent or more affirmative vote of the Executive Committee shall be required to authorize any action or determination by the Executive Committee, except where unanimous consent is otherwise required in this Agreement In the case of any vote requiring less than unanimous consent, no one Partner shall be able to veto any action or determination if the affirmative vote of all other Partners is given

6 4 Selection of Chair and Vice-Chair At its first meeting, the Executive Committee shall select from among its members a chairman and a vice-chairman, who will each serve through December 31, 1997 Commencing January 1, 1998 and every

two years thereafter the vice-chairman shall become the chairman and a new vice-chairman shall be selected by the Committee from its members on a rotating basis

6 5 **Meetings** The Executive Committee shall meet at least quarterly and at such other times as the chairman may determine or as requested by two or more Executive Committee members At least ten days written notice shall be given to each member and alternate of the Executive Committee of any meeting of the Executive Committee The chairman shall be responsible for notifying each member and alternate of the meeting The notice shall state the time and place of the meeting and shall include an agenda of the items to be considered Except by unanimous consent of those present, no action shall be taken on any items other than those included on the agenda Waiver of notice of an Executive Committee meeting may be given by unanimous consent of the representatives of all Partners

6 6 **Manager of DC Energia** The Executive Committee shall select a Manager who shall be accountable to the Executive Committee for the operation of DC Energia The Manager shall establish appropriate procedures for control center operations in accordance with this Agreement The Executive Committee is authorized to hire such additional employees as it deems necessary to staff the control center The actual hiring of such employees may be delegated to the Manager The Executive Committee shall regularly review the performance of the Manager and other employees

7 QUALIFICATIONS OF DC ENERGIA

7 1 **DC ENERGIA Staff** DC Energia shall maintain a staff of employees sufficient in number, skill, training and knowledge to satisfy its obligations under this Agreement

7 2 **Conflict of Interest** No Partner representative or alternative on the Executive Committee nor DC Energia employee shall allow himself/herself to remain in a position where he/she would receive financial gain by either a policy or an operating decision taken by DC Energia

8 RIGHTS AND OBLIGATIONS OF DC ENERGIA

8 1 **Operation of the System** DC Energia shall serve as the operator of the Central Asia Control Area and shall assume responsibility for operation of the System, consistent with the terms of this Agreement, the Criteria and the Operating Procedures, System safety and reliability, open non-discriminatory access to transmission service, Good Utility Practice and applicable laws and regulations

8 2 **Administration of Multilateral Wheeling Agreements** DC Energia will prepare invoices based upon the Multilateral Wheeling Agreement and monitor the payment of these invoices

8 3 **System Planning** DC Energia shall conduct System assessment and planning at the direction of the Executive Committee DC Energia shall have the authority to

independently conduct System assessment and planning as it may deem necessary, and shall report findings which result from such assessment and planning to the Executive Committee

8 4 **Facilities and Equipment** [This section will describe DC Energia's rights to use facilities and equipment currently owned by the "owner" of the United Control Center, possible rent payments or transfer of ownership, etc]

8 5 **Emergency Power** DC Energia shall have authority to enter into internal contracts to procure emergency power under the conditions set forth in the Criteria and Operating Procedures DC Energia may direct any Central Asia participant to take any reasonable action necessary to preserve the reliable operation of the Central Asia Control Area under the circumstances and in the manner set forth in the Criteria and the Operating Procedures

8 6 **System Shutdown** In the event that a System shutdown occurs affecting all or part of the Central Asia Control Area, DC Energia shall, in accordance with the Criteria and the Operating Procedures, coordinate the restoration of service in conjunction with the individual Republics' national control centers

8 7 **Interconnection Contracts** DC Energia shall administer the interconnection contracts between the Central Asia Control Area and contiguous Control Areas

8 8 **Relationships with Central Asia Republics' National Control Centers** DC Energia shall have the authority and responsibility to monitor the operation of the individual Republics' national control centers to ensure their compliance with the Criteria, the Operating Procedures and appropriate standards of conduct DC Energia shall also examine issues of reliability as they relate to the individual Republics' control centers and their functions and make such recommendations to the Executive Committee as it deems appropriate

8 9 **Dissemination of Information** DC Energia shall disseminate information furnished to it by the Partners consistent with the Partnership Information Policy **[to be developed]**, and shall maintain the confidentiality of such information in accordance with the provisions of such policy

8 10 **Code of Conduct** DC Energia shall develop and implement an employee code of conduct that, at a minimum, prohibits any of DC Energia's employees from violating the terms of this Agreement

8 11 **Annual Report and Performance Audit** the Manager of DC Energia shall prepare and submit to the Executive Committee an annual report on its performance under this Agreement and cooperate in the conduct of a periodic audit of its operating performance The audit shall be conducted by an independent third party to be chosen by the Executive Committee, and shall be conducted at such intervals not less frequently that every two years

8 12 **Financial Audit** DC Energia shall deliver to the Executive Committee as soon as available but in any event within ninety (90) days after the end of each calendar year a financial audit report for such year for DC Energia, duly certified by independent public accountants of recognized standing acceptable to the Executive Committee

9 RIGHTS AND OBLIGATIONS OF THE PARTNERS

9 1 **Operation of Facilities** The Partners shall operate their facilities which are part of the System at the direction of DC Energia, consistent with the terms of this Agreement, and the Tariffs, the Criteria and the Operating Procedures, System safety and reliability, open non-discriminatory access to transmission service, Good Utility Practice and applicable laws and regulations

9 2 **Provision of Information** The Partners shall provide DC Energia with any and all information within their custody or control that DC Energia deems necessary to perform its obligations under this Agreement, subject to applicable confidentiality limitations contained in the Partnership Information Policy

9 3 **Development of Additional Criteria** DC Energia shall develop any such additional Criteria and Operating Procedures as shall be necessary to allow DC Energia to carry out its obligations under this Agreement

9 4 **Payment for Services** The Partners shall pay DC Energia for services provided pursuant to the terms of this Agreement In addition to providing funding for DC Energia's operation and maintenance expenses, the Partners shall provide long-term financing for capital improvements, as budgeted according to the process described in Section __

9 5 **Payment for Audits** The Partners shall bear all costs of the performance and financial audits to be conducted in respect of DC Energia pursuant to Sections 8 11 and 8 12 of this Agreement

9 6 **Emergency Actions** The Partners shall respond to DC Energia's directions for actions necessary to preserve the reliable operation of the Central Asia Control Area under the emergency and other conditions set forth in the Criteria and the Operating Procedures

10 ADMISSION OF NEW PARTNER

Additional partners may be admitted to the partnership by the unanimous consent of the existing Partners upon such terms and conditions as agreed by the Partners

11 DC ENERGIA BUDGET

11 1 **First Operating Year** The budget for the first Operating Year shall be set forth in Schedule A [*to be developed*]

11 2 **Preparation of Annual Budget** Seventy-five (75) days before the start of each Operating Year, the Manager of DC Energia shall prepare and submit to the Executive Committee a detailed budget for the upcoming Operating Year

11 3 **Review of Budget** The Executive Committee shall review and comment on the proposed budget no later than forty-five (45) days before the start of the Operating Year The final budget shall be as approved by the Executive Committee

11 4 **Budget Disputes** If the members of the Executive Committee cannot reach agreement by the end of the then current Operating Year as to the budget, the final budget of the then current Operating Year shall remain in effect as to those portions on which no agreement has been reached on a pro rata monthly basis, as adjusted by multiplying such portion of the then-current budget by a reference index [*to be identified*], provided however that (i) the application of such index shall not increase the unapproved portion of the budget above DC Energia's proposed budget, and (ii) there shall be excluded from the budget for the next Operating Year any extraordinary non-recurring expenses incurred by DC Energia during the current Operating Year

11 5 **Changes to the Budget** The Manager of DC Energia may, at any time, request an adjustment to the then-current budget to address unanticipated events, including, but not limited to, events of Force Majeure Such a request shall be reviewed and approved by the Executive Committee

12 BILLING AND PAYMENT

12 1 **Obligation to Pay** The Partners shall be responsible for DC Energia's operating expenses and working capital requirements as set forth in the then-current budget Each Partner shall be liable only for such portion of such expenses and working capital requirements as are allocated to such Partner in accordance with Section 12 2 of this Agreement

12 2 **Contributions to Working Capital and Operating Expenses** Each Partner shall contribute a share of the amount determined by the Executive Committee in accordance to its voting right as a percentage of the total votes within the Executive Committee

12 3 **Period Billing and Payment** The Manager of DC Energia shall prepare an itemized statement no less frequently than once a month for each Partner, setting forth the amounts owed to DC Energia pursuant to this Agreement and the other amounts, if any, to be collected from or disbursed to such Partner by DC Energia pursuant to the performance of its obligations under this Agreement Such statements shall be prepared on a net basis, indicating the total amount to be paid to DC Energia or the total amount to be disbursed by DC Energia, as the case may be

12 4 **Payment Disputes** If a Partner disagrees with any amount set forth in a statement from DC Energia, that Partner shall promptly notify DC Energia and DC Energia shall attempt to resolve such disagreement with that Partner If the disagreement cannot be resolved by the Partner and the Manager of DC Energia, DC

Energia shall refer the matter to the Executive Committee for resolution If DC Energia disagrees with the resolution by the Executive Committee, it may seek dispute resolution under Section 17 of this Agreement Notwithstanding a Participant's disagreement with any amount set forth in a statement from DC Energia, that Partner shall pay when due the full amount, if any, shown as due from such Partner on such statement and such payment shall not prejudice the rights of the Partner to dispute the amounts set forth in such statement

12 5 Failure to Pay

(a) A failure of a Partner to pay DC Energia within the time for payment shall result in interest accruing on such unpaid amounts at a rate equal to __% per annum

(b) If a Partner fails to pay DC Energia any amount required under Section 12 2 of this Agreement, DC Energia shall provide notice to such Partner of the non-payment If, by the due date for payments in the next billing cycle, such Partner has not cured the non-payment, DC Energia may withhold and, in the case of amounts payable, retain any such unpaid amount, including interest at a rate of __% per annum, from any other amounts that would otherwise be disbursed by DC Energia to such Partner on such date If DC Energia is unable and is, in the sole judgment of the Manager of DC Energia, unlikely to be able to cure such non-payment through such a withholding, and if such non-payment relates to an amount payable, DC Energia may, in addition to any other remedies that it may have at law or in equity, make such pro rata adjustments to the statements of the other Participants as may be required to hold DC Energia harmless from the effects of such non-payment

(c) DC Energia shall not have any obligation to make a payment to any Partner to the extent that DC Energia has not collected amounts sufficient, after deduction of amounts due to DC Energia or the Tariffs, to make such payment If any Partner or a customer of transmission services which is not a Partner fails to pay DC Energia the full amount due from such Partner or entity when due, DC Energia, in disbursing amounts collected, shall allocate the resulting shortfall among the Partners in accordance with each Partner's voting hare as a percentage of the total votes in the Executive Committee

(d) If DC Energia is prevented from, or is delayed in, making a payment due to the other Participants because of the timing of cash flows, DC Energia may revise the billing and payment cycle or to take such other steps to allow DC Energia to make payments when due

13 WITHDRAWAL OF A PARTNER

13 1 Notification Assuming the partnership consists of three or more partners, any Partner may withdraw from the partnership by giving one year's written notice to each of the other Partners

13 2 Continuation of Partnership In the event a Partner withdraws from the partnership, the remaining Partners shall have the right to continue the business of the partnership under its present name in conjunction with any other person or entity they may select, but they shall pay to the withdrawing Partner the value of its interest in the partnership as provided in the following paragraph(s) If the remaining Partners do not desire to continue the business together, the partnership shall be liquidated in accordance with the provisions of Article 14

13 3 Distribution to Withdrawing Partner The amount distributed to the withdrawing Partner from the partnership shall be its share (as determined by its voting shares as a percentage of the total number of voting shares in the Executive Committee) of the book value of the partnership, increased or decreased by credits or debits to the Partner's account as a result of multilateral wheeling or similar transactions gained as a result of the Partner's membership in the partnership, all as shown on the books and records of the partnership as of the close of business on the effective date of withdrawal

14 DISSOLUTION OF PARTNERSHIP

The partnership shall continue until dissolved by agreement of the Partners Upon any such dissolution, the affairs of the partnership shall be liquidated as agreed by the Partners

15 LIABILITY, INDEMNIFICATION AND INSURANCE

15 1 Liability of DC ENERGIA DC Energia shall not be liable to the Participants for its operational decisions, its administration of Tariffs or its implementation of the Criteria, provided it has acted within the scope of its authority under this Agreement and has not willfully breached this Agreement or engaged in willful misconduct

15 2 Liability of Partners The Partners shall not be liable to DC Energia for a failure to perform under the terms of this Agreement, unless that failure to perform was a willful breach of this Agreement

15 3 Limitation of Liability In no event shall any party or parties to this Agreement be liable to any other party for any incidental, consequential, multiple or punitive damages, loss of revenues or profits, attorneys fees or costs arising out of, or connected in any way with the performance or non-performance of this Agreement

15 4 Indemnification The Partners shall indemnify DC Energia against liability to third parties for its operational decisions, its administration of Tariffs or its implementation of the Criteria, provided it has acted within the scope of its authority under this Agreement and has not willfully breached this Agreement or engaged in willful misconduct

15 5 Insurance DC Energia shall procure or cause to be procured and shall maintain in full effect at all times during the term of this Agreement, all insurance

required by applicable laws or regulations and customary in the electric utility industry through insurance policies with responsible insurance companies authorized to do business in Central Asia in such amounts and for such coverage and upon such terms as agreed to through the process of approving DC Energia's budget

16 FORCE MAJEURE

16 1 Obligations Excused A party's obligations under this Agreement shall be excused (except for its payment obligations) to the extent and for the period that the party's inability to perform is caused by an event of Force Majeure affecting the party, and only to the extent of the duration of the same, provided that the party claiming Force Majeure shall make all reasonable efforts to cure, mitigate or remedy the effects of the Force Majeure event Nothing herein shall be construed to require either party to settle a labor dispute

16 2 Notice of Event The party claiming a Force Majeure event shall give notice in writing to the other party as soon as is practicable, but not later than two days after the date on which such party knew or should have known of the commencement of the Force Majeure event

17 DISPUTE RESOLUTION

Any dispute between the parties to this Agreement arising out of or related to this Agreement shall be referred (i) by DC Energia, to a representative designated by the Chairman of the Executive Committee of DC Energia, and (ii) to a representative designated by the disagreeing Partner or Partners, for informal resolution as soon as is practicable If informal resolution cannot be reached, the dispute shall be referred to the Central Asia Energy Council, which shall form a three-member arbitration panel The decision of the arbitration panel shall be considered a final decision and the matter should not be referred to any other panel or court unless the Energy Charter Treaty explicitly requires such a referral

18 GOVERNING LAW

The terms of this Agreement shall be construed and enforced in accordance with the laws of the Republic of Uzbekistan

19 NOTICES

Except as otherwise expressly provided herein, any notice required hereunder shall be in writing and may be given by any of the following means Overnight courier, hand delivery, facsimile or other reliable electronic means, prepaid and addressed to the Partner entitled to receive the same at an address designated by each Partner, provided, however, that each Partner may change its mailing address by giving to each other Partner written notice of its change of address and of such new address
Any notice shall be deemed to have been given (i) upon delivery if given by overnight courier or hand delivery or (ii) upon confirmation if given by facsimile or other reliable electronic means

20 SUCCESSORS AND ASSIGNS

The rights and obligations created by this Agreement shall inure to and bind the successors and assigns of DC Energia, provided, however, that DC Energia shall not assign such rights and obligations without the written consent of [ ]

21 RELATIONSHIP OF THE PARTIES

Nothing in this Agreement is intended to create a partnership, joint venture or other joint legal entity making any party jointly or severally liable for the acts or omissions of the other parties

22 WAIVER

Delay by any party in enforcing its rights under this Agreement shall not be deemed a waiver of such rights Any waiver of rights by any party with respect to any default or other matter arising under this Agreement shall not be deemed a waiver with respect to any default or other matter arising under this Agreement

23 SEVERABILITY

If any term, condition, covenant, restriction or other provision of this Agreement is held by a court or regulatory agency of competent jurisdiction or by legislative enactment to be invalid, void or otherwise unenforceable, the remainder of the terms, conditions, covenants, restrictions and other provisions of this Agreement shall remain in full force and effect unless such an interpretation would materially alter the rights and privileges of any party hereto If any term, condition, covenant, restriction or other provision of this Agreement is held by a court or regulatory agency of competent jurisdiction or by legislative enactment to be invalid, void or otherwise unenforceable, the parties shall attempt to negotiate an appropriate replacement provision or other revisions to this Agreement to restore the rights and obligations conferred under the original Agreement

24 HEADINGS

The headings used in this Agreement are intended for convenience only and shall have no effect on the interpretation of any provision of this Agreement

25 COUNTERPARTS

This Agreement may be executed in any number of counterparts, each having the same force and effect as the original

26 ENTIRE AGREEMENT

This Agreement, including all schedules, appendices and other attachments hereto and made part hereof, is the parties' complete and exclusive statement of the terms of the

Agreement and the matters contemplated herein All prior written and oral understandings, offers or other communications of every kind pertaining to the subject matter of this Agreement are hereby superseded

27 AMENDMENT

This Agreement may be amended only in writing and as agreed to by the Executive Committee

The Partners have caused this Agreement to be executed by the duly authorized representatives as of the date first set forth above

[Partner #1]

By _____ Date _____

Name
Title

[Partner #n]

By _____ Date _____

Name
Title

SCHEDULE A

BUDGET FOR OPERATING YEAR 199_

[to be developed by the Partners]

Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

The state company (SC) Eesti Energia which is represented by the general director U R Lehtse, acting based on the Statutes of the state company Eesti Energia, state joint stock company (SJSC) Latvenergo represented by its president E Birkans acting based on the Statutes of SJSC Latvenergo, joint stock company (JSC) Lietuvos Energia represented by its general director R Rukshenas acting based on the Statutes of JSC Lietuvos Energia and the limited liability company Dispatch center of the Baltic power systems (DC Baltija) represented by its director V Kreslins, acting based on the statutes of the limited liability company DC Baltija, hereinafter referred to as the Parties with the purpose to provide more reliable power supply to the customers, to reduce the required amount of operating reserve, and to contract for mutually economically beneficial power and energy supply signed the multilateral agreement on parallel operation among the power systems of Estonia, Latvia and Lithuania - Integrated powers systems of the Baltic (the Baltic IPS)

1 General provisions

1 1 The present Agreement is drafted on the basis of the Agreement on parallel operation among the Republic of Estonia, the Republic of Latvia and the Republic of Lithuania, signed 7 January, 1992 by the Energy Ministries on behalf of the governments of the Republics

1 2 The present Agreement is a legal instrument used to regulate the conditions of parallel operation of the Baltic power systems, responsibility, rights and liabilities of the Parties -the signatories of the present Agreement

1 3 The highest body authorized to solve the principal issues related to the parallel operation is the Council of the Baltic Integrated Power Systems which was formed based on the Statutes of the joint venture DC Baltija

The Baltic IPS Council takes the decision based on the principle of consensus

The Parties solve all the issues by negotiations The disputes arising are considered at the Baltic IPS Council In case disputes cannot be resolved, they are submitted to Arbitration The location of Arbitration is determined by the Baltic IPS Council The rules of the country where the Arbitration takes place are applied

1 4 By the decision of the Baltic IPS Council the following committees are formed

Economic committee
Technical committee
Development planning committee

where one authorized representative is participating from each Party

The committees in the Baltic IPS may form working groups if needed to work on critical issues

1 5 The parallel operation of the Baltic power systems is implemented by DC Baltija

1 6 The Agreement is effective upon its signing Amendments and changes can be made to the Agreement by mutual agreement among the Parties

1 7 The operation of the Agreement can be terminated prior to the term in the following cases

- based on mutual agreement among the parties,
- by six month prior notice of any Baltic power system to terminate parallel operation

1 8 The implementation of this Agreement is described in the Appendices attached hereto The Parties designate the persons who are authorized to sign and approve the Appendices

2 Conditions of parallel operation

2 1 The parallel operation of the Baltic power systems is implemented through the existing and new erected lines of 330kV and if technically possible and economically feasible also through lines 110kV

2 2 The Baltic power systems are operated in parallel with the UPS of Russia and IPS of Belarus

The agreement on parallel operation with UPS of Russia and IPS of Belarus is concluded by DC Baltija, provided prior written concurrence is received from the Parties

In order to prevent interruption of power supply to their own customers in cases of frequency drop, the Baltic power systems together or separately may opt to disconnect for island operation The decision on islanding is taken by agreement among the Parties The island operation management is implemented by DC Baltija in compliance with Appendix 7, but the island operation of a separate power system by the respective power system dispatch service is based on the program on isolation which has the concurrence of the Parties

2 3 The necessary prerequisite for the parallel operation is the principle of balancing the net input/output flows of power and energy for each power system of the Baltic IPS considering the concluded contracts

2 4 The procedure for system operation is given in the Appendix 1

2 5 Regimes and plans which sustain conditions of parallel operation are given in the Appendix 2

2 6 Parties cooperate with regard to education, training and field training of personnel

3 Reliability of parallel operation

3 1 The basis for reliability criteria is the principle of sustaining stability at a loss of any one element in the grid or generating unit (N-1 principle) The Baltic power systems coordinate the actions which are affecting reliability of other power systems by employing DC Baltija

3 2 The management of parallel operation of the Baltic IPS must be implemented through at least two independent communication channels between DC Baltija and centers of power system operation

3 3 To prevent interconnection accidents, DC Baltija based on the methods approved by the Parties determines the amount of automatic load shedding on customers and operational capacity reserve and coordinates this with the power systems

3 4 DC Baltija performs stability calculations, short circuit calculations, submits settings for operation and emergency and relay protection automation for the basic tie line grid of 330kV based on the Appendix 3

3 5 In case of emergency situations in the Baltic IPS affecting the interests of several power systems, liquidation of such emergency situations is implemented under the guidance or coordination of the dispatcher of DC Baltija

3 6 Investigation of accidents on the interconnection lines 330kV and equipment affecting the reliable parallel operation of the Baltic IPS is performed by the Commission of the Parties and if the Technical Committee decides - with the participation of CDC UPS of Russia and UDC of Belarus The results and recommendations related to investigation are subject for distribution among the Parties

If the commission is unable to pass an agreed decision the issue is submitted to the Technical Committee

4 Planning and implementation of operation

4 1 The parties are planning the operational regime for active power and energy for the coming day, week, month and year based on the provisions of the concluded contracts

Implementation of the operational regime is carried out by planned interchange deliveries of power and energy within the allowed range of deviation provided the reliability of grid and equipment operations is preserved

4 2 The Baltic power systems are striving to have self balance of net in- and outflows of reactive power for each power system In case it is technically not possible or economically not feasible, the issue of compensations is solved bilaterally with the participation of DC Baltija

4 3 The planning of operating capacity reserve is based on share participation principle of the Baltic power system in order to cover the necessary reserve for the Baltic IPS In reserve calculation the most loaded generating unit for the delivery of electric energy outside the Baltic IPS borders is taken into account Each Baltic power system has the right to determine the method to provide the necessary operating reserve for its power system

4 4 The planning methods and implementation of regimes sustaining the balance for active and reactive power, active power operating reserve and also repairs of transmission and power plant equipment are given in the Appendix 4

5 Economic relations

5 1 The economic relations among the Baltic power systems are based on bilateral agreements on mutual delivery of electric power and energy and should not contradict the provisions of this Agreement

5 2 The Baltic power systems before concluding bilateral agreements submit the draft for concurrence to DC Baltija to determine the feasibility of technical implementation

5 3. The Baltic power systems provide contracting documentation in due time without confidential data in order for DC Baltija to be able to plan the operation

5 4 The Baltic power systems use the methods of balancing in and out flows with regard to interchange deliveries for the billing period The length of the billing period is determined by a bilateral agreement

5 5 DC Baltija informs the Baltic power systems on the results of the implementation of bilateral agreements for the billing period and prospects of their implementation in future

5 6 In case the deviations in amounts of deliveries are greater than defined in the bilateral agreements, the Baltic power systems sign spot commercial agreements

5 7 Conditions of interchange deliveries of electric energy based on bilateral agreements among power systems of the Baltic countries and adjacent other power systems are determined in the Appendix 5

5 8 The procedure of indemnifying damage incurred by one power system to another power system is defined in the bilateral agreements The issue related to the compensation for the damage incurred by force majeure is decided by the Baltic Council of IPS

The issue with regard to the damage incurred to the Baltic power systems due to the fault of DC Baltija is decided by the Baltic Council of IPS

5 9 The wheeling (transit) of electric power and energy is arranged by the initiative of one of the Baltic power systems or by the power system of another country

Transmission capability, methods determining amount and payment for the transit are defined in the bilateral agreement by the initiating party for the transit and the power system wheeling the transit (wheeler) or in accordance with the Appendix 8

6 Development planning of the Baltic IPS

6 1 The parties agree on construction and reconstruction of power facilities and their management facilities which are affecting the operation of the Baltic IPS

6 2 The party together develop a regional development program for the Baltic power systems and regularly adjust it

6 3 The parties agree on the principal approaches of development of system operation and technological management

7 Responsibilities of the parties

7 1 The Parties should not by uncoordinated actions incur damage to other Parties, lower the quality of electric energy (frequency and voltage level) and reliability of electric energy supply, or jeopardize the stability of parallel operation

7 2 The Baltic power systems must follow the instructions from DC Baltija to sustain the stability of parallel operation

7 3 The Baltic power systems must provide for, in the bilateral agreements, the obligation to the third party to conclude a transit contract with the Party which is wheeling the transit

7 4 The Baltic power systems must wheel electric power and energy of other power systems within the technical limits of transmission lines However, the priority in transmission network is given to own customers and implementation of own bilateral agreements

7 5 The Parties provide safe work executed on interconnection overhead lines in compliance with regulations defined in the Appendix 9

The Baltic power systems each on their respective territory use the Safety Regulations adopted by the respective power system

7 6 The Parties provide reliable operation of interconnection lines within the service area and also relay protection devices, operation management and protection automation, means of communication and data transfer for the needs of interconnection

7 7 The parties are guided by single criteria, requirement and recommendations ensuring the reliable parallel operation of the Baltic IPS

7 8 The Parties agree to coordinate amendments in the Technical Utilization Regulations with regard to electric equipment which affects the reliability of parallel operation of the Baltic IPS

7 9 The Baltic power systems must submit to DC Baltija the necessary information defined in the Appendix 6 in order to carry out its functions

The information which is available to DC Baltija must be available to any Baltic power system The transfer of information beyond the Baltic IPS is agreed among the Parties

7 10 The operation of DC Baltija in implementing function in compliance with the present Agreement is funded based on the budget presented by DC Baltija which is approved by the Baltic Council of IPS Expenses are allocated among the Baltic power systems based on agreed methodology

8 Rights of the Parties

8 1 To propose changes in the present Agreement The proposals must be considered within three months

8 2 To enter into contracts, agreements, letters of intentions among themselves or with the third party on participation in development, designing and cooperation in compliance with the present Agreement

8 3 To take part in the investigation of an accident on the territory of another power system, if it interfered with the normal operation and incurred damage to the present power system To demand to indemnify the damage incurred due to the fault of another Party

8 4 To express an protest or refuse to follow the commands of the dispatcher of DC Baltija, if it is contradicting the provisions of bilateral agreements, however, by that assuming the responsibility about the consequences of such non-compliance

9 Responsibility of the Parties

The Parties have equal responsibility for the implementation of the present Agreement

10 Content of the Agreement

10 1 The present Agreement is made on seven pages in four copies in the Russian language and 8 Appendices are attached hereto

1 Operational dispatch management procedure
2 Schemes and regimes of parallel operation
3 Relay protection and automation
4 Planning and implementation of regimes
5 Conditions for bilateral agreements on interchange of electric energy
6 Information provision
7 On island operation of the Baltic IPS from UPS of Russia and IPS of Belarus
8 Calculation methodology for wheeled energy through the network of Estonia, Latvia, Lithuania, Russia and Belarus
9 Safety regulation for work on interconnection overhead lines

10 2 All four copies of the present Agreement are identical and have equal legal force The Parties have the right to photocopy any number of copies of the present Agreement for technical needs

11 Legal addresses of the Parties and signatures

11 1 SC Eesti Energia
Boulevard Estonia 1
EE0100 Tallinn
Estonia

11 2 SJSC Latvenergo
Pulkveza Brieza 12
LV-1230 Riga
Latvia

11 3 JSC Lietuvos Energia
Zveju 14
2748 Vilnius
Lithuania

11 4 LLC DC Baltija
Smerla 1
LV-1006, Riga
Latvia

Udo Rein Lehtse	**Edgars Birkans**	**Rimvidas Rukshenas**	**Vilnis Kreslins**
General Director	President	General Director	Director
SC Eesti Energia	SJSC Latvenergo	JSC Lietuvos Energia	LLC DC Baltija
" 1996	1996	1996	1996

Appendix 1

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
SC Eesti Energia	SJSC Latvenergo	JSC Lietuvos Energia	LLC DC Baltija
J Marend	R Leveika	V Pashkavichus	J Ositis
" 1996	1996	1996	1996

To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

Operational dispatch management procedure

1 Dispatch Center Baltija (DC Baltija) is formed to provide reliable parallel operation of the Baltic IPS and shall carry out the following functions

- planning control and provision of balanced operation in the Baltic IPS,
- providing ability to implement bilateral commercial contracts,
- determination of amount and availability control over the sustainable operating reserve of active power, which is calculated based on the agreed methodology, for each power system of the Baltic IPS and neighboring countries,
- coordination of current conditions of transmission and power plant equipment which is under the management of DC Baltija,
- guidance and coordination in liquidation of emergency situations in the Baltic IPS affecting the interests of several power systems of the Baltic countries or parallel operation of the Baltic countries with the power systems of neighboring countries

2 System and dispatch management is provided 24 hours daily by shifts of dispatchers of DC Baltija

3 In order to carry out the assigned duties DC Baltija will develop and submit to concurrence the instruction documentation which is subject to compliance by all services in the Baltic power systems

- the list of equipment which is subject to management and regulation by DC Baltija,

- instruction on regime implementation in the Baltic IPS,
- instruction on prevention and liquidation of emergency situations in the Baltic IPS,
- operative instructions on utilization of overhead lines and breakers on overhead lines,
- island operation program of the Baltic region,
- operative instructions on the complex of protection and operation automation

The instruction documentation of the Baltic power systems should not contradict the documents listed here

4 DC Baltija keeps the records and concurs with the power systems of the Baltic IPS concerning necessary changes in the existing directives with regard to the equipment which affects the reliable parallel operation of the Baltic IPS

5 The operative dispatch management and liquidation of accidents on external transit of the Baltic IPS is carried out based on the documents concurred by DC Baltija, CDC of UPS of Russia and UDC of Belarus However, DC Baltija in the first place must comply with the interests of the Baltic power systems

6 The dispatcher of DC Baltija shall implement the operation in the Baltic IPS based on the daily schedule developed by DC Baltija and in case of deviation shall coordinate the actions of power systems in accordance with provisions of bilateral agreements on supply of electric energy
The power system dispatchers must comply with the directions of the dispatcher of DC Baltija in implementation of the daily schedule and its adjustment based on provisions of bilateral agreements and also in emergency situations

If the balance of power is changed due to the accident, the dispatcher of DC Baltija, if necessary, within two hours defines the changes in the balance of power systems and informs the dispatchers of power systems on the necessity to conclude spot commercial contracts

Head of
LLC DC Baltija **J Shtamers**

Head of
CDC of SC Eesti Energia **V Peterson**

Head of
CDC SJSC Latvenergo **E Rozental**

Head of
SDC JSC Lietuvos Energija **A Kiselius**

Appendix 2

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
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To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

Schemes and regimes of parallel operation

1 The normal scheme for the Baltic IPS is the scheme of transmission network of 330kV lines (on-line) and the basic system of busbars and system protection automation which is under the operative management and control of DC Baltija Schemes and regimes for 110kV interconnection lines are determined by the interconnected power systems

2 Deviation from the normal scheme is allowed in the Baltic IPS, if there occurs

- outage of equipment which is coordinated among the interconnected power systems and DC Baltija based on Article 1 for the planned maintenance or reserve,
- emergency disconnection during continuous disturbance or isolation of grid,
- isolation of the ring or island operation of the Baltic IPS or its part based on the decision of the Parties,
- a field test based on mutual agreement of the Parties

3 The regimes of the operation during the conditions of normal schemes and any deviation from normal scheme in the Baltic IPS is developed by DC Baltija taking into account reliability criteria In separate cases with concurrence from all the Parties DC Baltija may establish additional conditions of reliability (for example N-2)

4 The capability of overhead lines of 330kV in normal and emergency conditions is determined by power systems and submitted to DC Baltija

5 Switching to overhead lines of 330kV is carried out based on operative direction developed and coordinated by DC Baltija with the respective power systems

6 Opening of the interconnection lines along the ring of IPS North West of Russia, Baltic IPS and Belarus IPS or islanding of Baltic IPS to operate separately from UPS Russia and IPS Belarus is performed based on the program which is developed by DC Baltija and concurred by all the power systems, CDC UPS of Russia and UDC of Belarus

7 Island operation of one power system or part of the Baltic IPS is performed based on the program developed by the power systems and agreed upon by the Parties

8 In emergency situations if the frequency has dropped to the level of the last load shedding stage, the power systems have the right to automatically island themselves

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Appendix 3

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
SC Eesti Energia	SJSC Latvenergo	JSC Lietuvos Energia	LLC DC Baltija
J Marend	R Leveika	V Pashkavichus	J Ositis
" 1996	1996	1996	1996

To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

Relay protection and automation

1 Relay protection and automation include relay protection, different types of electric automation (linear, emergency, operational) devices to transfer directions and information signals of protection and automation, automatic oscillograph, recording devices of emergency processes, devices to determine the location of a disturbance in the line
The tie line network of 330kV includes busbars and lines of 330kV, except radial
Internal system network of 330kV includes busbars and lines of 330kV which are located within the territory of one country
Interconnection overhead lines include lines where the ends of the line are located in different countries

2 DC Baltija is performing short circuit calculation, static and transient stability of 330kV network taking into account parallel operation of the Baltic IPS with Russia UPS and Belarus IPS and operational regimes to disconnect from them Short circuit calculation, and static and transient stability calculations are performed based on the single electric scheme and operational conditions of the electric ring of the Baltic IPS - North West IPS - IPS Center - Belarus IPS- Baltic IPS which are coordinated with DC Baltija, CDC of Russia UPS, Belarus UDC and North West Russia UDC Electric scheme and operational conditions in the power systems of Estonia, Latvia and Lithuania are additionally coordinated with the mentioned systems

3 DC Baltija analyzes real and probable emergency situations in the electric ring when frequency decreases or increases Based on the results of analysis calculations with regard to frequency decrease or increase, the necessary amount of customer load shedding to restore frequency or changes in generation capacity are determined
Having determined the amount of customer load shedding or changes in generation capacity and determined the sequence of implementation (setting for automatic frequency load shedding), technical tasks are coordinated with CDC of Russia UPS,

UDC Belarus and UDC North West Russia, but in the territory of Estonian, Latvian and Lithuanian power systems - it is determined by the Technical Committee
The power systems shall in agreed term implement the settings of automatic frequency load shedding and provide the required reliability level of technical facilities

4 DC Baltija is coordinating the development and introduction in DC Baltija and in the power systems of the Baltic IPS technical devices which are necessary for automatic generation control with adjustment to frequency in the interconnection electric profile Baltic IPS -Russia UPS- Baltic IPS- Belarus IPS
DC Baltija shall provide the required level of reliability of technical facilities employed by DC Baltija, but the power systems provide for facilities in their power systems

5 The Parties consider and coordinate the principle of new or reconstructed relay protection devices on interconnection lines and tie lines of 330 kV in the following manner

5 1 Tie line network 330kV of Estonia Estonian power system together with DC Baltija,

5 2 Tie line network 330kV of Latvia Latvian power system together with DC Baltija,

5 3 Tie line network 330kV of Lithuania Lithuanian power system together with DC Baltija,

5 4 Interconnection high voltage line of 330kV respective power systems together with DC Baltija

6 The Parties perform calculations and choice of parameters of tripping of relay protection devices

6 1 DC Baltija performs calculations, selects parameters, characteristics and settings and coordinates it with power systems, submits them for implementation, performs the sensitivity and selectivity control of relay protection automation of 330kV lines in the Baltic IPS and system tie lines of 330kV based on the listing

6 2 The power systems do calculations, choose parameters, characteristics and settings and coordinate them with DC Baltija, perform the selectivity and sensibility control of relay protection devices of system tie lines of 330 kV based on the listing

6 3 The power systems shall in agreed time implement the agreed settings and characteristics of relay protection devices

6 4 DC Baltija, CDC of Russia UPS and Belarus UDC perform calculations, select parameters, characteristics and setting for relay protection devices on interconnections 330 kV lines between Baltic IPS and UPS of Russia, Baltic IPS and Belarus IPS and also settings and emergency protection automation principles in the system tie lines of electric ring in the mutually agreed manner DC Baltija selects parameters, characteristics and settings for relay protection devices and additionally coordinates them with the power systems of the Baltic IPS for the facilities where it is necessary to have such changes

6 5 Setting calculations, selection of principles, and reconstruction of relay protection devices in the interconnection lines of 110kV and lower are performed based on mutual agreement among power systems

7 Changes in the parameters of relay protection (settings, schemes, principles, operation regimes etc) which would affect the relay protection system of another power system must be mutually coordinated among the concerning Parties before implementing changes

8 Operative- dispatch documentation with regard to relay protection automation

8 1 DC Baltija prepares and submits to the power systems the necessary operative-dispatch documentation with regard to the relay protection automation of the international lines of 330kV in the Baltic IPS and emergency automation for the tie line network of the electric ring

8 2 The power systems prepare and submit to DC Baltija the necessary operative- dispatch documentation with regard to the relay protection automation of the 330kV tie lines

8 3 Operative documentation on relay protection devices on international lines of 110kV and lower is prepared by the dispatch service in the power system under whose management is the line

9 DC Baltija coordinates with the power systems the planned maintenance schedules of the relay protection devices on international lines of 330kV and also the tie line network of 330kV based on the listing
The power systems present the input data and provide due maintenance of relay protection devices in the tie line network of 330kV
If the coordinated maintenance schedule is rejected, the rejecting party coordinates with all concerned Parties a new schedule

10 The Parties perform a regular account and analysis of the operation of relay protection devices in the network of 330kV, but DC Baltija summarizes this data and informs the power systems DC Baltija and power systems prepare an information bulletin on methods how to eliminate the recognized defects Power systems agree to eliminate defects in the relay protection devices of the tie line network of 330kV

11 If there is a need for design of new devices and reconstruction of relay protection devices on international lines or tie line network of 330kV, the respective system and DC Baltija prepare and organize discussion of this issue

12 In the occurrence of a defect of a high frequency channel or relay part of (DFZ, BCTO, ANKA), if based on signal operation, outer appearance, and oscillograms it is impossible to determine at which end of the international overhead line the defect is located, the detection of the defect in the shortest possible time is started by both systems, who will inform each other and DC Baltija on the results

13 The power systems present to DC Baltija

13 1 Parameters of elements and equivalents of systems for short circuit, static and transient stability calculations, and the selection of settings and characteristics of relay protection devices or their changes

13 2 Settings and other parameters for relay protection devices, necessary for DC Baltija - by request or in case of changes,

13 3 Oscillogram copies, computer charts - by request,

13 4 Quarterly data on the operation of relay protection devices in the tie line network of 330kV - by the 20th day of the following month

13 5 Maintenance schedules of relay protection devices in international lines of 330kV and the tie line network of 330kV, based on the listing for the coming year - by December 15 of the current year

13 6 Principal or structural charts of relay protection devices of international lines of 330kV and tie line network of 330kV, based on the listing,

13 7 Information on defects in the relay protection devices of 330kV network methods of their elimination,

13 8 Parameters of relay protection devices subject to concurrence and not subject to concurrence of the 330kV network, based on listing,

13 9 Confirmation on concurrence, implementation of settings, schedules etc

14 DC Baltija presents to the power systems

14 1 Parameters of elements and equivalents of systems for short circuit, static and dynamic stability calculations after introduction of changes in the power system or an adjacent power system, or by request

14 2 Settings and other parameters for relay protection devices on interconnection lines of 330kV or tie lines of 330kV based on the listing

14 3 Data on defects of relay protection devices in the 330kV grid of the Baltic IPS and neighboring power systems

14 4 A coordinated annual maintenance schedule of relay protection devices on interconnection lines and system tie line network of 330kV based on the listing

14 5 Confirmation on coordinated settings and characteristics

15 Each power system, by request from another power system, presents

15 1 Equivalents of the system and parameters of elements, necessary to the calculation of relay protection devices

15 2 Data on relay protection devices,

15 3 Information on the defects and outage of relay protection devices

15 4 Schedules of planned maintenance of the relay protection devices on interconnection lines which are not in operational control of the DC Baltija dispatcher

16 DC Baltija in the agreements on parallel operation between the Baltic IPS and UPS of Russia, the Baltic IPS and UDC of Belarus defines the procedure of setting calculation, coordination of principles, preparation of the necessary operational and dispatch documentation, reconstruction and design of relay protection devices on interconnection lines of 330kV between the Baltic IPS and UPS of Russia and the Baltic IPS and UDC of Belarus and coordinates them with the respective power systems

17 Listing of relay protection devices and calculations determining mutual responsibilities and liability of the Parties is compiled by the power systems and DC Baltija and is reviewed if necessary
Listings are signed by responsible representatives from the relay protection division of the respective power system

Head of relay protection division DC Baltija	**K Brinkis**
Head of relay protection division SC Eesti Energia	**R Hausmann**
Head of relay protection division SJSC Latvenergo	**V Atyakov**
Head of relay protection division of JSC Lietuvos Energija	**I Bukauskas**

Appendix 4

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
SC Eesti Energia	SJSC Latvenergo	JSC Lietuvos Energia	LLC DC Baltija
J Marend	R Leveika	V Pashkavichus	J Ositis
" 1996	1996	1996	1996

To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

Planning and implementation of regimes

1 Planning and implementation of active power and electric energy

1 1 Annual planning Based on the data from power systems on anticipated demand, working capacity and generation of local power plants and also taking into account proposals of power systems on interchange of electric energy, an annual plan for electric energy balance in the Baltic IPS is formed, allocating the energy monthly
The input data is presented to DC Baltija 30 days prior to the planning year
The draft plan for the coming year is presented by DC Baltija 15 days prior the planning year

1 2 Monthly planning The power systems present the following data 10 days prior to the planning month

- hourly demand schedules for the characteristic days of the month,
- available capacity and minimum load of power plants for the characteristic days of the month,
- planned transmission maintenance schedules,
- planned power equipment maintenance schedules or schedule of reduction of working capacity in the power system,
- daily demand for the days of the month,
- proposals on amounts and conditions of export and import of electric energy in the planned month

DC Baltija performs the calculation of possibility of implementation of power system proposals and 3 days before the planning month presents a balanced plan for the Baltic power systems for the planning month with daily allocations
The monthly plan forms a basis for bilateral commercial agreements on electric energy supply
Power systems prior to the beginning of the month submit to DC Baltija signed monthly commercial agreements
In case such agreements are not submitted to DC Baltija, zero supplies are planned

1 3 Weekly planning
The billing period for interchange of electric energy is deemed to be a week Power systems by noon of Wednesday of the preceding week inform DC Baltija on types of equipment, capacity of power stations and consumption charts for the characteristic days of the week, amount of cold reserve and start-up time, informing about the equipment where the accelerated start-up is not more than 8 hours

The beginning of weekly billing period is Saturday
As a result of a weekly planning the following issues are determined

- weekly interchange of electric energy,
- unit commitment in the power plant for holidays and week days,
- load level of Ignalina nuclear power plant for holidays and week days,
- amount of weekly water discharge of the Daugava cascade and Krounu hydro pump storage,
- interchange schedules and net flow balance of the power systems and Baltic IPS,
- the amount of operating reserve of active power, amount and start-up time of cold reserve and possible amount of single deliveries in case of emergency outage of the Ignalina nuclear power station
- guaranteed amount of reserve of UPS of Russia and IPS of Belarus

The results of calculations for the most characteristic days are submitted to the power systems by noon on Friday

1 4 Daily planning
The basis for daily planning is generating unit mix (unit commitment) and amount of interchange capacity which are determined by the weekly plan
Adjustment to the demand projection in the power systems for the days of week is done by DC Baltija
The calculation results of daily schedules from Tuesday to Friday are submitted to the power companies by 2 p m of the preceding day, and the results of daily schedule calculation for holidays and Monday are submitted to the power system by noon on Friday
The power system coordinates the adjusted daily schedule with DC Baltija after the mix of generation units is clarified

1 5 The Parties and DC Baltija meter daily the compliance with the planned net flow of active power based on the daily meter readings and the performance of interchange supplies

types of reserve will be utilized in the whole Baltic IPS and for each power system The basic information which is necessary for reserve calculations is presented to the power systems by DC Baltija The reserve is activated by the command from the DC Baltija dispatcher for two hours following this time frame, and after that, based on the initiative from DC Baltija, agreements enter into force regulating further utilization of the reserve

2 8 The Baltic power systems provide obligatory share participation in sustaining operating reserve
The amount of this share of reserve for each power system is determined by formula

$$P_{res} = \frac{P_{max\,i}}{\sum_{1}^{3} P\max i} X\left(P_{\max Ignalina} - P_{resRussia} - P_{add\,res\ Lithuania}\right)$$

Where,

$P_{max\,i}$	maximum load of the largest generating unit of the power system i
$\sum_{1}^{3} P\max i$	total of the maximum load of the largest generating units in the Baltic IPS
P max Ignalina	load of the largest unit in the Ignalina nuclear power plant
P res Russia	the guaranteed amount of reserve from UPS of Russia for the Baltic IPS coordinated with CDC
P add reserve Lithuania	based on the export deliveries of Lithuania beyond the Baltics during the peak hours, this reserve is covered by Lithuania or based on bilateral agreements it may be covered by a third party a) Pmax Ignalina - 1000 when supplies ≥300MW b) P supply when supplies are <300MW

2 9 The reserve is utilized in the following cases

- quick reserve - in case of outage of the largest loaded unit in the power system, or a situation exceeding the limits needed to preserve stability of transits, or overload,
- slow and cold reserve - in case of change of generation structure or disconnection of customers

2 10 The total amount of reserve is calculated to sustain the single most serious emergency outage
When calculating the actual reserve of the power system the availability of reserve on one maximally loaded generating unit is not taken into account

2 11 The terms regarding how the reserve might be used for UPS of Russia and IPS of Belarus are determined in the Agreement between DC Baltija and CDC of UPS of Russia and IPS of Belarus

3 The planning of the maintenance of transmission and power plant equipment in the power systems is developed on the basis of ability to fulfill the plans, interchange of electric energy and reserve

4 Planning and implementation of reactive power balance
4 1 DC Baltija plans reactive power balance for each month, taking into account maintenance schedules for transmission equipment, by calculating balance of reactive power for the most characteristic days for each power system presenting voltage limits in the control points of the Baltic IPS

4 2 The established control points of reactive power balance among the Baltic power systems of the Baltic IPS are

- at the middle of the following lines of 330kV
line #301,#354,#324,#305,#316,#451
- on interconnection lines of 110 kV at the existing meters at the ends of the lines

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LLC DC Baltija **J Shtamers**

Head of
CDC of SC Eesti Energia **V Peterson**

Head of
CDC SJSC Latvenergo **E Rozental**

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Appendix 5

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
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To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

Conditions for bilateral agreements on interchange of electric energy

1 The subject of bilateral agreements can be

- supply (or interchange) of active electric power and energy,
- supply (or interchange) of reactive power and energy,
- use of operating reserve of active power in emergency situations and for regulation,
- transit (wheeling) of electric energy

2 Interchange of supplies of electric energy and services are defined in the following documents

- long term, annual and other agreements,
- monthly commercial agreements,
- spot commercial agreements,
- plans and schedules which are developed by DC Baltija, based on bilateral agreements (contracts)

3 The bilateral agreements concluded by the Parties and commercial contracts in accordance with Article 1 must contain the following information

- amount and term of supplies and services,
- conditions on sustaining or termination of supply during emergency situations and other situations,
- schedules of deliveries, or proportions of the supplied amount of energy for a typical day or for time periods during the day,
- amount and terms of emergency reserve use in emergency situations and for regulation and also compensation (direct payment or return in kind)

The agreements and contracts about reserve must state the amount and conditions to preserve a reserve, terms for the use of reserve (in emergency situations and for the

regulations of deviations in demand) and payment system (direct payment and return in kind)

4 Monthly commercial agreements are concluded by the beginning of the month
The necessary data to develop monthly commercial agreements is submitted to DC Baltija 10 days prior to the beginning of the month
DC Baltija submits its proposals on implementation to the power systems 3 days prior to the beginning of the month

5 If necessary any power system has the right to apply for assistance from the other power system with the purpose of adjusting the supply schedule by filing it in written form as a spot commercial agreement, no more than 5 days following the beginning of such supplies

6 The amount and terms of interchange supplies must be determined based on the limitations set by natural load flow Supply terms must be established in such form, that it is possible to provide operative control over implementation

7 The dispute settlement procedure for these bilateral agreements is determined by these agreements

Head of Dispatch Service
LLC DC Baltija **J Shtamers**

Head of
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Head of
CDC SJSC Latvenergo **E Rozental**

Head of
SDC JSC Lietuvos Energija **A Kiselius**

Appendix 6

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
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" 1996	1996	1996	1996

To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

Information provision

1 The information system includes
- the necessary teleinformation for the implementation of regimes
- inquiry information for planning

2 Teleinformation includes telemetering (TMET), telesignals (TS), telemanagement (TMG) and computer software to implement operation in the Baltic IPS

3 Teleinformation exchange is taking place continuously The amount of teleinformation exchange is coordinated among the Parties
The Parties mutually exchange reliable information which is necessary to implement and analyze operation in the Baltic IPS

4 In order to implement operation the power systems are employing the operative information complex (OIC) of the power system

5 In order to provide net balancing of the power flows in the Baltic IPS, the OIC of DC Baltija is used, and it is deemed to be determining

6 Reliability of teleinformation is provided by
- coordinating calculation algorithms for the parameters of power systems,
- coordinating the algorithm for integration of the calculation parameters of the power systems,
- comparison of metered values by two independent sources when information is transferred through the interconnection line,
- comparison of the measured values with the mathematical modules,
- filtering of unnecessary, inadvertent data on metered parameters,

- transfer of signals concerning outage of devices or outage of the channels of telemechanics

7 The dispatch centers of the parties provide the preservation of teleinformation in the OIC in the duration of no less than

- 2 hours - data values at 10 – 15 seconds intervals,
- 24 hours - data values at 1-2 minute intervals
- 7 days - data values at 1 hour intervals
- up to one year - an archive with data values at 5 minute intervals, on average, which form the balance of active and reactive power including generation on each power plant, interconnection flows and voltage in the network of 330kV

8 The power systems submit to DC Baltija the following teleinformation

- technical information of active and reactive power and voltage at the ends of 330kV lines, which are under control and management of the DC Baltija dispatcher,
- technical information on active and reactive load in autotransformers at the substations of 330kV,
- technical information on active and reactive load in the generators which are under control and management of the DC Baltija dispatcher
- technical information on frequency in the power systems,
- technical information on the levels of head-water and tail-water on hydroplants and pump storages
- technical information of ambient temperature

9 Data on breakers on 330 kV lines and generator station circuit breaker which are under control and management of the DC Baltija dispatcher

10 Transfer of inquiry information is implemented in the periods agreed among the Parties or by mutual requests

11 Transfer of inquiry information can be sent by means of e-mail, fax or interchange through equipment For this purpose it is necessary to maintain unified standard software

12 The Parties jointly periodically engage in checking the accuracy and reliability of the information

Head of Dispatch Service	
LLC DC Baltija	**J Shtamers**
Head of	
CDC of SC Eesti Energia	**V Peterson**
Head of	
CDC SJSC Latvenergo	**E Rozental**
Head of	
SDC JSC Lietuvos Energija	**A Kiselius**

Appendix 7

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
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1996	1996	1996	1996

To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

On island operation of the Baltic IPS from UPS of Russia and IPS of Belarus

1 The parties take the decision on island operation of the Baltic IPS (if necessary defining additional conditions) after the announcement from CDC of UPS of Russia on anticipated unbalanced operation or after 2 hours operation of UPS in the frequency of 49,3 - 49,5 Hz
The implementation of islanding is managed by DC Baltija with subsequent information to CDC of UPS of Russia and UDC of Belarus

2 Implementation of islanding of the Baltic IPS or its part is carried out in three phases

a) in case of frequency range 49,3 – 49,5 Hz DC Baltija calculates unit commitments for the case of island operation, based on the data on anticipated power and energy balance calculated by DC Baltija for the current week

b) having started additional units on the power plants at the frequency range 49,2 – 49,3 Hz and providing zero net flows ± 50MW, connection circuits of 330 kV are opened on the border with the separated region between the Baltic IPS and Belarus IPS and Russia UPS

In order to cover the load of Pskovenergo and Jantarenergo during island operation of the Baltic IPS, the load of the Daugava hydro power station and Krounu pump storage should not be used, and likewise the load of the Estonian power stations should not be used unless separately agreed between SC Eesti Energia and CDC of Russia

c) at a frequency range 49,1 – 49,2 Hz, the Baltic IPS or its part should be separated on island operation together with Pskovenergo and Jantarenergo or without them (based on the agreement among the Parties)

3 In slackening of the circuit on the transit interconnection of 330kV lines
between the Estonian and Leningrad power systems, two 330kV lines remain in operation Baltic electric station - Leningrad substation,
between Lithuania and Belarus power systems of 330 kV lines Ignalina nuclear power plant - substation Belarus
between Pskov and Belarus power systems of 330kV lines Novosokolniki - Polotsk or Novosokolniki - Pskov GRES

If disconnection of the 330kV line Novosokolniki - Polotsk is refused, the 330kV line Estonskaya - Pskov is transferred to the substation Kingisepp by the 330kV line Kingisepp - Estonskaya through a dedicated busbar of 330kV in the Estonian power system and the 330kV lines Tartu - Pskov and Rezekne - Pskov are disconnected

4 In order to provide isolation on the units which are included in the instantaneous reserve, the insensitivity zones of primary speed governors must be lowered to the minimum possible

5 It is allowed in the slackened circuit automatic sectioning of the Baltic IPS and the UPS of Russia and IPS of Belarus by sectioning devices at an angle in case of dynamic disturbance in the tie line network in the areas of Russia and Belarus without automatic post-emergency restoration

6 The technical program developed by DC Baltija on slackened interconnection and island operation of the Baltic IPS and also sectioning of separate power systems are approved by technical management of the Baltic IPS and are agreed upon by CDC of Russia UPS and Belarus IPS

7 Sustaining of frequency in the band 50 +- 0,5 Hz in the isolated Baltic IPS is performed by

a) automatic precision regulation on Plavinas hydro power plant, Riga hydro power plant and Krounu pump storage,

b) automatic regulation by means of instantaneous reserve on Estonian electric station, Baltic electric station, Lithuanian electric station and all combined heat and power stations with a capacity of 100MW and more and also Plavina hydro power plant, Riga hydro power plant, Krounu pump storage and Kaunas hydro power plant,

c) manual regulation by a command from the dispatcher in charge at DC Baltija taking into account the defined conditions in the bilateral agreements

8 The necessary share participation of each Baltic power system in covering capacity and electric energy and sustaining instantaneous reserve for the isolated Region is determined by DC Baltija Based on the proposed power balance spot bilateral contracts are concluded by the power systems

9 Operative and commercial metering is hourly, based on the data from the information center in DC Baltija and the commercial accounting (metering) system

10 Based on this document DC Baltija prepares a package of technical programs on isolation which is subject to approval by the Technical Committee and adopted by the Baltic Council

Head of Dispatch Service	
LLC DC Baltija	**J Shtamers**
Head of	
CDC of SC Eesti Energia	**V Peterson**
Head of	
CDC SJSC Latvenergo	**E Rozental**
Head of	
SDC JSC Lietuvos Energija	**A Kiselius**

Appendix 8

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
SC Eesti Energia	SJSC Latvenergo	JSC Lietuvos Energia	LLC DC Baltija
J Maarend	R Leveika	V Pashkavicius-	J Ositis
" 1996	1996	1996	1996

To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

Calculation methodology for wheeled energy through the network of Estonia, Latvia, Lithuania, Russia and Belarus

1 The transit (wheeling) of power and energy is organized by the initiative of one of the power systems
The implementation and payment for the transit is determined in the bilateral Agreement between the initiating party and the wheeler (the power system which provides wheeling)

2 Transit electric energy, as a rule, is considered to be electric energy which goes through the system for the needs of another system and is not used by the wheeler's power system

$$\sum Eitrans = \sum Ejinput - \sum Eideliv\ all$$

$\sum Eitrans$ - transit electric energy for the power system i

$\sum Ejinput$ -total of all in-going energy flows in the system i (through all j lines)

$\sum Eideliv\ all$ - total of all deliveries of electric energy for power system i

3 Input and output flows of the transit electric energy are balanced for each hour and summed up on an accrual basis In case of lack of automatic commercial metering, balancing is done for a day or a month

4 DC Baltija calculates the amount of transit energy through the Baltic power system and regularly informs all the concerned parties on the results of such calculations DC Baltija and CDC perform daily planning with consideration of transit deliveries The adjustment of transit deductions based on the actual transit value is performed when planning the next day

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LLC DC Baltija **J Shtamers**

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Appendix 9

Approved on behalf	Approved on behalf	Approved on behalf	Approved on behalf
SC Eesti Energia	SJSC Latvenergo	JSC Lietuvos Energia	LLC DC Baltija
J Maarend	K Purnis	V Pashkavicius-	J Ositis
1996	1996	1996	1996

To the Multilateral agreement among state company Eesti Energia, state joint stock company Latvenergo, joint stock company Lietuvos Energia and limited liability company DC Baltija on parallel operation of power systems of Estonia, Latvia and Lithuania

Safety regulations for work on overhead interconnection lines

1 General provisions

1 1 The present Regulations apply to the SC Eesti Energia, state joint stock company Latvenergo and joint stock company Lietuvos Energija in those parts which require jointly coordinated actions or touch upon the interests of the other Parties

1 2 Each power system must have Safety Regulations (SR) with regard to the service and work with electric facilities

1 3 With regard to international overhead lines it is necessary to determine the service border, confirming it with a bilateral document for each line The copy of this document with regard to 330kV lines is submitted to DC Baltija The work procedure of its area of service is established in accordance with the Safety Regulations of the respective system

1 4 The parties must respectively train the operative personnel who have the authority to organize and implement safe work in the electric facilities and the parties exchange the lists of the operative personnel in the dispatch services who have the right to negotiate the line switching on an operative basis

1 5 Operative personnel of DC Baltija and the operative personnel of power systems are responsible to prepare the overhead lines for safe work on them within the scope of these Regulations The mentioned personnel are responsible for the switching

which is under respective operative control Preparation of overhead lines to implement safe work on them requires certain organizational and technical measures

1 6 The violation of the present Regulations is considered at the Baltic Council or by the expert group designated from the Council The employees who have violated the present Regulations are held disciplinary and administratively liable based on the existing legislation of the respective country
Criminal responsibility is considered based on the Agreement dated November 11, 1992 among the Republics of Latvia, Lithuania and Estonia on legal assistance and legal relations

2 Organizational measures

2 1 This section refers to the international lines at all voltages when work is executed on the lines or line isolators

2 2 The dispatcher under whose operative management the line is located in accordance with the technical measure (Article 3) manages the preparation of lines for the execution of work and gives the permission to the power system dispatchers to issue access to the work base on the allowed request which is coordinated with the interested Parties

2 3 In the cases when the character of work on lines requires participation of representatives from two countries, the execution of work must be in due time coordinated and described in the request which is transferred to the dispatcher under whose operative management are the following lines for the work

2 3 1 border area lines,

2 3 2 overhead lines crossing the overhead lines of another power system or an overhead line system of another power system,

2 3 3 lines crossing transport routes (motor vehicle roads or railways, navigated rivers or channels) on the territory of other country,

2 3 4 overhead lines on the territory of other country

2 4 If the voltage is more than 42W in disconnected and grounded line at the ends, it is necessary to execute the measures described in the clause 3 3 When it is necessary to execute work on several spans of the line and it is not possible to section part of the lines, the work is executed only on one span The preparation requirements for the execution of work on lines are defined in the request

2 5 Preparation of the working place and work clearance and accounting of the working teams are done by the operative personnel of the power system under whose control is the section of the line, based on the document on the service borders Each power system is guided by its own Safety Regulations

2 6 Implementation of the switching-on of the line after the repair is performed based on the command from the dispatcher under whose operative management is the line, after the dispatcher has received the information from the power system dispatcher on

final completion of works and removal of all working teams and all groundings installed by the working teams

3 Technical measures

3 1 To prepare the working place, where it is necessary to reduce voltage the following technical measures must be executed in the mentioned order

3 1 1 Implement the necessary disconnection from all the parties from whom the power flows

Voltage and power transformers connected to the working section of the line must be disconnected and also from the side with voltage up to 1000W in order to prevent reverse transformation

3 1 2 In order to avoid tripping of switching devices either by mistake or automatically, which could supply voltage to the isolated line for the repair, the following measures must be applied

- at the line isolators, isolating switches and manual load disconnectors are mechanically locked in the "off" position,
- remote control switching devices, power circuits and management circuits are disconnected, and for switching devices operated on accumulated energy (air, spring, etc) additional measures are applied to eliminate spontaneous or default switching based on the accumulated energy

3 1 3 For each party from which voltage could be transferred by means of switching devices to the line which is isolated for repair, a visible separation must be seen as a disconnected isolator switch and disconnection from the busbar and the electric wires At remote control switches and at manual switching devices a notice must be posted to prohibit switching them on

3 1 4 During the preparation of the disconnected line for the execution of work, lines are grounded by switching the grounding rod or installing mobile grounding from all sides from which voltage could be transmitted

3 1 5 On isolation switch wires which are disconnected for the repair works on the lines, irrespective of the number of working teams, the notice must be posted prohibiting to switch on the line This notice is posted and removed by the direction of the employee of the power system who issued the command to prepare the working place and who is accountable for the working teams on the line

3 2 During the work on the disconnected line isolator, on descending wires from the side of the overhead line, irrespective of the existence of grounding on the isolator, on the grounding towards the side of the linear isolator of the overhead line an additional grounding must be installed from the side of the overhead line

3 3 If the disconnected line (circuit) has voltage, and it is impossible to reduce the voltage lower than 42W, it is necessary to work with the grounded wire only in the working place (on one support or on two joint supports) At the same time it is

prohibited to ground the line (circuit) in the places of disconnection It is permitted for the teams to work only on the supports which have grounding and in the span between such supports
If it is necessary to work in two or more spans (sections), the line (circuit) must be split into electrically disconnected sections by means of isolating loops on anchor supports On each of these sections in the places where grounding is installed only one working team has the work clearance

3 4 During the execution of work on wires of the line in the span which is crossing another line which is energized, grounding must be installed on the support where the work is executed If wires are to be changed or are hanging in this span, from both sides of the crossing it is necessary to ground both the hanging wires and the wires to be changed

4 Execution of works with the participation of the personnel of the other power system

4 1 In cases when personnel of the other party's power system are involved, the power systems which send personnel must define in writing

4 1 1 Position and name of the representative,

4 1 2 Type of work, which could be executed by the employee and his qualification,

4 1 3 Duration of the trip

4 2 The personnel after arrival to the location must listen to the instructions on electric safety by taking into account the specific character of the electric system where the work will be done The instruction is recorded in the file log for such instructions and confirmed with the signatures of the instructor and the instructed employee

4 3 The power system where the employee sent from another system is working is responsible for implementation of safety measures for the executed work

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Head of safety and labor protection
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The Situation in the Power Sector of Central Asia and the Status of Cooperation

V M Kasimova, Ph D in economics

December 1996

Honored Mr Chairman, colleagues,

December of the current year is significant by the fact that many republics of the former Soviet Union are celebrating their fifth anniversary of their independence and sovereignty The effectiveness of CIS is the subject for consideration not only for the politicians, but also for the general public of the former Soviet and presently independent republics Following the break-down of the Soviet Union and formation on its territory independent republics, fuel and power supply connections for the CIS countries and the Baltics de facto remained with Russia and to certain extent also to Turkmenistan irrespective efforts of the CIS countries to develop their own power resources and attempts to enter the world power market and diversify fuel and power resources

Continuing decrease of extraction and production of the basic types of fuel and power resources in the recent five years in the majority of Central Asian republics has taken a threatening character This is specially obvious bearing in mind the emerging trend and efforts applied to stabilize and accelerate the economies of the republic, where the developing economies can reach a situation when the shortage of fuel and energy resources becomes a detrimental factor in the social and economic progress

However, in the situation of the continuous slow-down in production of gross national product (see table 1 and 2), industrial and agricultural products, difficulties in fuel and energy supply for industries and public are increasing in the whole region of Central Asian republics This is said bearing in mind that the scope and tempo of decrease in production in industry and agriculture are considerably more comprehensive than the decrease in production of fuel and energy industries and also the development of economy on the whole

Based on the data from the republics in the period of 1990-1995 gross national product in the republics of Central Asia on the whole decreased for 42%, where the highest decrease took place in Tajikistan - 56%, Kazakstan - 55%, Kyrgyzstan - 50%, Turkmenistan - 38% and Uzbekistan 18% It is worth to mention that the income per capita in 1995 on average in the republics of Central Asia decreased by 49%, where in Tajikistan by 60%, Kazakstan by 54%, Kyrgyzstan by 52%, Turkmenistan by 50% and Uzbekistan by 26% (table 2)

During this period the extraction of oil (with condensate) decreased from 35 to 34 million tons (3% during 5 years), natural gas - from 136 to 81 billion cubic meters or 38%, coal - from 142 to 93 million tons or 35%, electric power from 116,8 to 106,47 KWh or for 20%

Consumption of the primary power resources for the same period in the countries of Central Asia decreased by 19%, electric energy - by 20 % (see slide) at the same time natural gas decreased by 13%, coal by 37%, oil by 7%

Difficulties in the power supply practically in all the countries of CIS in many ways are determined by a considerable increase of energy consumption in economy (which was high also in earlier years) and inefficient use of energy resources (see slide)

The situation is complicated for Central Asian Republics which are exporting energy resources (Turkmenistan, Kazakstan) Exporters from CAR are dependent from Russia, Ukraine and Belarus where the export energy transfer routes go to the other Eastern, Central and Western European countries, by that considerable reducing the efficiency of such export

Taking into account the key role of the power sector in the economic and social development Central Asian countries must be interested to a joint solutions to many problems and must strive to develop and strengthen the processes of integration, bearing in mind objective benefits of joint work in order to sustain and develop power sector industry infrastructure and benefits of large supplier systems of electricity, gas, oil and petroleum products and constructions and facilities which are part of before mentioned systems and used to be part of the united systems of former Soviet Union

Reduction in production of fuel and energy resources adversely influenced the development of electric power industry Tendencies in reduction of power generation manifested already in 1991 and have been preserved by this year

Situations in power sector for all three republics of Central Asia remains difficult and problems they are addressing are similar

- continuous economic recession,
- non-payment problem in power sector,
- difficulties in fuel supply in power sector,
- wear out of equipment of power stations,
- shortage of technical information on modern technologies,

And also problems which are caused by

- changes in the power sector management structure,
- privatization processes in power industry,
- formation of wholesale market in power industry,
- deficiencies in the interconnections of the power system of CIS and CAR in parallel operation

The low number of newly commissioned facilities is hindering the decommissioning of old facilities that have exhausted its standard life cycle that in its turn adversely affects economic and reliable operation of power stations and transmission system The operating reserve in the power systems of several countries of Central Asia is 2-3 times lower the standard requirement

Losses in jointly used transmission system in 1995 constituted (12) billion kWh or on the whole in the countries of CAR (13%) of the total consumption While in Kazakstan and Uzbekistan they were equal to 11%, [in Turkmenistan -13,8%, Tajikistan 14%] and Tajikistan and Kyrgyzstan up to 30% To compare, it could be mentioned that losses in Japan and Germany constitute 4%, in France - 7%

[This report has been edited by V Kasimova In the shorter report prepared for the seminar held in Almaty on 11-12 December 1996, the text is slightly different and figures are different The figures which are shown in brackets are from the shorter report received on the day of the conference, and were later omitted or changed]

The wear out of the main assets in the companies is drastically growing Two thirds of the fixed assets in the sector of fuel and energy industry have completed their life cycle Fundamental repair, modernization and reconstruction are done on a very low scale and are far behind the necessary level

40% of the technological equipment in power industry requires replacement or up-grading, only 25-30% of the transmission lines are repaired out of the number which is required for the reliable operation

Due to the insufficient amount of new generating capacities to replace the worn equipment, the number of accidents on the power plants is growing, also specific fuel consumption to generate electricity and heat is growing

Two out of five former republics that are at present independent countries - Turkmenistan and Kazakstan - in 1995 were net exporters Uzbekistan was basically self sufficient in energy, but Kyrgyzstan and Tajikistan - importers of energy resources are forced to consider power supply as a significant factor of national security which is to great extent dependent on reliable import of energy resources

However, the countries having energy surplus in Central Asia are concerned about energy safety which to great extent also determines national security

The decrease in production and export of electricity is aggravated by decreasing profit margin per unit of sold energy resources This adverse affect is marked by transit to the prices which are close to world market prices in the international trade with CIS These prices are certainly lower than world market prices, for example for 20-30%, but at the same time twice higher than 1990 prices for the internal market of the former Soviet Union and for trade with COMICOM countries During the years of reform, the production costs and transit costs have increased respectively The most important is the acute non-payment problem on internal market and the revenue from the fuel and energy industry in the commonwealth market have drastically decreased, reaching the negative profit

balance in the industry This caused shortage of investment and consequently aggravated the slow down of production of energy resources That is why, for the countries having excess of power, the discussion is not only about economic efficiency, but also about survival and consequently about national security

Now it is clear that Central Asian countries have become hostages to each other in the aspect of energy security of the countries Certainly, each country can solve these problems independently, but efficient and reliable solution for energy problems in Central Asian could be found in the integration processes, especially keeping in mind that energy complex in these countries for decades was formed as a single system

Solutions to this problems is carried out by a series of efforts and particularly the development of legal and institutional framework for cooperation, formation of coordinating bodies in this area and market oriented intergovernmental structures and also supporting industrial and scientific and technical cooperation

Bases for legal and institutional framework for cooperation among Central Asian countries in power industry are intergovernmental treaties in different aspects of this cooperation, usually being long term treaties in diverse aspects Such treaties are concluded on bilateral and multilateral basis

In 1992 the Electric Energy Council of CIS was formed, the agreement on parallel operation of CIS power systems was concluded and general principles of such operation were constituted In the framework of the Electric Energy Council of CIS the basic conceptual integration plan of the power systems of Commonwealth countries was worked out directed to sustain joint operation and development of such systems in CIS, providing their coordinated actions in the framework of operational and strategic management areas to reach the common goals

Now, having gained independence in Central Asia, each power system itself is responsible for operation In order to preserve the benefits arising from the parallel operation of power systems in Integrated grid of Central Asia and South Kazakstan, the republics in November 1991 in Ashgabad signed "The Agreement on parallel operation of the power systems of the Republic of Kazakstan, Kyrgyzstan, Uzbekistan, Tajikistan and Turkmenistan "

This agreement confirms the decision to preserve centralized system operation in the region of Central Asia implemented by the regional dispatch center "Energia "

As a result of this there is a three step management structure regional dispatch center "Energia", national dispatch centers and power facilities Some power systems in between the national dispatch centers and power facilities there are local dispatch centers that are dealing operational management of distribution system

As the benefit from the above mentioned agreement the five countries agreed to preserve regional coordination through dispatch center "Energia" and transfer responsibility of decision making of such problems as

1 Assistance to power systems in developing intergovernmental contracts on energy supply,

2 Execution of intergovernmental contracts on power supply,

3 Maintaining net balance of capacity and energy in the integrated power system of the region (annual, quarterly, monthly, daily)

4 Coordination of maintenance plans of power plants and transmission lines,

5 Electric grid calculations, selection of principles and calculation related to protection automation and relay protection,

6 Operational field adjustment of electric and energy equipment, emergency management in the integrated system of Central Asia,

7 Calculation of potential operational schedules for hydro plants with respect to irrigation requirements,

8 Informational support for power systems

9 Consultation on the issue of system development

United Dispatch Center of Central Asia "Energia" is not participating in generation and demand planning of electricity

Each power system is planning its own demand and generation on their stations and transfer this information to DC "Energia" Based on this information DC "Energia" calculates net energy balance in Central Asia and also calculated the physical energy flows among the countries of Central Asia and Kazakstan, by that having the picture of the total flows of interchange

After this procedure, the information is sent to the power systems for consideration and signing of agreements on export and import and the Council of Central Asian Integrated Grid is informed This practice of planning is annual, quarterly and monthly

In case of the deviation from the planned schedule, additional agreements are signed which are binding for the Central Asian countries to provide daily schedules

Daily scheduling is performed based on the monthly ratios of instability which are calculated for the whole system and then transferred to the respective separate systems

Schedules for hydro resources are calculated for vegetation period (April-September) and low water season (October - March) Forecasts for the vegetation period (April-September) and low water season (October - March) are performed by the hydro meteorological services of Uzbekistan, Tajikistan, Kyrgystan Based on these forecasts and schedules the deviation and expected generation on the cascade of hydro electric power stations (Naringk and Vahsh) are calculated

At present United Dispatch Center is not participating in the demand calculation due to its unstable position Unites Dispatch Center "Energia" has a plan of electricity based on meteorological conditions (ambient temperature, cloudiness etc)

To schedule operation of the Integrated Power systems, such factors as the reliability of each power system, reliability of separate node and reliability of the whole integrated systems is taken into account Each power system provides this reliability by their own stations, contracted energy and scheduling An to plan normal and maintenance regimes, the condition of the existing equipment which determines the stability of the systems, is taken into account

However, this sample of cooperation in this area is not sufficient and striving of each independent republic to be self sufficient is also present in internal demand of energy resources including electric industry (this striving is based on the fact that countries have enough installed capacity) which can lead to energy crisis where at present only Turkmenistan is able in normal condition to cover its electric demand and also demand in gas and petroleum products Other four republics are interdependent and due to that they are forced to cooperate In some cases shortage of fuel makes situation even worse

The potential of fuel and energy industry in Kazakstan is not fully used Own production covers the demand in electricity for 85%, in heavy fuel oil for -82%, in gasoline for 86%, in diesel fuel for - 74%, in natural gas for - 42% At present the installed capacity of the power plants constitutes 18,5 million kW with an annual generation of 66 billion kWh out of which thermal stations -16 million kW, hydrostations - 2,2, million kW, nuclear stations - 0,25 million kW In the past the existing capacity of power plants was not sufficient to cover the demand and the deficit in 1990 constituted 12, 4 billion kWh and Kyrgyzstan supplied 4-5 billion kWh annually to the customers in the South of Kazakstan Due to the drop in demand on electricity, own capacity could be enough to completely covered the lowered demand However, due to lack of resources, break down of commercial connections with suppliers of equipment, spare parts, the quality of maintenance and repair is critically going down resulting in lower production The lack of fuel and heavy fuel oil is also an influencing factor

At present the wear of fixed assets in electric energy sector is more than 50% By the year 2000 it is planned to decommission 58 turbines with the capacity of 2,8 million kW, 120 turbogenerators with the total capacity around 10 million kW generating at present 70% of the total Due to these reasons balance deficit remained and started to increase in 1995 constituting 14 billion kWh and South of Kazakstan has shortage of generating capacity amounts to 40%, however consumption in this region has considerably reduced, basically at the expense of industrial sector and due to that this region of Kazakstan always imports electric energy from Kyrgyzstan and Uzbekistan

Critical situation in power sector of Kazakstan has been aggravated by ongoing privatization and denationalization of this strategically important industry and by onset of new, mainly foreign, owners Namely, this is the American company AES, winner of the tender on property sale of thermal station of Ekibastuz 1 with the

mandatory requirement of investment from 500 million $ to 1,5 billion $ and increase in generation of electric energy by the year 2000 to 22 billion kWh and by the year 2005 to 27 billion kWh

Net assets of "Almatyenergo" are sold to Belgium company "Tractebel" for 5 million US dollars at the actual value of energy system based on the assessment of experts for more than one billion dollars At the same time the company "Tractebel' intended to raise energy tariff for 33% and invest in the course of 10 years 340 million US dollars in Almaty heat station (TEC) and is intended on long term operation in this region The power station which are transferred into the ownership of foreign companies - Ermakovki GREs and Pavlodarski TEC - are operated lower their potential All equipment requires replacement, but new owners do not want to operated without payment It is necessary to pay for received electric energy in the amount of 300 million kWh in compliance with agreement, 320 million tenge is required, but such amount, for example in Pavlodar, is not available as they also owe to coal miners 300 million tenge

At the beginning of heating season the most difficult situation was at the Shimkent TEC-3 - large power facility in the South of Kazakstan covering 25% of electric energy demand Moreover, due to the accident on Ekibastuz GRES-1 and GRES-2 generation of electricity and supply to adjacent power systems at separate days were close to zero To maintain power systems in operation the dispatch center of Kazakstan was forced to load hydro power stations of Irtish cascade exceeding the limit that caused the considerable excess of water discharge from basic Buhtarminsk water reservoir Results from the privatization of the main power facilities of Kazakstan will show during the autumn-winter heating peak load

The policy to privatize and sell power facilities to private foreign companies can lead to increase in the electricity tariff even reaching the world prices (7-8 cents for kWh of electricity per year)

The perspective development in accordance with conception of electric power industry of Kazakstan for the period to the year 2000 is envisaging overcoming energy crisis and deficit in electric industry by restoring and maintaining the generation of electric power in the existing units of Ekisbastuz GRES-1, by installing units of new technological generation in Jambul and Ermakovskya GRES and by construction of South Kazakstan GRES and commissioning first step of 1080 MW by the year 2002-2003 Construction of this power plant plays an important role in the striving to provide energy independence of the Republic of Kazakstan It will not only cover the demand of South Kazakstan, but also increase the transmission capability of 1150-500kW in the North of the Republic

Improvement in the situation will facilitate the construction of transmission lines North-South, as the North can export cheaper electricity generated on coal instead of energy generated on gas and heavy fuel oil The construction of such line shall allow parallel operation of the power systems of Central Asia and entire Kazakstan and if desired also Russian systems of Ural and Siberia As a result of these measures it is expected that import of electric energy from Kyrgyzstan and other countries will reduce by the year 2000

The issue of preservation of fuel and energy independence and reaching the level of industrially advance countries with regard to electricity costs per capita of population in **Uzbekistan** is marked by the government as one of the primary priorities of the republic

The republic has the largest installed capacity in the power plants - 11 283 million kW with the generation of 47,3 billion kWh out of which thermal stations - 8,914 million kW, hydrostations - 1,710 million kWh The peak load - 7,37 million kW Due to that, at least theoretically, they have potential to share with neighboring republics such as Kyrgyzstan and Tajikistan during winter period, when there are shortage of hydro resources Production of gas and oil is enough for the need of the republic and by 1995 Uzbekistan reached independence in oil

The thermal stations to 90% are operated on gas in the weather is no lower than -15C in the rest of the time gas is used to 50% to save for other need (for example heating) This is one of the constraints in the power sector that the existing indigenous resources must be distributed in all sectors There are other problems in power sector like wear-out of the equipment and lack of spare parts and effective maintenance As an example could be Sirdarniyskaya GRES where are 10 units 300 MW each, however, some of them are idle due to the lack of spare parts Purchase of these parts are made more difficult by currency exchange As a result Uzbeskiatan is able to cover its peak, but is forced to import electricity from Kyrgyzstan for 4 cents per kWh and from Tajikistan for 5 cents for kWh, where normally such price is 1,2 $

In this connection there are night regimes in Uzbekistan which allow to reach zero on net flows among republics, i e electricity received during the day return at night as the thermal stations in Uzbekistan are operated as base schedule, but stations in Kyrgyzstan and Tajikistan in zero schedule

Due to the shortage of reserve and fuel in the Integrated Power systems of Central Asia there were frequency deviation to 46, 6 Hz and sometimes lower In order to prevent this it is necessary to have capacity reserve which equals to the biggest generating unit in operation At present the biggest unit in the integrated power system is 300 MW Neither in Uzbekistan nor other power systems of the integrated region have such reserve which leads to such drop in frequency

Based on the energy strategy of Uzbekistan for the period to the year 2010 one of the most perspective power plants are Talimardjisk GRES, capacity 800 thousand kW, Pskemsk hydro power plant (HPP) - capacity 450 thousand kW with an average generation 890 million kWh per year In Surhandinsk valley it is planned to construct Tupolangsk HPP - design capacity 175 thousand kW with the potential generation 500 million kWh per year It is planned to construct 13 small hydro power plants with the total capacity 237 000 kW

Commissioning Talidjansk GRES operated on natural gas is planned in 1998 As a result the generation of electric energy will increase 2,5 times in comparison to the level of present generation By that export potential of electric energy will increase till 2,3 - 3 billion kWh Consequently will increase the consumption of natural gas by thermal station for 4,3 - 7 billion m^3 heavy fuel oil - 1 - 1,5 million tons, but export

potential of gas will stabilize in the future on the level of 6- 8 billion m^3 Kazakstan will increase import of natural gas from 7 billion m^3 to 9-11 billion m^3 by the year 2000

Due to that one of the important issues is use of Turkmenistan gas and petroleum products in the Central Asian region by reaching agreement with Uzbekistan on quata of transit of gas through its territory Due to lack of internal market production and export of natural gas reduced in Turkemnistan 2,5 times Potentially with the existing capacity it is possible to produce 2-3 times more gas then now At the border with Uzbekistan the gas from Turkmenistan costs 40-44 US dollars for 1000 cubic meters If the agreement is reached on supply of Turkmenistan gas by the pipeline Gazli-Buhara-Tashkent-Chimkent-Bishkek-Almaty, it would promote the idea of a single reasonble gas price for Central Asia to reach energy security in the region The Central Asian market will not require for Turkmenistan construction of new and additional gas pipelines Taking into account that in future the role of Uzbek gas will envetually be reduced, it is necessary to reach an agreement on increased use of Turkemenistan gas in Central Asian region

Availability of cheap gas allows rapidly develop generation of electric energy In 1995 it was 12,6 billion kWh Turkemistan system has excess In Integrated power systems of Central Asia 12,6 billion kWh were transferred Power sypply in Turkmenistan is provided by means of 5 thermal stations with the installed capacity 2548,2 thousand kW and six network enterprises The lenght of lines at all voltages is more than 47 thousand km, length of network at 500 kV is 389 km The basic system network voltage is 220 kV Customers in turkmenistan on the right bank of Amudarya river receive energy from Uzbekistan To connect these customers a high voltage line is built at voltage 500kV Seidi-Dashovuz

The development of power industry, especially energy consuming industries and export potential, will determine the economic development in Turkemenistan in the coming 10 years Internal electric demand might increase approximately 1,5 times which corresponds the existing capacity of power plants Based on the concluded contracts on electricity export and also based the Teheran intergovernmental treaty on the electricity delivery through Iran by three countries where within 2 years could be delivered 1,6 billion kWh through transmission line 400kV and after that up to 4,0 billion kWh This will give possibility for power industry reach significance as an export industry

In order to supply 5 billion kWh to other countries it is planned to increase capacity of thermal station in the city of Turkmenbashi to 900 thousand kW where the transmission line of 400 kv starts to Iran, upgrade Bezmeinsk GRES and construction of the first phase of Marinsk GRES, if a line is built through Afganistan to Pakistan In order to provide favourable conditions for the development of power industry it is necessary to solicit new customers and find new sale markets The maximum production and export can be reached by formation of new international power systems including Turkmenistan, Iran, Afganistan, Pakistan and possibly Transcaucasus It will require technical upgrading the entire power systems with the introdution of new standards in neighboring southern countries (voltage 400 and 700 kV) and installation of respective equipment

For Kyrgyzstan with it enormous hydro potential and total dependency on supplies of natural gas and petroleum products from outside, the security of energy supply must be the center of energy policy and strategy and must be reach by economic and also political means

National wealth of Kyrgyzstan is the unique natural resources, where second after gold, are hydro resources which where assessed only based on the accounted rivers in 142 billion kWh potential annual generation At present they are used for 9% and generation of electric energy is concentrated on Nizhni-Narisk cascade of hydro plants with a total capacity 2,180 million kW which are meant to be operated at peak and near peak load

[Not included in the longer version]

[Based on the energy strategy of ***Tajikistan*** *till the year of 2010, it is expected the significant increase of electric energy already by the year 200 up to 23,8 billion kWh or in 1,6 times, by 2005 in__ times (see slide) after the completion of Rogun hydro power plant and Shurub hydro power plant - capacity 3600 MW and 900 MW respectively and also the cascade of Sangtugiski hydro power plants with the total capacity 890 MW]*

For Kyrgyzstan the cascade of Narinsk hydro power plants with Toktogul water reservoir which is manyseasonal regulatin are the unique water complex to solve the needs of irrigation in Uzbekistan and Kazakstan and generation of electricity characterized by seasonal flactuation In this connection Bishkek thermal station - capacity 609 thousand kW plays an important role in providing uninterrupted electricity supply to the customers, as it is a base load power plant in the Kyrgyz national power system The difficult financial situation is mainly caused by non-payment and large debts of the customers Consequently Kyrgyz Energy Holding company has no resources to purchase fuel for the thermal station, reconstruction and maintenance of the existing capacities on the power stations and transmission lines The customers require switch to electric heating and electric stoves due to high prices for gas and coal However, the tariff for electric energy and district heating is not covering the production costs

As a result the system during the recent few years is bouncing due to the existing crisis, but solution to this crisis could be investment in amount of 650 million US dollars

Based on the economic strategy of Kyrgyzstan for the period till the year 2005 the generation of electric energy will increase up to 17,37 billion kWh and by 2010 to 23,3 billion kWh with the condition of accelerated development of hydro electric industry and construction of Kambarat hydro power plant - design capacity 2260 MW, High Narinsk cascade of hydro power plants with total capacity 380 MW

Respectively will increase export of electric energy up to 5-8 billion kWh By having possibility to satisfy the needs of Integrated Power Systems of Central Asia and South Kazakstan during peak hours due to the fact that thermal stations in Uzbekistan and Kazakstan are meant for base load operation

The intended power industry development strategy shall give the possibility for Kyrgyzstan in 21 century to become a big producer of ecologically clean energy in the region As a result of it will appear potential for export market including Uzbekistan in the amount of 500-750 million kWh, Pakistan - 5-6 billion kWh and Kazakstan - 1,6-2,2 billion kWh

Kazakstan by the year 2000 plans to reduce import of electricity from Kyrgyzstan However, the Republic of Kyrgyzstan is interested in preserving export of electricity in the amount of 1,3 billion kWh and further will increase to 2,2 billion kWh Due to the fact that the operation of hydro plants is connected with irrigation need of Kazakstan and Uzbeskistan, the problem of water supply to these republics require optimum work schedule for thermal and hydro power stations, as it used to be during Soviet times, where our power plants were built for the needs of the Central Asian region and South of Kazakstan

The greatest difference in opinion between Kyrgyzstan and Uzbekistan with regard to water use of the river Sirdarya Due to the existance of Toktogul hydro cascade Kyrgyzstan has posibility to regulate the flows of the river Narin and sirdarya in Uzbekistan In compliance with the Helsinski accord on use of international rivers, the actions of Kyrgyz government are acceptible and comply with international law

Finding the compromise of the use of water resources and electric energy demand and water for irrigation needs **must become one of the most important priority in regional integration processes**

The exisiting cooperation agreement among the five republics on coordination of generation and transmission management in the framework of the existing United Dispatch Center "Energia" (UDC "Energia") will assist, to the extent possible, the adversive effect on generation of electricity in the entire region, and what is more important in each republic, as

- generated energy resources are spread among five republics in such a way that availability and reliability of supplies are maximally satisfying for all,

-the interchange of power and energy can be arranged among the republics in the optimum economic way,

-the maximum benifits can be gained by mixing different generation (thermal-hydro) in the optimum manner

In future the United Dispatch Center of Central Asia and the South of Kazakstan - UDC "Energia" must undertake unbiased and principal policy in tis operation and must become a power pool or a stock exchange of electric energy for the five republics with an hourly monitoring of costs every day and by that, they will be able to receive and deliver cheaper electricity Here, in the conditions of competition, the cheaper energy will be used up, either in Uzbekistan or Kazakstan Electric energy which is generated on hydro stations, due to the absence of fuel component, will always be cheaper than the electric energy from thermal power stations, generated on coal, gas or heavy fuel oil ptice of which is constantly growing

The energy policy of Kazakstan is directed in future to cover the energy deficit in the south of Kazakstan by introduction of new capacities by means of construction new termal stations By this demand in coal will increase two times by the year 2010 and consequently increase hazardous emission into atmosphere which is not in compliance with the requirements of **ecological safety of the region** Moreover, the major thermal power stations are being privatized by foreign companies which are interested to increase profit by increase in prices

The export of electricity to Pakistan is acute issue based on the agreement signed by the leaders of the government The export capability in the amount of 5-6 billion kWh by the year 2005 annually is possible from UDC "Energia" considering optimization of operation of hydro and thermal station in Central Asia This will allow participation of thermal station of Uzbekistan and Kazakstan in even electricity supply in daily and annual operation of hydro and thermal plants in Central Asia Speaking in these terms Kyrgyzstan is interested and has economic value in preserve state ownership of Nizhnu-Narinsk hydro cascade and transmission system, of 500 and 220kW

The issue of providing energy security in Central Asia region to large extent is determined by reasonable decision in denationalization and privatization of main strategic power facilities in the republics and maintaining control of in interest in such enterprises by the state

In order to provide energy security it is necessary that single energy policy in the region is based on the principles of mutually beneficial trade and economic cooperation among the republics, including the coordination of power and energy flows, use of water resources for irrigation and energy, supply of natural gas

An important issue of energy security for the regional cooperation is the development of long term contracts in the area of regional trade of energy resources on equitable, mutually beneficial basis and implementation of pricing reform for energy resources

Intergovernmental Council of Uzbekistan, Kazakstan and Kyrgyzstan is planning in future to reach single approach to price calculation for natural gas, coal, petroleum products and electric energy

In this aspects EU is rendering large technical assitance to the republics of central Asia The TACIS project "Technical and organizational requirements to increase stability and economic operation of power systems in all CIS countries" is completed Republics have received recommendations and specialists fro all the republics have together discussed these issues during the seminar in Minsk which was held in July this year The United States Agency for International Development (USAID) have also rendered assitance in the form of project "Electricity contracting and price reform of import and export of electric energy in Central Asia" To discuss these issues in-country seminars were organized, a working group is formed representing governments and power companies for the joint cooperation in drafting contracts for 1997 and long term perspective To persue this goal it is intended to

organize a regional seminar with the participation of all the republics of Central Asia and intergovernmental Council of Uzbeksitan, kazakstan and Kyrgyzstan

Long term bilateral and thre and four party contracts among the governments of the republics must be followed by contracts among power systems There are different types of contracts, base contract should be preferred where different documents on capacity calculation, payment for capacity, capacity scheduling etc are attached Another approach could be drafting of a series of agreements on capacity operation, transmission services, reserve capacity, interchange of energy, purchase or sale of installed capacity

In this process the following issues must be complied with

equitable distribution of profit, responsibility of parties for their actions, access to information, development of economic dispatching, viability and adequacy with existing data, approval by the government and public organizations (the World Bank) possibility to apply in future

Таблица №1

Валовый внутренний продукт республик Центральной Азии (в ценах 1990 года, млрд руб)

Страна	*1990 факт*	*индекс к 1990г*	*1991 факт*	*индекс к 1990г*	*1992 факт*	*индекс к 1990г*	*1993 факт*	*индекс к 1990г*	*1994 факт*	*индекс к 1990г*	*1995 факт*	*индекс к 1990г*
Республи	46,40	1,00	40,90	0,88	35,50	0,77	31,00	0,67	23,10	0,50	21,10	0,45
Кыргызск	8,50	1,00	7,80	0,92	6,70	0,79	5,70	0,67	4,60	0,54	4,30	0,50
Республи	7,30	1,00	6,70	0,91	5,00	0,69	4,20	0,58	3,70	0,51	3,20	0,44
Туркмени	7,40	1,00	6,80	0,89	5,80	0,76	5,40	0,71	5,00	0,66	4,70	0,62
Республи	32,40	1,00	32,20	1,00	28,70	0,89	28,00	0,86	26,80	0,83	26,60	0,82
ИТОГО	**102,00**	**1,00**	**94,40**	**0,92**	**81,70**	**0,78**	**74,30**	**0,70**	**63,20**	**0,61**	**59,90**	**0,57**

Таблица №2

Валовый внутренний продукт республик ЦА на душу населения (в ценах 1990 года, млрд руб)

Страна	*1990 факт*	*индекс к 1990г*	*1991 факт*	*индекс к 1990г*	*1992 факт*	*индекс к 1990г*	*1993 факт*	*индекс к 1990г*	*1994 факт*	*индекс к 1990г*	*1995 факт*	*индекс к 1990г*
Республи	2780,00	1,00	2359,00	0,85	2005,00	0,72	1572,00	0,57	1128,00	0,41	1274,40	0,46
Кыргызск	1948,00	1,00	1759,00	0,90	1440,00	0,74	1222,00	0,63	905,00	0,46	939,70	0,48
Республи	1361,90	1,00	1196,50	0,88	903,10	0,66	736,80	0,54	639,00	0,47	544,20	0,40
Туркмени	2048,50	1,00	1784,80	0,87	1364,70	0,67	1238,50	0,60	1123,60	0,55	1028,40	0,50
Республи	1565,20	1,00	1520,70	0,97	1321,40	0,84	1259,50	0,80	1187,70	0,76	1155,10	0,74
ИТОГО		**1,00**		**0,89**		**0,73**		**0,63**		**0,53**		**0,52**

слайд

Таблица №3

Баланс первичных энергетических ресурсов стран Центральной Азии (млн т у т)

	1990	1993	1995	2000-мин	2000-макс	2010-мин	2010-макс
Производство							
Казахстан	152,00	131,00	107,00	114,00	147,00	171,00	239,00
Кыргызстан	4,00	2,00	1,00	2,00	2,00	4,00	4,00
Таджикистан	3,00	2,00	2,00	3,00	3,00	4,00	4,00
Туркменистан	109,00	82,00	42,00	72,00	99,00	117,00	165,00
Узбекистан	57,00	61,00	71,00	72,00	85,00	79,00	86,00
ИТОГО	2315,00	2271,00	2218,00	263,00	336,00	375,00	498,00
Потребление							
Казахстан	115,00	96,00	88,00	91,00	111,00	131,00	178,00
Кыргызстан	7,00	5,00	3,00	4,00	3,00	7,00	7,00
Таджикистан	5,00	4,00	5,00	5,00	4,00	7,00	5,00
Туркменистан	27,00	24,00	18 00	20,00	25,00	24,00	35,00
Узбекистан	63,00	64,00	62,00	65,00	76,00	72,00	78,00
ИТОГО	217,00	193,00	176,00	185,00	219,00	241,00	303,00
Чистый экспорт							
Казахстан	37,00	35,00	19,00	23,00	36,00	40,00	61,00
Кыргызстан	-3,00	-3,00	-2,00	-2,00	-1,00	-3,00	-3,00
Таджикистан	-2,00	-2,00	-3,00	-2,00	-1,00	-3,00	-1,00
Туркменистан	82,00	58,00	24,00	52,00	74,00	93,00	130,00
Узбекистан	-6,00	-3,00	9,00	7,00	9,00	7,00	8,00

Таблица №4

Баланс угля стран Центральной Азии (млн т)

	1990	1993	1995	2000-мин	2000-макс	2010-мин	2010-макс
Добыча							
Казахстан	132,00	112,00	90,00	90,00	103,00	125,00	155,00
Кырызста	4,00	2,00	0,00	1,00	1,00	2,00	2,00
Таджикис	0,00	0,00	0,00	1,00	1,00	1,00	1,00
Туркмени	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Узбекиста	6,00	4,00	3,00	3,00	4,00	5,00	8,00
ИТОГО	142,00	118,00	93,00	95,00	109,00	133,00	166,00
Потребление							
Казахстан	90,00	79,00	63,00	75,00	71,00	115,00	114,00
Кыргызст	5,00	3,00	2,00	2,00	3,00	4,00	5,00
Таджикис	1,00	1,00	1,00	1,00	1,00	1,00	2,00
Туркмени	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Узбекиста	9,00	5,00	3,00	3,00	4,00	5,00	8,00
ИТОГО	**106,00**	**89,00**	**70,00**	**82,00**	**80,00**	**126,00**	**130,00**
Дефицит(+)Избыток(-)							
Казахстан	42,00	33,00	27,00	15,00	32,00	10,00	41,00
Кырызста	-1,00	-1,00	-2,00	-1,00	-2,00	-2,00	-3,00
Таджикис	-1,00	-1,00	-1,00	0,00	0,00	0,00	-1,00
Туркмени	-1,00	-1,00	-1,00	-1,00	-1,00	-1,00	-1,00
Узбекиста	-3,00	-1,00	0,00	0,00	0,00	0,00	0,00

Таблица№5

Баланс нефти, вкл. газ. конденсат, стран ЦА(млн.т.)

	1990	1993	1995	2000-мин	000-макс	2010-мин	010-макс
Производство							
Казахстан	26,00	23,00	21,00	24,00	30,00	35,00	55,00
Кыргызст	0,00	0,00	0,00	0,00	0,00	1,00	1,00
Туркмени	6,00	5,00	5,00	4,00	5,00	8,00	11,00
Узбекиста	3,00	4,00	8,00	8,00	9,00	10,00	10,00
ИТОГО	**35,00**	**32,00**	**34,00**	**36,00**	**44,00**	**54,00**	**77,00**
Экспорт							
Казахстан	22 00	13,00	9 00	15,00	8,00	25,00	21,00
Кыргызст	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Туркмени	0,00	0,00	1,00	0,00	0,00	1,00	2,00
Узбекиста	0,00	0,00	1,00	0,00	0,00	0,00	0,00
ИТОГО	**22,00**	**13,00**	**11,00**	**15,00**	**8,00**	**26,00**	**23,00**
Импорт							
Казахстан	14,00	11,00	7,00	6,00	6,00	6,00	6,00
Кыргызст	0,00	0,00	0,00	0,50	1,00	1,50	2,00
Туркмени	0,00	1,00	0,00	0,00	0,00	0,00	0,00
Узбекиста	5,00	4,00	0,00	0,00	0,00	0,00	0,00
ИТОГО	**19,00**	**16,00**	**7,00**	**6,50**	**7,00**	**7,50**	**8,00**
Потребление							
Казахстан	18 00	12,00	19 00	16,00	28,00	16 00	40 00
Кыргызст	0,00	0,00	0,00	0,50	1,00	2 50	3,00
Туркмени	6,00	6,00	4,00	4,00	5,00	7,00	8,00
Узбекиста	8,00	7,00	7,00	8,00	8,00	10,00	10,00
ИТОГО	**32,00**	**25,00**	**30,00**	**28,50**	**42,00**	**35,50**	**61,00**

Таблица6

Баланс природного и попутного газа стран ЦА(млрд куб м)

	1990	1993	1995	000-ми	000-мак	010-ми	010-мак
Добыча							
Казахст	7,00	7,00	5,00	6,00	18,00	17,00	31,00
Кыргызс	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Туркмен	88,00	65,00	30,00	57,00	80,00	92,00	130,00
Узбекист	41,00	45,00	49,00	50,00	59,00	52,00	56,00
ИТОГО	**136,00**	**117,00**	**84,00**	**113,00**	**157,00**	**161,00**	**217,00**
Экспорт							
Казахст	3,00	3,00	3,00	6,00	8,00	13,00	17,00
Кыргызс	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Туркмен	72,00	52,00	20,00	45,00	65,00	80,00	110,00
Узбекист	10,00	4,00	7,00	6,00	6,00	6,00	6,00
ИТОГО	**85,00**	**59,00**	**30,00**	**57,00**	**79,00**	**99,00**	**133,00**
Импорт							
Казахст	9,00	10,00	7,00	7,00	7,00	9,00	11,00
Кыргызс	2,00	1,00	1,00	1,00	1,00	1,00	2,00
Таджики	2 00	1,00	2,00	2,00	3,00	3,00	4,00
Туркмен	0,00	0	0	0	0	0	0
Узбекист	7,00	2,00	0,00	0,00	0,00	0,00	0,00
ИТОГО	**20,00**	**14,00**	**10,00**	**10,00**	**11,00**	**13,00**	**17,00**
Потребление							
Казахст	15,00	14,00	9,00	7,00	13,00	13,00	26,00
Кыргызс	2,00	1,00	1,00	1,00	1,00	1,00	2,00
Таджики	2,00	1,00	2,00	2,00	3,00	3,00	4,00
Туркмен	16,00	13,00	10,00	12,00	15,00	12,00	20,00
Узбекист	38,00	43,00	42,00	44,00	53,00	46,00	50,00
ИТОГО	**73,00**	**72,00**	**64,00**	**66,00**	**85,00**	**75,00**	**102,00**