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**REGIONAL SEMINAR ON
INTERNATIONAL ELECTRIC POWER CONTRACTS**

Almaty, Kazakstan
December 11-12, 1996

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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December 1996

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CONTENTS

Agenda

List of Participants

Objectives of the Electricity Contracting and Pricing Reform Program

Experience of U S and Baltic Participants

Contract for the Sale of Capacity and Energy From One Power System to Another Power System Draft prepared by Hagler Bailly Consulting

Comments on the Contract for the Sale of Capacity and Energy From One Power System to Another Power System Prepared by Charles Zimmermann

Export Prices of Electric Capacity and Energy in Central Asia Presentation by Charles Zimmermann

Contract for the Sale of Capacity and Energy from a Power System to a Large Industrial Consumer in Another Country Draft prepared by Hagler Bailly Consulting

Agreements on Access to Electricity Markets An Example from the European Union Prepared by Charles Zimmermann

Bilateral Firm Capacity and Energy Wheeling Agreement Draft prepared by Hagler Bailly Consulting

Methodology for Calculating Wheeling Tariffs Presentation by David Thornton and Charles Zimmermann

Transmission Replacement Costs Prepared by David Thornton

Transmission Line Estimating Data Memorandum issued by the Bonneville Power Administration

Multilateral Agreement Regarding Frequency Regulation Services Draft prepared by Hagler Bailly Consulting

Central Asia Power Pool System Operator Agreement Draft prepared by Hagler Bailly Consulting

Answers to Questions on International Experience Prepared by David Thornton and Charles Zimmermann

The Columbia River Treaty Revisited Report published by the Bonneville Power Administration, Portland, Oregon, USA

Agreement on Mutual Interchange of Electric Energy Between the Lithuanian State Power System and the State Enterprise Latvenergo

Contract on Supply of Electric Energy and Power Between the State Enterprise Eesti Energia and the State Enterprise Latvenergo for the First Quarter of 1993

Multilateral Agreement Among the State Enterprise Eesti Energia, State Enterprise Latvenergo and Lithuanian State Power System on the Parallel Operation of the Power Systems of Estonia, Latvia and Lithuania

Resolution Concerning the Results of Technical Cooperation on Electricity Pricing and Contracting Arranged by USAID Seminars in Riga 1992-1993

All of the seminar materials are available in both languages, English and Russian

REGIONAL SEMINAR ON INTERNATIONAL ELECTRIC POWER CONTRACTS

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AGENDA

Wednesday, December 11, 1996

- 9 00 - 9 10 Opening remarks
J Michael Biddison, Hagler Bailly Consulting
- 9 10 - 9 20 Regional cooperation among Central Asia Republics
Marilyn Schmidt, Acting Director, Central Asia Region, USAID
- 9 20 - 9 30 Opening remarks
V V Khrapounov, Minister of Energy and Coal Industry of
Kazakstan
- 9 30 - 9 40 Opening remarks
Nikolai Radostovetz, Chairman of the State Committee on Pricing
and Antimonopoly Policy
- 9 40 - 10 00 Present situation regarding electricity contract negotiations in
Central Asia
Valentina Kasymova, Head of the Department of the International
Institute of Strategic Research under the President of the Kyrgyz
Republic
- 10 00 - 11 00 Draft contract for the sale of capacity and energy from one power
system to another power system
Charles Zimmermann, Hagler Bailly Consulting
- 11 00 - 11 30 Coffee break
- 11 30 - 12 00 Export prices of capacity and energy in Central Asia
Charles Zimmermann, Hagler Bailly Consulting
- 12 00 - 13 00 Proposal for a competitive market power pool in Kazakstan and its
relationship to Central Asia
Douglas Miller, Hagler Bailly Consulting
- 13 00 - 14 00 Lunch
- 14 00 - 15 00 Draft contract for the sale of capacity and energy from a power
system to a large customer in another country
Charles Zimmermann, Hagler Bailly Consulting
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SEMINAR AGENDA - 2

Wednesday, December 11, 1996 (continued)

- 15 00 - 16 00 Central Asia Power Pool system operator agreement
David Thornton, Central Maine Power Company/CMPI
- 16 00 - 16 30 Coffee break
- 16 30 - 17 00 Agreements on access to electricity markets an example from the
European Union
Charles Zimmermann, Hagler Bailly Consulting
- 17 00 - 18 00 Discussion of draft contracts
- 18 00 - 21 30 Reception/Dinner at the Government House of Reception

Thursday, December 12, 1996

- 9 00 - 10 30 Draft bilateral agreement for firm capacity and energy wheeling
David Thornton, Central Maine Power Company/CMPI
- 10 30 - 11 00 Methodology for calculating wheeling tariffs
Charles Zimmermann, Hagler Bailly Consulting
- 11 00 - 11 30 Coffee break
- 11 30 - 12 00 Methodology for calculating wheeling tariffs
Charles Zimmermann, Hagler Bailly Consulting
- 12 00 - 12 30 Transmission replacement costs
David Thornton, Central Maine Power Company/CMPI
- 12 30 - 13 00 Discussion of the need for a multilateral wheeling agreement
Moderated by Charles Zimmermann, Hagler Bailly Consulting
- 13 00 - 14 00 Lunch
- 14 00 - 15 45 Draft contract for a system of payment for frequency regulation in
Central Asia
David Thornton, Central Maine Power Company/CMPI
- 15 45 - 16 00 Comments on the Columbia River Treaty and water rights issues
Charles Zimmermann, Hagler Bailly Consulting
- 16 00 - 16 30 Break
- 16 30 - 17 00 Next steps regarding the activities of the working group
Charles Zimmermann, Hagler Bailly Consulting

REGIONAL SEMINAR ON INTERNATIONAL ELECTRIC POWER CONTRACTS

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LIST OF PARTICIPANTS

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Charles Zimmermann	Manager Hagler Bailly Consulting, Inc
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Barry Primm	Director, Energy and Environment Programs U S Agency for International Development Almaty, Kazakstan

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Kirdyashkin A F	Deputy Head of the United Dispatch Center of Kazakstan
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Charles Zimmermann	Manager Hagler Bailly Consulting, Inc
David Thornton	Director of Transmission and System Control Services CMP International Consultants, a subsidiary of Central Maine Power Company
Marilynn Schmidt	Acting Director U S Agency for International Development Almaty, Kazakstan
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**РЕГИОНАЛЬНЫЙ СЕМИНАР ПО МЕЖДУНАРОДНЫМ КОНТРАКТАМ НА
ЭЛЕКТРОЭНЕРГИЮ**

Республика Казахстан, Алматы, 11-12 декабря 1996 г

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REGIONAL SEMINAR ON INTERNATIONAL ELECTRIC POWER CONTRACTS

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OBJECTIVES OF THE ELECTRICITY CONTRACTING AND PRICING REFORM PROGRAM

The U S Agency for International Development (USAID) has been requested to assist the Central Asian Republics to develop and operate their electric power systems on the basis of international contracts which will ensure the reliability of electricity supply and will provide a basis for long-term planning and investment in the power sector. Therefore, USAID has requested that Hagler Bailly Consulting, Inc implement the technical project.

Summary Description of Task

This program is designed to provide assistance to the five Central Asian Republics -- Kazakstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan -- to address regional trade issues in contracting and pricing for international sales of electricity. Such assistance will enhance the reliable operation of the regional grid, promote the economic dispatch of power plants, and facilitate the sale of electricity at prices that reflect the true economic cost of electric power generation and transmission. A series of seminars will be held separately in each country, followed by a regional seminar, a seminar in Riga, Latvia to review the Baltics experience and additional regional workshops to provide assistance to an Electricity Contracting Working Group to be formed. The power companies and energy ministries of the five Central Asian Republics will participate in the program.

Objectives

The broader objectives of this program are

- (1) To work with the five Central Asian Republics (Kazakstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) on developing acceptable terms and conditions of electric power transactions among these countries
- (2) To promote the development of pricing principles that are consistent with the efficient operation of the regional electrical system and consistent with economic efficiency objectives
- (3) To provide information to the Central Asian Republics regarding the choices that are available regarding electric power pooling arrangements, contracting arrangements, and tariff structure
- (4) To help the Central Asian Republics reach agreement on key issues involving power contracting and pricing

The program is designed to facilitate a process in which the Central Asian countries negotiate (1) agreements on methods of establishing responsibility for reserve capacity, (2) agreements on general principles for pricing capacity and energy, and (3) contracts for the sale of capacity and energy. If the Central Asian countries participate fully in this process, the ultimate results will be signed agreements and international power contracts. These agreements would provide a foundation for other types of international power purchase agreements, including wheeling transactions and power purchase and sale transactions involving such countries as Russia, Afghanistan, Pakistan, and Turkey.

EXPERIENCE OF U S AND BALTIC PARTICIPANTS

David H Thornton

David Thornton is the Director of Transmission and System Control Services at CMP International Consultants (CMPI), a company located in Winthrop, Maine, USA. CMPI is a subsidiary of Central Maine Power Company, the largest electric utility company in the state of Maine, and Mr Thornton has 26 years of experience at Central Maine Power. Mr Thornton now provides technical consulting services for clients of CMPI. Before joining CMPI in April 1995, Mr Thornton was the Project Manager for the purchase and installation of a new Dispatch Energy Management System for Central Maine Power. Other duties during his career at Central Maine Power include electrical engineering studies for a high-voltage direct-current (HVDC) interconnection with Canada, substation design, and Supervisory Control and Data Acquisition (SCADA) applications.

Mr Thornton holds a Bachelor of Science in Electrical Engineering from the University of Maine.

Charles F Zimmermann

Charles F Zimmermann is a Manager at Hagler Bailly Consulting, Inc., an energy and environmental consulting firm based in Arlington, Virginia, USA with offices in several countries, including Russia, Ukraine, Kazakstan, Armenia, Georgia, and Latvia. Dr Zimmermann is the company's representative in Riga, Latvia. He is an economist with expertise in pricing of energy commodities, including electricity, natural gas, crude oil, coal, and petroleum products. He has worked in Hungary, Croatia, Serbia, and most of the former Soviet republics. During 1991-92 he managed a program of technical assistance in Estonia and Latvia on international natural gas contracts, district heat pricing, and other energy price issues, and during 1992-93 he managed a series of seminars on electricity contracting in the Baltic countries. He conducted a study of electricity tariffs in Egypt in 1995 and at present he is conducting a study of electricity tariffs in Kazakstan. He has worked as a consultant at Hagler Bailly since 1982 and at Foster Associates, an oil and gas consulting firm, in 1978-79 and 1981-82. He worked as an economist for the U.S. government Council on Environmental Quality in 1979-81.

Dr Zimmermann has a Ph.D. in Resource Economics from Cornell University and a Bachelor of Arts degree in Architecture and City Planning from Brown University.

J Michael Biddison

J Michael Biddison is the Central Asian Republics Regional Manager for Hagler Bailly Consulting, Inc. From an office in Almaty, Mr Biddison manages several technical cooperation projects funded by USAID in the oil, gas pipeline transportation, and electric sectors of the five central Asian countries. From 1990 to 1995 Mr Biddison was a Member of a regulatory agency in the state of Ohio called the Public Utilities Commission. This commission supervised the activities of private companies in the electric sector, the natural gas distribution sector, the telephone and telecommunications sector, the water distribution sector, and the transportation sector. Prior to 1990 Mr Biddison was the Director of the Oil and Gas Regulatory Agency of the State of Ohio. This agency supervised the activities of private companies in the oil and gas exploration and production sector. Mr Biddison also worked in oil and gas exploration and production companies for over nine years.

Mr Biddison has a Master of Business Administration degree from Kent State University and a Bachelor of Science degree in Geology and Mineralogy from The Ohio State University.

Inese Eglite

Inese Eglite is a translator and legal specialist with experience in translation of different types of contracts in the electric sector. She has worked as the primary translator for nearly all of the technical cooperation programs between Dispatch Center "Baltija" and foreign organizations, including the program of technical cooperation on electricity pricing and contracting conducted in 1992-1994 under USAID funding. She is a resident of Riga, Latvia and is fluent in English, Swedish, Latvian, and Russian.

Ms Eglite has a master's degree in Foreign Languages from Riga University. She completed courses at the Higher School of the Labor Movement in Moscow, where she conducted research on the Swedish model of democratic socialism.

CONTRACT FOR THE SALE OF CAPACITY AND ENERGY
from one power system to another power system

This Contract for the Sale of Capacity and Energy is signed on the [31st] day of [December 1996] between [the first power system], hereinafter called the Buyer, and [the second power system], hereinafter called the Seller

Preamble

WHEREAS the Buyer and Seller operate electric networks which were designed to permit the flow of electric energy among countries, within the Interconnected Power Grid of Central Asia, and

WHEREAS the Buyer needs to import electric energy to meet consumer requirements for electricity in [certain oblasts located in] the Buyer's country at certain times of the year, as a result of shortages of fuel and generating capacity and constraints on transmission capacity, and

WHEREAS the Seller is able to provide energy to the Buyer during the period of the year when imports are needed, and

WHEREAS the Buyer would like to obtain priority rights to a portion of the Seller's generating capacity, to ensure that the Buyer will receive energy during the hours when it is needed, and

WHEREAS the Seller is able to offer priority rights to a portion of Seller's generating capacity

Now therefore the parties agree as follows

1 Effective Date and Term of Agreement

This contract shall be effective from 1 January 1997 and shall terminate on 31 December 1997. However, this contract may be renewed for an additional one-year term or a longer period if both parties sign an Amendment to this contract stating the renewal term and stating the revisions, if any, in the contract amounts of power and energy described in Article 4. Such an Amendment will not take effect on 1 January 1998 unless it is signed prior to December 31, 1997.

2 Definitions of Terms

2.1 The "Buyer's delivery area" is the area where imported electricity is needed by the Buyer. The Buyer's delivery area consists of [Chimkent oblast, Kzyl-Orda oblast, and Jambyl oblast, Almaty oblast, and Taldykorgan oblast]

2.2 "Firm capacity" is a specified number of megawatts of capacity for which the Seller gives priority rights to the Buyer, under all conditions except force majeure. Firm capacity is measured at the border of the Seller's power system, at the delivery points specified in this contract.

- 2 3 “Priority rights” are the rights to schedule the use of generating capacity and transmission capacity on the Seller’s system, according to dispatch procedures used by the Dispatch Center Energia, to meet the Buyer’s need for capacity and energy. When the Buyer exercises his priority rights, the Seller may not use firm capacity to meet the needs of any customer other than the Buyer, unless the Seller is authorized by Dispatch Center Energia to do so.
- 2 4 “Peak periods” are [the 3-hour period from 7 am to 10 am and the 4-hour period from 6 pm to 10 pm on the Buyer’s power system]
- 2 5 A “power system” is an enterprise or entity which owns and operates high-voltage networks and has the ability to sell electric energy and firm capacity to other power systems. This firm capacity is provided by generating stations owned by the power system or by generating stations which have signed contracts to provide energy and firm capacity to the power system.
- 2 6 A “regional network enterprise” is an enterprise or entity which owns and operates low-voltage networks and is not a power system.
- 2 7 The “hot reserves” of a power system equal the amount of unloaded generating capability that can be made available within ten minutes. These reserves may also be called “spinning reserves.”
- 2 8 The “cold reserves” of a power system equal the amount of unloaded generating capability that can be made available within 24 hours, but not within ten minutes. These reserves may also be called “non-spinning reserves.”
- 2 9 The “operating reserves” of a power system equal the sum of hot reserves and cold reserves.
- 2 10 “High-voltage networks” are electric networks designed for operation at 110 kV or higher voltages.
- 2 11 “Low-voltage networks” are electric networks designed for operation at 35 kV or lower voltages.

3 Status of Previous Agreements between the Parties

- 3 1 This contract is written in accordance with “The Agreement Between the Government of the Republic of [Buyer’s country] and the Government of the Republic of [Seller’s country] on Economic Cooperation in 1997” dated [December 1996], hereinafter known as the “agreement on economic cooperation.” This contract is intended to implement the agreement on economic cooperation, which is still effective.
- 3 2 The government of the Buyer’s country and the government of the Seller’s country are both signatories of the Energy Charter Treaty dated December 17, 1994. Therefore this contract is subject to the terms and conditions of the Energy Charter Treaty.

3 3 This contract, the agreement on economic cooperation, and the Energy Charter Treaty are the only agreements effective 1 January 1997 between the parties with respect to electricity trade. All previous contracts for electricity trade between the parties, either oral or written, including the various drafts of this contract, shall be of no force or effect and shall not be used as a guide to the interpretation of this contract.

3 4 Where electric generation is produced from hydroelectric resources it shall be produced in accordance with international agreements to regulate the flow of rivers in Central Asia to provide for irrigation and environmental protection.

3 5 Nothing in this section will prevent Buyer and Seller from entering into future bilateral or multilateral agreements that may alter the terms of this contract.

4 Contract Amounts of Capacity and Energy

4 1 The Seller will deliver scheduled energy according to the following schedule

1 st quarter 1997	_____	million kWh
2 nd quarter 1997	_____	million kWh
3 rd quarter 1997	_____	million kWh
4 th quarter 1997	_____	million kWh

4 2 The Buyer may submit requests to the Seller for the delivery of unscheduled energy on a voluntary and non-firm basis. The Buyer may also submit requests to Dispatch Center Energia for unscheduled energy, and from time to time Dispatch Center Energia may ask whether the Seller would like to fulfill such requests on a voluntary and non-firm basis. In either case the Seller has no obligation to deliver unscheduled energy under this contract.

4 3 On a daily or weekly basis the Buyer may designate certain quantities of unscheduled energy as "emergency energy." Whenever the price of emergency energy is significantly higher than the price of other energy, the Seller has an economic incentive (but not a contractual obligation) to try to provide emergency energy.

4 4 If the Seller supplies surplus energy which is not requested by the Buyer, this surplus energy shall be returned in kind according to a schedule selected by the Operating Committee.

4 5 Buyer and Seller will both ensure that the Dispatch Center Energia is informed of all quantities of capacity and energy to be transferred under this contract. To deliver the target quantities of scheduled energy, as well as any unscheduled energy which the Seller agrees to provide, the Seller will follow dispatch instructions received from Dispatch Center Energia.

4 6 The Seller agrees to give the Buyer priority rights to firm capacity. The following schedule shows the maximum amount of firm capacity to be provided in any hour.

1 st quarter 1997	_____	MW
2 nd quarter 1997	_____	MW
3 rd quarter 1997	_____	MW
4 th quarter 1997	_____	MW

- 4 7 The Buyer may request any amount of firm capacity, up to the maximum amounts described in the preceding section. The quantities of firm capacity cited above will be available to the Buyer every day, 24 hours per day, subject to the approval of the Dispatch Center Energia, provided the Buyer notifies Dispatch Center Energia of the amount of firm capacity needed on an hourly basis, no less than 8 hours before the hour in which firm capacity is needed. The Seller will maintain sufficient cold reserves and hot reserves to ensure that these quantities of firm capacity are as reliable as any other type of capacity available to the Buyer's power system.
- 4 8 If energy is wheeled from the Seller's country to the Buyer's country through a third country, the contract amounts of capacity and energy are not affected. The amounts received by the Buyer are determined by the wheeling agreement, which should specify a method of compensation for transmission losses by the wheeler.
- 4 9 If the Buyer fails to provide payment to the Seller for the electric energy and capacity provided, the delivery quantities stated in this section may be modified, as described in Section 13.

5 Characteristics of Power and Energy

- 5 1 All electric power and energy interchanged according to this contract shall be in the form of three phase alternating current at operating voltages and frequencies established by Dispatch Center Energia or resulting from instructions issued by Dispatch Center Energia.
- 5 2 If either party believes that the other party has taken actions that resulted in unacceptable fluctuations in voltage or frequency, a complaint may be filed with the Operating Committee. The Operating Committee will decide whether to submit a request to Dispatch Center Energia to change its guidelines and procedures for regulating voltage and frequency.
- 5 3 Buyer and Seller agree to participate in the negotiation of a multilateral agreement in Central Asia regarding frequency regulation services.

6 Delivery Points

- 6 1 The capacity and energy provided by Seller will be delivered at the border of the Seller's country at the following points on the high-voltage network:
- 1 the 500 kV power line connecting [substation A] to [substation B], at the border between the Seller's country and the Buyer's country
 - 2 the 500 kV power line connecting [substation D] and [substation E], at the border between the Seller's country and [a third country]

6.2 If one of the delivery points specified above is not on the border of the Buyer's country, the Buyer shall be responsible for negotiating the wheeling agreement or agreements necessary to deliver capacity and energy from the border of the Seller's country to the border of the Buyer's country. The Seller shall maintain interconnections with the power systems that are able to provide the necessary wheeling services. The Buyer is responsible for all wheeling charges including energy used to compensate the wheeling power system for transmission losses.

6.3 The high-voltage network shall be used to transfer capacity and energy from the Seller to the Buyer, subject to any operating restrictions imposed by the Dispatch Center Energia. If the low-voltage network of the Buyer's country is directly connected to the low-voltage network of the Seller's country, Buyer and Seller shall attempt to minimize the net monthly flow of energy (saldo) between these low-voltage networks. Energy delivered at low voltage shall be returned in kind.

6.4 Additional delivery points may be established by the Operating Committee.

7 Scheduling

7.1 Two weeks before the start of each quarter, the Operating Committee shall develop a preliminary schedule of hourly deliveries of energy for the quarter. The preliminary schedule is not binding on either party, but Buyer and Seller should make reasonable efforts to reach a consensus through their representatives on the Operating Committee. Dispatch Center Energia shall receive a copy of the preliminary schedule from the Operating Committee.

7.2 On every Saturday, the Buyer will inform the Seller regarding the Buyer's requirements for energy to be provided by the Seller during each hour of the following week.

7.3 No less than 40 percent of the scheduled energy shall be delivered by the Seller during peak periods during each quarter.

7.4 Buyer shall keep Dispatch Center Energia informed of the Buyer's needs for capacity and energy. Deliveries of capacity and energy will be scheduled by Dispatch Center Energia. Seller shall deliver electric energy to the Buyer in accordance with dispatch instructions and daily schedules received from Dispatch Center Energia.

7.5 If the Operating Committee determines that the delivery of the total amount scheduled energy shown above during a calendar quarter would result in a spillage of water from hydroelectric stations operated by the Buyer, the Operating Committee may revise the quarterly schedule so that the annual quantity of scheduled energy is not affected.

8 Monitoring and Metering

8.1 The Operating Committee shall provide metering data to Dispatch Center Energia. Total electric energy flows in each month will be reported to Dispatch Center Energia during the first 10 days of the month following the reporting month. If the Seller's delivery point is not metered, data will be provided from another point on the Seller's system, the location of which must be acceptable to the Operating Committee. If, in the opinion of either the Buyer or the Seller, existing metering (regardless of location) cannot accurately measure the energy flow in the transaction, these two parties will evenly share the cost of installing new metering equipment, at a location agreeable to the Operating Committee. If the metering point is different from the Seller's delivery point, an appropriate allowance (as agreed to by the Operating Committee) will be made for losses between the metering and delivery points.

8.2 Electric energy flows under this contract will be calculated and confirmed by Dispatch Center Energia on the basis of data received.

8.3 The Operating Committee is responsible for inspecting the Seller's generating facilities, if necessary, to ensure that the amounts of firm capacity described above are in fact provided according to the terms of this contract. The Seller is not required to deliver the maximum amount of firm capacity shown in section 4.6 unless the Buyer requests it. The Buyer has the right to request the maximum amount of firm capacity once per month, for up to 12 hours, for the purpose of ensuring that this capacity is available.

9 Deficiencies and Interruptions

9.1 If the Seller is unable to deliver the full amount of scheduled energy in a particular quarter, due to conditions in the Buyer's country that are not force majeure (Article 17), the Seller has no obligation to make up for the deficiency. The Buyer shall pay for the number of kWh actually delivered.

- 9 2 If the Seller is unable to deliver the full amount of scheduled energy in a particular quarter, due to conditions in the Seller's country that are not force majeure (Article 17), the Seller must deliver the deficiency during the following quarter. For each quarter the Buyer shall pay for the number of kWh actually delivered. This clause does not apply to situations in which the Seller's country has a shortage of fuel for power generation as a result of a dispute over fuel and energy trade between the Buyer's country and the Seller's country.
- 9 3 If the Seller is unable to deliver the full amount of scheduled energy in a particular quarter because the price of scheduled energy under this contract is substantially below the price needed to recover the Seller's cost of fuel used in power generation, the parties shall attempt to renegotiate the price of energy according to Article 12.
- 9 4 If the Seller is unable to deliver the amount of firm capacity requested by the Buyer (up to the maximum listed above), due to conditions in the Buyer's country that are not force majeure (Article 17), the Buyer still has an obligation to pay for the maximum amount of firm capacity reserved under section 4.6 of this contract.
- 9 5 If the Seller is unable to deliver the amount of firm capacity requested by the Buyer (up to the maximum listed above), due to conditions in the Seller's country that are not force majeure (Article 17), the Buyer shall pay only for the average amount of capacity actually delivered during the hours when the Buyer requested a greater amount of capacity. This clause does not apply to situations in which the Seller's country has a shortage of fuel for power generation as a result of a dispute over fuel and energy trade between the Buyer's country and the Seller's country.
- 10 Rates and Charges**
- 10 1 The base price for scheduled energy delivered under this contract is ___ US cents per kWh. This price does not include capacity payments, which are described in section 10.4.
- 10 2 The price for emergency energy delivered under this contract is ___ US cents per kWh.
- 10 3 The price for unscheduled energy delivered under this contract, other than emergency energy, is ___ US cents per kWh.
- 10 4 The price for firm capacity that is reserved under this contract is ___ US dollars per kW per month.
- 10 5 The Buyer's country and the Seller's country have no customs duties on electric energy. If either country imposes customs duty on electric energy, prices may be renegotiated according to Section 12.

11 Price Adjustments

11 1 The Operating Committee has the authority to adjust the price for scheduled energy according to changes in the international price of natural gas sold in Central Asia. For this type of adjustment the renegotiation procedure described in Article 12 is not necessary.

11 2 The standard cost of natural gas for power generation, is defined as

$$S_G = (P_G / C_G) * R_G$$

where

S_G = the standard cost of gas for power generation, in US cents per kWh

P_G = the average price of gas exported by Turkmenistan,
in US cents per thousand cubic meters, at the border of Turkmenistan

C_G = the average heat content of gas exported by Turkmenistan
in GJ per thousand cubic meters,

R_G = the heat rate of a typical gas-fired power station on the Seller's system,
in GJ per kWh

11 3 The Operating Committee shall calculate the standard cost of natural gas for power generation for the month of December 1996 and for each month of 1997. The adjusted price of scheduled energy shall be calculated as follows

$$M_E = B_E + (S_{GM} - S_{G96})$$

where

M_E = the monthly adjusted price of scheduled electric energy
in a particular month m

B_E = the base price of scheduled electric energy

S_{GM} = the standard cost of gas for power generation
in a particular month m

S_{G96} = the standard cost of gas for power generation in December 1996

11 4 For each month of 1997 the Operating Committee shall decide whether scheduled energy shall be sold at the base price or at the monthly adjusted price. If the Operating Committee cannot reach a decision, scheduled energy shall be sold at the base price.

12 Price Renegotiation

12 1 The prices for capacity and energy in the first quarter of 1997 may not be renegotiated, although the price of scheduled energy may be adjusted according to Section 11.

12 2 The prices for capacity and energy for subsequent quarters may be renegotiated by Buyer and Seller at any time. If these prices are successfully renegotiated, the contract must be amended by a document signed by both parties. A change in prices may be justified on the basis of changes in the Seller's cost of generating electric energy for export, changes in the Seller's cost of maintaining generating capacity and operating reserves, or changes in the price of capacity and energy under other electricity trade agreements in Central Asia.

12.3 Neither the Buyer nor the Seller has the right to unilaterally change the prices for capacity and energy under this contract. A change in prices, other than a rate adjustment according to Section 11, may be proposed by either party but it shall not take effect until both parties have signed an amendment to this contract.

12.4 Both parties intend to implement the sale of capacity and energy as described in Section 4. Therefore the purpose of price renegotiation is to determine the price at which the transaction described in Section 4 is acceptable to both parties.

13 Billing and Payments

13.1 No later than the 7th day of each month, Dispatch Center Energia shall provide both Buyer and Seller with a precise calculation of the quantities used to compute the Seller's invoice: scheduled energy, emergency energy, other unscheduled energy, and firm capacity. The Seller's invoice shall exclude electric energy that the Buyer must repay in kind.

13.2 In exchange for electric energy and capacity the Buyer may use energy commodities as a form of payment. In the remainder of this section the Buyer is the Buyer of electric energy and capacity and the Seller is the Seller of electric energy and capacity.

13.3 Not later than the 7th day of each month, the Operating Committee shall provide the Buyer and Seller with a price list for energy commodities that may be used as a form of payment for electric energy and capacity. For electric energy and capacity delivered in the month of January 1997 the price list shall be as follows (for export at the border of the Buyer's country):

Gasoline	\$200 per ton
Diesel fuel	\$150 per ton
Heavy fuel oil	\$75 per ton
Crude oil	\$100 per ton
Natural gas	\$60 per thousand cubic meters
Coal (Ekibastuz)	\$20 per ton
Coal (Karaganda)	\$30 per ton

13.4 Not later than the 10th of each month, the Buyer shall notify the Seller of the portion of the invoice that the Buyer wishes to pay in USD or other currency, by bank transfer. This portion is defined as the "currency payment amount". It may equal zero, because the Buyer is not obligated to provide the Seller with payment in USD or any other currency. For the portion of the invoice that is not paid in currency, the Buyer is obligated to deliver energy commodities as described below.

- 13 5 Seller shall send the Buyer an invoice on the 14th of each month for the capacity and energy provided in the preceding month. The total amount of the invoice for electric capacity and energy shall be shown in USD. Seller shall also submit a proposed schedule of energy commodities to be delivered by the Buyer in exchange for the electric energy received. The total value of energy commodities in this schedule must be calculated in USD. This total plus the currency payment amount must equal the amount of the Seller's invoice for electric capacity and energy. The value of energy commodities shall be calculated according to the price list issued by the Operating Committee.
- 13 6 On the 21st of each month the Operating Committee shall prepare a revised schedule of energy commodities to be delivered by the Buyer, based on the Buyer's ability to produce, purchase, and transport energy commodities as well as the Seller's proposed schedule. The Seller must accept the revised schedule prepared by the Operating Committee. Therefore the Seller has an incentive to develop a proposed schedule that will be accepted by the Operating Committee with minor modifications.
- 13 7 On the 28th of each month the Seller will propose the terms and conditions for the delivery of energy commodities by the Buyer. One of the following options must be proposed for each commodity. Buyer is not responsible for any storage or transportation costs outside the Buyer's country.
- 13 7 1 The commodity may be delivered to the Seller in the following month. If storage is necessary in the Seller's country, Seller is responsible for the cost of storage.
- 13 7 2 The commodity may be delivered to the Seller during the following winter according to a delivery schedule set by the Seller.
- 13 7 3 An oil commodity may be delivered to an oil storage terminal with access to international markets. The ownership of the commodity may be transferred to the Seller's account with a broker or marketing company designated by the Seller.
- 13 7 4 The commodity may remain in the Buyer's country but the ownership may be transferred to the Seller's account with a broker or marketing company designated by the Seller. The Seller must specify a location at which ownership is transferred from the Buyer.
- 13 7 5 The commodity may be delivered by the Buyer to a third country designated by the Seller. The commodity is ultimately consumed in the third country. The Seller is responsible for arranging for the receipt of money or other compensation from the third country.
- 13 7 6 The commodity may be delivered by the Buyer to a transportation company or transportation enterprise designated by the Seller. The Seller is responsible for arranging for the export of the commodity to markets outside Central Asia.

- 13 8 Buyer shall deliver or store energy commodities according to Seller's instructions. On a monthly basis the Buyer shall submit a report to the Seller and to the Operating Committee describing the status of activities performed to implement the commodity delivery schedule established by the Operating Committee.
- 13 9 If the Operating Committee issues a formal letter stating that the Buyer has failed to fulfill his payment obligations, the Seller is entitled to unilaterally reduce the delivery of electric energy and capacity under this contract after providing 30 days notice to the Buyer and to Dispatch Center Energia. The notice must state the percentage reductions in scheduled energy or firm capacity that will go into effect, and the effective date of reductions.
- 13 10 If the Operating Committee issues a formal letter stating that the Buyer has failed to fulfill his payment obligations, and then later issues a second letter stating that the Buyer has substantially fulfilled his payment obligations, the Seller is obligated to fully resume the delivery of electric energy and capacity within 5 days of the receipt of the second letter.
- 14 Operating Committee**
- 14 1 The parties shall maintain an Operating Committee, consisting of four members, two appointed by the Seller and two appointed by the Buyer, and four alternate members, two appointed by the Seller and two appointed by the Buyer. Should a member be unable to attend a meeting, he shall be represented at the meeting by the alternate member or by the person to whom the member reports administratively. Prompt notice in writing shall be given for all appointments, removals and replacements.
- 14 2 The Operating Committee is authorized on behalf of both parties to do all things necessary to provide for transmission and delivery of capacity and energy and for payment for such capacity and energy in accordance with the provisions and intent of this contract. The duties of the Operating Committee include, but are not limited to:
- 14 2 1 Matters related to voltage and frequency disturbances, as described in Section 5
 - 14 2 2 Matters related to the selection of additional delivery points, as described in Section 6
 - 14 2 3 Matters related to scheduling, as described in Section 7
 - 14 2 4 Matters related to metering, as described in Section 8
 - 14 2 5 Matters related to rate adjustment, as described in Section 11
 - 14 2 6 Matters related to the settlement of the Seller's invoice to the Buyer, as described in Section 13
 - 14 2 7 Matters related to contract amendments, as described in Section 24

- 14.3 The Operating Committee shall comply with instructions received from Dispatch Center Energia and shall not duplicate the work of Dispatch Center Energia. Technical problems that can be solved most effectively through multilateral coordination among Central Asian countries may be the responsibility of Dispatch Center Energia. Buyer and Seller shall participate in multilateral negotiations, if necessary, to clarify the ownership and operation of Dispatch Center Energia.
- 14.4 All decisions of the Operating Committee shall be unanimous.
- 14.5 Each party shall pay the expenses of its own members of the Operating Committee. Any expenses jointly incurred by the Committee for activities pertaining to this contract shall be shared equally by the parties or shared according to a procedure determined by the Operating Committee.
- 14.6 The Operating Committee shall have access at all reasonable times to the pertinent and relevant records of the Buyer and Seller that are required to substantiate any fact pertaining to this contract.
- 14.7 Any agreement of the Operating Committee made pursuant to this contract shall be confirmed in writing and signed by the members of the said Committee.
- 15 Settlement of Disputes**
- 15.1 Either party to this contract may refer questions to the Operating Committee for resolution. If both parties accept the decision of the Operating Committee regarding a specific issue, the parties shall not submit that issue for arbitration or intervention by any third party.
- 15.2 Either party to this contract may refer questions to the Central Asia Energy Council for resolution. If this alternative is selected, the party making a request to the Council must ask the Council to form an arbitration panel consisting of three members of the Council who do not represent the Buyer's country or the Seller's country or any power system in either country. The decision of the arbitration panel should 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. If one of the parties does not accept the decision of the arbitration panel, that party may consider termination of this contract in accordance with Section 21.
- 15.3 Either party to this contract may initiate the dispute resolution procedures of the Energy Charter Treaty. In this situation the other party must respond in accordance with its obligations under the Energy Charter Treaty.

16 Liabilities

- 16 1 The parties to this contract may negotiate and sign other international agreements, including multilateral agreements, which identify circumstances in which one party is liable for loss or damage associated with a failure of the high voltage network or a major disturbance in voltage or frequency. However, nothing in this contract creates any liability for either the Buyer or the Seller to provide compensation for loss or damage. None of the language in this contract should be used to determine whether liability exists under some other agreement.
- 16 2 If the government of the Buyer's country unilaterally determines that the Buyer is liable for loss or damage associated with a failure to deliver electricity or a major disturbance in voltage or frequency, the Buyer shall consider this a domestic issue that does not involve the Seller. Similarly, if the government of the Seller's country unilaterally determines that the Seller is liable for loss or damage associated with a failure to deliver electricity or a major disturbance in voltage or frequency, the Seller shall consider this a domestic issue that does not involve the Buyer.

17 Force Majeure

- 17 1 Both parties shall exercise due diligence to perform their obligations under this contract, but conditions may arise which prevent or delay performance by one or the other because of causes beyond a party's reasonable control, including flood, drought, earthquake, storm, lightning, fire, explosion, epidemic, war, riot, civil disturbance, and sabotage. If a party is unable to fulfill any obligations by reason of such causes, it shall be excused from performing to the extent it is prevented or delayed from doing so, but it shall exercise due diligence to correct such inability.
- 17 2 Both parties shall make reasonable efforts to pay salaries and wages to power system workers, to pay fuel suppliers for fuel delivered, and to collect revenues from customers. Each party shall make reasonable efforts to avoid a financial crisis in which it is impossible to fulfill its obligations under this contract.
- 17 3 If either party is able to anticipate force majeure conditions, that party shall make reasonable efforts to inform the other party so that the other party can try to mitigate the adverse effects of force majeure conditions.

18 Applicable Law

- 18 1 This agreement shall be interpreted according to the laws of the Seller's country, subject to the condition that the Buyer shall not be prevented or restricted from following the dispute resolution procedures described in Section 15.
- 18 2 The Energy Charter Treaty shall be used as a guide to international law pertaining to dispute resolution.

19 Government Approvals and Authorities

- 19 1 This contract may be signed by government ministries whose approval is needed to implement the contract. In any case the parties to the contract are simply the Buyer, the Seller, and the National Electric Network.
- 19 2 By signing this contract, the Buyer and the Seller indicate that they have obtained all necessary government approvals needed to implement this contract on the effective date of the contract.
- 19 3 If the Buyer's country creates a regulatory agency with jurisdiction over electricity import contracts, after this contract is signed, the Buyer shall be responsible for securing any approvals required from the regulatory agency. Similarly, if the Seller's country creates a regulatory agency with jurisdiction over electricity export contracts, after this contract is signed, the Seller shall be responsible for securing any approvals required from the regulatory agency.
- 19 4 Nothing in this contract shall obligate the Buyer to provide information to a government agency or ministry in the Seller's country or obligate the Seller to provide information to a government agency or ministry in the Buyer's country.

20 Succession and Assignment of Rights

- 20 1 If either party to this agreement is corporatized, privatized, or restructured so that a single company, enterprise, or ministry is the legal successor, that successor shall be subject to all of the provisions of this contract as though the successor were one of the original parties to the contract.
- 20 2 If either party to this agreement is restructured so that two or more companies, enterprises, or ministries are the legal successors but only one of them has authority to import or export electric energy, that successor shall be subject to all of the provisions of this contract as though the successor were one of the original parties to the contract.
- 20 3 If the Buyer is restructured and it is not clear what entity should become the successor under this contract, the Seller shall ask the Ministry of Energy in the Buyer's country to designate a legal successor. Similarly, if the Seller is restructured and it is not clear what entity should become the successor under this contract, the Buyer shall ask the Ministry of Energy in the Seller's country to designate a legal successor.
- 20 4 Unless a party is corporatized, privatized or restructured, that party may not assign its rights and responsibilities under this contract to any other organization.

21 Termination

- 21 1 This contract may be terminated at any time by mutual agreement between the Buyer and Seller.

21 2 If the Buyer is in default under this contract, the Seller shall have the right to terminate this contract after giving three month's written notice to the Buyer, if such default is not corrected before the end of the three-month period
Similarly, if the Seller is in default under this contract, the Buyer shall have the right to terminate this contract after giving three month's written notice to the Seller, if such default is not corrected before the end of the three-month period

21 3 If one party wants to exercise its right to terminate the contract on the grounds of default by the other party, it is necessary to first obtain a written declaration from the Central Asia Energy Council stating that the other party is in default
This declaration must be obtained no less than 30 days before the end of the three-month period cited in section 21 2

22 Relationship to Agreements with Other Parties

22 1 This contract must be implemented in accordance with international agreements dealing with the regulation of the flow of rivers in Central Asia for the purpose of providing irrigation and environmental protection
This contract does not alter the obligations of Buyer or Seller to comply with regulations issued by the appropriate government authorities responsible for regulating the flow of rivers

22 2 The responsibilities Dispatch Center Energia under this contract are subject to multilateral agreements concerning Dispatch Center Energia
The parties to this contract are both participants in such multilateral agreements

22 3 Seller is able to provide the electric energy and capacity described in section 4 without importing electric energy and capacity from power systems in other countries
Seller's ability to fulfill the terms of this contract does not depend on any agreement under which the Seller imports electric energy or capacity

22 4 Priority rights to firm capacity under this contract are assigned exclusively to the Buyer and may not be assigned or sold to any other entity

22 5 The Seller is responsible for fulfilling his obligations under this contract, before fulfilling his obligations under any electric energy import or export agreement that is signed after this contract is signed
Similarly, the Buyer is responsible for fulfilling his obligations under this contract, before fulfilling his obligations under any electric energy import or export agreement that is signed after this contract is signed

23 Incorporation of Annexes and Exhibits

23 1 A map of the interconnection facilities and is shown in Annex 1

23 2 No other annexes are included in this contract

24 Procedure for Amendment

- 24 1 The terms of this contract may be modified at any time by the addition of an amendment or amendments. An amendment is defined as a short document attached to the main document and signed by representatives of both parties. An amendment must very clearly identify the paragraphs of the contract that are modified by the amendment.
- 24 2 If either party desires to make an amendment to the contract, that party must submit a proposed draft amendment to the Operating Committee for review. The Operating Committee shall then express an opinion regarding the completeness, clarity, and technical feasibility of the proposed amendment. The parties should discuss the proposed amendment after receiving the statement from the Operating Committee.
- 24 3 Revisions to section 4 and section 10 must be carefully considered and discussed with the Operating Committee before the term of the contract is extended. The parties shall meet no later than November 1, 1997 to discuss the possibility of extending the term of the contract beyond December 31, 1997.

IN WITNESS WHEREOF, Buyer and Seller hereto have caused this Agreement to be signed as of the [31st] day of [December 1996]

General Director, [first power system]

General Director, [second power system]

**Annex 1
Map of Interconnection Facilities and Delivery Points**

COMMENTS ON THE CONTRACT FOR THE SALE OF CAPACITY AND ENERGY FROM ONE POWER SYSTEM TO ANOTHER POWER SYSTEM

Charles F Zimmermann, Hagler Bailly Consulting

Regional Seminar on International Electric Power Contracts
Almaty, Kazakstan, December 11-12, 1996

If this contract is compared with a North American electricity contract there are at least three areas in which the contract terms are unusual

- 1 **Services provided by Dispatch Center Energia** The bilateral contract gives the Dispatch Center Energia a lot of authority to schedule deliveries of energy, measure energy flows, and regulate frequency and voltage. However, the contract does not refer to a power pooling agreement. In North America the Dispatch Center would not have such authority, unless the buyer and seller were members of a power pool and had signed a pooling agreement.
- 2 **Payment using energy resources other than electricity** Section 13 contains a proposed procedure for arranging for payment using barter, that is, using energy resources such as petroleum products, natural gas, and coal. A North American contract typically would require payment in currency, by bank transfers.
- 3 **Pricing terms** This contract establishes prices that are not related to the seller's incremental cost or the buyer's decremental cost. Neither party is obligated to reveal information about its electric generation costs. In North American contracts the price is normally a function of production costs, and in some contracts the price is adjusted on an hourly basis.

There are many paragraphs in the proposed contract in which the wording has been developed on the basis of institutions and market conditions in Central Asia. However, the basic structure of the contract follows international standards. For an analysis of the structure of the draft contract, see the attached table.

This contract was prepared by Hagler Bailly Consulting at the request of Kyrgyzstan, Kazakstan, Uzbekistan, Turkmenistan, and Tajikistan. The request for a draft contract on capacity and energy was contained in five Memoranda signed in August 1996. This capacity and energy contract has a limited scope, however, for the reasons discussed below.

- 1 **Frequency regulation** Kyrgyzstan, Kazakstan, Uzbekistan, and Tajikistan requested a contract for "trade in capacity for the regulation of frequency" as well as trade in energy. Turkmenistan did not use these words, and simply requested a contract for "trade in capacity and energy," which is more consistent with international practice.

From a North American viewpoint, capacity sales are used to provide the buyer with the ability to meet customer load at all times, and in particular during the

annual system peak hour. Frequency regulation is an ancillary service which does not affect the buyer's ability to meet customer load. If the buyer did not receive frequency regulation service, the firm customers served by the buyer would continue to receive electricity but the frequency would be less stable.

This contract deals with the sale of capacity and energy while recognizing that there is a need for a multilateral agreement on frequency regulation (see Section 5). Hagler Bailly will draft a separate multilateral agreement on frequency regulation.

- 2 **Irrigation needs** Kyrgyzstan, Uzbekistan, and Tajikistan asked for a capacity and energy contract "taking into account the water supply for irrigation needs." Kazakhstan and Turkmenistan deleted this language from paragraph 3 in their Memoranda.

The upstream countries (Kyrgyzstan and Tajikistan) now incur an economic loss as a result of river flow restrictions. If there were no restrictions on river flow as a result of irrigation requirements, the upstream countries would be able to reduce their electricity imports and shift hydroelectric production away from off-peak periods and toward peak periods. In theory these changes would yield a net benefit to the upstream countries, measured in dollars or other foreign currency. Therefore the economic loss caused by river flow restrictions equals the upstream countries' "operating income" (billed revenues minus expenses) without restrictions minus their "operating income" with the restrictions. Because the downstream countries receive economic benefits from river flow restrictions, arguably they should compensate the upstream countries for their economic loss.

River water itself is not a commodity which is sold by upstream countries to downstream countries. When one country's use of water is restricted, the restriction results in some economic loss which can be estimated. There is no standard international practice regarding payment for such losses.

This is simply an electricity agreement and not a broader trade agreement on electricity and water. Electricity trade is subject to agreements to regulate the flow of rivers (see Section 3 and Section 22). If the downstream countries have an obligation to compensate the upstream countries for flow restrictions, that compensation should be stated in a separate contract which establishes river flow restrictions.

It would be useful for the countries to estimate the cost of river flow restrictions to the power sector and discuss the possibility of compensation. This work may be addressed in separate multilateral negotiations, not a bilateral agreement for the sale of capacity and energy.

- 3 **Trade in energy other than electricity** Kyrgyzstan, Kazakhstan, Uzbekistan, and Tajikistan requested a "methodology of price calculation on export of energy and capacity and import of other types of energy resources." Turkmenistan requested "development of the electricity billing mechanism in the conditions of the transition economy." In North America, electricity contracts are based on payment in kind or payment with money. Barter agreements are not used.

This draft contract includes a payment clause (Section 13) in which the buyer pays for electricity using other types of energy resources. However, separate contracts should be used to specify the quantity, quality, delivery schedule, and other conditions regarding trade in petroleum products, coal, natural gas and other energy resources.

CONTRACT FOR THE SALE OF CAPACITY AND ENERGY
from one power system to another power system

Analysis of the structure of the draft contract

Draft Contract for CARs	Type of Contract Clause	Standard Terms Listed by World Bank Report	Hydro-Quebec - NEPOOL Inter-connection Agreement	Hydro-Quebec - NEPOOL Energy Contract	Ontario Hydro - Vermont Public Power Supply Auth Agreement
	Parties, Date and Title	1			
Preamble	Preamble/ Recitals	2			
-	Description of Project and Facilities	3	Article 3		
Section 1	Effective Date and Term of Agreement	4	Article 14 1	Article 22	Article 1
-	Delay in Start Date	5			
Section 2	Definition of Terms	6	-	Article 1	-
Section 3	Status of Previous Agreements between the Parties	7	-	Articles 10 and 21	Attachment 1
Section 4	Contract Amounts of Power and Energy	8	-	Articles 2 and 11	Article 2
Section 5	Characteristics of Power and Energy	9	Article 2	Articles 4 and 9	Article 4
Section 6	Delivery Points	10	Article 4	Article 5	Article 5
-	Transmission	11			
Section 7	Scheduling	12	-	Articles 2 and 3	Article 3
Section 8	Monitoring and Metering	13	Article 4	Article 7	-

Draft Contract for CARs	Type of Contract Clause	Standard Terms Listed by World Bank Report	Hydro-Quebec - NEPOOL Inter-connection Agreement	Hydro-Quebec - NEPOOL Energy Contract	Ontario Hydro - Vermont Public Power Supply Auth Agreement
-	Service Conditions and Standards	14			
-	Hydro Spill Conditions	15			
Section 9	Deficiencies and Interruptions	16	-	-	-
Section 10	Rates and Charges	17	Supplements	Article 8 and Supplement 1	Article 6
Section 11	Rate Adjustments	18	-	-	-
Section 12	Rate Renegotiation	19	-	-	-
Section 13	Billing and Payments	20	Article 7	-	Article 7
-	Taxes	21			
-	Stabilization Clause	22			
Section 14	Operating Committee	23	Article 8	-	Article 8
-	Ownership	24			
Section 15	Settlement of Disputes	25	-	-	-
-	Records	26			
Section 16	Liabilities	27	Article 11	Article 14	Article 10
Section 17	Force Majeure	28	Article 10	Article 13	Article 10
Section 18	Applicable Law	29	Article 12	Article 15	Article 11
Section 19	Government Approvals and Authorities	30	Article 1	Article 16	Article 12
-	Land Easements	31			

Draft Contract for CARs	Type of Contract Clause	Standard Terms Listed by World Bank Report	Hydro-Quebec - NEPOOL Inter-connection Agreement	Hydro-Quebec - NEPOOL Energy Contract	Ontario Hydro - Vermont Public Power Supply Auth Agreement
Section 20	Assignment of Rights	32	Articles 13, 15	Articles 17 and 18	Article 15
Section 21	Termination	33	Articles 14, 17	Article 19	Article 14
-	Suspension	34			
-	Previous Communications	35			
Section 22	Relationship to Agreements with Other Parties	36	-	-	-
Section 23	Incorporation of Annexes and Exhibits	37	Articles 5, 6	-	-
Section 24	Procedure for Amendment/Revision	38	Article 18	-	-
-	Negotiation of Details after Signing of Contract	39			
Supplements 1 and 2	Annexes, Supplements and Exhibits	40	Supplements I through VI	Supplement 1	Attachments 1 and 2, Schedules 1 and 2

EXPORT PRICES OF ELECTRIC CAPACITY AND ENERGY IN CENTRAL ASIA

Charles F Zimmermann, Hagler Bailly Consulting

Regional Seminar on International Electric Power Contracts
Almaty, Kazakstan, December 11-12, 1996

The purpose of this paper is to comment on the electricity market in Central Asia and suggest a methodology for calculating prices of electric capacity and energy in sales contracts among the Central Asian Republics. According to this methodology electricity prices are expressed in terms of USD per kW or US cents per kWh.

The description of Central Asia electricity trade in this report is based upon the limited amount of information available to Hagler Bailly Consulting. Existing electricity price levels are considered to be confidential and are not discussed in this paper.

Geographic range of electricity trade in Central Asia

The Central Asian Republics (CARs) are interconnected by a high-voltage grid in a way that requires these countries to maintain trade in electricity. Kyrgyzstan and Tajikistan are divided into north and south regions (and forced to arrange electricity trade with Uzbekistan) because their domestic high-voltage grids run in an east-west direction rather than a north-south direction, and mountainous terrain separates the north and south. The eastern portion of Uzbekistan (the Fergana valley) is connected to the rest of the country by a power line passing through Tajikistan, and therefore at a minimum a wheeling agreement is needed. Turkmenistan and Kazakstan are more independent, they are upgrading their high-voltage electric networks to enable domestic generating units to supply the areas bordering Uzbekistan. However, some of the generating units in the southern region of Kazakstan depend on imported natural gas, and this region must import electricity when gas supplies are limited.

Electricity trade in Central Asia is competitive. It appears that no country is willing to price its exports on the basis of the production cost calculations used to set internal electricity prices. Export prices can be higher than the average wholesale price, or even the average tariff, in the internal market. Therefore it is necessary to identify the geographic region in which competition may take place in the future. Prices in neighboring countries are significant if they are much higher or much lower than existing prices in the CARs.

- If neighboring countries offer to sell electricity to CARs at prices that are significantly lower than the existing price level, they will tend to cause the price of electricity in Central Asia to fall. This could happen for a short period, for example, if neighboring countries have a surplus of hydroelectric energy from river water that would otherwise be spilled. Moreover, if neighboring countries set very low prices during off-peak hours it is possible that Central Asia will also have low prices during off-peak (night) periods and will import energy during off-peak periods.

- If neighboring countries offer to buy electricity at prices that are significantly higher than the existing price level, they will tend to cause the price of electricity in Central Asia to rise. For example, if neighboring countries set very high prices during peak hours it is possible that Central Asia will also have high prices during peak periods and will export energy during these periods.

The geographic area of electricity trade is likely to expand first of all into a neighboring region - northern Kazakhstan - rather than a neighboring country. On the northern boundary of the high-voltage grid there is a connection (via a single 500 kV north-south line) with the power grid of northern Kazakhstan, which in turn is connected to the unified power system of Russia. At present the principal effect of this line is to bring a few hundred MW of power from Karaganda GRES 2 to Almaty and Chimkent, without placing northern Kazakhstan into competition with Kyrgyzstan, Uzbekistan, and Turkmenistan. However, it is possible that an upgrade of the north-south transmission capacity of Kazakhstan will expand the geographic area in which competition among generating stations is technically possible. The price of electricity in south Kazakhstan could then be affected by electricity prices in North Kazakhstan and possibly even the Siberian interconnected system and the Urals interconnected system.

On the southwestern boundary of the high voltage grid, there is a possibility of increased electricity trade with Iran. If a transmission line can be constructed through Iran to provide an opportunity for Turkmenistan to export to Turkey, the price of exports from Turkmenistan to other CARs may be influenced by competition between those CARs and Turkey.

On the southern boundary of the high-voltage grid there is a possibility of increased electricity exports to Afghanistan, but as a result of civil war and the poor condition of the economy, Afghanistan will probably have a minor effect on the regional market. In the longer term the more interesting export possibility consists of trade with Pakistan by construction of a power line through Afghanistan or a line through China (from Kyrgyzstan). The quantity of electric energy sold to Pakistan could be very large but the power line investment would be very risky and a line through China would be very expensive because of the mountainous terrain. On the eastern boundary of the Central Asian power grid lies China. In principle there could be increased electricity exports to China but this is not very likely, as a result of the mountainous terrain and low population density of western China.

Existing tariff structure

Kazakhstan purchases electricity from Uzbekistan under a one-year agreement with a one-part annual tariff that is expressed in US cents/kWh and is fixed throughout the year. Kazakhstan purchases electricity from Turkmenistan under a one-year agreement with a one-part seasonal tariff that is expressed in US cents/kWh and has different levels for the winter season (January 1 through April 30, and November 1 through December 31) and the summer season (May 1 through October 31). During the 1996 growing season Kazakhstan purchased electricity from Kyrgyzstan under a short-term agreement with a one-part seasonal tariff expressed in US cents/kWh. Little or no electricity is available from Kyrgyzstan during the 4th quarter and the 1st quarter, and so Kazakhstan must rely on Uzbekistan and Turkmenistan during the 4th quarter and 1st quarter. None of these contracts contain time of day tariffs (peak and off-peak) or capacity charges.

In 1995 Tajikistan delivered electricity to Uzbekistan during the summer months and received electricity during the winter months. Most (or perhaps all) of the energy received during the winter was provided in exchange for energy delivered during the summer.

Kazakhstan purchases electric energy from Russia according to time-of-day pricing as well as seasonal pricing. There are separate contracts with Uralsk, with Aktyubinsk, and with Kazakstanenergo. For the Kazakstanenergo contract the time of day tariffs are calculated as multipliers of a base tariff which is expressed in US cents/kWh and is seasonally adjusted. The winter season is simply the 4th and 1st quarters and the summer season is the 2nd and 3rd quarters. The multipliers are as follows:

- Peak period (7 to 10 am and 6 to 10 pm) 1.4 times the base tariff
- Night period (10 pm to 6 am) 0.6 times the base tariff
- Day time period (6 to 7 am and 10 am to 6 pm) 1.0 times the base tariff

Kazakhstan has an agreement with Uzbekistan which covers wheeling services provided by Uzbekistan. The agreement contains a one-part tariff expressed in US cents/kWh/1000 km and specifies a one-part tariff in US Cents/kWh for transit from Turkmenistan to Kazakhstan based on a stated transit distance in km and a one-part tariff in US Cents/kWh for transit from Kyrgyzstan to Kazakhstan based on a stated transit distance in km. The electricity in "transit" from Turkmenistan is actually consumed by Uzbekistan near the receipt point on the border with Turkmenistan and additional electric energy is generated by Uzbekistan near the delivery point on the border with Kazakhstan. Transit prices are not adjusted by season or by time of day.

In summary, existing tariffs fall in four categories:

- electricity exchange without payment of currency (Tajikistan)
- one-part tariffs with annual adjustment (Uzbekistan)
- one-part tariffs with seasonal adjustment (Turkmenistan) or seasonal availability (Kyrgyzstan)
- one-part tariffs with time-of-day and seasonal adjustment (Russia)

It appears that all export contracts in Central Asia involve some form of barter payment. Turkmenistan delivers Uzbekistan delivers electric energy and provides wheeling services to Kazakhstan in exchange for a combination of currency payment (in USD or tenge) and electrical equipment, materials and services needed by the power sector. In 1993-95 Tajikistan delivered electric energy to Kazakhstan in exchange for electrical equipment and materials needed by the power sector. Kyrgyzstan delivers electric energy to Uzbekistan in exchange for natural gas. Kyrgyzstan delivers electric energy to Kazakhstan in exchange for coal and other material resources. Russia delivers electric energy to Kazakhstan and receives coal, but there are separate contracts for these resources and there is no effective mechanism for the clearing of debts between the two countries. The price of electric energy sold by Russia is linked to the price of coal sold by Kazakhstan. Turkmenistan delivers electric energy to Kazakhstan in exchange for currency payment (USD, tenge, or manat) or "material assets".

which must be identified in a separate agreement and are not limited to items needed by the power sector

In summary, the methods of barter payment fall into three categories

- Payment with energy resources, such as coal
- Payment with equipment and materials needed by the power sector
- Payment with material assets identified in a separate agreement

Payment in currency can be a required form of settlement for a certain percentage of the contract value, or it can be mentioned as an alternative to barter payment, or it can be left out of the agreement altogether

CONTRACT FOR THE SALE OF CAPACITY AND ENERGY
from a power system to a large industrial customer in another country

This Contract for the Sale of Capacity and Energy is signed on the [1st] day of [March 1997] among [a power system], hereinafter called the Seller, and [an industrial customer], hereinafter called the Buyer, and [a national electric network], hereinafter called the National Electric Network

Preamble

WHEREAS the Seller owns and operates high-voltage networks and facilities for the generation of electrical capacity and energy and desires to sell capacity and energy to the Buyer, and

WHEREAS the Buyer desires to purchase capacity and energy for its own use, and owns industrial facilities that are directly connected to the National Electric Network, and

WHEREAS the National Electric Network is an independent structure registered under the laws of [the Buyer's country] and is authorized to sign international agreements, and

WHEREAS the National Electric Network owns and operates transmission facilities which provide a path for the flow of electrical energy between the Seller and the Buyer and is willing to transport this electrical energy and make transmission capacity available to the Buyer,

Now therefore the parties agree as follows

1 Effective Date and Term of Agreement

This contract shall be effective from 1 April 1997 and shall terminate on 31 December 1997. However, this contract may be renewed for a one-year term or a longer period if all parties sign an Amendment to this contract stating the renewal term and stating the revisions, if any, in the contract amounts of power and energy described in Article 4. Such an Amendment will not take effect on 1 January 1998 unless it is signed prior to December 31, 1997.

2 Definitions of Terms

- 2.1 "Firm capacity" is a specified number of kilowatts of capacity that the Seller will make available to the Buyer at all times for the duration of this contract.
- 2.2 "Firm energy" is a specified number of kWh of energy that the Seller agrees to deliver to the Buyer according to a quarterly schedule, provided that the Seller is not obligated to deliver any kW in excess of firm capacity.

- 2 3 "Surplus energy" is measured by the National Electric Network and consists of energy that is delivered by the Seller to the National Electric Network but is not consumed by the Buyer
- 2 4 "Deficit energy" is measured by the National Electric Network and consists of energy that is consumed by the Buyer but is not delivered by the Seller to the National Electric Network
- 2 5 "Supplemental energy" is energy delivered by the Seller in any calendar quarter, at the request of the Buyer, after the Seller has delivered the full amount of firm energy for that quarter
- 2 6 "Electricity" includes electric capacity and energy
- 2 7 "Peak periods" are [the 3-hour period from 7 am to 10 am and the 4-hour period from 6 pm to 10 pm at the Buyer's location]
- 2 8 "High-voltage networks" are electric networks designed for operation at 110 kV or higher voltages
- 2 9 A "national electric network" is an independently managed enterprise or entity which owns and operates high-voltage networks and provides wheeling services but does not own or operate generating facilities. A national electric network owns all of the networks designed for operation at 220 kV or higher voltages in one country
- 2 10 A "power system" is an enterprise or entity which owns and operates a high-voltage network and has the ability to sell electric energy and firm capacity. This firm capacity is provided by generating stations owned by the power system or by generating stations and other power systems which have signed contracts to provide energy and firm capacity to the power system
- 2 11 A "national power system" is a power system which owns a national electric network, or owns all of the networks designed for operation at 220 kV or higher voltages in one country. A regional network enterprise under state ownership is not a national power system
- 2 12 A "national purchase contract" is a contract for the purchase of electrical energy by a national power system
- 2 13 "DC Energia" is the Central Asia Republics regional electric energy dispatch center and any permitted successors and assigns
- 3 Status of Previous Agreements between the Parties**
- 3 1 This contract is the only agreement effective 1 April 1997 regarding the sale of capacity and energy by the Seller to the Buyer. All previous contracts for the sale of capacity and energy by the Seller to the Buyer, either oral or written, including the various drafts of this contract, shall be of no force or effect and shall not be used as a guide to the interpretation of this contract

- 3 2 This agreement does not supersede and does not modify any other agreements signed by the Seller, provided the Buyer is not a party to such agreements. If the National Electric Network or the national power system has signed a national purchase contract with the Seller for the purchase of capacity and/or energy from the Seller, that contract will remain in force until it expires or it is amended or terminated by the parties to that contract.
- 3 3 The Seller is responsible for managing its capacity and energy sales commitments so that all of its sales contracts can be fulfilled. If the Seller is unable to fulfill its obligations under this contract, as a result of other contractual commitments, the Seller must immediately notify the Buyer as well as DC Energia.
- 3 4 If necessary, the Buyer and the National Electric Network will negotiate a wheeling agreement for the transport of capacity and energy from the border of the Buyer's country to the Buyer. Such an agreement is not necessary if the Buyer is entitled to receive wheeling services under a published tariff.
- 3 5 This agreement supersedes all previous contracts between the Buyer and the National Electric Network for the sale of capacity and energy. Effective 1 April 1997 the National Electric Network will provide only wheeling services to the Buyer and will not sell capacity or energy to the Buyer under any tariff or any agreement for a period of five years. The National Electric will not compete with the Seller for the sale of capacity and energy to the Buyer during this five-year period.
- 3 6 If the National Electric Network is owned by a national power system, this agreement supersedes all previous contracts between the Buyer and the national power system for the sale of capacity and energy, and effective 1 April 1997 the national power system will not sell capacity or energy to the Buyer under any tariff or agreement for a period of five years.
- 3 7 If the Buyer's electrical facilities have been used to provide energy to subcustomers, the Buyer will pay for the cost of installation of any lines or meters necessary to ensure that the sale of capacity and energy under this contract is not subject to tariff regulations of the government of [the Buyer's country] and not subject to agreements between the subcustomers and other suppliers. The subcustomers are not a party to this agreement and have no rights to the capacity and energy provided by the Seller. Nothing in this section will prevent the Buyer from receiving reimbursement for installation costs from the regional network enterprise, from the subcustomers, or from other organizations.
- 3 8 The firm capacity described in this agreement is not subject to the curtailment regulations of the Electricity and Heat Utilization Code in the Buyer's country and is not subject to curtailment under any peak period regime established for sales customers of the national power system in the Buyer's country. However, the Buyer must continue to observe all portions of the Electricity and Heat Utilization Code in the Buyer's country, other than curtailment regulations, which are not in conflict with the terms and conditions of this contract.

- 3 9 DC Energia is not a party to this agreement and has no obligation to communicate with the Buyer. The Seller and the National Electric Network will provide DC Energia with all information necessary to fulfill their agreements with DC Energia.
- 3 10 The government of the Buyer's country and the government of the Seller's country are both signatories of the Energy Charter Treaty dated December 17, 1994. Therefore this contract is subject to the terms and conditions of the Energy Charter Treaty.
- 3 11 Where the Seller's electric generation is produced from hydroelectric resources it shall be produced in accordance with international agreements to regulate the flow of rivers in Central Asia to provide for irrigation and environmental protection.
- 3 12 Nothing in this section will prevent the Buyer and Seller from entering into future agreements that may alter the terms of this contract.
- 3 13 Nothing in this section will prevent the Buyer from purchasing capacity and energy from sources other than the Seller, provided the Buyer does not purchase capacity and energy from the National Electric Network or any organization which owns the National Electric Network.

4 Contract Amounts of Capacity and Energy

- 4 1 The Seller will deliver firm energy according to the following schedule

1 st quarter 1997	_____	million kWh
2 nd quarter 1997	_____	million kWh
3 rd quarter 1997	_____	million kWh
4 th quarter 1997	_____	million kWh

- 4 2 The National Electric Network will provide the Buyer with any quantity of energy consumed by the Buyer in any hour, provided that the power flow in kW is no larger than the firm capacity stated in section 4 6.
- 4 3 If the Seller delivers the full amount of firm energy before the end of a quarter, the Buyer may ask the Seller to deliver supplemental energy on a voluntary and non-firm basis. The Seller has no obligation to deliver supplemental energy under this contract.
- 4 4 On an hourly basis the National Electric Network will make up the difference between the amount of energy consumed by the Buyer and the amount delivered by the Seller, provided the National Electric Network has no obligation to deliver kW to the Buyer in excess of firm capacity. The National Electric Network and the Seller agree to develop a procedure for ensuring that the Seller's schedule of energy deliveries is reasonably consistent with the Buyer's schedule of energy consumption.

4 5 Deficit energy and surplus energy shall be measured by the National Electric Network on a daily basis. When the Seller supplies surplus energy, it shall be returned in kind within the following 30 days according to a schedule established by the National Electric Network. If the amount of deficit energy exceeds the Buyer's total consumption over a period of one week, the Seller shall be considered in default of this contract and the National Electric Network has the right to terminate the contract under Section 21.

4 6 Seller and National Electric Network will inform the Dispatch Center Energia of the total quantity of firm capacity and firm energy under all agreements between the Seller and customers connected to the National Electric Network.

4 7 The following schedule shows the maximum amount of firm capacity to be provided by the Seller in any hour:

1 st quarter 1997	_____	MW
2 nd quarter 1997	_____	MW
3 rd quarter 1997	_____	MW
4 th quarter 1997	_____	MW

4 8 If energy is wheeled from the Seller's country to the Buyer's country through a third country, the contract amounts of firm capacity and firm energy are not affected. The amounts received by the Buyer are determined by the wheeling agreement, which should specify a method of compensation for transmission losses by the wheeler.

4 9 If the Buyer fails to provide payment to the Seller for the electric energy and capacity provided, the delivery quantities stated in this section may be modified, as described in Section 13.

5 Characteristics of Power and Energy

5 1 Electric power and energy delivered to the Buyer under to this contract shall be in the form of three phase alternating current at operating voltages and frequencies established by the National Electric Network.

5 2 Electric power and energy delivered to the National Electric Network under to this contract shall be in the form of three phase alternating current at operating voltages and frequencies established by DC Energia.

5 3 The Seller agrees to participate in the negotiation of a multilateral agreement in Central Asia regarding frequency regulation services.

5 4 The National Electric Network agrees to participate in the negotiation of a multilateral agreement in Central Asia regarding frequency regulation services or to designate an organization that will participate in such negotiations on its behalf.

6 Delivery Points

- 6 1 The capacity and energy provided by Seller will be delivered at the border of the Seller's country at the following points on the high-voltage network
- 1 the 500 kV power line connecting [substation A] to [substation B], at the border point between the Seller's network and the National Electric Network
 - 2 the 500 kV power line connecting [substation D] and [substation E], at the border between the Seller's country and [a third country]
- 6 2 If one of the delivery points specified above is not on the National Electric Network, the Buyer shall be responsible for negotiating the wheeling agreement or agreements necessary to deliver capacity and energy from the border of the Seller's country to the National Electric Network. The Seller shall maintain interconnections with the power systems that are able to provide the necessary wheeling services. The Buyer is responsible for all wheeling charges including energy used to compensate the wheeling power system for transmission losses
- 6 3 Additional delivery points may be established by agreement between the Seller and the National Electric Network

7 Scheduling

- 7 1 The Buyer has no obligation to give advance notice to the Seller or to the National Electric Network of Buyer's daily schedule of electricity consumption

8 Monitoring and Metering

- 8 1 The Buyer's electricity consumption will be metered on an hourly basis and metering data will be provided to the National Electric Network on a weekly basis
- 8 2 The Seller and the National Electric Network will negotiate a procedure for metering Seller's delivery of capacity and energy under this contract. If the Seller's delivery point is not metered, data will be provided from another point on the Seller's system, and an appropriate allowance will be made for losses between the metering and delivery points

9 Deficiencies and Interruptions

- 9 1 If the Seller is unable to deliver the full amount of firm energy in a particular quarter, due to conditions in the Buyer's country that are not force majeure (Article 17), the Seller has no obligation to make up for the deficiency. The Buyer shall pay for the number of kWh actually delivered

- 9.2 If the Seller is unable to deliver the full amount of firm energy in a particular quarter, due to conditions in the Seller's country that are not force majeure (Article 17), the Seller must deliver the deficiency during the following quarter. For each quarter the Buyer shall pay for the number of kWh actually delivered.
- 9.3 If the Seller is unable to deliver the full amount of firm energy in a particular quarter because the price of firm energy under this contract is substantially below the price needed to recover the Seller's cost of fuel used in power generation, the Buyer and Seller shall attempt to renegotiate the price of energy according to Article 12.

10 Rates and Charges

- 10.1 The base price for firm energy delivered under this contract is ___ US cents per kWh. This price does not include capacity payments, which are described in section 10.4.
- 10.2 The price for non-firm energy delivered under this contract is ___ US cents per kWh.
- 10.3 The price for firm capacity that is reserved under this contract is ___ US dollars per kW per month.
- 10.4 The Buyer's country and the Seller's country have no customs duties on electric energy. If either country imposes customs duty on electric energy, prices may be renegotiated according to Section 12.

11 Price Adjustments

- 11.1 The Seller has the authority to adjust the price for firm energy according to changes in the average price of natural gas exported by Turkmenistan, if the Seller is able to obtain the necessary data. For this type of adjustment the renegotiation procedure described in Article 12 is not necessary. If the Seller cannot obtain the necessary data, there will be no price adjustment and the price of firm energy will equal the base price of firm energy.

- 11.2 The standard cost of natural gas for power generation, is defined as

$$S_G = (P_G / C_G) * R_G$$

where

S_G = the standard cost of gas for power generation, in US cents per kWh

P_G = the average price of gas exported by Turkmenistan,
in US cents per thousand cubic meters, at the border of Turkmenistan

C_G = the average heat content of gas exported by Turkmenistan
in GJ per thousand cubic meters,

R_G = the heat rate of a typical gas-fired power station on the Seller's system,
in GJ per kWh

- 11 3 The Seller shall calculate the standard cost of natural gas for power generation for the month of December 1996 and for each month of 1997. The adjusted price of firm energy shall be calculated as follows:

$$M_E = B_E + (S_{GM} - S_{G96})$$

where

M_E = the monthly adjusted price of scheduled electric energy in a particular month m

B_E = the base price of firm energy

S_{GM} = the standard cost of gas for power generation in a particular month m

S_{G96} = the standard cost of gas for power generation in December 1996

12 Price Renegotiation

- 12 1 The prices for capacity and energy in the first quarter of 1997 may not be renegotiated, although the price of firm energy may be adjusted according to Section 11.
- 12 2 The prices for capacity and energy for subsequent quarters may be renegotiated by Buyer and Seller at any time. If these prices are successfully renegotiated, the contract must be amended by a document signed by both Buyer and Seller. A change in prices may be justified on the basis of changes in the Seller's cost of generating electric energy for export, changes in the Seller's cost of maintaining generating capacity and operating reserves, or changes in the price of capacity and energy under other electricity trade agreements in Central Asia.
- 12 3 Neither the Buyer nor the Seller has the right to unilaterally change the prices for capacity and energy under this contract. A change in prices, other than a rate adjustment according to Section 11, may be proposed by either party but it shall not take effect until both parties have signed an amendment to this contract.
- 12 4 Both Buyer and Seller intend to implement the sale of capacity and energy as described in Section 4. Therefore the purpose of price renegotiation is to determine the price at which the transaction described in Section 4 is acceptable to both Buyer and Seller.

13 Billing and Payments

- 13 1 No later than the 7th day of each month, the National Electric Network shall provide both Buyer and Seller with a calculation of the quantities used to compute the Seller's invoice: firm energy, non-firm energy, and firm capacity.
- 13 2 In exchange for electric energy and capacity the Buyer may use energy commodities as a form of payment. In the remainder of this section the Buyer is the Buyer of electric energy and capacity and the Seller is the Seller of electric energy and capacity.

- 13 3 Not later than the 7th day of each month, the Seller shall provide the Buyer with a price list for energy commodities that may be used as a form of payment for electric energy and capacity For electric energy and capacity delivered in the month of January 1997 the price list shall be as follows (for export at the border of the Buyer's country)

Gasoline	\$200 per ton
Diesel fuel	\$150 per ton
Heavy fuel oil	\$75 per ton
Crude oil	\$100 per ton
Natural gas	\$60 per thousand cubic meters
Coal (Ekibastuz)	\$20 per ton
Coal (Karaganda)	\$30 per ton

- 13 4 Not later than the 10th day of each month, the Buyer shall notify the Seller of the portion of the invoice that the Buyer wishes to pay in USD or other currency, by bank transfer This portion is defined as the "currency payment amount " It may equal zero, because the Buyer is not obligated to provide the Seller with payment in USD or any other currency For the portion of the invoice that is not paid in currency, the Buyer is obligated to deliver energy commodities as described below

- 13 5 Seller shall send the Buyer an invoice on the 14th of each month for the capacity and energy provided in the preceding month The total amount of the invoice for electric capacity and energy shall be shown in USD Seller shall also submit a proposed schedule of energy commodities to be delivered by the Buyer in exchange for the electric energy received The total value of energy commodities in this schedule must be calculated in USD This total plus the currency payment amount must equal the amount of the Seller's invoice for electric capacity and energy

- 13 6 The Seller's invoice will state the terms and conditions for the delivery of energy commodities by the Buyer One of the following options must be proposed for each commodity Buyer is not responsible for any storage or transportation costs outside the Buyer's country

13 6 1 The commodity may be delivered to the Seller in the following month
If storage is necessary in the Seller's country, Seller is responsible for the cost of storage

13 6 2 The commodity may be delivered to the Seller during the following winter according to a delivery schedule set by the Seller

13 6 3 An oil commodity may be delivered to an oil storage terminal with access to international markets The ownership of the commodity may be transferred to the Seller's account with a broker or marketing company designated by the Seller

13 6 4 The commodity may remain in the Buyer's country but the ownership may be transferred to the Seller's account with a broker or marketing

company designated by the Seller. The Seller must specify a location at which ownership is transferred from the Buyer.

13.6.5 The commodity may be delivered by the Buyer to a third country designated by the Seller. The commodity is ultimately consumed in the third country. The Seller is responsible for arranging for the receipt of money or other compensation from the third country.

13.6.6 The commodity may be delivered by the Buyer to a transportation company or transportation enterprise designated by the Seller. The Seller is responsible for arranging for the export of the commodity to markets outside Central Asia.

13.7 Buyer shall deliver or store energy commodities according to Seller's instructions. On a monthly basis the Buyer shall submit a report to the Seller describing the status of activities performed to implement the commodity delivery schedule.

14 Operating Committee

14.1 This contract does not require that an operating committee be formed. If an operating committee is formed under another agreement between the Seller and the National Electric Network, the operating committee's responsibilities should be defined in that agreement.

15 Settlement of Disputes

15.1 Either party to this contract may refer questions to the Central Asia Energy Council for resolution. If this alternative is selected, the party making a request to the Council must ask the Council to form an arbitration panel consisting of three members of the Council who do not represent the Buyer's country or the Seller's country or any power system in either country. The decision of the arbitration panel should 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. If one of the parties does not accept the decision of the arbitration panel, that party may consider termination of this contract in accordance with Section 21.

15.2 Either party to this contract may initiate the dispute resolution procedures of the Energy Charter Treaty. In this situation the other party must respond in accordance with its obligations under the Energy Charter Treaty.

16 Liabilities

- 16 1 The parties to this contract may negotiate and sign other international agreements, including multilateral agreements, which identify circumstances in which one party is liable for loss or damage associated with a failure of the high voltage network or a major disturbance in voltage or frequency. However, nothing in this contract creates any liability for either the Buyer or the Seller to provide compensation for loss or damage. None of the language in this contract should be used to determine whether liability exists under some other agreement.
- 16 2 If any subcustomers receive energy from the Buyer, the Seller is not liable for any loss or damage to these subcustomers.
- 16 3 If the government of the Seller's country unilaterally determines that the Seller is liable for loss or damage associated with a failure to deliver electricity or a major disturbance in voltage or frequency, the Seller shall consider this a domestic issue that does not involve the Buyer.

17 Force Majeure

- 17 1 Both parties shall exercise due diligence to perform their obligations under this contract, but conditions may arise which prevent or delay performance by one or the other because of causes beyond a party's reasonable control, including flood, drought, earthquake, storm, lightning, fire, explosion, epidemic, war, riot, civil disturbance, and sabotage. If a party is unable to fulfill any obligations by reason of such causes, it shall be excused from performing to the extent it is prevented or delayed from doing so, but it shall exercise due diligence to correct such inability.
- 17 2 The Seller shall make reasonable efforts to pay salaries and wages to power system workers, to pay fuel suppliers for fuel delivered, and to collect revenues from customers.
- 17 3 If either party is able to anticipate force majeure conditions, that party shall make reasonable efforts to inform the other party so that the other party can try to mitigate the adverse effects of force majeure conditions.

18 Applicable Law

- 18 1 This agreement shall be interpreted according to the laws of the Seller's country, subject to the condition that the Buyer shall not be prevented or restricted from following the dispute resolution procedures described in Section 15.
- 18 2 The Energy Charter Treaty shall be used as a guide to international law pertaining to dispute resolution.

19 Government Approvals and Authorities

- 19 1 This contract may be signed by government ministries or agencies whose approval is needed to implement the contract. In any case the parties to the contract are simply the Buyer, the Seller, and the National Electric Network.
- 19 2 By signing this contract, the parties indicate that they have obtained all necessary government approvals needed to implement this contract on the effective date of the contract.
- 19 3 If the Buyer's country creates a regulatory agency with jurisdiction over electricity import contracts, after this contract is signed, the Buyer shall be responsible for securing any approvals required to import electricity and the National Electric Network shall be responsible for securing any approvals required to transmit electricity to the Buyer. Similarly, if the Seller's country creates a regulatory agency with jurisdiction over electricity export contracts, after this contract is signed, the Seller shall be responsible for securing any approvals required from the regulatory agency.
- 19 4 Nothing in this contract shall obligate the Buyer to provide information to a government agency or ministry in the Seller's country or obligate the Seller to provide information to a government agency or ministry in the Buyer's country.

20 Succession and Assignment of Rights

- 20 1 If any party to this agreement is corporatized, privatized, or restructured so that a single company, enterprise, or ministry is the legal successor, that successor shall be subject to all of the provisions of this contract as though the successor were one of the original parties to the contract.
- 20 2 If any party to this agreement is restructured so that two or more companies, enterprises, or ministries are the legal successors but only one of them has authority to import or export electric energy, that successor shall be subject to all of the provisions of this contract as though the successor were one of the original parties to the contract.
- 20 3 If the National Electric Network is restructured and it is not clear what entity should become the successor under this contract, the Seller shall ask the Ministry of Energy in the National Electric Network's country to designate a legal successor. Similarly, if the Seller is restructured and it is not clear what entity should become the successor under this contract, the National Electric Network shall ask the Ministry of Energy in the Seller's country to designate a legal successor.
- 20 4 Unless a party is corporatized, privatized or restructured, that party may not assign its rights and responsibilities under this contract to any other organization.

21 Termination

- 21 1 This contract may be terminated at any time by mutual agreement between the Buyer and Seller
- 21 2 If the Buyer is in default under this contract, the Seller shall have the right to terminate this contract after giving three month's written notice to the Buyer, if such default is not corrected before the end of the three-month period
Similarly, if the Seller is in default under this contract, the Buyer shall have the right to terminate this contract after giving three month's written notice to the Seller, if such default is not corrected before the end of the three-month period
- 21 3 If the amount of deficit energy exceeds the Buyer's total consumption over a period of one week, the Seller shall be considered in default of this contract and the National Electric Network has the right to terminate the contract
- 21 4 If one party claims that another party is in default but the other party disagrees, the dispute should be resolved according to the dispute resolution procedures described in Section 15

22 Relationship to Agreements with Other Parties

- 22 1 This contract does not alter the obligations of the Seller to comply with regulations issued by the appropriate government authorities responsible for regulating the flow of rivers in Central Asia for the purpose of providing irrigation and environmental protection
- 22 2 The responsibilities of Dispatch Center Energia under this contract are subject to multilateral agreements concerning Dispatch Center Energia

23 Incorporation of Annexes and Exhibits

- 23 1 A map of the interconnection facilities and is shown in Annex 1
- 23 2 No other annexes are included in this contract

24 Procedure for Amendment

- 24 1 The terms of this contract may be modified at any time by the addition of an amendment or amendments. An amendment is defined as a short document attached to the main document and signed by representatives of both parties. An amendment must very clearly identify the paragraphs of the contract that are modified by the amendment
- 24 2 The parties shall meet no later than November 1, 1997 to discuss the possibility of extending the term of the contract beyond December 31, 1997

IN WITNESS WHEREOF, the Buyer, the Seller, and the National Electric Network hereto have caused this Agreement to be signed as of the [1st] day of [March 1997]

[representing the Buyer]

[representing the Seller]

[representing the National Electric Network]

Annex 1
Map of Interconnection Facilities and Delivery Points

AGREEMENTS ON ACCESS TO ELECTRICITY MARKETS AN EXAMPLE FROM THE EUROPEAN UNION

Charles F Zimmermann, Hagler Bailly Consulting

Regional Seminar on International Electric Power Contracts
Almaty, Kazakstan, December 11-12, 1996

Background

The Government of Kazakstan approved a *Program of Privatization and Restructuring of the Electric Power Sector* in Resolution No 663 of the Government of the Republic of Kazakstan, dated May 30, 1996. The stated objectives of the program are "to create competition in the process of electric energy production and to arrange the independent delivery of electric energy by creation of a wholesale electricity market" and to set up a regulatory framework consistent with the creation of a competitive market. Because Kazakstan is the leading importer of electricity in Central Asia and because the electric grid of the southern portion of Kazakstan is part of an interconnected power system spanning five countries, it is only natural that the other Central Asian Republics (CARs) are interested in knowing whether they will have an opportunity to sell electricity to large industrial customers or other wholesale market customers in Kazakstan. Until 1996, Kazakstanenergo (a state-owned power system and owner of the national electric network) had a complete monopoly over electricity imports and exports in Kazakstan, but now it is possible that a more competitive structure will be created.

Seminars on *International Electric Power Contracts and Power Pooling* were held in the five CARs in August 1996, under USAID funding. At each of these seminars the local participants requested Hagler Bailly Consulting to prepare a sample contract for the sale of electricity from a power system in one country to a large industrial customer located in another country. The wording of Kazakstan's request suggested that access would be restricted to customers directly connected to the national electric network, which includes all power lines at 220 kV and higher voltages. The other four countries used simpler wording.

- *Kazakstan* Contract power system - National Electric Network - large customer
- *Kyrgyzstan, Uzbekistan, Turkmenistan, Tajikistan* Contract power system - a large customer in another country

In Central Asia the five countries have very different structures of power sector ownership and management, and it is not at all clear that an opening of the electricity market in Kazakstan will be accompanied by an opening of the market in other countries. The request for a sample contract might be considered in the context of a broader issue, that is, the question whether the CARs should negotiate some sort of agreement regarding access to wholesale customers connected to the high-voltage electricity networks.

North American experience does not provide a suitable example of a multilateral agreement on access issues. International electricity trade in North America is largely between the United States and Canada, where neither country has a national grid company or national

electric network company. A mixture of ownership structures, public and private, exists in both countries. Similar types of sales contracts and wheeling contracts are used on both sides of the border.

In western Europe, however, the question of access to electric networks has been debated and resolved within the government structures of the European Union. The process of debate began with the submission of a proposal by the Commission (originally the "Commission of the European Community") on 24 February 1992 and concluded with a 34-page Directive issued by the Council on 25 July 1996. The Directive is subject to approval by the European Parliament. It is not an agreement among power systems, it might be considered a type of free trade agreement that has been specifically developed to deal with electricity trade.

This paper provides a summary of the key points in the 25 July 1996 EU directive *Concerning common rules for the internal market in electricity* ("the Directive"). The paper summarizes the types of reforms and policy decisions that will have to be made by EU members.

Basic objectives

The Directive does not contain a concise summary of its objectives. The introductory "Whereas" section of the Directive is 6 pages in length. The following summary is based on an interpretation of the document as a whole.

Over the past decade the EU has established various long-term goals concerning economic integration, such as a "single financial market" throughout the EU. In the electric sector the objective of this Directive is to introduce reforms which move the EU closer to a single electricity market, in the sense that electricity prices paid by suppliers, distribution companies and large industrial customers should be increasingly determined by regional competition, without regard to national borders. The idea is that an electricity producer should have access to different customers, and a distribution company, supplier, or large industrial customer should have either (a) access to different producers, or (b) the opportunity to buy electricity from a monopolist at the price level that would be achieved by access to different producers. When these conditions are achieved, the result is not called a "single electricity market" but simply "a competitive market in electricity."

There are two concepts supporting this objective. First, the electricity sector is considered to be subject to the general principle that national borders within the EU should not result in trade barriers, in any sector. Second, electricity is considered to have an effect on the competitive position of manufacturers located in different countries, and no manufacturer should be placed at a competitive disadvantage vis-a-vis other EU manufacturers, as a consequence of artificially distorted electricity prices.

Although some paragraphs in the Directive provide a basis for a country to make exceptions, the general tone of the document strongly supports equal rights for all electricity producers in all EU countries to participate in a regional competitive market. Large electricity consumers' rights to network access are also supported.

In the following discussion several of the important legal terms and phrases are shown in italics, followed by a definition. Unfortunately, there are a few terms - for example, "equivalent economic results" or "non-discriminatory" - which are not defined by the Directive, despite their important role in the document.

Obligations of member countries

According to the Directive each EU member must implement the following steps

- 1 Designate a *system operator* for the transmission system and give the system operator very broad powers to ensure the security of supply and the construction of interconnections with other countries. The system operator is responsible for dispatch (Article 8, point 1) but it is much more than a dispatch center, it must be “responsible for ensuring a secure, reliable and efficient electricity system” (Article 8, point 3) it receives information needed “to ensure the secure and efficient operation, coordinated development and interoperability of the interconnected system” (Article 7, point 4). If the member country offers negotiated access, the system operator must negotiate prices for wheeling and must publish an indicative range of prices (Article 17, points 2 and 3). A reasonable interpretation of these phrases is that the system operator must be either the owner of the transmission grid or an entity backed by very strong multilateral agreements such as those supporting Nordel.
- 2 Require *vertically integrated undertakings* (as defined in Article 2, point 18) to prepare a set of accounts in which generation, transmission, distribution, and non-electricity activities are treated as profit centers or independent divisions of the undertaking. For each of these activities there must be a balance sheet and a profit and loss account (Article 14, point 3). The term *undertaking* is not defined but it is used in a very general way to describe companies, public enterprises, or other types of organizations that operate in the power sector.
- 3 Require vertically integrated undertakings to set up a management structure in which transmission system operations are independent of generation and distribution operations (See, for example, Article 7, point 6).
- 4 Designate a competent authority to “settle disputes concerning contracts, negotiations and refusal of access or refusal to purchase” (Article 20, point 3).
- 5 Guarantee certain forms of network access to the transmission grid, that is, (a) allow independent producers and autoproducers to supply their own subsidiaries and (b) allow producers in other countries to participate in tenders for new domestic generating capacity (Article 20, point 1).

Surprisingly, there are no references to the organizations responsible for regional coordination in the European electric sector (for example, UCPTÉ, Nordel, Centrel, or UNIPEDE) despite the fact that the Directive promotes regional coordination.

Although the language of Article 3, point 2 suggests that in principle a member country could try to evade these requirements by establishing some sort of “public service obligations” on power sector undertakings, the language of Article 3, point 3 suggests that exceptions to the Directive are limited to only three topics - the choice of *authorization* or *tendering*, the choice of *negotiated access* or a *single buyer*, and authorizations to construct *direct lines*. These topics are explained below.

The Directive does not contain a definition of “electricity supply undertaking” although *supply* consists of “the delivery and/or sale of electricity to customers” (Article 2, point 16) It is clear from the wording of Articles 17, 18, and 21 that the Directive does not require any EU member to authorize the existence of electricity supply undertakings

In summary, producers always have access rights, but an EU country can refuse to authorize the existence of electricity supply undertakings within that country’s territory If an EU member sets up eligibility criteria that yield a small set of eligible customers, the Commission has authority to force a country to change the eligibility criteria when they become too restrictive (Article 19, point 4) Furthermore the EU member cannot prevent its eligible customers from negotiating with electricity supply undertakings located in other countries (Article 17, point 1 and Article 18, point 1)

Each country has a choice between two policy options

- *Negotiated access* Under this heading there are actually two options One option is to enable entities with access rights to negotiate with the transmission system operator, and to enable an eligible customer to negotiate with the distribution system operator when the customer is connected to the distribution system The objective is to enable entities with access rights to “conclude supply contracts with each other on the basis of voluntary commercial agreements” (Article 17, point 1) The other option is to give eligible customers a right of access on the basis of published wheeling tariffs (Article 17, point 4) The published tariffs should give the eligible customers a degree of access that is “at least equivalent” to the negotiation procedure
- *Single buyer procedure* Under this heading there are also two options One option is to make the single buyer a reseller In this situation the single buyer publishes a wheeling tariff, offers a sale price to the customer, allows the customer to negotiate with the producer, and buys the electricity from the producer at the sale price minus the wheeling tariff The other option is to give entities a right of access on the basis of published, non-discriminatory wheeling tariffs (Article 18, point 3) This is very similar to the published tariff option under “negotiated access”

The single buyer is not permitted to establish tariffs or restrictions that make the negotiated access procedure more desirable from the standpoint of the producer or the eligible customer The two approaches “must lead to equivalent economic results and hence to a directly comparable level of opening up of markets and to a directly comparable degree of access to electricity markets” (Article 3, point 1)

It is possible to have a mixture of the two procedures, i e , a choice between (a) the single buyer as reseller and (b) negotiated access, these options are described in Article 18, point 3 Presumably the single buyer can decide which option to offer to the customer

If a country desires, the system operator can also act as the single buyer The single buyer could also be a national electricity marketing organization which is not the system operator The EU member country must “designate a legal person to be the single buyer within the territory covered by the system operator” (Article 18, point 1) If any generation or distribution undertakings are affiliated with the single buyer, the single buyer is not allowed to discriminate in favor of them

If a member country decides that either alternative would “obstruct the performance of the obligations imposed on electric utilities in the general economic interest” and finds that rejecting both forms of access would not affect the development of trade “to such an extent as would be contrary to the interest of the Community,” that country may reject both procedures (Article 3, point 3) Given this language, the rejection of both forms of access would appear to be difficult to justify except in EU countries that are not connected to UCPTE or Nordel (for example, in Greece)

Direct lines

A *direct line* (see Article 2, point 12) is a power line which is owned by a producer, customer, or electricity supply undertaking and not by a transmission system operator or distribution system operator The Directive basically divides the electric grid of EU members into three components

- the *interconnected system*, which includes a number of transmission (high-voltage) and distribution (medium- and low-voltage) systems (Article 2, point 11)
- *direct lines*, which are connected to the interconnected system and are “complementary” to it (Article 2, point 12)
- *small isolated systems*, which receive less than 5 percent of their energy from the interconnected system (Article 2, point 23)

Direct lines may be constructed by producers, by eligible customers, and also by electricity supply undertakings in countries where such undertakings are authorized to exist (Article 21, point 1) Article 21 simply requires EU member countries to authorize the construction of direct lines, but the rights of a producer, eligible customer, or supply undertaking to buy or sell electricity are defined in Articles 17 and 18, which explain negotiated access and the single buyer form of access

If a member country decides that a direct line would “obstruct the performance of the obligations imposed on electric utilities in the general economic interest” and finds that refusal to authorize the direct line would not affect the development of trade “to such an extent as would be contrary to the interest of the Community,” that country may refuse to authorize the direct line (Article 3, point 3) However, the direct line can hardly pose a threat to trade unless it is associated with network access, which is undoubtedly the key issue in a controversy The language of Article 3 can be used to restrict access as well

Relevance to future EU members

The Directive deals with the “internal market,” not with interconnections between the EU and the rest of Europe It was written for EU members and does not contain any discussion of non-members or possible future members of the EU It is possible that the countries of central and eastern Europe will be subject to a revised form of the Directive by the time they become EU members, but any country presently seeking to join the EU can assume that it will need to comply with the Directive sooner or later

The Commission has the authority to allow an EU country to implement a "transitional regime" if the country can show that the Directive would prevent the country from honoring "commitments or guarantees of operation given before the entry into force of this Directive" (Article 24, point 1). In this phrase there is a suggestion that in some countries the Commission may decide to protect long-term commitments that were used to attract private investment. However, it does not appear that a transitional regime would be accepted on the grounds that it would enable a power system to offer subsidized tariffs to selected classes of customers. Certain restrictions on the electricity market might be retained to respect "public service obligations" under Article 3, point 2, provided such obligations are "non-discriminatory."

The Directive is intended to remain in effect for nine years, after which "a further opening of the market" could be initiated according to some future directive issued by the European Parliament and the Council (Article 26). This nine-year period (1996-2005) is generally regarded by countries in central and eastern Europe as the period in which they might join the EU.

If the Baltic countries join the EU, the system operator requirement may be difficult to implement. The regional dispatch center today has very little control over the transmission system plans and capital investment programs of the individual Baltic power systems. Some sort of power pool agreement or restructuring of the ownership of the transmission grid might need to be considered. The Directive does not allow any exceptions to the creation of a strong transmission system operator.

2 PURPOSE

The purpose of this agreement is to provide the detailed terms and conditions under which the Wheeler shall transport electrical capacity and energy from the Seller to the Buyer

3 STATUS OF PREVIOUS AGREEMENTS BETWEEN THE PARTIES

3 1 This Agreement is written in accordance with Agreements on Economic Cooperation among the Government of the Republic of [Buyer's country], the Government of the Republic of [Seller's country], and the Government of the Republic of [Wheeler's country] dated [December 1996], hereinafter known as the "agreements on economic cooperation" This contract is intended to implement the agreements on economic cooperation, which are still in effect

3 2 The Governments of the Buyer's country, the Seller's country, and the Wheeler's country 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 The Seller and the Buyer have executed a "Contract for the Sale of Capacity and Energy", dated [December 1996] which defines certain obligations that each has to the other relative to the transaction described by this Agreement, but which adds no further obligations upon the Wheeler

3 4 Nothing in this section will prevent the Parties 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)(months) upon mutual agreement among the three Parties

5 TERMS OF SERVICE

5 1 Metering Metering equipment shall be installed and maintained according to the requirements of the Contract for the Sale of Capacity and Energy executed between the Seller and the Buyer

5 2 Losses Unless otherwise agreed among the Parties, the extra transmission losses (either positive or negative) in the wheeler's system shall be compensated by a percentage reduction in the amount of energy delivered to the Buyer, relative to the amount received from the Seller The amount of the reduction, applied as a percentage of the kWh delivered under the Contract for the Sale of Capacity and Energy, shall be estimated by load flow studies and agreed upon by the Parties

8 3 Barter Payments In exchange for providing wheeling services, the Wheeler may accept energy commodities as payment. The Buyer must pay in currency unless the Wheeler's invoice lists specific energy commodities that may be delivered in lieu of currency payment, specifying the quantities to be delivered and the delivery points or storage locations. The comparable value of various energy commodities shall be as published by the Central Asia Energy Council, as revised by them from time to time.

8 4 Failure to Pay

(a) A failure of the Buyer to pay the Wheeler within the time for payment shall result in interest accruing on such unpaid amounts at a rate equal to ___% per annum.

(b) If the Buyer fails to pay the Wheeler any amount required under this Agreement, the Wheeler shall provide notice to the Buyer of the overdue amounts. If, by the due date for payments in the next billing cycle, the Buyer has not cured the non-payment, including interest, the Wheeler may, by its unilateral decision, withhold the furnishing of wheeling services to the Buyer.

9 LIABILITIES

In no event shall any of the Parties to this Agreement be liable to the other Parties 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.

10 FORCE MAJEURE

10 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.

10 2 Notice of Event The Party claiming a Force Majeure event shall give notice in writing to the other Parties 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.

11 DISPUTE RESOLUTION

Any dispute among the Parties to this Agreement arising out of or related to this Agreement and which cannot be resolved by informal means among the Parties 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.

12 GOVERNING LAW

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

13 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.

Notice shall be given to the Seller at

Notice shall be given to the Buyer at

Notice shall be given to the Wheeler at

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. A Party may change its address for receiving notices contemplated by this Agreement by delivering notice of its new address to the other Parties.

14 SUCCESSORS AND ASSIGNS

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

15 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 a 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.

16 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.

17 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.

18 AMENDMENT

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

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

The SELLER

The BUYER

By _____
Organization
Name
Title

By _____
Organization
Name
Title

The WHEELER

By _____
Organization
Name
Title

ATTACHMENT 1

CALCULATION OF FIRM POWER WHEELING RATE

1	Firm Service to be wheeled	_____ MW
2	Replacement cost of wheeling assets	_____ (unit)
3	Discount rate	_____ %
4	Economic life of assets	_____ years
5	Annualized replacement cost*	_____ (unit)
6	Wheeling asset as percentage of maximum asset MW capability	_____ %
7	Annual rent of wheeling asset	_____ (unit)
8	Operation & Maintenance charge (at ___%)	_____ (unit)
9	Annual Wheeling Charge	_____ (unit)
10	Monthly Wheeling Charge	_____ (unit)

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

R = recurring annuity value 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

METHODOLOGY FOR CALCULATING WHEELING TARIFFS

David Thornton, CMPI
Charles Zimmermann, Hagler Bailly Consulting

Regional Seminar on International Electric Power Contracts
Almaty, Kazakstan, December 11-12, 1996

The purpose of this paper is to describe alternative methodologies for calculating wheeling tariffs, based on North American experience, and to recommend a methodology that can be applied to wheeling transactions among the Central Asian republics

Definitions of terms

A *transmission system* is a high-voltage network within a geographic area. It is a set of assets and it is not necessarily an organization such as a state enterprise or joint stock company.

In Central Asia the *high-voltage network* (HV) may be defined as 110 kV and higher voltages and the *extra high-voltage network* (EHV) may be defined as 220 kV and higher voltages.

A *power system* is an organization which owns and operates high-voltage electric networks.

An *interconnection point* is a location on the high-voltage network where energy is transferred from one power system to another.

A *wheeling transaction* is an agreement to wheel power from a specific source (for example, a generating station or a interconnection point between two power systems) to a specific destination (for example, a large industrial customer or a second interconnection point between two power systems). The duration of the transfer of energy may be only a few hours or an entire year, the transaction may include many transfers of energy over a period of one year.

A *wheeling tariff* is a price for transmission service that is applied to many wheeling transactions. It can be established by a voluntary agreement among power systems, or it can be established by a regulatory agency or ministry. For international transactions it would normally be established by a voluntary agreement among power systems.

A *postage stamp tariff* is a wheeling tariff that is a standard price per MW regardless of the distance between the source and destination and regardless of the path in which the energy travels when the transaction is implemented.

In a specific wheeling transaction, a *wheeler* is a power system which provides transmission services. A wheeler transports electric energy so that it can be consumed in the geographic area of another power system.

A *power pool* is a group of power systems which have voluntarily formed a pool by signing a pool agreement. The pool is used to improve the reliability of electricity supply, regulate voltage and frequency, and facilitate short-term energy sales transactions which enable the power systems to lower the cost of electric generation.

Energy is measured in kWh or MWh. *Capacity* is requested or scheduled by the buyer and is measured in kW or MW. *Power* is measured in kW or MW and it is simply a physical flow, it is not necessarily requested or scheduled by the power system which receives it.

List of methodologies

There is no single "correct" way to calculate a bilateral or multilateral wheeling tariff. Within the United States, hundreds of wheeling contracts are negotiated annually and probably no two of them are exactly alike. In this paper the most commonly used methodologies are presented in an analytical framework that is used to compare the alternatives. It is possible to consider four different methods of calculating costs, and apply each of these methods to three different types of transactions or agreements. The methods of calculating costs will be described in more detail below, but the basic ideas behind each method may be summarized as follows:

- **Replacement cost** The wheeling tariff consists of two components: a payment per MW of power, and a loss factor which indicates the percentage of additional energy to be provided to the wheeler to compensate for network losses. The payment per MW is based on a calculation of the annual revenue needed to pay for the replacement cost of the wheeler's HV network. This is also called the *rental of assets* approach.
- **Approved production cost** The wheeling tariff consists of two components: a payment per MW of power, and a loss factor which indicates the percentage of additional energy to be provided to the wheeler to compensate for network losses. The payment per MW is based on standard approved procedures for calculating production cost according to government regulations in the wheeler's country. In North America this is also called the *embedded cost* approach.
- **Short Run Marginal Cost (SRMC)** The wheeling tariff consists of a payment per MW of power. The payment is based on a detailed calculation of every possible cost, except capital investment, which the wheeler could incur as a consequence of a wheeling transaction or a group of wheeling transactions. The cost of network losses is calculated by identifying the generating units which are used to produce the extra energy required to offset the losses caused by the transaction(s).
- **Long Run Marginal Cost (LRMC)** The wheeling tariff consists of a payment per MW of power. The payment equals SRMC plus an allowance for the capital investment which would be needed to implement the wheeling transaction(s) over a period of at least ten years, according to least-cost plans for the high-voltage network.

The three types of wheeling transactions or agreements are as follows

- **Bilateral and specific** Power system A (the buyer) pays power system B (the wheeler) to receive energy from power system C (the seller) and deliver it to power system A. For the tariff calculation the power systems assume that specific EHV network facilities on B's system are used to transmit the energy. This is one of the approaches that can be applied to a single transaction. This approach is rarely suitable for a set of transactions.
- **Bilateral and systemwide** Power system A (the buyer) pays power system B (the wheeler) to receive energy from power system C (the seller) and deliver it to power system A. For the tariff calculation the power systems assume that all of the EHV network facilities on B's system are used to transmit the energy. This approach could be applied to one transaction or to many transactions under a long-term agreement.
- **Multilateral "postage stamp"** A power pool establishes a postage stamp tariff used to set the price of wheeling services provided by any member of the pool to any other member of the pool. For the tariff calculation the members of the pool assume that all of the EHV network facilities on all of the systems are used to transmit the energy. Through a multilateral agreement the postage stamp rate is applied to many transactions.

Therefore the different methods of calculating costs and types of wheeling transactions can be combined as following table. The replacement cost method is recommended because it is simple and feasible.

Alternative Types of Wheeling Tariffs

<i>Method of Calculating Costs</i>	Feasibility of this method, in Central Asia	<i>Bilateral and specific</i>	<i>Bilateral and systemwide</i>	<i>Multilateral "postage stamp"</i>
<i>Replacement cost</i>	simple and reasonable	1	2	3
<i>Approved production cost</i>	already established	4	5	6
<i>Short Run Marginal Cost</i>	too complex	7	8	9
<i>Long Run Marginal Cost</i>	too complex	10	11	12

Recommended for CARs

Not recommended for CARs

Replacement cost

Under this approach the wheeler calculates a price per kW that is equivalent to a rental fee for the use of a portion of the wheeler's EHV network capacity. The rental fee which is charged to another power system (in another country) is not necessarily related to the domestic tariffs in any way. However, this rental fee is based on the replacement cost of building new overhead lines and substations using international prices for equipment and labor. Asset values are based on replacement cost.

In North America this technique is usually applied to the use of specific transmission facilities in a bilateral transaction. However, in Central Asia it would be possible for the power systems to calculate a multilateral "postage stamp" tariff on this basis. A working group of power system representatives could calculate the levelized annual cost in USD which corresponds to the replacement cost of the whole EHV grid of Central Asia, and divide this value by the sum of the coincident peak loads of the five countries. The result would be a value measured in USD per MW per year. When this value is divided by 12, the result is a tariff in USD per MW per month.

Bilateral and specific transactions

In cases where it can be shown that specific transmission facilities are the principal ones employed in providing wheeling service in a wheeling transaction, the wheeling tariff will be based upon an estimate of the costs associated with committing a portion of the transmission capacity of those facilities to the transaction.

The steps involved in calculating a wheeling tariff would follow the following sequence:

- 1 Identify the amount of power to be wheeled, in MW
- 2 Identify the location on the network from which the wheeler receives power from the seller and the location to which the wheeler delivers power to the buyer
- 3 Identify the path for the wheeling transaction. Identify the transmission lines and substation equipment used to implement the wheeling transaction
- 4 Determine the replacement cost, in USD, of the transmission lines and substation facilities along the path
- 5 Using an appropriate discount rate and economic life of the assets, calculate the levelized annuity in USD/year which corresponds to the replacement cost of the assets
- 6 Determine the percentage of the assets' capacity which is proposed to be committed to the wheeling transaction

- 7 Multiply the annual cost (item 5) by the percentage committed (item 6) and divide the result by the amount of power to be wheeled (item 1), to determine a value in USD/MW/year
- 8 Add an appropriate percentage to cover the cost of annual operation and maintenance
- 9 Divide this result by 12, to determine a monthly tariff in USD/MW/month

The higher the discount rate, the higher will be the wheeling tariff. In principle the method used to select the appropriate discount rate (Step 5) depends on the sources of capital for the power system which owns the transmission assets. If the power system is a state enterprise which has obtained financing (directly or indirectly) through long-term loans, the discount rate should equal the weighted average interest rate on these loans. The appropriate indicators are those which are based on international investment - for example, the interest rates on loans in USD or other hard currency should be used rather than interest rates on loans in local currency. If the power system is a state enterprise which simply receives capital from a component of the average tariff and/or transfers from the state budget, in principle the discount rate should equal the true cost of capital to the government but in practice the discount rate may be calculated as the average interest rate on government debt. If the power system is a joint stock company which obtains capital through both long-term debt and equity, the discount rate should be calculated as a weighted average of the interest rate on long-term debt and the percentage rate of return paid to equity shareholders.

It would be possible for the power systems in Central Asia to agree upon a standard discount rate that is high enough to make wheeling transactions profitable or beneficial to the wheeler, but not so high that fuel resources and generating capacity in Central Asia are used inefficiently because wheeling is too expensive. When a country uses its geographic location and infrastructure to try to obtain extra profits from energy transit fees, such as wheeling tariffs for electricity, the result is usually an inefficient and wasteful use of energy resources. From the standpoint of economic efficiency it would be better to establish a competitive market among generating units, with competitive prices that change daily or hourly, and then allow power systems to obtain extra profits from the export of electricity from the lowest-cost generating units. Even if such a market cannot be created, it is better to establish wheeling tariffs on the basis of the true cost of capital rather than an arbitrarily high discount rate.

EXAMPLE

An example of a calculation of a wheeling tariff based on replacement cost is as follows. Suppose that Kyrgyzstan and Uzbekistan agree that Kyrgyzstan will sell 50 MW of firm power on a long-term basis to Uzbekistan. It is determined that the primary path for this transaction will be via the 500 kV line which passes from Toktogul Hydroelectric Station through Luchin Substation, through approximately 75 km in the territory of Tajikistan and hence into Djizak Substation in Uzbekistan. In this case, a wheeling tariff for transit through Tajikistan is needed. Tajikistan would be asked to provide wheeling service for 50 MW through its 75 km of 500 kV transmission line. Assume that 50 MW is 15 percent of the line's capability, and that the replacement cost of a 500 kV line is USD 300,000 per km. Assume a discount rate

of 10 percent and an economic life of 25 years. Finally, assume that annual operation and maintenance expenses equal 5 percent of the annual rental value of the transmission assets.

The equivalent annuity value R is measured in USD and calculated by the formula

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

R = annual fee for rental of the transmission assets, such that the present value of the stream of annual payments over 25 years equals the replacement cost of the transmission assets

P = the replacement cost of the transmission assets, in USD

r = discount rate, reflecting the cost of capital in USD or other hard currency

n = economic life of the facility, in years

Using our example

$$R = 300,000 \text{ USD/km} \cdot 75 \text{ km} \cdot 0.1 / [1 - (1 + 0.1)^{-25}] = \$2,480,000 \text{ per year (approximately)}$$

The rental component of the wheeling tariff is fifteen percent of this amount, or \$372,000 per year. To this is added 5 percent to cover annual operation and maintenance expenses. Therefore the wheeling tariff would be

$$(1.05 \cdot \$372,000 \text{ per year}) / 12 = \$390,600 \text{ per year} / 12 = \$32,550 \text{ per month}$$

Such a wheeling tariff would be appropriate for a long-term firm wheeling agreement. For non-firm wheeling, which may be curtailed unilaterally by the wheeler, the wheeling charge would be a lesser amount - perhaps half of the firm wheeling rate.

Bilateral and systemwide transactions

If the power systems negotiating a bilateral wheeling transaction agree that the wheeler's entire EHV network is involved in transmitting the energy and power involved in the transaction, the power systems can agree that wheeling tariff should be based upon the replacement cost of the entire system. In this situation the annual rental fee for the wheeler's power system should be divided by the coincident peak load or by the peak generating capability.

The steps involved in calculating a wheeling tariff would follow the following sequence:

1. Select a measure of the capability of the wheeler's transmission system, in MW. If the wheeler is a net importer of power at the time of the annual system peak, this measure should be the coincident peak load of the system. If the wheeler is a net exporter of power at the time of the annual system peak, this measure should be the peak generating capability of the system.
2. Determine the replacement cost, in USD, of all the transmission lines and substation facilities in the wheeler's system.

- 3 Using an appropriate discount rate and economic life of the assets, calculate the levelized annuity in USD/year which corresponds to the replacement cost of the assets
- 4 Divide the annual cost (item 3) by system capability (item 1), to determine a value in USD/MW/year
- 5 Add an appropriate percentage to cover the cost of annual operation and maintenance
- 6 Divide this result by 12, to determine a monthly tariff in USD/MW/month

Multilateral “postage stamp” agreement

In North America, some regional power pools which include a large number of utilities use a “postage stamp” wheeling tariff. This type of tariff is particularly useful when the transmission system is complex and therefore it is difficult to identify a particular path for each wheeling transaction. The New England Power Pool (NEPOOL), for example, is a large and complex power pool which uses a “postage stamp” tariff. Such a tariff can be calculated according to different methods of measuring costs.

When replacement costs are used to compute a “postage stamp” tariff for the EHV network, the steps involved in calculating the tariff follow the following sequence:

- 1 Calculate the sum of the coincident peak loads of South Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, and Tajikistan. Alternatively, calculate the coincident peak load of the whole EHV grid of Central Asia.
- 2 Determine the replacement cost of the EHV facilities of the Central Asia interconnected grid, in USD.
- 3 Using an appropriate discount rate and economic life of the assets, calculate the levelized annuity in USD/year which corresponds to the replacement cost of the assets.
- 4 Divide annual cost (item 3) by peak load (item 1), to determine a value in USD/MW/year.
- 5 Add an appropriate percentage to cover the cost of annual operation and maintenance.
- 6 Divide this result by 12, to determine a monthly tariff in USD/MW/month.

Approved production cost

The replacement cost method is not related to “book costs” shown in the accounting systems used by the power systems in a bilateral or multilateral agreement. If all of the member companies of a power pool use similar accounting systems, they can voluntarily agree to establish wheeling tariffs on the basis of the costs shown in their

officially approved accounts. Similarly the parties to a bilateral agreement can agree that the wheeling tariff should be based upon the wheeler's costs shown in officially approved accounts. The advantage of this method is that it does not require the parties to set up a new method of measuring costs. In international wheeling transactions, the disadvantage is that the wheeler may end up providing a "subsidy" to the customer when the officially approved costs do not reflect the true economic cost of capital investments or do not provide an adequate compensation for the labor component of operation and maintenance expenses. If the parties to a wheeling agreement are located in different countries with different inflation rates, and different procedures and indexes for adjusting the level of depreciation expense for past inflation, the parties may decide that it would not be "fair" to establish wheeling tariffs on the basis of production costs shown in officially approved accounts.

For a power system such as NEPOOL this approach is relatively easy to implement because all of the accounts are in USD, inflation is relatively low, and similar accounting procedures are used by all of the power systems. In North America the following costs are typically included for power systems that are private corporations (and similar to open joint stock companies)

- annual costs related to the physical assets of the transmission system, including depreciation, an allowance for interest expense, an allowance for return on equity, income tax associated with return on equity, property taxes, and other taxes associated with the transmission facilities
- operating and maintenance costs related to the transmission system
- a share of administrative and general costs for the overall power system

Bilateral and specific transactions

If the parties to a bilateral transaction agree that specific transmission facilities are involved in the transaction, but they choose not to use the replacement cost methodology described above, in principle they could develop an alternative methodology on the basis of approved production costs. This methodology requires the wheeler to distinguish the costs associated with the facilities used in the specific transaction from the costs associated with the rest of the wheeler's transmission system. If the bilateral wheeling transaction is negotiated in the context of other trade agreements, it is possible that both parties to the transaction will prefer to calculate a relatively low wheeling tariff on the basis of book costs, rather than a high tariff on the basis of replacement costs.

The steps involved in calculating a wheeling tariff would follow the following sequence

- 1 Identify the amount of power to be wheeled, in MW
- 2 Identify the location on the network from which the wheeler receives power from the seller and the location to which the wheeler delivers power to the buyer

- 3 Identify the path for the wheeling transaction Identify the transmission lines and substation equipment used to implement the wheeling transaction
- 4 Calculate the annual cost of the transmission lines and substation facilities along the path according to the approved procedures used to calculate production costs in the wheeler's country Convert this value to USD using the exchange rate in effect on a specific date
- 5 Determine the percentage of the assets' capacity which is proposed to be committed to the wheeling transaction
- 6 Multiply the annual cost (item 4) by the percentage committed (item 5) and divide the result by the amount of power to be wheeled (item 1), to determine a value in USD/MW/year
- 7 Add an appropriate percentage to cover the cost of annual operation and maintenance
- 8 Divide this result by 12, to determine a monthly tariff in USD/MW/month

Bilateral and systemwide transactions

If the parties to a bilateral transaction agree that the wheeling tariff should be based on approved production costs, the simplest type of calculation is based on the total costs of the wheeler's transmission network These costs are normally a component of domestic tariffs, and therefore the wheeler should have established procedures for measuring these costs every year, if not every quarter The steps involved in calculating a wheeling tariff would follow the following sequence

- 1 Select a measure of the capability of the wheeler's transmission system, in MW If the wheeler is a net importer of power at the time of the annual system peak, this measure should be the coincident peak load of the system If the wheeler is a net exporter of power at the time of the annual system peak, this measure should be the peak generating capability of the system
- 2 Calculate the annual cost of the transmission system according to the approved procedures used to calculate the average tariff or calculate production costs Convert this value to USD using the exchange rate in effect on the date when the tariff or cost calculation was officially submitted
- 3 Divide the annual cost (item 2) by system capability (item 1), to determine a value in USD/MW/year
- 4 Add an appropriate percentage to cover the cost of annual operation and maintenance plus administrative and general costs
- 5 Divide this result by 12, to determine a monthly tariff in USD/MW/month

Multilateral “postage stamp” agreement

An example of this type of tariff is the NEPOOL wheeling tariff. In NEPOOL, the EHV transmission system includes transmission lines and substations at 230 kV and 345 kV which are owned by eight companies. The total annual cost of EHV transmission system assets is measured on the basis of approved production costs in USD, and this number is divided by the total NEPOOL generating capability in MW. This number, expressed in USD/MW, is applied to all EHV wheeling transactions within the pool, regardless of distance, and regardless of the number of systems through which the transaction passes. The Pool prepares invoices for wheeling transactions and collects wheeling charges from Pool members and then distributes the revenues among Pool members according to rules established in the NEPOOL Agreement.

The steps involved in calculating a wheeling tariff for the EHV network are as follows:

1. Calculate the sum of the coincident peak loads of South Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, and Tajikistan. Alternatively, calculate the coincident peak load of the whole EHV grid of Central Asia.
2. For each country, calculate the annual cost of the EHV transmission system according to the approved procedures used to calculate the average tariff or calculate production costs. Convert this value to USD using the exchange rate in effect on the date when the tariff or cost calculation was officially submitted.
3. Calculate the total annual cost of the EHV facilities of the Central Asia interconnected grid by summing the individual countries' costs.
4. Divide the annual cost (item 3) by peak load (item 1), to determine a value in USD/MW/year.
5. Add an appropriate percentage to cover the cost of annual operation and maintenance.
6. Divide this result by 12, to determine a monthly tariff in USD/MW/month.

Short Run Marginal Cost

The replacement cost methodology may be criticized on the grounds that it does not exactly measure the true cost of a wheeling transaction. In theory it is possible to compare two scenarios, to estimate the costs which result from a wheeling transaction:

- Scenario A, without wheeling, requires a precise calculation of the operating costs of the wheeler's power system under conditions in which the wheeling transaction *does not* occur.
- Scenario B, with wheeling, requires a precise calculation of the operating costs of the wheeler's power system under conditions in which the wheeling

transaction *does* occur and transmission capacity utilization is therefore higher

The difference in operating costs under these two scenarios is the SRMC. It does not include capacity-related costs. It may include the following components:

- the incremental fuel costs and variable operating costs required to generate the electric energy that is used to offset the network losses attributable to the wheeling transaction
- an incremental increase in the cost of generating reactive power and spinning reserve
- an incremental increase in operation and maintenance costs
- an incremental increase in administrative costs, including invoicing and accounting costs
- a surcharge or penalty that is intended to represent the decrease in system reliability associated with the higher level of utilization of transmission capacity (and perhaps generating capacity) on the wheeler's system. This is called a *congestion cost*.

In some North American agreements the wheeling tariff is based on a methodology that is similar to SRMC, but includes *opportunity costs* in addition to SRMC. It is assumed that the wheeler has to make a choice between two customers who are competing for the use of the wheeler's transmission capacity. Scenarios A and B are defined so that transmission capacity is fully utilized in both scenarios, and the wheeling tariff is based on the revenue that the wheeler would receive from the use of transmission facilities to serve another customer, subject to an adjustment to reflect the incremental effect on costs. Opportunity cost calculations are not possible unless the second customer has fixed a wheeling tariff without regard to the first customer.

Long Run Marginal Cost

The calculation of LRMC follows exactly the same principles as the calculation of SRMC, except that capital-related costs are also included. For a short-term wheeling transaction it would not be appropriate to calculate LRMC because the capital investment plan of the wheeler's power system will not change as a result of the transaction. However, when a long-term wheeling transaction requires the construction of new transmission facilities or requires an alteration in the capacity specifications and construction dates for new transmission facilities, a wheeling tariff based on SRMC clearly is not an adequate tariff because it omits capital-related costs. The simplest way to compensate the wheeler for capital-related costs would be to develop a wheeling tariff on the basis of replacement costs, as described above. However, an LRMC calculation can be done, if the parties wish to have a very precise analysis of all of the ways in which the wheeling transaction affects the wheeler's costs.

LRMC analysis is well suited to domestic tariff calculations in which a set of tariffs for different customer groups is developed using a tariff structure based on LRMC. This approach is generally favored by the multilateral development banks such as the World Bank, Asian Development Bank, and European Bank for Reconstruction and Development. However, LRMC analysis is not commonly applied to international agreements regarding tariffs.

In a calculation of wheeling tariffs based on LRMC it is necessary to compare two scenarios, to estimate the costs which result from a wheeling transaction:

- Scenario A, without wheeling, requires a precise calculation of the total costs of the wheeler's power system under conditions in which the wheeling transaction *does not* occur.
- Scenario B, with wheeling, requires a precise calculation of the total costs of the wheeler's power system under conditions in which the wheeling transaction *does* occur and there is a need for additional transmission capacity.

Capital costs must be measured by a method acceptable to both parties, but the intent of the calculation should be to estimate true economic costs as accurately as possible. Taxes and subsidies which disguise the true economic costs should be omitted from the calculation.

In the end, the best choice of tariff methodology is the one which is practical to administer and which gives each party a sense of being treated fairly and equitably. Because an LRMC analysis depends on calculations which are difficult to audit and verify, such as computer simulations of load flow under different scenarios, it is not a convenient basis for negotiation between countries and it does not necessarily provide both parties with a sense of being treated fairly.

Transmission Replacement Costs

David Thornton, CMPI

Regional Seminar on International Electric Power Contracts Almaty, Kazakstan, December 11-12, 1996

The sample "Bilateral Firm Capacity and Energy Wheeling Agreement" suggested that wheeling services be priced as a function of the replacement cost of the transmission facilities engaged in the wheeling transaction. This memorandum presents some sample costs to be used as illustrations of wheeling calculations and also to stimulate the development of a set of replacement values specific to the facilities of the Republics of Central Asia.

The table gives estimating data from the Bonneville Power Administration, a very large federally-owned generation and transmission electric utility located in the Pacific Northwest section of the United States. Their data is from 1993 and I have escalated it to be typical of costs in the US in 1996. The estimates are per kilometer of line, based upon a minimum line length of 80 km. The estimates do not include indirect overheads, the cost of land, environmental studies, or environmental mitigation. A 10 percent contingency amount is included, applied only to material and labor. This data is specific to the terrain, design and construction practices of the northwestern United States, and is not meant to be representative of transmission replacement costs in the Republics of Central Asia.

<u>VOLTAGE</u>	<u>CONDUCTOR</u>	<u>STRUCTURE</u>	<u>CONFIGURATION</u>	<u>US\$/km</u>
500 kV	3x604 sq mm	Lattice steel	Single Circuit	\$314,000
500 kV	3x604 sq mm	Lattice steel	Double Ckt	\$672,000
500 kV	3x947 sq mm	Steel Pole	Single Circuit	\$458,000
500 kV	3x947 sq mm	Steel Pole	Double Ckt	\$742,000
230 kV	1x764 sq mm	Lattice Steel	Single Circuit	\$183,000
230 kV	1x764 sq mm	Lattice steel	Double Ckt	\$263,000
230 kV	1x805 sq mm	Steel Pole	Double Ckt	\$250,000
115 kV	1x403 sq mm	Lattice Steel	Single Circuit	\$134,000
115 kV	1x403 sq mm	Lattice Steel	Double Ckt	\$184,000
115 kV	1x403 sq mm	Steel Pole	Single Circuit	\$98,000

Memorandum

DATE

FROM Angela M Wykoff, Chief
Program Management Section - EFCH

SUBJECT Transmission Line Estimating Data

TO Attached Distribution List

Attached is the December 1993 Edition of the Bonneville Power Administration's (BPA's) "Per Mile Cost Data for Preliminary Transmission Line Estimates ". The two remaining crossrope options were dropped from this year's edition. Also removed were the 500-kV double-circuit 3-bunting and 3-thrasher options. These options were replaced with 4-Deschutes and 3-Jefferson. The 3-Jefferson was found to be more economical than 3-thrasher on our existing 19 series towers as the conductors are electrically larger than thrasher and mechanically smaller. The 4-Deschutes costs are based on a proposed new tower series with a number of enhancements over the 19 series including greater circuit-to-circuit separation and a quad conductor bundle. The greater circuit separation facilitates both reliability and maintainability while the quad conductor yields better audible noise performance. The 4-Deschutes estimates have a higher cost/capacity ratio than the 3-Jefferson estimates but without some of the limitations encountered with the 3-Jefferson.

Typical mile costs increased an average of 4.3 percent over the August 1992 Edition. Wood pole lines averaged 5.4 percent while lattice steel lines averaged 3.8 percent.

EXPLANATORY NOTES FOR THIS YEAR'S EDITION ARE AS FOLLOWS

Environmental analysis costs and land costs are contained in separate tables. These costs must be added to the Typical Mile costs to arrive at the total project cost.

- Environmental costs are project- (not mile-) based and vary, depending upon the project scope and the amount of public controversy. Table 1 gives ranges of project environmental analysis costs.
- Land costs vary widely, even in specific cases where the location is known. The land costs shown in Table 2 are provided as a general guideline only.

Indirect overheads and Management, Supervision, and Administration charges have been omitted. Appropriate user overhead costs should be added to the Typical Mile estimates.

The Typical Mile estimates include 10 percent contingency applied to labor and material.

Most of the 115-kV and 230-kV Typical Miles use trapezoidal conductors reflecting BPA's policy to use the most efficient conductor design on new construction.

Wood pole construction is based on rolling terrain, with 1/4 mile of new access road per mile of transmission line. Lattice steel construction, based on flat and rolling terrain, also includes 1/4 mile of new access road construction per mile of transmission line. Lattice steel construction, based on 50 percent rolling/50 percent mountain terrain, includes 1/2 mile of new access road construction per mile of transmission line.

Steel pole lines for 115-kV and 230-kV use a direct-embedded steel pole. Steel pole lines for 500-kV use a steel pole with concrete shaft footing.

The per-mile costs shown illustrate expected costs where the minimum total length of the wood pole line is 10 miles and the minimum total length of the steel line is 50 miles. Shorter lines may have substantially higher per-mile costs.

THIS DATA IS FOR PLANNING ONLY

Request estimates for specific projects from the Office of Engineering.

Additional copies of the Typical Mile estimates are available upon request and are not limited to BPA users.

If you have any questions regarding the data, please contact Angela Wykoff at (503) 230-5613 or Vic Shaw at (503) 230-5614.

3 Attachments

VFShaw bh 5614 (9406-EFCH-TRANSDAT doc)

cc

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Idaho Falls District Office - WI (2)

Table 1

PROJECT ENVIRONMENTAL ANALYSIS COST

TYPE OF ANALYSIS	PROJECT COST
Categorical Exclusion (Minor Impact)	\$1,000 - \$5,000
Environmental Assessment (No Significant Impact)	\$5,000 - \$100,000
Environmental Impact Statement (Significant Impact)	\$100,000 - \$750,000

Table 2

PROJECTS LAND COSTS - PER MILE
(Excluding Timber Trees Crops and Improvements)

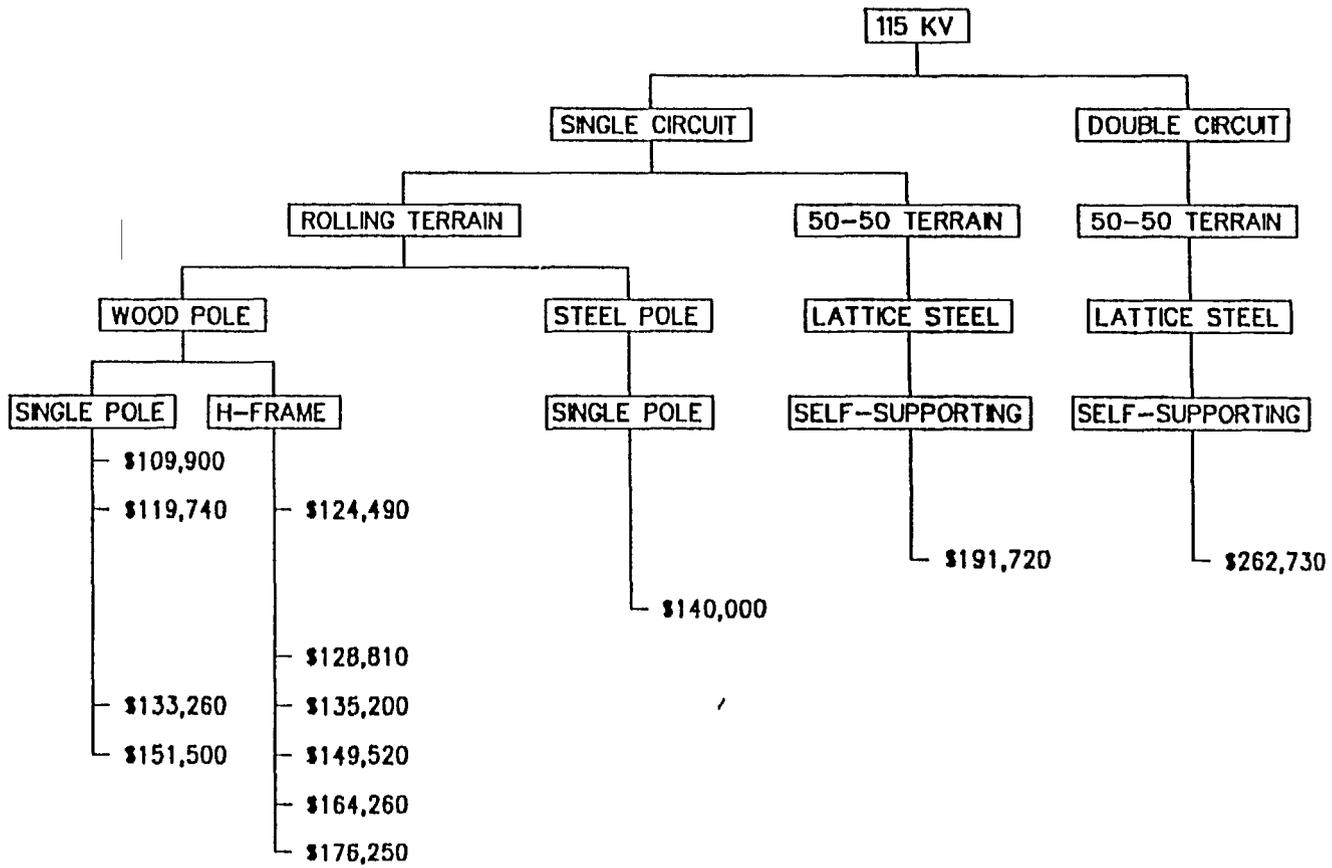
R O-W WIDTH	NON-URBAN AREAS EAST OF THE CASCADES		URBAN AREAS INCLUDING ALL WEST OF THE CASCADES	
	Oregon	Washington	Oregon	Washington
50'	\$9,700	\$10,900	\$60,600	\$90,900
75'	\$14,500	\$16,400	\$90,900	\$136,400
90'	\$17,500	\$19,600	\$109,100	\$163,600
100'	\$19,400	\$21,800	\$121,200	\$181,800
105'	\$20,400	\$22,900	\$127,300	\$190,900
110'	\$21,300	\$24,000	\$133,300	\$200,000
115'	\$22,300	\$25,100	\$139,400	\$209,100
120'	\$23,300	\$26,200	\$145,500	\$218,200
125'	\$24,200	\$27,300	\$151,500	\$227,300
130'	\$25,200	\$28,400	\$157,600	\$236,400
135'	\$26,200	\$29,500	\$163,600	\$245,500
140'	\$27,200	\$30,500	\$169,700	\$254,500
145'	\$28,100	\$31,600	\$175,800	\$263,600
150'	\$29,100	\$32,700	\$181,800	\$272,700

vfs
11/30/93

1993 TYPICAL MILE TRANSMISSION LINE ESTIMATES
 (LAND, INDIRECT OVERHEADS, AND ENVIRONMENTAL COSTS NOT INCLUDED)

CONDUCTOR

MCM	NAME
398	ACSR,IBIS
795	AAC,BAKER
795	ACSR DRAKE
795	ACSR,TOUTLE
954	AAC,RAINIER
1137	AAC,HELENS
1589	ACC,HOOD
1979	AAC,BACHELOR
2406	AAC,JEFFERSON

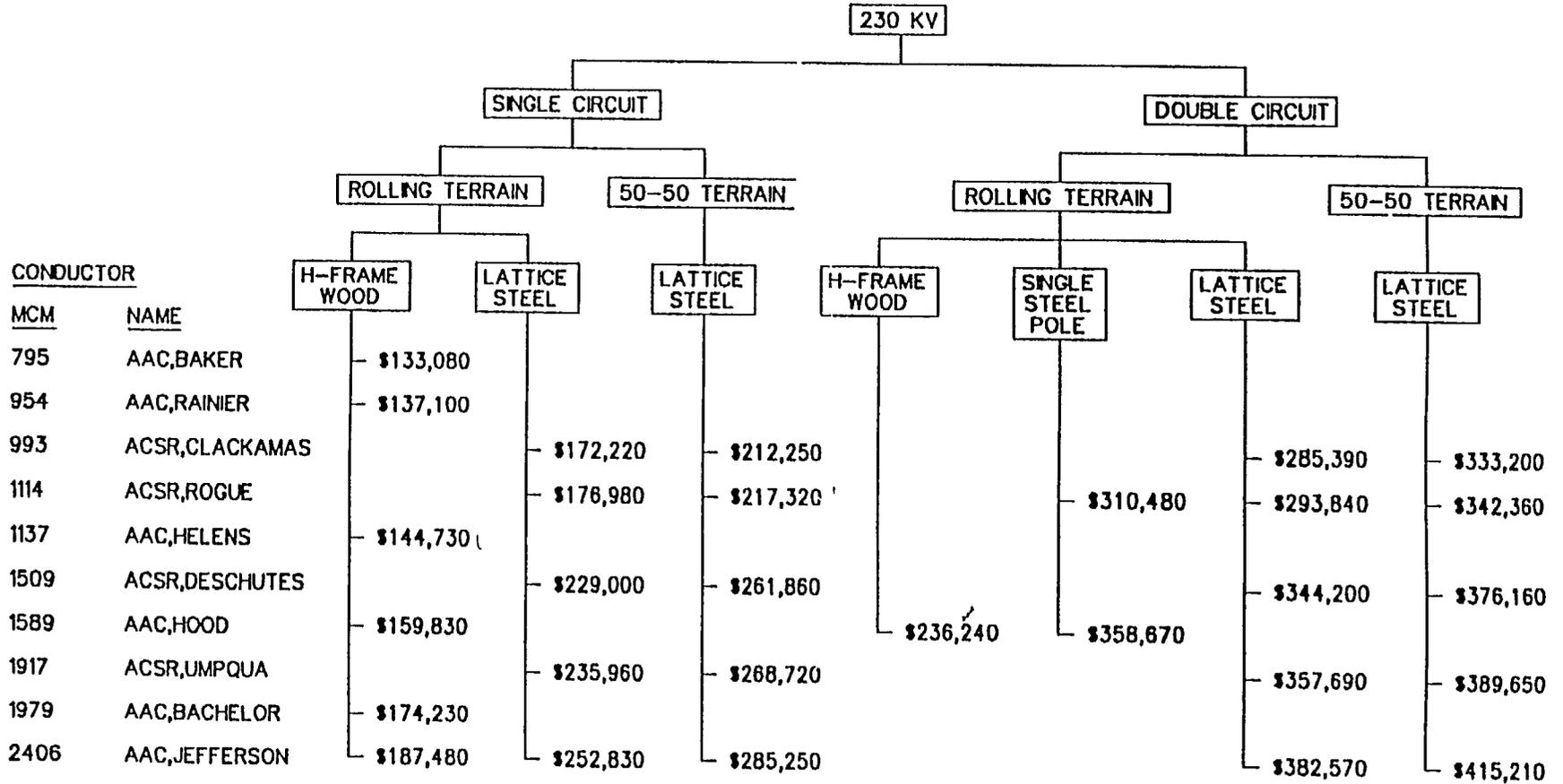


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 PROGRAM MANAGEMENT SEC -EFCH
 DECEMBER 1993 1 OF 3

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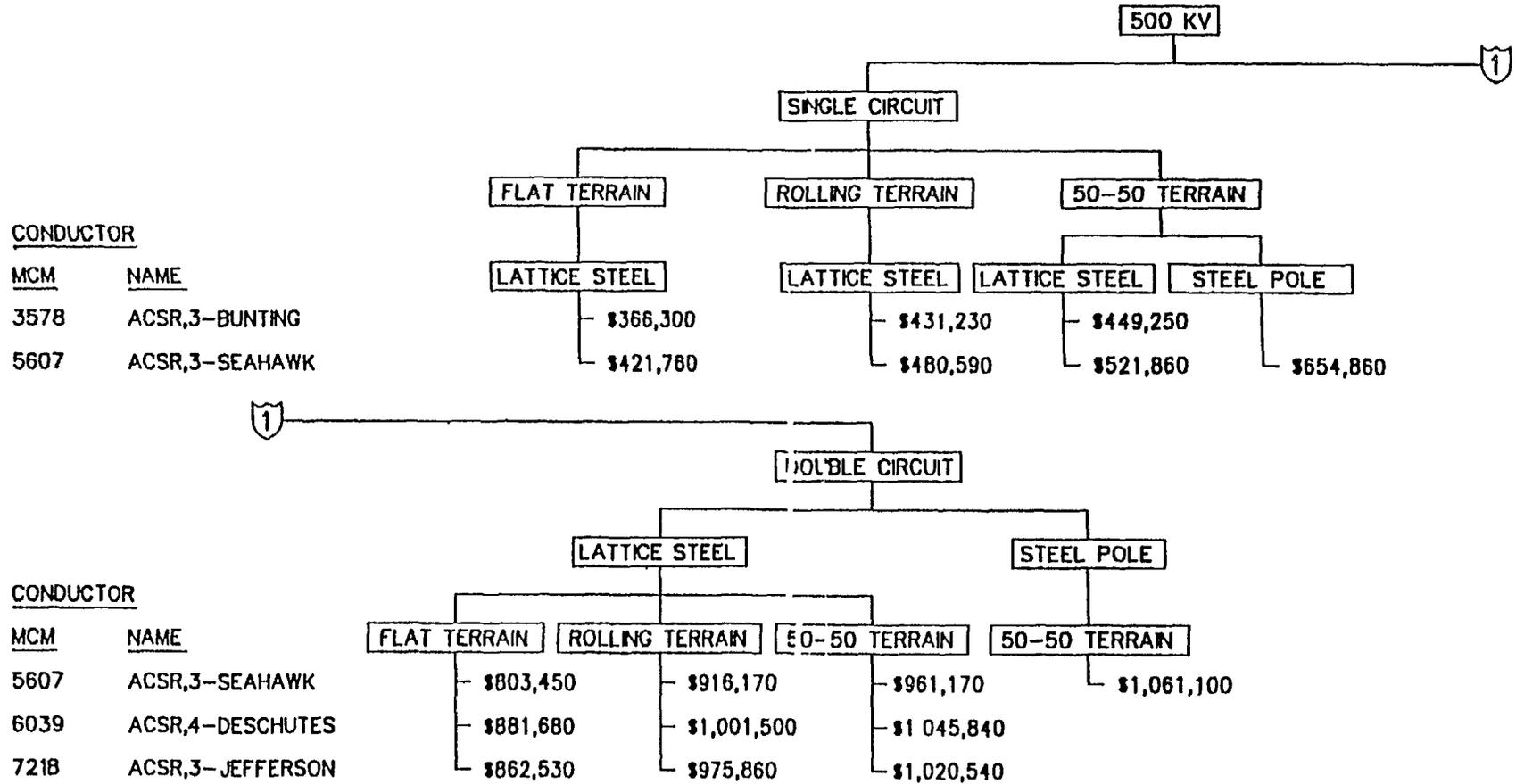
1993 TYPICAL MILE TRANSMISSION LINE ESTIMATES
 (LAND, INDIRECT OVERHEADS, AND ENVIRONMENTAL COSTS NOT INCLUDED)



DIVISION OF FACILITIES ENGINEERING
 PROGRAM MANAGEMENT SEC - EFCH

88

1993 TYPICAL MILE TRANSMISSION LINE ESTIMATES
 (LAND, INDIRECT OVERHEADS, AND ENVIRONMENTAL COSTS NOT INCLUDED)



CONDUCTOR

MCM	NAME
3578	ACSR,3-BUNTING
5607	ACSR,3-SEAHAWK

CONDUCTOR

MCM	NAME
5607	ACSR,3-SEAHAWK
6039	ACSR,4-DESCHUTES
7218	ACSR,3-JEFFERSON

DIVISION OF FACILITIES ENGINEERING
 PROGRAM MANAGEMENT SEC.-EFCH
 DECEMBER 1993 3 OF 3

89

SINGLE-CIRCUIT WOOD

ROLLING TERRAIN

VOLTAGE STRUCTURES	115 KV		115 KV	
	SGL WOOD	POLE	SGL WOOD	POLE
	500' SPAN IBIS	440' SPAN BAKER	380' SPAN HELENS	330' SPAN HOOD
RIGHT-OF-WAY WIDTH	60 FT	60 FT	60 FT	60 FT
TONS OF STEEL OR # OF POLES	10 6	12 0	13 9	16 0
SURVEYS	\$ 23310	\$ 23310	\$ 23310	\$ 23310
DESIGN	\$ 5060	\$ 5060	\$ 5060	\$ 5060
MATERIALS				
TOWER STEEL & FOUNDATIONS	0	0	0	0
POLES - STEEL	0	0	0	0
WOOD	10210	10070	10290	11830
CONCRETE	0	0	0	0
CROSSARMS & HARDWARE	4500	5130	5990	6940
CONDUCTOR	7700	11930	17120	23900
GROUNDWIRE & COUNTERPOISE	0	0	0	0
CONDUCTOR HARDWARE	2770	3290	4040	4910
INSULATORS	3300	3590	3990	4420
VIBRATION & SPACER DAMPERS	0	0	0	0
GUYS & ANCHORS	1290	1290	1290	1290
SUBTOTAL	\$ 29770	\$ 35300	\$ 42720	\$ 53290
CONTINGENCIES 10 0%	2980	3530	4270	5330
TOTAL MATERIALS	\$ 32750	\$ 38830	\$ 46990	\$ 58620
CONSTRUCTION				
TOWER STEEL & FOUNDATIONS	0	0	0	0
POLES - STEEL	0	0	0	0
WOOD	10970	11810	13090	15050
CONCRETE	0	0	0	0
CROSSARMS & HARDWARE	4590	5220	6070	7000
CONDUCTOR STRINGING	8250	9730	11810	14110
GROUNDWIRE STRINGING	0	0	0	0
GUYS & ANCHORS	3570	3570	3570	3570
R O W CLEARING AND PREP	3710	3710	3710	3710
ACCESS ROADS	7220	7220	7220	7220
SUBTOTAL	\$ 38310	\$ 41260	\$ 45470	\$ 50660
CHANGE ORDERS 7 0%	2680	2890	3180	3550
SUBTOTAL	\$ 40990	\$ 44150	\$ 48650	\$ 54210
CONTINGENCIES 10 0%	4100	4420	4870	5420
INSPECTION 9 0%	3690	3970	4380	4880
TOTAL CONSTRUCTION	\$ 48780	\$ 52540	\$ 57900	\$ 64510
TOTAL COST PER MILE	\$ 109900	\$ 119740	\$ 133450	\$ 151500

SINGLE-CIRCUIT WOOD

ROLLING TERRAIN

VOITAGF STRUCTURES	115 KV HFWP	115 KV HFWP	115 KV HFWP	115 KV HFWP	115 KV HFWP	115 KV HFWP
CONDUCTOR	800' SPAN BAKER	800' SPAN RAINIER	770' SPAN HELENS	710' SPAN HOOD	615' SPAN BACHELOR	580' SPAN JEFFERSON
RIGHT-OF-WAY WIDTH	90 FT	90 FT	90 FT	90 FT	90 FT	90 FT
TONS OF STEEL OR # OF POLES	14 2	14 2	14 8	16 0	18 2	19 2
SURVEYS DESIGN	\$ 23310 \$ 5060	\$ 23310 \$ 5060	\$ 23 10 \$ 5060	\$ 23310 \$ 5060	\$ 23310 \$ 5060	\$ 23310 \$ 5060
MATERIALS						
TOWER STEEL & FOUNDATIONS	0	0	0	0	0	0
POLES - STEEL	0	0	0	0	0	0
WOOD	12080	12080	12590	13590	14210	14230
CONCRETE	0	0	0	0	0	0
CROSSARMS & HARDWARE	3570	3570	3740	4060	4670	4940
CONDUCTOR	11930	14330	17120	23900	30010	36490
GROUNDWIRE & COUNTERPOISE	0	0	0	0	0	0
CONDUCTOR HARDWARE	1630	1990	2050	2200	2910	3650
INSULATORS	1850	1850	1910	2030	2260	2360
VIBRATION & SPACER DAMPERS	0	0	0	0	0	0
GUYS & ANCHORS	1630	1630	1630	1630	1630	1630
SUBTOTAL	\$ 32690	\$ 35450	\$ 39040	\$ 47410	\$ 55690	\$ 63300
CONTINGENCIES 10 0%	3270	3550	3900	4740	5570	6330
TOTAL MATERIALS	\$ 35960	\$ 39000	\$ 42940	\$ 52150	\$ 61260	\$ 69630
CONSTRUCTION						
TOWER STEEL & FOUNDATIONS	0	0	0	0	0	0
POLES - STEEL	0	0	0	0	0	0
WOOD	14040	14040	14630	15810	17450	18080
CONCRETE	0	0	0	0	0	0
CROSSARMS & HARDWARE	5910	5910	6180	6710	7670	8110
CONDUCTOR STRINGING	9730	10740	11810	14110	15940	17700
GROUNDWIRE STRINGING	0	0	0	0	0	0
GUYS & ANCHORS	4930	4930	4930	4930	4930	4930
R O W CLEARING AND PREP	5350	5350	5350	5350	5350	5350
ACCESS ROADS	7280	7280	7280	7280	7280	7280
SUBTOTAL	\$ 47240	\$ 48250	\$ 50180	\$ 54190	\$ 58620	\$ 61450
CHANGE ORDERS 7 0%	3310	3380	3510	3790	4100	4300
SUBTOTAL	\$ 50550	\$ 51630	\$ 53690	\$ 57980	\$ 62720	\$ 65750
CONTINGENCIES 10 0%	5060	5160	5370	5800	6270	6580
INSPECTION 9 0%	4550	4650	4830	5220	5640	5920
TOTAL CONSTRUCTION	\$ 60160	\$ 61440	\$ 63890	\$ 69000	\$ 74630	\$ 78250
TOTAL COST PER MILE	\$ 124490	\$ 128810	\$ 135200	\$ 149520	\$ 164260	\$ 176250

SINGLE- & DOUBLE-CIRCUIT STEEL

ROLLING & 50% ROLL/50% MT TERRAIN

	115 KV SGL STL POLE*	115 KV LATTICE STEEL	115 KV LATTICE STEEL
VOLTAGE	115 KV	115 KV	115 KV
STRUCTURES	SGL STL POLE*	LATTICE STEEL	LATTICE STEEL
	SGL CIR	SGL CIR	DBL CIR
	ROLLING	50/50	50/50
CONDUCTOR	TOUTLE	DRAKE	DRAKE
RIGHT-OF-WAY WIDTH	75 FT	110 FT	115 FT
TONS OF STEEL OR # OF POLES	6 4	25 0	38 2
SURVEYS	\$ 23310	\$ 32110	\$ 32110
DESIGN	\$ 5060	\$ 3860	\$ 3860
MATERIALS			
TOWER STEEL & FOUNDATIONS	0	33130	50550
POLES - STEEL	39820	0	0
WOOD	0	0	0
CONCRETE	0	0	0
CROSSARMS & HARDWARE	2540	0	0
CONDUCTOR	13790	13440	26880
GROUNDWIRE & COUNTERPOISE	0	0	0
CONDUCTOR HARDWARE	1880	1830	3660
INSULATORS	1600	1400	2800
VIBRATION & SPACER DAMPERS	0	530	1060
GUYS & ANCHORS	2300	0	0
SUBTOTAL	\$ 61930	\$ 50330	\$ 84150
CONTINGENCIES 10 0%	6190	5030	8500
TOTAL MATERIALS	\$ 68120	\$ 55360	\$ 93500
CONSTRUCTION			
TOWER STEEL & FOUNDATIONS	0	38250	58370
POLES - STEEL	5990	0	0
WOOD	0	0	0
CONCRETE	0	0	0
CROSSARMS & HARDWARE	3660	0	0
CONDUCTOR STRINGING	10670	11950	17310
GROUNDWIRE STRINGING	0	0	0
GUYS & ANCHORS	2070	0	0
R O W CLEARING AND PREP	4530	8350	8710
ACCESS ROADS	7250	20290	20310
SUBTOTAL	\$ 34170	\$ 78840	\$ 104700
CHANGE ORDERS 7 0%	2390	5520	7330
SUBTOTAL	\$ 36560	\$ 84360	\$ 112030
CONTINGENCIES 10 0%	3660	8440	11200
INSPECTION 9 0%	3290	7590	10080
TOTAL CONSTRUCTION	\$ 43510	\$ 100390	\$ 133310
TOTAL COST PER MILE	\$ 140000	\$ 191720	\$ 262730

*Crossarms, crossarm hardware & guy anchors are included in steel pole material & labor costs

23

SINGLE- & DOUBLE-CIRCUIT WOOD

ROLLING TERRAIN

	230 KV HFWP						
VOLTAGE	230 KV						
STRUCTURES	HFWP						
	SGL CIR	DBL CIR					
	830' SPAN	830' SPAN	780' SPA I	680' SPAN	620' SPAN	590' SPAN	725' SPAN
CONDUCTOR	BAKER	RAINIER	HELENS	HOOD	BACHELOR	JEFFERSON	HOOD
RIGHT-OF-WAY WIDTH	100 FT	105 FT					
TONS OF STEEL OR # OF POLES	13 8	13 8	14 6	16 6	18 0	19 0	14 6
SURVEYS	\$ 23310	\$ 23310	\$ 23310	\$ 23310	\$ 23310	\$ 23310	\$ 23310
DESIGN	\$ 5060	\$ 5060	\$ 5060	\$ 5060	\$ 5060	\$ 5060	\$ 5060
MATERIALS							
TOWER STEEL & FOUNDATIONS	0	0	0	0	0	0	0
POLES - STEEL	0	0	0	0	0	0	0
WOOD	14820	14820	15680	15800	17140	18090	27310
CONCRETE	0	0	0	0	0	0	0
CROSSARMS & HARDWARE	5440	5440	5790	6660	7270	7700	11210
CONDUCTOR	11930	14330	17120	23900	30010	36490	47790
GROUNDWIRE & COUNTERPOISE	0	0	0	0	0	0	0
CONDUCTOR HARDWARE	2300	2370	2540	2940	3260	3550	4340
INSULATORS	3610	3610	3780	4190	4480	4690	7580
VIBRATION & SPACER DAMPERS	0	0	0	0	0	0	0
GUYS & ANCHORS	1630	1630	1630	1630	1630	1630	2460
SUBTOTAL	\$ 39730	\$ 42200	\$ 46540	\$ 55120	\$ 63790	\$ 72150	\$ 100690
CONTINGENCIES 10 0%	3970	4220	4650	5510	6380	7220	10070
TOTAL MATERIALS	\$ 43700	\$ 46420	\$ 51190	\$ 60630	\$ 70170	\$ 79370	\$ 110760
CONSTRUCTION							
TOWER STEEL & FOUNDATIONS	0	0	0	0	0	0	0
POLES - STEEL	0	0	0	0	0	0	0
WOOD	14860	14860	15730	17100	18540	19570	18440
CONCRETE	0	0	0	0	0	0	0
CROSSARMS & HARDWARE	5210	5210	5520	6300	6850	7240	16700
CONDUCTOR STRINGING	9730	10740	11810	14110	15940	17700	20450
GROUNDWIRE STRINGING	0	0	0	0	0	0	0
GUYS & ANCHORS	4930	4930	4930	4930	4930	4930	7210
R O W CLEARING AND PREP	5890	5890	5890	5890	5890	5890	6160
ACCESS ROADS	7300	7300	7300	7300	7300	7300	7310
SUBTOTAL	\$ 47920	\$ 48930	\$ 51800	\$ 55630	\$ 59450	\$ 62630	\$ 76270
CHANGE ORDERS 7 0%	3350	3430	3580	3890	4160	4380	5340
SUBTOTAL	\$ 51270	\$ 52360	\$ 54600	\$ 59520	\$ 63610	\$ 67010	\$ 81610
CONTINGENCIES 10 0%	5130	5240	5480	5950	6360	6700	8160
INSPECTION 9 0%	4610	4710	4930	5360	5720	6030	7340
TOTAL CONSTRUCTION	\$ 61010	\$ 62310	\$ 65700	\$ 70830	\$ 75690	\$ 79740	\$ 97110
TOTAL COST PER MILE	\$ 133080	\$ 137100	\$ 144700	\$ 159830	\$ 174230	\$ 187480	\$ 236240

42

SINGLE-CIRCUIT STEEL

ROLLING TERRAIN

VOLTAGE STRUCTURES	230 KV LATTICE STEEL				
CONDUCTOR	1150' SPAN CLACKAMAS	1150' SPAN ROGUE	1150' SPAN DESCHUTIS	1150' SPAN UMPQUA	1150' SPAN JEFFERSON
RIGHT-OF-WAY WIDTH	125 FT	125 FT	95 FT	90 FT	90 FT
TONS OF STEEL OR # OF POLES	25 7	26 2	38 0	38 0	40 4
SURVEYS DESIGN	\$ 23310 \$ 3860	\$ 23310 \$ 3860	\$ 23 10 \$ 3160	\$ 23310 \$ 3860	\$ 23310 \$ 3860
MATERIALS					
TOWER STEEL & FOUNDATIONS	34050	34720	50351	50350	53530
POLES - STEEL	0	0	0	0	0
WOOD	0	0	0	0	0
CONCRETE	0	0	0	0	0
CROSSARMS & HARDWARE	0	0	0	0	0
CONDUCTOR	16890	18940	26170	30560	36490
GROUNDWIRE & COUNTERPOISE	0	0	0	0	0
CONDUCTOR HARDWARE	1820	1910	2860	3180	3500
INSULATORS	2900	2900	4640	4640	4640
VIBRATION & SPACER DAMPERS	260	290	310	330	330
GUYS & ANCHORS	0	0	0	0	0
SUBTOTAL	\$ 55920	\$ 58760	\$ 84330	\$ 89060	\$ 98490
CONTINGENCIES 10 0%	5590	5880	8430	8910	9850
TOTAL MATERIALS	\$ 61510	\$ 64640	\$ 92760	\$ 97970	\$ 108340
CONSTRUCTION					
TOWER STEEL & FOUNDATIONS	39320	40090	58140	58140	61810
POLES - STEEL	0	0	0	0	0
WOOD	0	0	0	0	0
CONCRETE	0	0	0	0	0
CROSSARMS & HARDWARE	0	0	0	0	0
CONDUCTOR STRINGING	11690	12200	14600	16270	17700
GROUNDWIRE STRINGING	0	0	0	0	0
GUYS & ANCHORS	0	0	0	0	0
R O W CLEARING AND PREP	7250	7250	5620	5350	5350
ACCESS ROADS	7350	7350	7290	7280	7280
SUBTOTAL	\$ 65610	\$ 66890	\$ 85650	\$ 87040	\$ 92140
CHANGE ORDERS 7 0%	4590	4680	6000	6090	6450
SUBTOTAL	\$ 70200	\$ 71570	\$ 91650	\$ 93130	\$ 98590
CONTINGENCIES 10 0%	7020	7160	9170	9310	9860
INSPECTION 9 0%	6320	6440	8250	8380	8870
TOTAL CONSTRUCTION	\$ 83540	\$ 85170	\$ 109070	\$ 110820	\$ 117320
TOTAL COST PER MILE	\$ 172220	\$ 176980	\$ 229000	\$ 235960	\$ 252830

SINGLE-CIRCUIT STEEL

50% ROLLING/50% MOUNTAIN TERRAIN

VOLTAGE STRUCTURES	230 KV		230 KV		230 KV		230 KV	
	LATTICE	STEEL	LATTICE	STEEL	LATTICE	STEEL	LATTICE	STEEL
CONDUCTOR	1150' SPAN CLACKAMAS		1150' SPAN ROGUE		1150' SPAN DESCHUTES		1150' SPAN UMPQUA	
RIGHT-OF-WAY WIDTH	125 FT		125 FT		95 FT		90 FT	
TONS OF STEEL OR $\frac{1}{2}$ OF POLES	29 2		29 8		39 6		39 6	
SURVEYS	\$ 32110		\$ 32110		\$ 32110		\$ 32110	
DESIGN	\$ 3860		\$ 3860		\$ 3860		\$ 3860	
MATERIALS								
TOWER STEEL & FOUNDATIONS	38690		39490		52470		52470	
POLES - STEEL	0		0		0		0	
WOOD	0		0		0		0	
CONCRETE	0		0		0		0	
CROSSARMS & HARDWARE	0		0		C		0	
CONDUCTOR	16890		18940		26170		30560	
GROUNDWIRE & COUNTERPOISE	0		0		C		0	
CONDUCTOR HARDWARE	1820		1910		2860		3180	
INSULATORS	2900		2900		4640		4640	
VIBRATION & SPACER DAMPERS	260		290		310		330	
GUYS & ANCHORS	0		0		0		0	
SUBTOTAL	\$ 60560		\$ 63530		\$ 86450		\$ 91180	
CONTINGENCIES 10 0%	6060		6350		8650		9120	
TOTAL MATERIALS	\$ 66620		\$ 69880		\$ 95100		\$ 100300	
CONSTRUCTION								
TOWER STEEL & FOUNDATIONS	44680		45590		60590		60590	
POLES - STEEL	0		0		0		0	
WOOD	0		0		0		0	
CONCRETE	0		0		0		0	
CROSSARMS & HARDWARE	0		0		0		0	
CONDUCTOR STRINGING	11690		12200		14600		16270	
GROUNDWIRE STRINGING	0		0		0		0	
GUYS & ANCHORS	0		0		0		0	
R O W CLEARING AND PREP	9420		9420		7270		6910	
ACCESS ROADS	20330		20330		20260		20250	
SUBTOTAL	\$ 86120		\$ 87540		\$ 102720		\$ 104020	
CHANGE ORDERS 7 0%	6030		6130		7190		7280	
SUBTOTAL	\$ 92150		\$ 93670		\$ 109910		\$ 111300	
CONTINGENCIES 10 0%	9220		9370		10990		11130	
INSPECTION 9 0%	8290		8430		9890		10020	
TOTAL CONSTRUCTION	\$ 109660		\$ 111470		\$ 130790		\$ 132450	
TOTAL COST PER MILE	\$ 212250		\$ 217320		\$ 261860		\$ 268720	

DOUBLE-CIRCUIT STEEL

ROLLING TERRAIN

VOLTAGE STRUCTURES	230 KV LATTICE STEEL	230 KV LATTICE STEEL	230 KV LATTICE STEEL	230 KV T-TEL LATTICE STEEL	230 KV LATTICE STEEL	230 KV LATTICE STEEL	230 KV SGL STL POLE* DIR EMBED 900' SPAN ROGUE	230 KV SGL STL POLE* DIR EMBED 900' SPAN HOOD
CONDUCTOR	1150' SPAN CLACKAMAS	1150' SPAN ROGUE	1150' SPAN DESCHUTES	1150' SPAN UMPQUA	1150' SPAN JEFFERSON			
RIGHT-OF-WAY WIDTH	125 FT	125 FT	100 FT	100 FT	100 FT	110 FT	110 FT	
TONS OF STEEL OR # OF POLES	49 9	50 7	58 3	58 3	60 8	6 4	6 4	
SURVEYS	\$ 23310	\$ 23310	\$ 23310	\$ 23310	\$ 23310	\$ 23310	\$ 23310	\$ 23310
DESIGN	\$ 3860	\$ 3860	\$ 3860	\$ 3860	\$ 3860	\$ 5060	\$ 5060	\$ 5060
MATERIALS								
TOWER STEEL & FOUNDATIONS	66120	67180	77250	77250	80560	0	0	
POLES - STEEL	0	0	0	0	0	136440	161340	
WOOD	0	0	0	0	0	0	0	
CONCRETE	0	0	0	0	0	0	0	
CROSSARMS & HARDWARE	0	0	0	0	0	0	0	
CONDUCTOR	33770	37880	52330	61120	72970	37880	47790	
GROUNDWIRE & COUNTERPOISE	0	0	0	0	0	0	0	
CONDUCTOR HARDWARE	3650	3820	5710	6350	6990	4220	4750	
INSULATORS	5800	5800	9280	9280	9280	6710	6710	
VIBRATION & SPACER DAMPERS	530	590	630	660	650	1220	1460	
GUYS & ANCHORS	0	0	0	0	0	2870	2870	
SUBTOTAL	\$ 109870	\$ 115270	\$ 145200	\$ 154660	\$ 170450	\$ 189340	\$ 224920	
CONTINGENCIES 10 0%	10990	11530	14520	15470	17050	18930	22490	
TOTAL MATERIALS	\$ 120860	\$ 126800	\$ 159720	\$ 170130	\$ 187500	\$ 208270	\$ 247410	
CONSTRUCTION								
TOWER STEEL & FOUNDATIONS	76350	77570	89200	89200	93020	0	0	
POLES - STEEL	0	0	0	0	0	24500	28830	
WOOD	0	0	0	0	0	0	0	
CONCRETE	0	0	0	0	0	0	0	
CROSSARMS & HARDWARE	0	0	0	0	0	0	0	
CONDUCTOR STRINGING	16930	17680	21150	23570	25650	17680	20450	
GROUNDWIRE STRINGING	0	0	0	0	0	0	0	
GUYS & ANCHORS	0	0	0	0	0	2050	2050	
R O W CLEARING AND PREP	7250	7250	5890	5890	5890	6440	6440	
ACCESS ROADS	7350	7350	7300	7300	7300	7320	7320	
SUBTOTAL	\$ 107880	\$ 109850	\$ 123400	\$ 125960	\$ 131860	\$ 57990	\$ 65090	
CHANGE ORDERS 7 0%	7550	7690	8650	8820	9230	4060	4560	
SUBTOTAL	\$ 115430	\$ 117540	\$ 132900	\$ 134780	\$ 141090	\$ 62050	\$ 69650	
CONTINGENCIES 10 0%	11540	11750	13220	13480	14110	6210	6970	
INSPECTION 9 0%	10390	10580	11900	12130	12700	5580	6270	
TOTAL CONSTRUCTION	\$ 137360	\$ 139870	\$ 157300	\$ 160390	\$ 167900	\$ 73840	\$ 82890	
TOTAL COST PER MILE	\$ 285390	\$ 293840	\$ 344200	\$ 357690	\$ 382570	\$ 310480	\$ 358670	

* Crossarms, crossarm hardware & guy anchors are included in steel pole material & labor costs

86

DOUBLE CIRCUIT CABLE

50% ROLLING/50% MOUNTAIN TERRAIN

VOLTAGE STRUCTURES	230 KV LATTICE STEEL				
CONDUCTOR	1150' SPAN CLACKAMAS	1150' SPAN ROGUE	1150' SPAN DESCHUT S	1150' SPAN UMPQUA	1150' SPAN JEFFERSON
RIGHT-OF-WAY WIDTH	125 FT	125 FT	100 FT	100 FT	100 FT
TONS OF STEEL OR # OF POLES	55 7	56 7	59 6	59 6	62 3
SURVEYS DESIGN	\$ 32110 \$ 3860	\$ 32110 \$ 3860	\$ 32 10 \$ 3 160	\$ 32110 \$ 3860	\$ 32110 \$ 3860
MATERIALS					
TOWER STEEL & FOUNDATIONS	73800	75130	78970	78970	82550
POLES - STEEL	0	0	0	0	0
WOOD	0	0	0	0	0
CONCRETE	0	0	0	0	0
CROSSARMS & HARDWARE	0	0	0	0	0
CONDUCTOR	33770	37880	52330	61120	72970
GROUNDWIRE & COUNTERPOISE	0	0	0	0	0
CONDUCTOR HARDWARE	3650	3820	5710	6350	6990
INSULATORS	5800	5800	9280	9280	9280
VIBRATION & SPACER DAMPERS	530	590	630	660	650
GUYS & ANCHORS	0	0	0	0	0
SUBTOTAL	\$ 117550	\$ 123220	\$ 146920	\$ 156380	\$ 172440
CONTINGENCIES 10 0%	11760	12320	14690	15640	17240
TOTAL MATERIALS	\$ 129310	\$ 135540	\$ 161610	\$ 172020	\$ 189680
CONSTRUCTION					
TOWER STEEL & FOUNDATIONS	85220	86750	91190	91190	95320
POLES - STEEL	0	0	0	0	0
WOOD	0	0	0	0	0
CONCRETE	0	0	0	0	0
CROSSARMS & HARDWARE	0	0	0	0	0
CONDUCTOR STRINGING	16930	17680	21150	23570	25650
GROUNDWIRE STRINGING	0	0	0	0	0
GUYS & ANCHORS	0	0	0	0	0
R O W CLEARING AND PREP	9420	9420	7630	7630	7630
ACCESS ROADS	20330	20330	20270	20270	20270
SUBTOTAL	\$ 131900	\$ 134180	\$ 140240	\$ 142660	\$ 148870
CHANGE ORDERS 7 0%	9230	9390	9820	9990	10420
SUBTOTAL	\$ 141130	\$ 143570	\$ 150060	\$ 152650	\$ 159290
CONTINGENCIES 10 0%	14110	14360	15010	15270	15930
INSPECTION 9 0%	12700	12920	13510	13740	14340
TOTAL CONSTRUCTION	\$ 167940	\$ 170850	\$ 178480	\$ 181660	\$ 189560
TOTAL COST PER MILE	\$ 333220	\$ 342360	\$ 376 60	\$ 389650	\$ 415210

SINGLE-CIRCUIT STEEL

FLAT, ROLLING & 50/50 TERRAIN

VOLTAGE STRUCTURES	500 KV LATTICE STEEL FLAT 1150' SPAN 3-BUNTING	500 KV LATTICE STEEL FIAT 1150' SPAN 3-SEAHAWK	500 KV LATTICE STEEL ROLLING 1150' SPAN 3-BUNTING	500 KV LATTICE STEEL ROLLING 1150' SPAN 3-SEAHAWK	500 KV LATTICE STEEL 50/50 1150' SPAN 3-BUNTING	500 KV LATTICE STEEL 50/50 1150' SPAN 3-SEAHAWK	500 KV SGL STL POLE* 50/50 1050' SPAN 3-SEAHAWK
RIGHT-OF-WAY WIDTH	115 FT	105 FT	115 FT	105 FT	115 FT	105 FT	100 FT
TONS OF STEEL OR # OF POLES	59 7	64 2	66 0	73 8	68 4	77 8	5
SURVEYS DESIGN	\$ 14510 \$ 3860	\$ 14510 \$ 3860	\$ 23210 \$ 3860	\$ 23310 \$ 3860	\$ 32110 \$ 3860	\$ 32110 \$ 3860	\$ 32110 \$ 3860
MATERIALS							
TOWER STEEL & FOUNDATIONS	79100	85060	87450	97790	90630	103090	0
POLES - STEEL	0	0	0	0	0	0	289040
WOOD	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0
CROSSARMS & HARDWARE	0	0	0	0	0	0	0
CONDUCTOR	57620	87440	57620	87440	57620	87440	87440
GROUNDWIRE & COUNTERPOISE	6080	6080	6080	6080	6080	6080	3310
CONDUCTOR HARDWARE	6660	6660	9270	9270	9270	9270	9550
INSULATORS	18030	18700	20070	21760	20070	21760	22780
VIBRATION & SPACER DAMPERS	4970	5280	4970	5280	4970	5280	4990
GUYS & ANCHORS	0	0	0	0	0	0	0
SUBTOTAL	\$ 172460	\$ 209220	\$ 185 60	\$ 227620	\$ 188640	\$ 232920	\$ 417110
CONTINGENCIES 10 0%	17250	20920	18550	22760	18860	23290	41710
TOTAL MATERIALS	\$ 189710	\$ 230140	\$ 204010	\$ 250380	\$ 207500	\$ 256210	\$ 458820
CONSTRUCTION							
TOWER STEEL & FOUNDATIONS	91340	98230	100980	112910	104650	119030	0
POLES - STEEL	0	0	0	0	0	0	65030
WOOD	0	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0	0
CROSSARMS & HARDWARE	0	0	0	0	0	0	0
CONDUCTOR STRINGING	24010	29140	24010	29140	24010	29140	29140
GROUNDWIRE STRINGING	3940	3940	3940	3940	3940	3940	3640
GUYS & ANCHORS	0	0	0	0	0	0	0
R O W CLEARING AND PREP	2710	2520	6710	6160	8710	7990	7630
ACCESS ROADS	2250	2240	7330	7310	20310	20280	20270
SUBTOTAL	\$ 124250	\$ 136070	\$ 142970	\$ 159460	\$ 161620	\$ 180380	\$ 125710
CHANGE ORDERS 7 0%	8700	9520	10010	11160	11310	12630	8800
SUBTOTAL	\$ 132950	\$ 145590	\$ 152980	\$ 170620	\$ 172930	\$ 193010	\$ 134510
CONTINGENCIES 10 0%	13300	14560	15300	17060	17290	19300	13450
INSPECTION 9 0%	11970	13100	13770	15360	15560	17370	12110
TOTAL CONSTRUCTION	\$ 158220	\$ 173250	\$ 182050	\$ 203040	\$ 205780	\$ 229680	\$ 160070
TOTAL COST PER MILE	\$ 366300	\$ 421760	\$ 413230	\$ 480590	\$ 449250	\$ 521860	\$ 654860

*Concrete footing & anchor bolts are included in steel pole material & labor costs

42

DOUBLE CIRCUIT TOWER

FLAT, & ROLLING TERRAIN

VOLTAGE	500 KV	500 KV				
STRUCTURES	LATTICE STEEL	LATTICE STEEL				
	FLAT	FLAT	FIAT	ROLLING	ROLLING	ROLLING
CONDUCTOR	1150' SPAN	1150' SPAN				
	3-SEAHAWK	4-DESCHUTS	3-JEFFERSN	3-SEAHAWK	4-DESCHUTS	3-JEFFERSN
RIGHT-OF-WAY WIDTH	150 FT	150 FT				
TONS OF STEEL OR # OF POLES	134 3	141 7	135 5	157 3	166 1	158 5
SURVEYS	\$ 14510	\$ 14510	\$ 14510	\$ 23310	\$ 23310	\$ 23310
DESIGN	\$ 3860	\$ 3860	\$ 3860	\$ 3860	\$ 3860	\$ 3860
MATERIALS						
TOWER STEEL & FOUNDATIONS	177950	187750	179540	208420	220080	210010
POLES - STEEL	0	0	0	0	0	0
WOOD	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0
CROSSARMS & HARDWARE	0	0	0	0	0	0
CONDUCTOR	174880	209340	218910	174880	209340	218910
GROUNDWIRE & COUNTERPOISE	3310	3310	3310	3310	3310	3310
CONDUCTOR HARDWARE	13320	15830	14720	18540	22030	20490
INSULATORS	36600	44140	36590	42710	51400	42710
VIBRATION & SPACER DAMPERS	10120	11270	10120	10120	11270	10120
GUYS & ANCHORS	0	0	0	0	0	0
SUBTOTAL	\$ 416180	\$ 471640	\$ 463190	\$ 457980	\$ 517430	\$ 505550
CONTINGENCIES 10 0%	41620	47160	46320	45800	51740	50560
TOTAL MATERIALS	\$ 457800	\$ 518800	\$ 509510	\$ 503780	\$ 569170	\$ 556110
CONSTRUCTION						
TOWER STEEL & FOUNDATIONS	205480	216800	207320	240670	254130	242510
POLES - STEEL	0	0	0	0	0	0
WOOD	0	0	0	0	0	0
CONCRETE	0	0	0	0	0	0
CROSSARMS & HARDWARE	0	0	0	0	0	0
CONDUCTOR STRINGING	42220	44420	46160	42220	44420	46160
GROUNDWIRE STRINGING	3640	3640	3640	3640	3640	3640
GUYS & ANCHORS	0	0	0	0	0	0
R O W CLEARING AND PREP	3400	3400	3400	8610	8610	8610
ACCESS ROADS	2300	2300	2300	7400	7400	7400
SUBTOTAL	\$ 257040	\$ 270560	\$ 262120	\$ 302540	\$ 318200	\$ 308320
CHANGE ORDERS 7 0%	17990	18940	18400	21180	22270	21580
SUBTOTAL	\$ 275030	\$ 289500	\$ 281200	\$ 323720	\$ 340470	\$ 329900
CONTINGENCIES 10 0%	27500	28950	28120	32370	34050	32990
INSPECTION 9 0%	24750	26060	25310	29130	30640	29690
TOTAL CONSTRUCTION	\$ 327280	\$ 344510	\$ 334650	\$ 385220	\$ 405160	\$ 392580
TOTAL COST PER MILE	\$ 803450	\$ 881680	\$ 862530	\$ 916170	\$ 1001500	\$ 975860

DOUBLE-CIRCUIT STEEL		50% ROLLING/50% MOUNTAIN TERRAIN			
VOLTAGE	500 KV	500 KV	500 KV	500 KV	
STRUCTURES	LATTICE STEEL	LATTICE STEEL	LATTICE STEEL	SGL STL POLE	
	50/50	50/50	50/50	50/50	
CONDUCTOR	1150 SPAN	1150' SPAN	1150' SPAN	1050' SPAN	
	3-SEAHAWK	4-DESCHUTS	3-JEFFE SN	3-SEAHAWK	
RIGHT-OF-WAY WIDTH	150 FT	150 FT	150 FT	150 FT	
TONS OF STEEL OR # OF POLES	162 1	170 7	163 2	5 5	
SURVEYS	\$ 32110	\$ 32110	\$ 32110	\$ 32110	
DESIGN	\$ 3860	\$ 3860	\$ 3850	\$ 3860	
MATERIALS					
TOWER STEEL & FOUNDATIONS	214780	226180	216240	0	
POLES - STEEL	0	0	0	470560	
WOOD	0	0	0	0	
CONCRETE	0	0	0	0	
CROSSARMS & HARDWARE	0	0	0	0	
CONDUCTOR	174880	209340	218910	174880	
GROUNDWIRE & COUNTERPOISE	3310	3310	3310	3310	
CONDUCTOR HARDWARE	18540	22030	20490	19080	
INSULATORS	42710	51400	42710	45570	
VIBRATION & SPACER DAMPERS	10120	11270	10120	9970	
GUYS & ANCHORS	0	0	0	0	
SUBTOTAL	\$ 464340	\$ 523530	\$ 511780	\$ 723370	
CONTINGENCIES 10 0%	46430	52350	51180	72340	
TOTAL MATERIALS	\$ 510770	\$ 575880	\$ 562960	\$ 795710	
CONSTRUCTION					
TOWER STEEL & FOUNDATIONS	248010	261170	249700	0	
POLES - STEEL	0	0	0	102710	
WOOD	0	0	0	0	
CONCRETE	0	0	0	0	
CROSSARMS & HARDWARE	0	0	0	0	
CONDUCTOR STRINGING	42220	44420	46160	42220	
GROUNDWIRE STRINGING	3640	3640	3640	3640	
GUYS & ANCHORS	0	0	0	0	
R O W CLEARING AND PREP	11220	11220	11220	11220	
ACCESS ROADS	20390	20390	20390	20390	
SUBTOTAL	\$ 325480	\$ 340840	\$ 331110	\$ 180180	
CHANGE ORDERS 7 0%	22780	23860	23180	12610	
SUBTOTAL	\$ 348260	\$ 364700	\$ 354290	\$ 192790	
CONTINGENCIES 10 0%	34830	36470	35430	19280	
INSPECTION 9 0%	31340	32820	31890	17350	
TOTAL CONSTRUCTION	\$ 414430	\$ 433990	\$ 421110	\$ 229420	
TOTAL COST PER MILE	\$ 961170	\$ 1045840	\$ 1020140	\$ 1061100	

*Concrete footing & anchor bolts are included in steel pole material & labor costs

100

FREQUENCY REGULATION AGREEMENT

This Frequency Regulation Agreement (this "Agreement") is made and entered into this _____ day of _____, 199_, by and among _____ representing the Republic of Kazakhstan, _____ representing the Republic of Kyrgyzstan, _____ representing the Republic of Tajikistan, _____ representing the Republic of Turkmenistan and _____ representing the Republic of Uzbekistan, (each a "Party" and, altogether, the "Parties")

Whereas, the Parties own and operate facilities for the generation and transmission of electrical energy, and

Whereas, the Parties serve electrical load within their respective Republics, and

Whereas, the Parties' electrical generation and transmission facilities are interconnected within the Central Asia Control Area, and

Whereas, the Parties recognize that it is in the best interests of themselves and their customers to operate the Central Asia Control Area as close as possible to a frequency of 50 Hertz, and

Whereas, the Parties recognize that certain generation assets must be controlled to assure that the Control Area frequency remains as close as possible to 50 Hertz, and

Whereas, each Party shares in the responsibility of maintaining the Control Area frequency as close as possible to 50 Hertz, and

Whereas, the Parties acknowledge that the owners of such regulating facilities incur additional costs in regulating the frequency of the Central Asia Control Area,

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

1 DEFINITIONS

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

1.2 **CAPP** The Central Asia Republics Regional Electric Power Pool, an association of electrical energy companies and applicable Ministries of the governments of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, established to oversee and set policy for the operation of the electrical power network in the Central Asia Control Area

1.3 Control Area The electric power system or combination of electric power systems bounded by interconnection metering and telemetry to which a common automatic generation control scheme is applied. The CAPP control area includes the electrical energy systems of Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, and the southern part of Kazakhstan.

1.4 DC Energia The Central Asia Republics regional electrical energy dispatch center and any permitted successors and assigns.

1.5 Effective Date [_____, 199_]

1.6 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.

1.7 System All generating facilities in the CAPP Control Area which are subject to central dispatch and all transmission facilities rated 110kV or above in the CAR Control Area.

1.8 Central Asia Control Area peak load The coincident peak load of the five Central Asia Republics, as measured by DC Energia, for the calendar year preceding the Effective Date of this Agreement.

2 PURPOSE

The purpose of this agreement is to establish a procedure by which the costs of providing frequency regulation service within the Central Asia Control Area are equitably shared among the Parties.

3 STATUS OF PREVIOUS AGREEMENTS BETWEEN THE PARTIES

3.1 This Agreement is the only agreement in effect among the Parties as of the Effective Date regarding compensation for frequency regulation service. All previous agreements for the compensation for frequency regulation service among the Parties, either oral or written, including the various drafts of this Agreement, shall be of no force or effect and shall not be used as a guide to the interpretation of this Agreement.

3.2 The Governments of the Parties to this Agreement 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 DC Energia is not a party to this Agreement but the obligations of DC Energia under Sections 5 and 6 are governed by the CAPP System Operator Agreement. The Parties to this Agreement will provide to DC Energia all information necessary for DC Energia to make the appropriate allocation among the Parties of billings for frequency regulation service.

3.4 The obligations of the CAPP under Sections 5 and 6 are governed by the CAPP Agreement. If the Parties have not signed the CAPP Agreement, this Frequency Regulation Agreement will not become effective until a CAPP Agreement is signed.

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)(months) upon mutual agreement among the Parties.

5 FREQUENCY REGULATION SERVICE

Each Party to this Agreement shall be responsible for a share of the costs associated with regulating the frequency of the Central Asia Control Area. The allocation of the costs among the Parties shall be made on the basis of each Party's percentage share of the Central Asia Control Area peak load. The dispatching of frequency regulation service shall be performed by DC Energia, in accordance with criteria and procedures as established by the Central Asia Power Pool.

6 BILLING AND PAYMENT

6.1 Billing for Frequency Regulation Service Each Party which provides Frequency Regulation Service shall calculate a monthly bill for such service (according to the methodology shown in Attachment A) and shall submit the bill to the Central Asia Power Pool by the 10th day of the following month. CAPP will verify the amount of each billing through operating records kept by DC Energia and will produce a monthly total for the costs of frequency regulation service to the Central Asia Control Area.

6.2 Allocation of Monthly Costs Based upon each Party's proportional share of the previous calendar year's peak load in the Central Asia Control Area, CAPP will compute each Party's share of the total monthly cost of furnishing Frequency Regulation Service, and will bill, by the 15th day of the following month, each party for its allocated share, regardless of whether or not the party provided Frequency Regulation Service.

6.3 Calculation of Net Amount Owed To (Due From) CAPP CAPP shall, for each Party, subtract that Party's allocated share of Frequency Regulation Service from its billed cost of providing such service. If the difference is negative, that Party will be billed said amount by CAPP. If the difference is positive, that Party will be reimbursed said amount by CAPP.

6.4 Payment for Monthly Frequency Regulation Service by Parties to CAPP Each Party owing CAPP for the net amount of monthly frequency regulation service shall make payment to CAPP of the invoiced amount for such service by the last day of the following month. Payment not received at CAPP within 30 days of invoicing shall be considered outside of the payment period and overdue.

6 5 Reimbursement to Parties for providing Frequency Regulation Service

Within 15 days of receiving payment from the owing Parties, CAPP shall disburse the receipts back to those Parties which are due reimbursement

6 6 Failure to Pay

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

(b) If a Party fails to make payment of any amount required under this Agreement, CAPP will notify said Party of the overdue amounts. If CAPP and the Party cannot come to an arrangement suitable to all Parties to this Agreement, the matter will be taken to the Central Asia Energy Council for resolution

6 7 Responsible Party in the Republic of Kazakhstan The Party of the Republic of Kazakhstan is responsible for measuring the costs associated with frequency regulation in Kazakhstan, calculating monthly bills under Section 6 1, making payments under Section 6 4 and receiving reimbursement under Section 6 5. This Agreement is not contingent on any system of billing and payment among generating companies and other entities that are internal to Kazakhstan. No generating company in Kazakhstan has the right to negotiate directly with the other Parties concerning frequency regulation services and payments

7 LIABILITIES

In no event shall any of the Parties to this Agreement be liable to the other Parties 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

8 FORCE MAJEURE

8 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

8 2 Notice of Event The Party claiming a Force Majeure event shall give notice in writing to the other Parties 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

9 DISPUTE RESOLUTION

Any dispute among the Parties to this Agreement arising out of or related to this Agreement and which cannot be resolved by informal means among the Parties or with the Central Asia Power Pool 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.

10 GOVERNING LAW

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

11 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.

Notice shall be given to the Party of the Republic of Kazakhstan at

Notice shall be given to the Party of the Republic of Kyrgyzstan at

Notice shall be given to the Party of the Republic of Tajikistan at

Notice shall be given to the Party of the Republic of Turkmenistan at

Notice shall be given to the Party of the Republic of Uzbekistan at

105

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. A Party may change its address for receiving notices contemplated by this Agreement by delivering notice of its new address to the other Parties.

12 SUCCESSORS AND ASSIGNS

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

13 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 a 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.

14 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.

15 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.

16 AMENDMENT

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

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

For the Republic of Kazakhstan

By _____
Organization
Name
Title

For the Republic of Kyrgyzstan

By _____
Organization
Name
Title

For the Republic of Tajikistan

By _____
Organization
Name
Title

For the Republic of Turkmenistan

By _____
Organization
Name
Title

For the Republic of Uzbekistan

By _____
Organization
Name
Title

107

ATTACHMENT 1

**METHODOLOGY FOR CALCULATING THE COSTS OF PROVIDING
FREQUENCY REGULATION SERVICE**

STEP ONE For each Republic, determine the total mean hourly deviation of generation assigned to frequency regulation over the monthly period

From operating records obtained from the previous month, calculate the absolute mean value of the change in MW load level from one hour to the next hour for stations assigned by DC Energia to frequency regulation. Since there is equal likelihood that the deviation was either an increase or a decrease, the mean shall next be divided by two. Calculate the system-wide mean deviation by summing all the individual stations' mean deviations.

STEP TWO From engineering studies, determine the present value of the total cost per kW for each type of generating asset which could be assigned to frequency regulation service in Central Asia. The different types of units could include low-head hydro, high-head hydro, coal-fired thermal, oil-fired thermal, gas-fired thermal, single-cycle gas turbine, and combined-cycle gas turbines. For each type of asset, determine the annual value of generation (per KW) through the use of the following formula:

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

R = recurring annuity value equivalent to the present value of the asset (over the life of the facility)

P = the present value of a particular type of generating asset

r = discount rate

n = economic life of the facility

Divide the annualized value by 12 to get a monthly value.

STEP THREE For each generating station assigned to frequency regulation in the month, multiply its installed capacity by the percentage of time that it was assigned to such duty and also by its availability over the month. This available capacity figure can then be compared to the total system capacity available for frequency regulation to give percentage of each station's participation in frequency regulation. Multiply each station's percentage participation in frequency regulation by that station's monthly value of generation to get each station's weighted monthly cost, expressed on a per-kW basis. Sum each station's weighted cost to get the system cost (per Republic) over the month for frequency regulation service.

STEP FOUR Determine the month's cost of frequency regulation service by multiplying the system-wide mean deviation times the total weighted cost per kW for such service.

An Example of the Flow of Costs and Payments for Frequency Regulation Service

(Not a part of the Agreement)

Assume that the billed costs of each Party in providing frequency regulation service for the month of November, 1996 were

Kazakhstan	\$ 30,000	
Kyrgyzstan	\$100,000	
Tajikistan	\$125,000	
Turkmenistan	\$ 10,000	
Uzbekistan	<u>\$ 15,000</u>	
	\$280,000	Total cost for frequency regulation in Central Asia Control Area for 11/96

Assume also that each Party's share of the 1995 peak load was

Kazakhstan	30%
Kyrgyzstan	9%
Tajikistan	11%
Turkmenistan	8%
Uzbekistan	42%

Therefore, each Party is responsible for the following amount

Kazakhstan	30% of \$280,000 =	\$ 84,000
Kyrgyzstan	9% of \$280,000 =	\$ 25,200
Tajikistan	11% of \$280,000 =	\$ 30,800
Turkmenistan	8% of \$280,000 =	\$ 22,400
Uzbekistan	42% of \$280,000 =	\$117,600

Subtracting the responsibility charge from the cost of providing the service yields the net amount due from each Party

Kazakhstan	\$84,000	minus \$ 30,000 =	\$54,000
Kyrgyzstan	\$25,200	minus \$100,000 =	(\$74,800)
Tajikistan	\$30,800	minus \$125,000 =	(\$94,200)
Turkmenistan	\$22,400	minus \$ 10,000 =	\$12,400
Uzbekistan	\$117,600	minus \$ 15,000 =	\$102,600

Thus, each Party pays for its share of the total Pool cost of providing frequency regulation service and is also reimbursed for its documented costs in providing such service to the Pool

**A SAMPLE DETERMINATION OF A REPUBLIC'S COSTS OF PARTICIPATION IN
FREQUENCY REGULATION OVER A MONTH**

1 Assume that an analysis of operating records shows that one Republic determined that its system-wide mean deviation over the previous month was 7,000 kW

The determination of the weighted monthly cost of frequency regulation is as follows

STATION	INSTALLED CAPACITY (MW)	% OF MONTH ON FR	AVAIL FACTOR	AVAIL CAPACITY (MW)	PARTICI PATION	VALUE PER KW	ANNUAL FACTOR	WEIGHTED ANNUAL COST/KW
Hydro #1	100	95 00%	99%	94 05	0 12586	\$ 1 400	0 20	\$ 35 24
Hydro #2	150	85 00%	99%	126 23	0 16893	\$ 1 200	0 20	\$ 40 54
Hydro #3	1500	35 00%	99%	519 75	0 69557	\$ 800	0 20	\$ 111 29
Thermal	1800	5 00%	80%	72	0 00964	\$ 600	0 30	\$ 1 73
totals	3550			747 23	1 00			\$ 188 81

The weighted cost per month on a per-kW basis is $\$188.81 / 12 = \15.73

The system's monthly cost of frequency regulation service is

$$\$15.73 \text{ per kW} * 7,000 \text{ kW} = \$110,110$$

CENTRAL ASIA POWER POOL SYSTEM OPERATOR AGREEMENT

This Central Asia Power Pool System Operator Agreement (this "Agreement") is made and entered into this ____ day of _____, 199_, by and between the Central Asia Power Pool (CAPP), an association of electrical energy companies and applicable Ministries of the governments of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, and the Dispatch Center Energia (DC Energia) (each a "Party" and, together, the "Parties")

Whereas, the members of CAPP own and operate facilities for the generation and transmission of wholesale electric power, and

Whereas, CAPP coordinates and directs the operation of the System through a mechanism of central dispatch in order to attain maximum practicable economy consistent with proper standards of reliability, and

Whereas, CAPP and DC Energia desire to enter into this Agreement to clarify the roles and responsibilities of each Party relating to the operation of the System,

Now, therefore, CAPP and DC Energia, each in consideration of the mutual agreements set forth herein agree as follows

1 DEFINITIONS

1.1 **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

1.2 **CAPP** The Central Asia Republics Regional Electric Power Pool as defined in the first paragraph of this Agreement

1.3 **CAPP Agreement** The agreement reached between CAPP and its members regarding the duties and responsibilities of same toward each other relative to the operation of the Pool, including all schedules thereto, as the same may be amended or supplemented from time to time

1.4 **CAPP Participant** An electrical energy company which meets the requirements for membership in and is a signatory to the CAPP Agreement

1.5 **Control Area** The electric power system or combination of electric power systems bounded by interconnection metering and telemetry to which a common automatic generation control scheme is applied. The CAPP control area includes the electrical energy systems of Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, and the southern part of Kazakhstan

1.6 **Criteria** Criteria, rules and standards for administration of CAPP Agreement and 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

1 7 DC ENERGIA The Central Asia Republics regional electrical energy dispatch center and any permitted successors and assigns

1 8 DC ENERGIA Control Center The dispatching facilities used by DC Energia in carrying out its responsibilities under CAPP Agreement, consisting of a portion of a certain building located in Tashkent, Uzbekistan, together with furnishings and equipment contained therein

1 9 Effective Date [_____, 199_]

1 10 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

1 11 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.

1 12 Multilateral Wheeling Agreement An agreement among the CAPP participants 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

1 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

1 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

1 15 System All generating facilities in the CAPP Control Area which are subject to central dispatch and all transmission facilities rated 110kV or above in the CAR Control Area

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 13

4 AGREEMENT ADMINISTRATION

This agreement shall be administered for and on behalf of (i) DC Energia Board of Directors, and (ii) CAPP or its designee

5 QUALIFICATIONS OF DC ENERGIA

5.1 Board of Directors The Board of Directors of DC Energia shall be comprised of 11 members with a cross-section of skills and experience (such as, for purposes of illustration but not by way of mandate or limitation experience in regulatory affairs, electric utility management, corporate finance, bulk power systems, human resource administration, power pool operations, public policy, consumer advocacy, environmental affairs, business management and information systems), sufficient to enable the Board to ensure that DC Energia is satisfying its obligations under this Agreement. One member shall be the Director of DC Energia. The remaining ten positions shall be two each per Central Asia Republic, shall serve four-year terms, shall be nominated by the DC Energia Board of Directors, and approved by the applicable Republic's energy ministry.

5.2 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.

5.3 Conflict of Interest No DC Energia Director or 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.

5.4 Non-Profit Entity DC Energia shall exist as a non-profit corporation and not engage in for-profit activity.

6 RIGHTS AND OBLIGATIONS OF DC ENERGIA

6.1 Operation of the System DC Energia shall serve as the operator of the CAPP Control Area and shall assume responsibility for operation of the System, consistent with the terms of this Agreement, CAPP 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

6 2 Administration of Multilateral Wheeling Agreements DC Energia will prepare invoices based upon the Multilateral Wheeling Agreement and monitor the payment of these invoices

6 3 System Planning DC Energia shall conduct System assessment and planning at the direction of CAPP 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 CAPP

6 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][Who is the present owner?]

6 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

6 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

6 7 Interconnection Contracts DC Energia shall administer the interconnection contracts between the CAPP Control Area and contiguous Control Areas

6 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 CAPP as it deems appropriate

6 9 Dissemination of Information DC Energia shall disseminate information furnished to it by CAPP members consistent with CAPP Information Policy [to be developed], and shall maintain the confidentiality of such information in accordance with the provisions of such policy

6 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

6 11 Annual Report and Performance Audit DC Energia shall prepare and submit to CAPP an annual report on its performance under this Agreement and cooperate in the conduct of a periodic audit of its performance. The audit shall be conducted by an independent third party to be chosen by mutual agreement of the Parties, and shall be conducted at such intervals as shall be determined by CAPP, but in any event not less frequently than every two years.

6 12 Financial Audit DC Energia shall deliver to CAPP 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 CAPP.

7 RIGHTS AND OBLIGATIONS OF CAPP AND THE CAPP PARTICIPANTS

7 1 Operation of Facilities The CAPP Participants shall operate their facilities which are part of the System at the direction of DC Energia, consistent with the terms of this Agreement, CAPP 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.

7 2 Provision of Information CAPP and the CAPP Participants 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 CAPP Information Policy.

7 3 Development of Additional Criteria CAPP shall, in conjunction with DC Energia, develop and provide DC Energia with additional Criteria and Operating Procedures appropriate to allow DC Energia to carry out its obligations under this Agreement.

7 4 Payment for Services CAPP 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, CAPP shall provide long-term financing for capital improvements, as budgeted according to the process described in Section 8.

7 5 Payment for Audits CAPP shall bear all costs of the performance and financial audits to be conducted in respect of DC Energia pursuant to Sections 6 11 and 6 12 of this Agreement.

7 6 Emergency Actions The CAPP Participants 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.

8 DC ENERGIA BUDGET

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

8.2 Preparation of Annual Budget Seventy-five (75) days before the start of each Operating Year, DC Energia shall prepare and submit to CAPP a detailed budget for the upcoming Operating Year

8.3 Review of Budget CAPP 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 agreed to by CAPP and DC Energia

8.4 Budget Disputes If CAPP and DC Energia 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 nonrecurring expenses incurred by DC Energia during the current Operating Year

8.5 Changes to the Budget 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 by CAPP, and any changes to the budget shall be as mutually agreed to by DC Energia and CAPP

9 BILLING AND PAYMENT

9.1 Obligation to Pay CAPP shall pay DC Energia for its operating expenses and working capital requirements as set forth in the then-current budget. Each Central Asia Participant shall be liable only for such portion of such expenses and working capital requirements as are allocated to such Participant in accordance with the provisions of CAPP Agreement [*to be developed*], subject to Section 9.4 of this Agreement

9.2 Period Billing and Payment DC Energia shall prepare an itemized statement no less frequently than once a month for each Central Asia Participant, 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 Central Asia Participant 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

9.3 Payment Disputes If a Participant disagrees with any amount set forth in a statement from DC Energia, that Participant shall promptly notify DC Energia and DC

Energia shall attempt to resolve such disagreement with that Participant. If the disagreement cannot be resolved by the Participant and DC Energia, DC Energia shall refer the matter to CAPP for resolution. If DC Energia disagrees with the resolution by CAPP, it may seek dispute resolution under Section 12.1 of this Agreement. If the Participant disagrees with the resolution by CAPP, it may seek dispute resolution under the dispute resolution procedures of CAPP Agreement. Notwithstanding a Participant's disagreement with any amount set forth in a statement from DC Energia, that Participant shall pay when due the full amount, if any, shown as due from such Participant on such statement and such payment shall not prejudice the rights of the Participant to dispute the amounts set forth in such statement.

9.4 Failure to Pay

- (a) A failure of a Participant 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 Participant fails to pay DC Energia any amount required under Section 9 of this Agreement, DC Energia shall provide notice to such Participant of the non-payment. If, by the due date for payments in the next billing cycle, such Participant has not cured the non-payment, DC Energia may withhold and, in the case of amounts payable under Section 9.1, 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 Participant on such date. If DC Energia is unable and is, in the sole judgment of DC Energia, unlikely to be able to cure such non-payment through such a withholding, DC Energia shall send a notice to CAPP. CAPP may take such measures as may be permitted under CAPP Agreement to collect such overdue payment from the defaulting Participant. If CAPP fails, within 30 days of the receipt of such notice, to collect such non-payment and if such non-payment relates to an amount payable under Section 9.1, 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 Participant to the extent that DC Energia has not collected amounts sufficient, after deduction of amounts due to DC Energia pursuant to Section 9.1 or the Tariffs, to make such payment. If any Participant or a customer of transmission services which is not a Participant fails to pay DC Energia the full amount due from such Participant or entity when due, DC Energia, in disbursing amounts collected, shall allocate the resulting shortfall among the Participants in accordance with CAPP/CAPP Participants Agreement.
- (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, CAPP shall designate a subcommittee to work with DC Energia to revise the billing and

payment cycle or to take such other steps to allow DC Energia to make payments when due

10 LIABILITY, INDEMNIFICATION AND INSURANCE

10 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

10 2 Liability of CAPP Participants The Participants 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

10 3 Limitation of Liability In no event shall either Party to this Agreement be liable to the 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

10 4 Indemnification CAPP 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

10 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 coverages and upon such terms as agreed to through the process of approving DC Energia's budget

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 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

11 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

12 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 Board of Directors of DC Energia, and (ii) by CAPP, to a representative designated by CAPP Executive Committee, 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.

13 DC ENERGIA TERMINATION OR RESIGNATION

13.1 DC ENERGIA Default

(a) In the event that CAPP determines that DC Energia has failed, for any reason other than Force Majeure or the non-performance by Participants of their duties and obligations under this Agreement, to perform under this Agreement in a satisfactory fashion, CAPP shall attempt to resolve the performance problem informally with the management of DC Energia. In the event that such informal efforts to resolve such performance problems are unsuccessful, the Chairman of CAPP shall put CAPP's concerns in writing and shall submit a written request to the Board of Directors of DC Energia asking that the Board of Directors take appropriate action to resolve the performance problem. The Board of Directors shall have 60 days to resolve the performance problem to the satisfaction of CAPP or to submit the problem for resolution in accordance with the dispute resolution procedures set forth in Section 12.

(b) In the case of a violation by DC Energia of any of the provisions of Section 5.3 of this Agreement (financial interest), or a willful violation of this Agreement that materially impairs the safe or reliable operation of the Central Asia Control Area, CAPP shall not be required to pursue informal resolution under this Section 13.1 and may, upon written notice to the Board of Directors of DC Energia and after a reasonable period to cure such violation, which shall be specified in that notice and established in light of the nature of the violation, proceed immediately to seek to remove DC Energia under Section 13.2(b) if such violation has not been cured by DC Energia to the satisfaction of CAPP. DC Energia shall not have the right to submit a disagreement involving a matter described in the immediately preceding sentence for dispute resolution under Section 12.1.

13.2 Removal Vote

(a) In the event DC Energia's Board of Directors fails to satisfy the concerns submitted to it pursuant to Section 13.1 to the satisfaction of CAPP within 60 days of the submittal, or if DC Energia's Board of Directors sought resolution of the concerns in accordance with the dispute resolution procedures set forth in Section 12.1 within such 60 day period and the concerns have not been resolved through such procedures, CAPP shall have the right to submit the performance problem to the Executive Board of CAPP for a vote as to whether DC Energia should be removed and replaced

(b) DC Energia may be removed under this section by a two-thirds vote supporting removal by the Executive Board of CAPP

(c) Other than in the circumstances specified in Section 13.1(b), it is the intent of the Parties that the procedures in this Section 13.2 providing for potential removal of DC Energia for failure to perform satisfactorily under this agreement will be used only when all reasonable good faith efforts have been exhausted under Section 13.1(a) to resolve concerns regarding DC Energia's performance by means short of removal of DC Energia

13.3 Individual Party Concern with DC Energia In the event that any Participant believes that DC Energia is not performing satisfactorily, such Participant may pursue the matter only by submitting a complaint in writing concerning the matter to CAPP. If CAPP agrees with the complaint, the procedures of Section 13.1 shall apply

13.4 Selection of New DC ENERGIA

(a) In the event that CAPP votes to remove DC Energia pursuant to Section 13.2 or DC Energia gives a notice of resignation pursuant to Section 13.7, the Executive Committee of CAPP shall designate three individuals, representing a diversity of interests, to form a subcommittee to select and negotiate a new service agreement with, or an assignment of this Agreement to, a new independent system operator

(b) Such subcommittee shall have the authority to retain counsel, with the costs thereof and other costs of the subcommittee allocated among the Participants in the same proportions as the allocation of DC Energia budget for the current year

(c) The selection of the new independent system operator and the proposed new service agreement or an assignment of this Agreement shall be subject to approval by a vote of CAPP Executive Committee

13 5 Transition During the period that a new independent system operator is being chosen in accordance with Section 13 4, this Agreement shall remain in effect and DC Energia shall continue to perform its functions in accordance with this Agreement DC Energia shall also work with the subcommittee appointed pursuant to Section 13 4 and the new independent system operator to effect a smooth transition, including, if requested by such subcommittee, (I) assisting in the preparation of an inventory of all equipment and supplies, (II) assigning all subcontracts and other contracts as directed and (III) assisting the training of any personnel of the successor independent system operator

13 6 Breach of Contractual Obligations by Participants

(a) If a Participant fails to perform any of its obligations (other than its payment obligations) to DC Energia under this Agreement for reasons other than Force Majeure, DC Energia shall provide notice of such failure to such Participant and to CAPP If, within 60 days of the date of such notice, such Participant has not made substantial progress to remedy such failure to perform, DC Energia shall send a notice of such failure to CAPP Executive Committee

(b) The CAPP Executive Committee may take such measures as may be permitted under the CAPP Agreement to remedy the failure to perform by the defaulting party If CAPP Executive Committee fails, within 30 days of the receipt of such notice, to remedy such failure to perform, and such failure has a material adverse effect on DC Energia, CAPP Executive Committee shall inform DC Energia of the reasons for its failure to remedy the default and DC Energia may pursue any other remedies that it may have at law or in equity

(c) If a Participant fails to comply with an authorized direction from DC Energia, in the circumstances in which such failure is not permitted by the Criteria and the CAPP Agreement, and such failure imperils the safety or reliability of the Central Asia Control Area, DC Energia shall be authorized to take any action it deems to be prudent to maintain the safety and reliability of the Central Asia Control Area In such circumstances, DC Energia shall have the right to request CAPP Executive Committee to address such Participant in accordance with the provisions of the CAPP Agreement

13 7 Resignation of DC Energia If, after following the requirements of Section 13 6, the failure of a Participant to perform an obligation under this Agreement has not been cured, and such failure to perform has a material adverse effect on DC Energia, DC Energia may, in addition to any other remedies that it may have at law or in equity, resign by giving notice to CAPP Executive Committee An uncured failure of a Participant to make a payment due to DC Energia shall be deemed to have a material adverse effect on DC Energia

14 GOVERNING LAW

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

15 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

Notice shall be given to DC Energia at

Notice shall be given to CAPP at

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 Either Party may change their address for receiving notices contemplated by this Agreement by delivering notice of its new address to the other

16 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 CAPP Executive Committee

17 RELATIONSHIP OF THE PARTIES

Nothing in this Agreement is intended to create a partnership, joint venture or other joint legal entity making either Party jointly or severally liable for the acts or omissions of the other Party [*this wording may not be necessary in Central Asia*]

18 WAIVER

Delay by either Party in enforcing its rights under this Agreement shall not be deemed a waiver of such rights Any waiver of rights by either 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

19 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 either 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.

20 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.

21 COUNTERPARTS

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

22 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.

23 AMENDMENT

This Agreement may be amended only in writing and as agreed to by DC Energia and CAPP, acting pursuant to a vote of the Executive Committee of CAPP.

CAPP and DC Energia have caused this Agreement to be executed by the duly authorized representatives as of the date first set forth above.

CAPP

DC ENERGIA

By _____
Name
Title

By _____
Name
Title

SCHEDULE A

BUDGET FOR OPERATING YEAR 199_

[to be developed]

ANSWERS TO QUESTIONS ON INTERNATIONAL EXPERIENCE

David Thornton, CMPI
Charles Zimmermann, Hagler Bailly Consulting

Regional Seminar on International Electric Power Contracts
Almaty, Kazakstan, December 11-12, 1996

This document contains answers to questions raised by the Ministry of Power Industry of Uzbekistan following the seminar held in August 1996 in Tashkent. The following questions are discussed here:

#1 Contractual relationships *In what way are the relationships on electricity energy flows arranged between*

- *the power pools in the USA*
- *the energy companies within the power pool*
- *the countries (e.g. USA-Canada, France-Spain, etc.)*

#2 Tariff setting *In what way are the tariffs on mutual energy and power flows set in the power company, in the pool, between the power company and the pool, and between the countries as well?*

#3 Regulation of frequency *Is there any methodology on how to determine the expenses of the power company which regulates the capacity in the power pool by the Hydros? Who shall cover such expenses?*

#4 Customs procedures *Do any customs procedures on interstate electricity flows and wheeling exist? If they do, what are the procedures and customs duty rates?*

#5 Wheeling tariffs *What are the average tariffs for electricity wheeling services made by the power company (by the pool or by the country)?*

#6 Settlements *What is the baseline for the mutual settlements? In what way are the intersystem electricity flows, wheeling and frequency regulation services accounted?*

Our answers are based on U.S. and Canadian experience. In question 4 (customs duties) we also discuss European experience.

Definitions of terms

In providing answers to these questions we use certain terms to describe the power sector in the United States and Canada.

A *state* is one of the 50 states in the USA. A *province* is one of the provinces of Canada.

A *power system* is an organization which owns and operates electric networks. If it is a private company it must have a legal structure comparable to an open joint stock company in the CIS. If it is a government enterprise it may be owned by the national government, by a state or province, by a county (a small region located within a state), or by a city. The large private companies own generating stations as well as networks. Many of the smaller enterprises owned by counties and cities do not own generating stations.

A *power pool* is a group of power systems which have voluntarily formed a pool by signing a pool agreement.

Mutual settlements are payments made by power systems to other power systems or to organizations owned by power systems.

Energy which is *returned in kind* consists of energy which is delivered and received in equal amounts at different times, so that there is no payment of cash and no payment with barter, there is no mutual settlement. This energy flow is measured hourly but the power systems attempt to maintain a net balance (saldo) equal to zero over an agreed time period (for example, a year).

Energy is measured in kWh or MWh. *Capacity* is requested or scheduled by the buyer and is measured in kW or MW. *Power* is measured in MW and it is simply a physical flow, it is not necessarily requested or scheduled by the power system which receives it.

A *regional council* is a group of power systems which are interconnected and have voluntarily formed a council to set reliability standards. Two of the ten regional councils in North America are power pools and the other eight regional councils are not power pools. All of the regional councils are members of the North American Electric Reliability Council, which sets reliability standards for the U.S. and Canada.

Ancillary services include frequency control, voltage control, reactive power control, maintenance of reserve capacity, and other services necessary to support network operations and ensure reliability of power supply.

Question #1 Contractual relationships

In what way are the relationships on electricity energy flows arranged between

- *the power pools in the USA*
- *the energy companies within the power pool*
- *the countries (e.g. USA-Canada, France-Spain, etc.)*

Pool-to-pool

Within the United States, power pools are private (non-government) organizations which act as agents for their participating electric utility companies (predominantly private companies also). One Pool may enter into a contract with another pool for various services, depending on the individual and aggregate needs of its participants.

The contract may be for energy only, for capacity only, for a combination of capacity and energy, or may be structured as an Interconnection Agreement, incorporating a comprehensive set of services including, besides energy and capacity, other services to the mutual benefit of both pools (and their participants)

During the Seminar which were conducted in Tashkent in August of 1996, we described an Energy Contract between the New England Power Pool (NEPOOL) and Hydro-Quebec. Although this contract is between a US power pool (NEPOOL) and a Canadian utility (Hydro-Quebec), the form is nearly identical with that of a contract between two US pools (deleting the few international aspects). Mr. Biddison, Hagler Bailly/Almaty, has a copy of the NEPOOL - Hydro-Quebec Contract and can make a copy available for you. I am sending, by separate cover, an example of a second contract, an Interconnection Agreement between NEPOOL and the New Brunswick Power Commission (Canada).

Company-to-company (both within the same pool)

Individual electric power companies within a pool may negotiate and execute bilateral contracts for energy and/or capacity or may negotiate and execute comprehensive interconnection agreements, subject to review and approval by the Pool. The Pool's interest in reviewing the proposed transaction is to ensure that such a transaction does not place an undue impact upon other participants within the Pool. In other words, if a proposed transaction would place limitations on an existing economy energy contract (for instance), the Pool would either disallow it entirely or place restrictions on its operation. I am sending (under separate cover) examples of both a long-term bilateral contract and a shorter term, more standardized contract.

International contracts

In North America, international contracts may be negotiated and executed by Pools, acting as agents for their participants, or by individual companies or consortiums of companies. As with the other types of transactions described above, the contracts may be for energy and/or capacity, or may be in the form of comprehensive interconnection agreements. In the August Seminars, we described the NEPOOL/Hydro-Quebec Energy Contract (mentioned above) and also an Interconnection Agreement between Central Maine Power Company and Hydro-Quebec. Both of these documents are available from Mr. Biddison at the Almaty office of Hagler Bailly Consulting.

Question #2 Tariff setting

In what way are the tariffs on mutual energy and power flows set in the power company, in the pool, between the power company and the pool, and between the countries as well

There are many different approaches to tariff-setting in the United States as a result of the variety of ownership structures for power sector organizations and the fact that each state government has the legal authority to set regulations that are different from the other state government's regulations. In the following discussion we will try to keep our answer simple, we will describe the most common approaches to tariff-setting.

Transactions between the power system and end users

Tariffs for the sale of electricity by a power system to end users are normally subject to the regulatory approval of a state government commission, usually called the Public Utilities Commission. This commission includes a decision-making board at the highest level and it also includes a staff of technical experts who review the documents and plans submitted for approval. A large commission may have various administrative law judges who issue decisions on requests for tariff increases and other types of routine applications received by the commission from the power companies. Throughout the United States the traditional approach to calculating electricity tariffs involves five basic steps:

- 1 Calculate the total production cost of all of the electricity sold by the power system during a particular calendar year (the *test year*), and the cost of wheeling the electricity that is wheeled during the same year. Production cost includes an allowance for dividend payments to shareholders and interest payments to holders of long-term debt. Develop a projection of the level of energy sales, the level of peak demand, and the amount of revenue that the power system will need to collect from consumers during the year.
- 2 Divide the total production cost into three categories: demand-related, and energy-related, and customer-related. These costs can be used to develop two-part tariffs or flat tariffs, and normally some minimum monthly fee is used by the power system to recover the customer-related costs.
- 3 Identify a set of customer classes, such as industry, households, street lighting, public authorities, railroads, and so forth. There could be a customer class for wheeling customers.
- 4 Collect information on the daily, weekly, and annual load profile for each customer class, and allocate the total revenue requirement to the different customer classes. Develop tariffs so that each customer class will have a total electricity bill that covers the production cost of the electricity sold during the test year (or the cost of wheeling the electricity wheeled).
- 5 Develop either a two-part tariff or a flat tariff for each customer class, so that the projected levels of capacity and energy use will result in the target level of revenue for the power system.

Once the tariffs are calculated by the power system and approved by the commission on the basis of projections for the test year, the tariffs are normally adjusted on a monthly basis according to changes in the cost of purchased fuels and purchased electricity. When the price of heavy fuel oil changes as a result of oil market conditions, for example, the power system is normally allowed to adjust the price of electricity generated from heavy fuel oil and sold to end users. Fuel prices are typically considered to be outside the control of the power system, and therefore the commission establishes a procedure for adjusting prices monthly (or annually) in response to fuel price changes.

Additional information on traditional U.S. procedures for calculating tariffs to end users is found in a publication of the Edison Electric Institute which is available (in

Russian) from the Almaty office of Hagler Bailly Consulting. This short publication is entitled *Progress in the Creation of Tariffs for Electric Energy*¹

Transactions between the power system and the pool

The prices for electric capacity and energy sold or exchanged within a power pool are normally calculated according to a procedure selected by the members of the power pool and not by the state government(s) or the federal government. The government authorities generally recognize that transactions achieved by a power pool may result in a lower cost of electricity but do not result in higher electricity prices. Each power pool has its own set of rules. For the New England Power Pool the pricing procedure is described in the presentation on *Power Pool Operation* by David Thornton, in the seminar materials distributed in August 1996. In summary the New England Power Pool operates a central dispatch center which dispatches electricity on a least-cost basis and later calculates the amount of savings, in dollars, that resulted from the existence of a pool (as opposed to a group of power systems acting independently). These savings are distributed among the owner of the pool and are not taxed as profits.

Most pool transactions exist between the power system and the pool. In some cases a pool can schedule or facilitate short-term transactions between two power systems. There are no tariffs for energy and power flows "in the pool" (as opposed to energy and power flows "between the power company and the pool") because the pool does not have an internal market for electricity. The pool quickly resells any electricity that it buys. It may earn a "profit" on purchases and sales, and then redistribute this profit to the power systems that own the pool.

The federal government of the United States manages a Federal Energy Regulatory Commission (FERC) which has the legal authority to set the tariffs for electricity in any sales or wheeling transaction involving two or more states. Most of the activities of FERC are directed to transactions outside the operations of pools such as the New England Power Pool. The FERC has anti-monopoly powers, in the electric sector, it must protect the interests of buyers, when the seller is a monopoly, and must protect the interests of sellers, when the buyer is a monopsony. A power pool does not allow one of the members of the pool to act as a monopolist and charge excessive prices to the other pool members. Economy energy transactions within a power pool are too numerous to be regulated by the FERC.

Transactions between countries

In North America, sales of electricity across international borders are always sales between two power sector organizations - for example, between a power system and a power pool, or between two power systems. The national governments do not negotiate or sign the contracts, and there is no national organization which holds a monopoly over power exports or imports. Therefore the prices of electricity sold between the United States and Canada are determined by negotiation between the parties to the contract, and the contract is subject to the approval of the FERC (on the U.S. side) and the National Energy Board (on the Canadian side). Normally the

¹ This title was used in the Russian translation. The English version is entitled *The Art of Rate Design*.

approval is a routine matter and the government agencies do not change the terms of the contract. On both sides the government does not play a direct role in contract negotiations, it normally entrusts the power company to negotiate electricity import or export contracts that are advantageous to the power company.

It is very common for the prices of energy in U S -Canada transactions to be based on production costs - specifically, on the buyer's decremental cost and/or the seller's incremental cost. Therefore both sides set up a system for sharing information on production costs. The accounting systems are similar in the two countries and there is a level of trust on both sides, the buyer and seller assume that the production cost information provided by the other side is accurate. Fixed prices are not usually found in U S - Canada electricity transactions.

Question #3 Regulation of frequency

Is there any methodology on how to determine the expenses of the power company which regulates the capacity in the power pool by the Hydros? Who shall cover such expenses?

In North America, power pools each operate a control area, which is defined as an 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 pool dispatch center's control computer sends control pulses (raise/lower) to generating units which are equipped to receive and respond to them. NEPOOL expects that each of its Participants will share in the responsibility of regulation. Toward this goal, the NEPOOL Operations Committee determines which generating units among all the participants in the Pool should be equipped to respond to control signals from the Pool Dispatch Center to regulate the speed of the system.

NEPOOL recognizes that its participants which equip their generators for such automatic generation control (AGC) must be compensated both for the installation of the control equipment as well as for increased wear and tear on the units and for adverse efficiency consequences. In NEPOOL, charges are assessed in two parts: Fixed Costs and Hourly Costs.

Fixed Costs

Those units which either haven't installed the necessary control equipment, and those which have but do not have the automatic generation control (AGC) feature available the expected 90 percent of the time must pay a penalty to the pool. The unit's AGC availability rate is defined as the number of hours per year that the unit is available for AGC while the unit is available for operation, divided by the number of hours that the unit is available for operation. If, for example, a unit's AGC availability is 60%, it receives a 30% deficiency (the amount by which it was deficient from 90%). The Pool determines a "generic annual carrying cost" for AGC equipment and updates it from time to time. Each unit's AGC Deficiency Charge is determined by multiplying its deficiency percentage times the generic annual carrying cost. If, for the example given, the generic carrying cost were \$50,000, the AGC Deficiency Charge would be \$15,000 (30% of \$50,000).

If AGC is not installed by a Participant by the date agreed upon with the Pool, the Fixed Cost payment would be one twelfth of the generic annual carrying cost times the number of months late in the current year

At the end of the calendar year, deficient participants will be billed for the past year based upon the rules set forth above. The dollars in the fund are then distributed on a pro rata basis on the product of the unit's generic annual carrying costs and the number of hours per year that the unit is available for AGC while the unit is available for operation.

Hourly Costs

This component compensates the Participants for the increased maintenance costs and efficiency loss associated with load-following (regulation) operation. Thermal units "earn" compensation at a rate of one percent of the unit's hourly production cost during the hour that the unit provides any AGC service. The percentage rate is reviewed by the Pool Operating Committee on an annual basis. For hydro units, the compensation will be equal to the total dollars/total MWh in that hour paid to the thermal AGC units, times the hydro's MWh produced in the hour. During some hours, hydro provides all of the regulation service. For these hours, hydro will be compensated at a rate equal to the total dollars paid during the month to thermal AGC units divided by the corresponding number of thermal MWh generated by those units in hours the units were on AGC. This monthly rate will then be multiplied by the hydro MWh produced in the hour.

The total of these calculated fee dollars are summed for each hour. The total dollars are then collected, pro rata to their hourly load, from all Participants (regardless of whether they provided AGC service or not) and paid into the Hourly Cost Fund. The dollars in the Hourly Cost Fund are then distributed back to each Participant who provided AGC in that hour, in amounts pro rata to the sum of their units' calculated fees.

Changes to reimbursement in NEPOOL

Many utilities and pools in the United States are planning to restructure themselves and their operation in order to become more market-driven rather than have their rates and returns on investment set by regulation. Such a move in NEPOOL would significantly change the way a participant's regulation efforts would be rewarded. Under the restructured NEPOOL, participants would be allocated an AGC requirement equal to their prorated portion of AGC utilized by the Pool on a load basis. Unit owners would submit daily bids expressed in \$/MW-minutes to provide AGC service and dispatchers would select units to provide AGC based on the relative costs of units available to provide AGC. Hourly market clearing prices would be calculated based on the price of the highest block of MWs utilized by NEPOOL in the hour. Participants would be responsible to meet this requirement through either their own resources, bilateral transactions or interchange through the NEPOOL clearing market.

Question #4 Customs procedures

Do any customs procedures on interstate electricity flows and wheeling exist? If they do, what are the procedures and customs duty rates?

A customs tax on electricity may be defined as a tax on electric energy which is imported from another country or exported to another country. This type of tax raises the cost of electricity to consumers and prevents power systems from achieving the least-cost mix of generating sources. If it is a tax on imports, it protects domestic generating stations from competition with imports. If it is a tax on exports, in some situations it could be a source of government revenue - if export prices are very low before the tax is imposed. Our research on electricity taxes shows that none of the leading market economies have a customs tax on electricity, and quite possibly it does not exist anywhere in the world. Our sources of information on electricity taxes are shown in Attachment 1.

We have collected information on electricity taxes in the 26 countries that belong to the Organization for Economic Cooperation and Development (OECD). These countries include all of the countries in western Europe as well as the United States, Canada, Mexico, Turkey, Australia, New Zealand, Japan, Czech Republic, and Hungary. We also collected information on Ukraine. None of these countries has a customs tax on electricity. The best single source of information on energy taxes in the 26 countries in OECD is the quarterly publication entitled *Energy Prices and Taxes*. It contains, for each country, a description of the types of taxes on electricity and the tax rates. Customs taxes on electricity are not mentioned anywhere in this publication, apparently the idea is not even considered seriously. Most OECD countries have value added taxes on electricity, but very few countries have excise taxes on electricity - possibly only Denmark, Italy, and Turkey.

A tax on electricity is against the spirit of free trade. Therefore countries participating in free trade agreements or similar arrangements have signed documents that restrict or prohibit customs taxes on electricity. For example, the European Union issued a Directive on 25 July 1996 *Concerning common rules for the internal market in electricity*. The purpose of the directive is to prevent any EU member country from isolating its electricity market and protecting its domestic generating companies from competition. For example, Article 22 contains a broad prohibition against giving the domestic electricity producers an advantage over foreign producers.

Member States shall create appropriate and efficient mechanisms for regulation, control and transparency so as to avoid any abuse of dominant position, in particular to the detriment of consumers, and any predatory behavior.

In the Directive there is no explicit discussion of import taxes, but our understanding is that these taxes are completely prohibited. According to the Directive the price of generation should be no higher than the cost of generation. Article 14 requires a vertically integrated company or enterprise to set up separate accounts for generation, transmission and distribution activities "with a view to avoiding discrimination, cross-subsidization and distortion of competition."

Taxes on energy imports are usually based on oil imports, not electricity imports. For example, during the early 1980s there was a debate in the United States regarding the desirability of a tax on imported oil. This proposal was rejected, despite the rise in the percentage of oil supply obtained from oil imports. Electricity import taxes are not even mentioned in the International Energy Agency report, *Taxing Energy: Why and How* (see Attachment 1).

The idea of an import tax on electricity was raised in the United States in the late 1980s by the U.S. coal mining industry. Low-priced electricity from Canada was being used to reduce the amount of electricity generated from coal mined in the United States. In a report published in 1988 by the Edison Electric Institute - an association representing electric systems - the idea of a "remedial tariff to protect the coal industry from subsidized electricity imports" is criticized.² This kind of tax was against the interests of electricity consumers and electric companies, and it did have much political support and was never enacted.

Taxes on energy exports are usually based on oil, gas, or coal. The idea of an export tax on energy is normally discussed in the context of policies designed to collect government revenue by taxing the difference between the production cost of an energy commodity (usually crude oil, a petroleum product, or natural gas) and the market value of the commodity internationally. For example, Russia has imposed taxes on oil exports. We do not know of any country which tried to tax its electricity exports.

The electricity market of Ukraine has been restructured to promote competition among generating companies. In the market rules there is no discussion of a tax on imported or exported electricity.³

In many countries hydroelectric power is produced by enterprises that are owned by the national government or by regional governments such as Canadian provinces. Therefore there is no need to impose an export tax on hydropower, to protect the government's interests, it is necessary only to negotiate export contracts that are favorable to the exporting country. For example, if hydropower is priced on the basis of the incremental cost of the electric energy that would have been generated by the purchasing country, there is usually no benefit in having an export tax. Similarly, if a country such as Lithuania exports low-cost nuclear power, outside the EU or a comparable free-trade area, there is no need to set an export tax because the export price is not necessarily related to some estimate of production cost.

² Thomas Connell, *Canada-U.S. Electricity Trade: A Survey of Current Trends, Costs, Benefits, and Issues* (Washington, DC, USA: Edison Electric Institute, March 1988), page 75.

³ Energomarket State Enterprise of Ukraine. *Energomarket Members Agreement*. Approved 20 March 1996.

Part 3 Direct and indirect methods of load management in power systems

3 1 Load profile in the power systems of the Baltic states

3 1 1 Changes in load profile in the interconnected power system in the latest years

3 1 2 Economic effect of shifts in load profile shown on the example of one power system

3 2 Time-of-use metering of electric power

3 2 1 Transition to two-part tariffs for electric energy in the Baltic power system

3 2 2 Technical devices in use in the Baltic interconnected system at present and in the future

3 3 Direct load management (Demand side management)

3 3 1 Application of demand side management at present in the power systems of the Baltic states

3 3 2 The possibilities for the future use of DSM

Reports will be prepared by Yuri Pervushin. He will analyze documents presented by power systems of Central Asia and assess the present situation of these countries

Question #5 Wheeling tariffs

What are the average tariffs for electricity wheeling services made by the power company (by the pool or by the country)?

Pool transmission facilities

The transmission facilities 69 kV and above belonging to the participants of NEPOOL are regulated by the pool. Pool transmission facilities rated 230 kV or above are designated as extra-high voltage (EHV) facilities and have a so-called "postage stamp" wheeling rate. If a participant owns or has contracted for output from a unit outside its own territory, it pays a wheeling fee (through a Pool fund) called an "entitlement transfer charge".

To calculate the entitlement transfer charge, total NEPOOL EHV transmission network annual ownership costs are divided by Pool kW capability as of 30 June of the previous year. This \$/kW is divided by 12 and charged monthly per kilowatt of ownership or entitlement in units not in a Participant's system. Fifty percent of this charge is disbursed monthly among EHV owners in proportion to their respective annual ownership costs in the EHV network. The other 50% is paid to the participant on whose system the transfer originates. The 1996 NEPOOL entitlement transfer charge is approximately \$3/kW-year. This charge is applied to transactions where the seller's generating station and the purchasing utility are connected to transmission facilities at 230 kV or higher. The charge applies regardless of length of EHV transmission or number of participants between the buyer and seller.

In addition to the entitlement transfer charge, participants pay a wheeling charge to the Pool for replacement energy and capacity for their units which are on either scheduled or unscheduled outage. This "reliability transfer charge" is charged on a daily basis when the Participant relies upon the Pool for these outage services. It equals one 365th of the entitlement transfer charge, with adjustments to ensure that the participant does not have to pay twice for the transfer of energy which would have come from its entitlements not in its system. Receipts from this charge are disbursed monthly among participants in proportion to their respective EHV network ownership costs.

Pool transmission facilities between 69 kV and 230 kV have a different methodology for calculation of wheeling than for the Pool's EHV facilities. For these low voltage pool transmission facilities, the entitlement transfer charges are calculated by dividing the annual carrying charges of associated transmission facilities by the sum of the annual peaks of the participants who own the associated low voltage facilities. In these cases where EHV does not connect the seller and the buyer, the wheeling rate is specific to the facilities involved in the transaction. If the transaction passes through more than one wheeling utility, proceeds of the charges are prorated among the wheelers according to their individual annual carrying charges.

Question #6 Settlements

What is the baseline for the mutual settlements? In what way are the intersystem electricity flows, wheeling and frequency regulation services accounted?

Settlements among power systems that do not belong to a power pool

Normally these power systems do not pay for frequency regulation services or other ancillary services. Each power system is expected to manage its power supplies and customer loads so that voltage and frequency disruptions are not transmitted to neighboring power systems, except in rare emergencies.

Each power system maintains metering facilities at the points of interconnection with neighboring power systems, and the flow of MW is measured hourly. For each neighboring power system, the net import or export is measured hourly.

In the simplest example, the power systems will exchange economy energy but there is no purchase of capacity and no wheeling. In this case, the total energy flow with each neighboring power system is measured hourly. The price of economy energy is adjusted hourly according to the variable costs of production (typically, the average of the seller's incremental cost and the buyer's decremental cost).

If one power system agrees to sell both capacity and energy to another, the contract will specify the way the capacity is measured. Typically, the payment per MW is based on the number of MW that are guaranteed to be available to the buyer if needed, and is not related to the number of MW actually flowing. Similarly, if there is an agreement to provide both capacity and energy wheeling services, the contract will specify the way capacity is measured.

If there is a wheeling agreement as well as an energy purchase or sale agreement, the power system which provides the wheeling service does a calculation of the amount of energy wheeled in each hour and the amount of energy purchased or sold in each hour. The amount of energy wheeled (according to an hourly schedule) is subtracted from the total energy flow, and the residual is the amount of energy purchased or sold. The payment for energy wheeled is typically based on the number of kWh delivered to the recipient of wheeled energy, but in some cases the wheeling charge is based on the maximum hourly flow during a week or month. The contract will establish an allowable deviation between the amount of energy received by the power system which provides wheeling service and the amount delivered in each hour, in a wheeling transaction, for deviations within an allowable band (for example, plus or minus 1.5 percent), energy is returned in kind. For deviations outside the allowable band, the contract must state whether energy is returned in kind or the customer may pay for energy provided by the wheeling service company at a negotiated rate. The allowable deviation is normally 1 or 2 percent. In other words, the customer who pays for wheeling services cannot provide kWh at night and receive them during the daytime, he is only allowed to receive an amount based on what he delivers to the power system providing the service.

Settlements among power systems in a power pool

This is the most complex situation because many different types of services can be provided by one member of the power pool to another member of the power pool. The pool owns and operates a dispatch center which is responsible for gathering and archiving all of the measurements of capacity and energy flows in each hour. All of the power systems which belong to the pool utilize the settlement data provided by the dispatch center.

Each power system maintains metering facilities at the points of interconnection with neighboring power systems, and the flow of MW is measured hourly by the power system and transmitted to the pool dispatch center. The power pool can accommodate every type of transaction that can occur between power systems that are not in a pool, and it can also set up a system of payments for a very large number of economy energy transactions, a system of payments for reserve capacity, and a system of payments for ancillary services such as frequency regulation.

The pool agreement is a contract which defines the types of transactions which can occur, and therefore it defines the types of mutual settlement needed. In NEPOOL the settlements for economy energy are based on a method of distributing the savings achieved as a result of pool operations. This system was explained in the presentation on "Power Pool Operation" given in August 1996 by David Thornton.

Settlements between Hydro Quebec and power systems in the United States

Hydro Quebec has contracts with individual power systems, such as Central Maine Power, and with a power pool - the New England Power Pool. Hydro Quebec exports electricity to the New York Power Authority and to Niagara Mohawk Power Corporation, these two power systems belong to the New York Power Pool, but the export contracts are signed by the two power systems. All of the interconnections are made through Direct Current facilities. Therefore there is no settlement for frequency regulation services.

Each contract specifies Delivery Points and Metering Points which may be at different locations. In the Interconnection Agreement between NEPOOL and Hydro-Quebec, for example, the Delivery Point is at the border between the two countries but the Metering Point is located at a substation in Quebec (see Supplement 1 of the contract). The measurements at the Metering Point are adjusted to provide estimates of the energy flow at the Delivery Point (see section 4.2 of the contract). The settlements are based on the quantities of energy crossing the international border.

Hourly deliveries of energy are scheduled by the Operating Committee. The actual deliveries of energy are estimated from metering data. According to the schedule of deliveries the Operating Committee divides the total energy flow in each hour into the different categories in the contract, such as Economy Energy, Fuel Replacement Energy, Tertiary Energy, and the energy which is associated with Capacity or Emergency Power. Settlements are calculated for each of these categories of energy because the prices are different. There are no cash payments for Conservation Energy, which is returned in kind. When the net actual energy interchange does not

equal the net scheduled energy interchange, the difference is called Inadvertant Energy. There is no cash payment for Inadvertant Energy, which is returned in kind, every import of Inadvertant Energy offset by an export of energy at a later time.

In the Interconnection Agreement with NEPOOL, Capacity or Emergency Power is scheduled according to the buyer's request and is measured daily. The buyer does not pay for reserves that are available if needed, he simply pays for MW that he requests and receives. The buyer pays a price in USD/MW/day for the maximum amount of capacity scheduled and provided in any hour of the day, and also pays a price in USD/MWh for associated energy (see Supplement IV of the contract).

In the Interconnection Agreement with Central Maine Power Company, Daily Capacity is scheduled according to the buyer's request. The buyer pays for reserves that are available if needed. The actual power flow in MW is specified according to the buyer's needs, but it has nothing to do with the payment for capacity. The buyer pays a price in USD/MW/day for the reserve capacity scheduled, and also pays a price in USD/MWh for associated energy (see Supplement IV of the contract). The system of mutual settlements does not require a measurement of power flows, it only requires a measurement of energy flows.

Attachment 1

Sources of Information on Electricity Taxes and Energy Taxes

- 1 International Energy Agency *Energy Prices and Taxes*, Second Quarter 1996. Paris: OECD, 1996. See especially Table 5 and Table 6 on pages xiv-xv.
- 2 European Parliament and the Council of the European Union. *Directive concerning common rules for the internal market in electricity*. Brussels: European Union, 25 July 1996.
- 3 Energomarket State Enterprise of Ukraine. *Energomarket Members Agreement*. Approved 20 March 1996.
- 4 International Energy Agency. *Taxing Energy: Why and How*. Paris: OECD, 1993.
- 5 Eurostat. *Electricity Prices 1985-1991*. Luxembourg: Statistical Office of the European Communities, 1991.
- 6 Thomas Connell. *Canada-US Electricity Trade: A Survey of Current Trends, Costs, Benefits, and Issues*. Washington, DC, USA: Edison Electric Institute, March 1988.

Backgrounder

March 1989

Bonneville
POWER ADMINISTRATION

The Columbia River Treaty Revisited



September of this year will mark the 25th anniversary of the ratification of the Treaty Between the United States and Canada Relating to Cooperative Development of the Water Resources of the Columbia River Basin. Commonly referred to as the Columbia River Treaty, this compact has had enormous impact on the Western power system from Canada to Mexico.

The Treaty document was signed in January 1961. But that action and its ratification a few months later by the United States only marked the start of negotiations on a master plan. The complex and unique terms of that plan took nearly 4 years to resolve—until September 1964.

The huge undertaking which evolved from the Treaty included doubling the hydroelectric reservoir capacity in the Columbia Basin and construction of the Pacific Northwest Pacific Southwest Intertie. The additions of the Third Powerhouse at Grand Coulee Dam and the Second Powerhouse at Bonneville Dam are outshoots of the Treaty, as are other hydropower resources in both Canada and the U.S. Northwest.

It is unlikely that our regional economy could have developed as it has over the past quarter century without the Columbia River Treaty and the common store of power which it afforded.

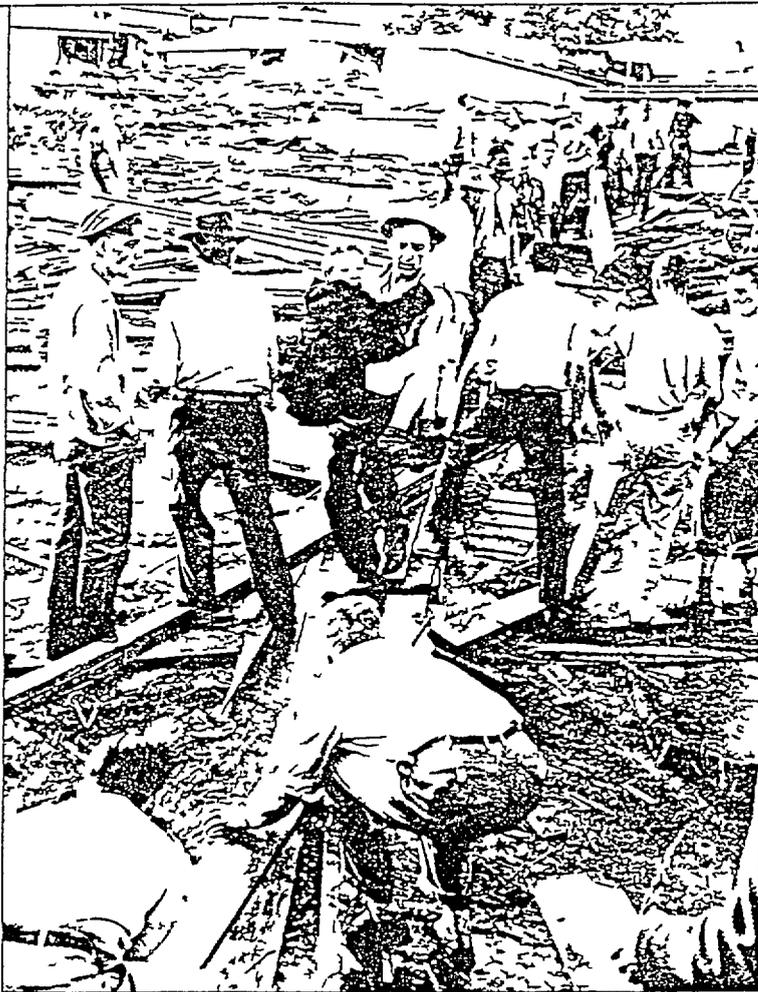
Background

The Columbia River Treaty grew out of two major Northwest challenges following World War II. Both were related to the mighty Columbia River and its partners, including the Kootenai (spelled Kootenay in Canada) and Peace Rivers in British Columbia.

The first challenge was the periodic flooding of the untamed river system. As measured at the Canadian/US border, the Columbia's flow varied from a recorded low in the early 1930s of 12,000 cubic feet per second (cfs) to a devastating 548,000 cfs in June 1948. On the latter occasion, the rampaging waters destroyed numerous downstream communities, including the Portland suburb of Vanport.

Challenge No. 2: During the postwar period, the economy and population of the Pacific Northwest were sharply on the upswing. This spurred the construction of a number of dams, both Federal and non-Federal, on the Columbia main stem. But a series of power shortages—incl. Korean War production pressures—made it apparent that generating capacity alone was not the answer.

What was needed was vastly expanded water storage, preferably on the upper reaches of the river. This would enable the network of dams to be



A June 1948 flood on the Columbia virtually wiped out Vanport, Oregon.

What was needed was vastly expanded water storage, preferably on the upper reaches of the river.

fueled on a year-round basis and would multiply their megawatt output. It would also provide badly needed flood control.

As early as 1944, the governments of Canada and the U.S. asked an International Joint Commission (IJC) to determine whether an extension of the use of the Columbia River would be practical and in the public interest of both countries. The IJC accepted the task, formed an engineering board comprising technical staff from both nations, and undertook a series of water management studies. Concurrently, the U.S. Army Corps of Engineers set about updating its 308 Report, the earlier master plan which had rostered Federal development on the Columbia.

The results of both sets of studies were generally complementary. They pointed to the development of upriver storage on the Columbia and its tributaries as being of great benefit to both nations. This storage would prevent the river water from flowing unchecked and sometimes disastrously to the sea. Instead, it could be released as needed to produce power at downstream dams—mostly in the United States.

The Treaty

Acting upon a final IJC report issued in December 1959, the two governments began diplomatic negotiations two months later. A total of nine negotiating sessions led to the signing of the Columbia River Treaty by President Dwight Eisenhower and Prime Minister John Diefenbaker on January 17, 1961.

Storage Facilities

Under the Treaty terms, Canada built three huge storage dams in British Columbia. Two of these, Mica and Keenleyside, are on the main stem of the Columbia. The third, Duncan, is on a tributary of the Kootenay. Of the three, only Mica has power production facilities.

The total Canadian storage under the Treaty was to be 15.5 million acre feet of water. In addition, the Mica reservoir was constructed to provide some 5 million acre feet of non-Treaty storage.

The Treaty also authorized the United States to build Libby Dam on the Kootenai River in northwestern Montana. The Libby reservoir, which added nearly 5 million acre feet of storage, extends 42 miles into Canada. In total, the 20.5 million acre feet of storage developed under the Treaty more than doubled the existing capacity in the Columbia Basin. All of this storage is usable for power production.

A major complication—but a US opportunity—was the lack of a market in British Columbia for the Treaty power.

President Dwight Eisenhower (right) and Prime Minister John Diefenbaker sign the Columbia River Treaty in 1961.

The Treaty does not specify an end date. Instead, both nations have the option of terminating the compact after the year 2024.

Flood Control Benefits

Under the Treaty, Canada has been paid to operate 8.5 million acre feet for US flood control. The remaining 7 million acre feet is available to the US, as needed, for additional uses.

A total of \$64.4 million was paid in advance to Canada for the flood control benefits for the first 60 years of storage. An ongoing payment schedule for flood control may be renegotiated toward the end of the 60 years.

The Canadian Entitlement

With regard to power benefits, the three Canadian storage dams and Libby would enable downstream US projects to produce up to an additional 2,800 megawatts of dependable capacity. Under the Treaty provisions, half of this additional capacity, or 1,400 MW, would belong to Canada—the other half to the United States.

A major complication—but a US opportunity—was the lack of a market in British Columbia for the Treaty power. This was coupled with a B.C. decision to develop the Peace River for its future domestic needs.



March 1989

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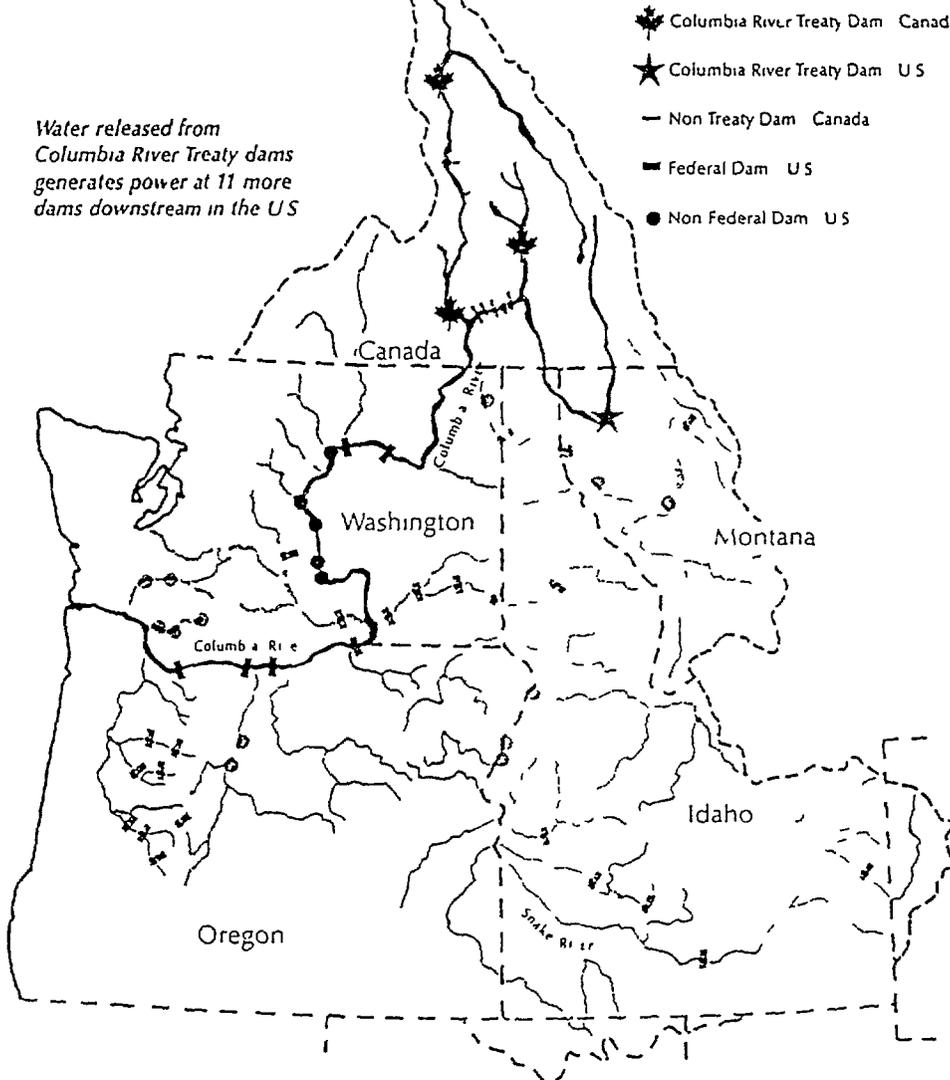
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<p>"The Coordination Agreement has proved to be as important as the Treaty itself"</p>	<p>Hence the B C government looked to some US party to purchase the rights to Canada's share of the downstream power benefits. The intent was to use the proceeds of this sale to construct the three Canadian storage projects.</p> <p>Canada's 50 percent share of the downstream power benefits from the Treaty became known as the Canadian Entitlement. The rights to this Entitlement were offered for sale in the United States for an agreed upon period of 30 years based on the operational dates of the three Canadian storage projects.</p> <p>As it turned out, Duncan was completed in 1967, Keenleyside in 1968, and Mica in 1973 — all ahead of schedule. The first downstream power benefits (from Duncan) were delivered in April 1968.</p> <p>In calculating downstream power benefits, the 30 year schedule was a workable base. But allocating those benefits and their costs among 41 US Northwest entities proved to be a formidable task. It was further complicated by the fact that Treaty implementation was hampered by differences between British Columbia and the Canadian federal government with regard to Treaty benefits and long term hydroelectric development in British Columbia.</p> <p>The intra-Canada differences were not resolved until 1963. At that point, negotiations between the US and Canada were resumed to implement the original Treaty provisions.</p> <p>The Treaty Entities</p> <p>Before describing the sale of the Canadian Entitlement rights, certain key elements of the Treaty need to be recognized. They include the two Entities: the Permanent Engineering Board</p>	<p>and the Treaty requirement for an Assured Operating Plan.</p> <p>The Treaty established the US and Canadian Entities as the implementing agencies of the two governments. The US Entity is the Administrator of the Bonneville Power Administration (BPA) chairman and the Commanding General of the Corps of Engineers, North Pacific Division.</p> <p>The Canadian Entity is British Columbia Hydro and Power Authority (B C Hydro). This crown corporation was formed in 1962 following the merger of an expropriated private utility and the B C Power Commission.</p> <p>Together the two Entities are responsible for overseeing the conduct of the Treaty. A Permanent Engineering Board designated by the two governments reviews the Entities' actions and assists in resolving disputes.</p> <p>Each year the Entities are required to prepare an Assured Operating Plan with agreed determinations of downstream power benefits for the six succeeding operating years. This six year planning horizon is especially important in view of the reversion of the Canadian Entitlement to British Columbia starting in 1998. It means that some determination as to the remaining Entitlement needs to be made by 1992 — only 3 years from now.</p> <p>Columbia Storage Power Exchange</p> <p>The B C government insisted that the Canadian Entitlement be purchased by a single US entity and that a cash payment in full be made in advance of Treaty implementation. The possibility of underwriting the transaction with Federal appropriations was explored but was ruled out in light of the US budgetary situation at the time.</p>
	<p>The Pacific Northwest Coordination Agreement</p> <p>When the original Columbia River Treaty was signed in 1961, it set forth the broad, joint objectives to be achieved. But it left up in the air the question of how the downstream power benefits were to be calculated and shared.</p> <p>This was the first of a series of major challenges facing the new BPA Administrator, Charles F. Luce, who took office less than a month after the 1961 Treaty signing. "We started with a concept," Luce said in retrospect, "to pretend that these resources belonged to a single owner and to develop them so as to achieve maximum benefits without regard to diverse ownership." This became known as the 'single utility concept'.</p>	<p>That was the thrust of the Pacific Northwest Coordination Agreement, both in its planning and throughout its quarter century of operation.</p> <p>In addition to the three Treaty storage reservoirs in Canada, a base system of 24 projects was used to determine benefits under the Treaty. But all of the Treaty power downstream benefits would be produced at 11 Columbia River main stem plants. The six Federal dams are (upstream to downstream) Grand Coulee, Chief Joseph, McNary, John Day, The Dalles, and Bonneville.</p> <p>The five non-Federal dams are Wells Dam owned by Douglas County Public Utility District (PUD), Rocky Reach and Rock Island Dams owned by Chelan County PUD, and Wanapum and Priest Rapids Dams owned by Grant County PUD.</p>

142

Major Dams of the Columbia River Basin

Water released from Columbia River Treaty dams generates power at 11 more dams downstream in the US



It is worth noting that substantial interests in the non-Federal dams had been sold by the owners to a number of public agencies and five large investor-owned utilities. The latter in particular were key participants in fashioning the Coordination Agreement and in other Treaty related matters.

In the 44 months between the 1961 Treaty signing and the final ratification in 1964, the US negotiators developed several interim and subsidiary compacts. The most complex of these were the allocation agreements which resolved how the CSPE shares were apportioned. An interim agreement took effect in late 1963. It included detailed procedures for computing firm load carrying capabilities and payments for benefits from upstream reservoir regulation.

Negotiations went into high gear in 1964 to stay apace with CSPE and the other Treaty related

issues being resolved. The resultant product was a 39-year Coordination Agreement which was signed on September 15, 1964, by 16 parties. They included BPA, the Corps of Engineers, five investor-owned utilities, five public utility districts, three municipalities, and an aluminum company subsidiary (The US Bureau of Reclamation and a generating public utility district in Washington State subsequently became signatories).

Signed just one day before the final Treaty ratification, the Coordination Agreement is an extremely complex document which governs the day to day operations and financial transactions on the Northwest power system. As described by a key participant in the negotiations, 'The Coordination Agreement has proved to be as important as the Treaty itself.'

Major Columbia Basin dams include four Treaty projects.

The Pacific Intertie

Undoubtedly the greatest single development which evolved concurrently with the Columbia River Treaty was the Pacific Intertie. Indeed the Intertie may well have been the prime catalyst in getting the Treaty ratified and implemented in its present form. While the early planning for the two great undertakings was on separate tracks, it came together in the mid 1960s. It was a classic example of "the whole being greater than the sum of its parts."

The story of the Intertie is a saga of its own and can only be highlighted here. Suffice it to say that the Intertie assured that the Canadian Entitlement could be resold—at a fair price—in the California market during the early years of the Treaty implementation when BPA and the CSPE participants did not need the power.

The uniqueness of the Intertie lies in its giant scale and diverse ownership. The huge transmission project—with an initial investment of some \$700 million—was sponsored by BPA, the Bureau of Reclamation, five private utilities and the City of Los Angeles.

One leg—a direct current (DC) line—stretches 846 miles from northern Oregon to near Los Angeles. This DC line, with a capacity of 1,400 megawatts, was first energized in 1970. Congress also authorized a second DC Intertie to serve Arizona. This line has not been built.

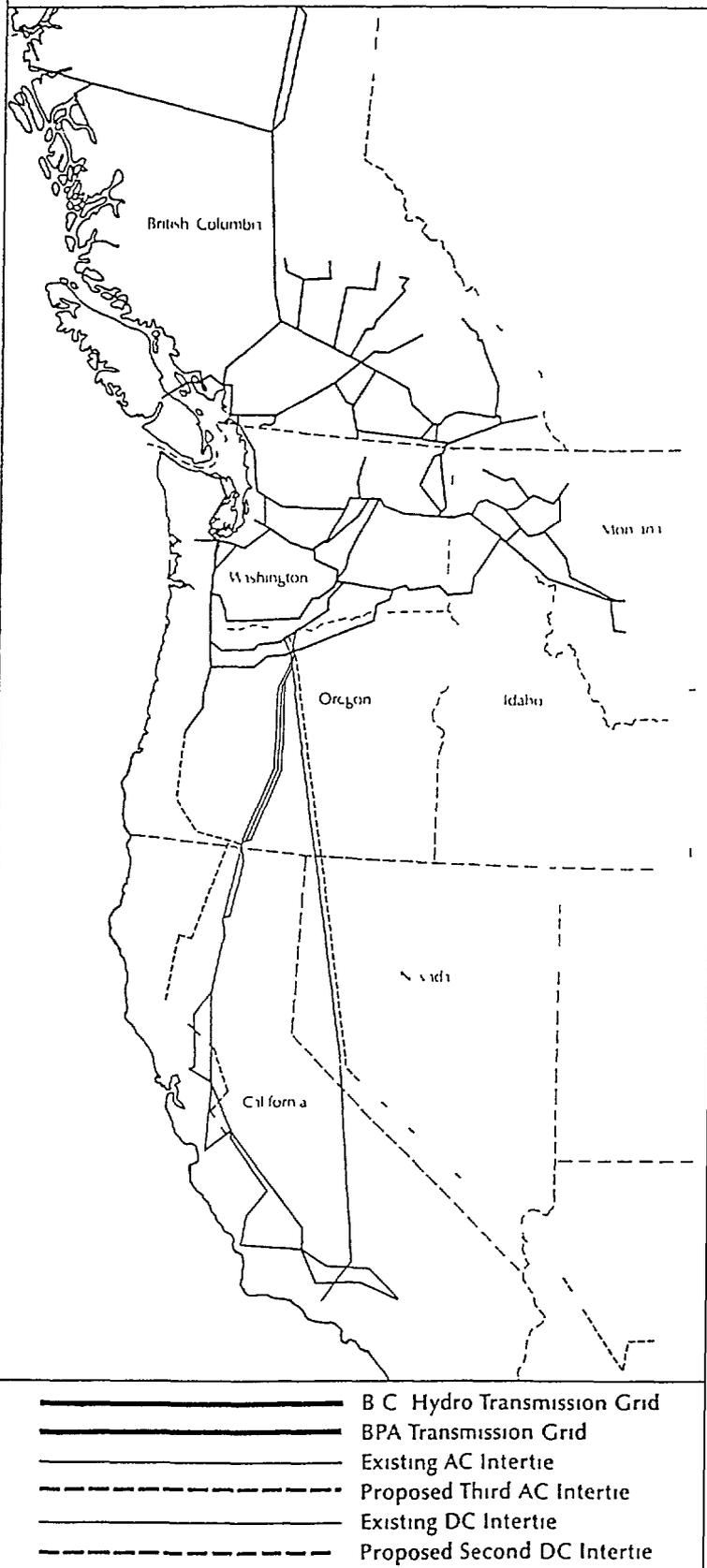
The two 500 kilovolt alternating current (AC) legs of the Intertie—each with a capacity of about 1,000 MW, were built from John Day Dam on the Columbia River to the Los Angeles area. These lines were energized in early 1969.

Since then the Intertie has had several upgrades—from the initial capacity of 3,440 MW to the present capacity of 5,200 MW. With the completion of the DC Terminal Expansion Project this month the total capacity will be boosted to 6,300 MW. Plans are underway for a Third AC Intertie which is expected to add another 1,600 MW of transmission capacity by 1993.

During the period 1968 through 1973 almost all of the Entitlement power went to California—up to 1,400 megawatts of dependable capacity and some 6.6 million megawatt hours of energy per year. (See graph.) In April 1970 the California utilities which purchased Entitlement power were given a 5-year notice of withdrawal.

Increasing portions of the Entitlement power were recaptured for Northwest use in the late 1970s. The withdrawal was completed in 1983 but the Intertie had more than proved its worth—and incidentally paid for its original construction several times over.

Major Transmission Paths from British Columbia to California



It was a classic example of "the whole being greater than the sum of its parts"

Resale of the Canadian Entitlement to California peaked in the early 1970s

Since this financing route was blocked and BPA had no authority to acquire the Canadian Entitlement the alternative was to turn to the 41 Northwest public and private utilities which had interests in the US downstream dams. They were to form the Canadian Storage Power Exchange or CSPE.

Convincing them to participate was no easy task since the purchase price negotiated with British Columbia was more than four tenths of a cent per estimated kilowatt hour or about double BPA's wholesale rate at that time.

However a persuasive argument was made that this cost only applied to Canada's half of the downstream power benefits and the rest is free. Unless the deal could be struck with Canada the Treaty itself was in jeopardy along with both halves of its downstream benefits.

Once this selling point and the other long term resource advantages were understood the financing hurdle was overcome.

CSPE a non profit entity was created to buy the Canadian Entitlement rights. But it needed a vehicle to assure that the Entitlement power could be put to optimal use in the US despite the diverse participation. As a consequence near round the clock negotiations got underway to formulate what came to be known as the Pacific Northwest Coordination Agreement. (See separate box on pages 4 and 5)

Four Northwest investor owned utilities took 50 percent of the 1400 MW dependable capacity and 37 Northwest public agencies took the remainder. The purchase was accelerated by tax exempt revenue bonds sold by CSPE.

The terms of the bonds coincide with the return of the Entitlement to British Columbia. Based upon the filling of each Canadian reservoir the 30 year reversion dates extend from 1998 (for Duncan) to 2003 (for Mica).

The Entitlement participants made their allocations available to BPA through exchange agreements. In this way BPA assumed the risk that the Treaty benefits may have been overestimated. As it turned out the opposite was true.

Final ratification of the Columbia River Treaty and its detailed protocol and annexes was proclaimed on September 16, 1964. The joint proclamation came from US President Lyndon Johnson and Canadian Prime Minister Lester Pearson at a ceremony held on the international boundary at the Peace Arch in Blaine, Washington. At the same hour in New York City CSPE bankers handed representatives of the Canadian government a check for some \$254 million in exchange for the 30 year rights to the Canadian Entitlement. The Treaty had become a reality.

Non-Treaty Storage

When the Treaty ratification and protocol were executed in 1964 development of major new hydro sites in the US Northwest was nearly complete. But for British Columbia it was only beginning.

With the money from the sale of the Canadian Entitlement British Columbia was able to build the three Treaty storage projects.

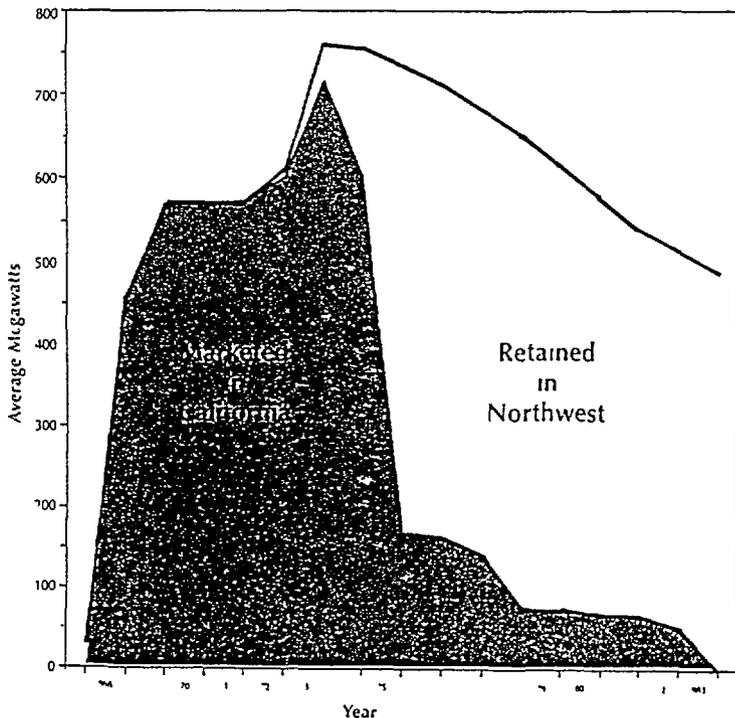
The Peace River a part of the northern Mackenzie River system was the first all British Columbia river to have major hydroelectric development. Two dams with a total capability of about 3000 megawatts and a huge reservoir were built by B C Hydro during the 1960s and 1970s.

A third B C Hydro project on the Columbia River was completed at Revelstoke in 1983. The reservoir for this new facility needed to be coordinated with that behind Mica Dam.

BPA and B C Hydro in October 1983 agreed on provisions to fill the new reservoir. In addition the two agencies would coordinate the use of 2 million of the 5 million acre feet of Mica non Treaty storage. This contract is scheduled to terminate in July 1993.

In October 1987 BPA and B C Hydro agreed in principle to explore the expansion of Columbia River coordination between their systems to the

Disposition of Canadian Entitlement Energy 1968 - 1983





total 5 million acre feet of Mica non Treaty storage and to extend the agreement to the year 2003. The agreement could make available up to 300 megawatts of additional firm energy on the Columbia River.

Discussions of further coordination which would include the Peace River were delayed at B.C. Hydro's request pending the results of the Columbia coordination and other discussions still underway. Full coordination of the Peace as well as the Columbia could yield a total of some 600 megawatts of additional firm power.

Duncan Dam, the smallest of the Canadian storage projects, was completed first.

A new non Treaty storage agreement on the Columbia will also involve a contract between the Mid-Columbia utilities (and their project participants) and BPA because the Mid-Columbia dams are affected by the non Treaty storage agreement.

Other Issues To Be Addressed— 1989-1992

In addition to complex questions relating to non Treaty storage, several other key issues need to be resolved during the period 1989-1992. How these matters are decided will have a deep and lasting imprint on the energy future of the entire West Coast.

146

The Future of Canadian Entitlement

Since the Columbia River Treaty was fashioned in the early 1960s, load growth and thermal power plant additions in the US Northwest have fallen well behind those projected. It was thought that—as more thermal plants were built—the Entitlement power would increasingly be used to displace the more costly thermal, and the Entitlement would steadily diminish.

As it turned out, the Canadian Entitlement has not diminished to the extent anticipated. Instead of being about 200 average megawatts as originally contemplated, the Canadian Entitlement will still represent 500 to 600 megawatts of usable energy and 1,300 to 1,400 MW of capacity when it reverts to British Columbia during the period 1998-2003.

The time line is propitious since BPA's most recent load/resource forecast indicates that the BPA power surplus will run out in about 2003. Other resources—including conservation—will need to be acquired. If the Canadian Entitlement rights are among the least cost options, they could make a valuable contribution to the Northwest's energy mix.

But this depends upon what use B.C. will make of its remaining Entitlement. The options include retaining the power for domestic needs or marketing it in the US. The choice is up to the British Columbia government. If it decides to resell, who will be the purchaser, and on what terms? How will BPA and its transmission grid be affected?

The Northwest stewardship of the Canadian Entitlement has benefited all parties over the past two decades, including California. Both in the CSPE exchange arrangements and in its marketing

and transmission role, BPA has sought to maximize these shared benefits.

Pressures on the Pacific Northwest Coordination Agreement

Closely allied to the sale of Canadian Entitlement rights is the Pacific Northwest Coordination Agreement, which is also slated to expire by 2003.

The most urgent matter has to do with the Treaty Entities' Annual Operating Plan, which extends six years into the future. With the Canadian Entitlement beginning to revert to British Columbia in 1998, the time frame telescopes to 1992. Decisions made between now and then will exert pressure either to extend or renegotiate the Coordination Agreement.

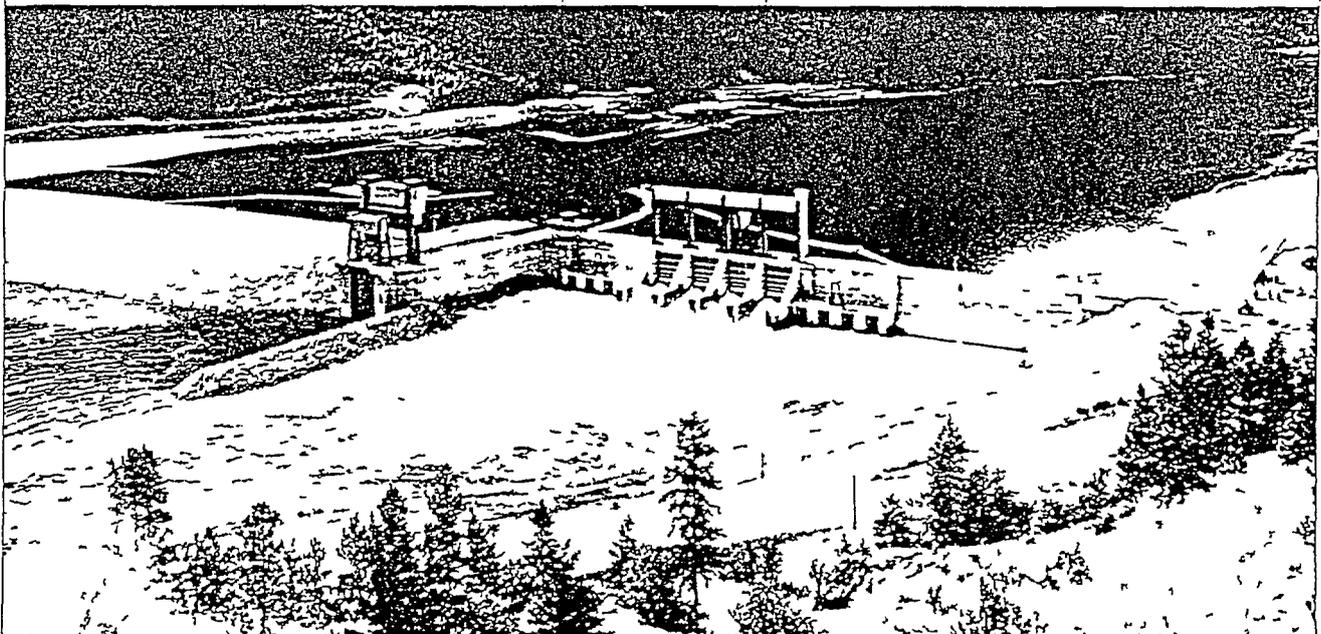
Factors that were not present in the early 1960s will also come into play. These will include planning compliance with US and Canadian environmental statutes and the Northwest Power Act. Another demanding task would be to negotiate reallocations or downstream power benefits and costs which might be involved in new Entitlement arrangements.

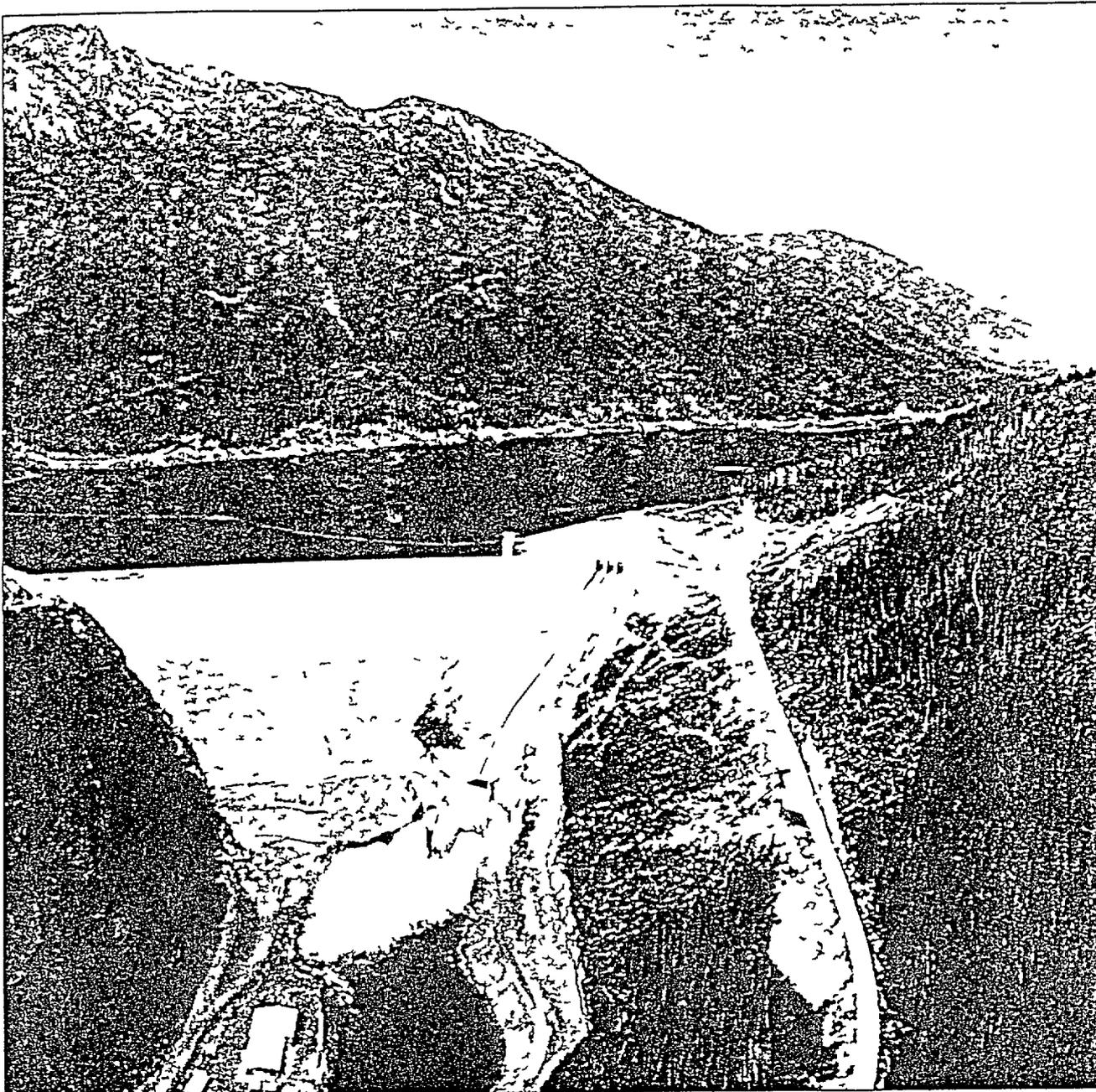
Would the complex Coordination Agreement need a complete overhaul, or could it be extended pretty much as is to meet the needs of the 21st Century? Which parties to the Agreement might seek to better their situations through major changes, and what might these include?

How do the California interests fit into this puzzle, and those of Canada? Most importantly, will the present Northwest parties to the Agreement rally behind a common set of objectives as they did a quarter century ago? Is the single utility concept still valid?

Full coordination of the Peace as well as the Columbia could yield a total of some 600 megawatts

Keenleyside Dam stores 7 million acre feet in Arrow Lakes





The sooner these cards are placed on the table the better for all concerned—including the ratepayers of the Northwest and its neighbors to the north and south

Canadian Exports

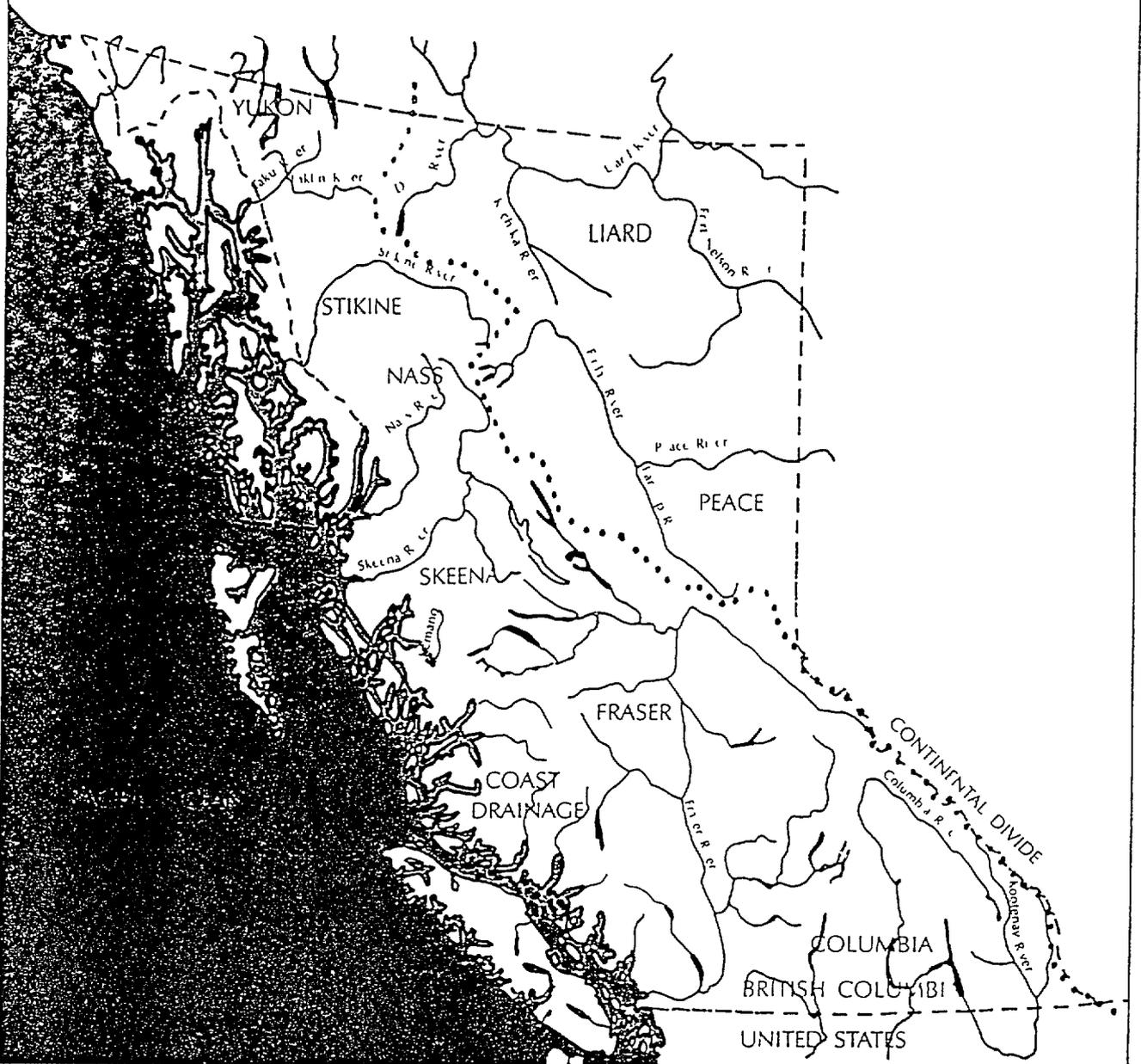
Equally as important as the Entitlement issue is the matter of future British Columbia development for export. The present B.C. policy appears to be tilting in that direction, including the recent formation of British Columbia Power Export Corporation or POWEREX.

This B.C. Hydro subsidiary will develop projects and markets for long term exports to the U.S. Northwest and California. POWEREX is now seeking expressions of interest from independent power producers for electricity from the province which could be exported to the U.S.

Under its new management, B.C. Hydro has shown a renewed interest in developing the 900 megawatt capacity of the Site C project on the Peace River—possibly for export—as well as other hydro and coal resources. It has also entered into agreements with the Aluminium Company of Canada (Alcan) to purchase several hundred megawatts of energy that would be provided by

Completed in 1973, Mica Dam provides 7 million acre feet of Tricity storage and 5 million of "non-Tricity" storage.

Major River Basins of British Columbia



British Columbia rivers hold enormous hydroelectric potential

Equally as important as the Entitlement issue is the matter of future British Columbia development for export

the expansion of Alcan's existing project at Kemano

With the ratification of the US/Canada Free Trade Agreement the political and institutional structures now support British Columbia's apparent interest in exporting energy

Transmission

Each of the above issues has major implications for the Western high voltage grid. How much export power will be developed in British Columbia and where will it be sold? Similar questions pertain to Alberta with its relatively untapped energy resources

We know that seasonal diversity between regions offers tremendous advantages in terms of power exchanges and minimizing the need for additional generation. By the same token carefully planned transmission routes and interconnections enhance our ability to shift blocks of electricity at the lowest monetary and environmental cost.

Nearly everyone agrees that system reliability is of paramount importance when siting new generation. Transmission planners also recognize that economic, demographic, political and environmental influences will be brought to bear on where powerlines will be built by whom and in what configurations.

Major uncertainties face the Pacific Northwest and its neighbors with respect to planning new resources, their timing, and their markets. Transmission strategy must be a full partner in this undertaking. The factors mentioned above should not be allowed to hamstring or dictate system planning but rather complement it.

Our region's low electricity rates and reliable delivery service are partially attributable to the single utility concept which has shaped the Northwest grid. With few exceptions, the region has come to rely upon BPA to plan, build, and operate most of the high-voltage network.

Conclusion

Several vital issues need to be resolved between now and 1992.

The future of the Canadian Entitlement, the future of the Pacific Northwest Coordination Agreement, non-Treaty storage coordination, and the development of other Canadian power resources—existing and potential—are all closely linked. Transmission construction and operation—including the Third AC Intertie—depend upon how these issues are resolved and how the resultant power is supposed to flow among British Columbia, the U.S. Northwest, and California.

Important factors entering the overall picture include the projected evaporation of BPA's present power surplus shortly after the turn of the century, the expected end of the regional surplus in the early 1990s, and the expiration of BPA's power delivery contracts with its direct-service industrial customers in 2001. (In what form should these contracts be replaced, if at all?)

As required by the Treaty, the Assured Operating Plan developed by the Entities must look 6 years ahead—to 1998, the beginning of the period in which the Canadian Entitlement rights begin to revert to British Columbia.

The disposition of the Canadian Entitlement, the non-Treaty storage arrangements, and the development of other B.C. power resources for export are of great interest to the Northwest and California. From BPA's perspective, however, these elements must be viewed in the context of a comprehensive inventory of potential power resources.

In this broader arena, the selection of specific resources and their priority will depend to a considerable degree on their relative cost, effectiveness, and environmental implications. These factors loom even larger now than they did in the Treaty negotiations in the 1960s.

It is hoped that these modern day challenges can be addressed with the same high purpose and spirit of cooperation as were those of a quarter century ago.

For More Information

For more copies of this brochure or further information about the Columbia River Treaty and cooperation between Canada and the United States in the West's power system, contact your nearest BPA Area or District Office, or the BPA Public Involvement office.

BPA Public Involvement Office
PO Box 12999
Portland, Oregon 97212
(503) 230-3478
800-452-8429 (toll free in Oregon)
800-547-6048 (toll free in other Western States)

BPA Area and District Offices

Portland (503) 230-4552
Eugene (503) 687-6952
Seattle (206) 442-4130
Spokane (509) 456-2515
Missoula (406) 329-3060
Wenatchee (509) 662-4377
Walla Walla (509) 522-6226
Idaho Falls (208) 523-2706
Boise (208) 334-9137
Washington, D.C. (202) 586-5640
Oakland, CA (415) 446-7706

DOE/BP 1195
March 1989
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Several vital issues need to be resolved between now and 1992.

Cover photo
Water runs over
the spillway at
Duncan Dam in
British Columbia

051

AGREEMENT

ON MUTUAL INTERCHANGE OF ELECTRIC ENERGY BETWEEN THE LITHUANIAN STATE POWER SYSTEM AND THE STATE ENTERPRISE LATVENERGO

The Lithuanian state power system and the state enterprise Latvenergo (hereinafter referred to as the "Parties")

WHEREAS the Parties are acting in accordance with the legislation of the respective countries, and

WHEREAS the Parties are guided by the principles of the European Energy Charter executed in the Hague on 17th December, 1991, and inter-governmental treaties between the governments of the Republic of Latvia and the Republic of Lithuania,

WHEREAS the Parties are wishing to develop mutually beneficial cooperation between the Parties

NOW THEREFORE the Parties have executed this Agreement as follows

1 Subject of the Agreements and terms of the electric energy supply

This Agreement constitutes the basic legal instrument governing relations between the Parties on mutual interchange of electric energy between power systems of Latvia and Lithuania. The Parties have agreed to supply electric energy on the following terms

1.1 Depending whether the party shall act as a receiver of the electric energy from the power system of the other party or a supplier of the electric energy to the other party's power system, both parties may appear either as a Buyer or a Seller

1.2 The Party acting as a Seller shall supply and the Party acting as a Buyer shall receive the amount of electric energy based on the results of accounting balance of the interchange energy between the countries in accordance with the approximate planned mutual interchange of electric energy per year with the lay-out for quarters (Supplement 1) and monthly commercial contract (Supplement 2)

1.3 In addition to the monthly commercial contracts short term additional supplies of electric energy may be carried out on the terms other than defined in the monthly commercial contract provided the Parties shall sign a separate spot commercial contract on supply of electric energy (Supplement 3)

1.4 Monthly and spot commercial contracts must state

- 1) supply period

- 2) amount of electric energy,
- 3) price for 1 kwhr in hard currency or in Latvian roubles at a rate of the Bank of Latvia, unless other intergovernmental treaties exist,

15 The duly signed monthly or spot commercial contracts may be sent by fax or courier and they have equal legal force

16 In case of emergency any Party has the right to request assistance from the other party with the purpose to amend the amount and terms of the validly existing monthly commercial contracts followed up by the consequent written spot commercial contract no later than 5 days following the occurrence of the amendments

17 The state enterprise Latvenergo shall provide the availability of operational capacity reserve for the Lithuanian power system to cover emergency loss of capacity

2 Term and procedure to execute monthly contracts

21 The Monthly commercial contracts must be signed no later than 3 days prior to the commencement of a new month The data to prepare monthly contracts is presented to Dispatch Centre Baltija 10 days prior to the commencement of a month DC Baltija shall present its remarks to the power systems 5 days prior to a new month

22 In case of price rise for fuel which could serve cause to any Party to come with an initiative to change the price for 1 kwhr of electric energy, the initiating Party shall inform in writing the other Party no later than 15 days prior to the commencement of the next consecutive month

23 The price for 1 kwhr of electric energy defined in the Monthly commercial contract may not be changed

3 Commercial metering of electric energy supplied under this Agreement

31 Each Party under this Agreement shall own, operate and maintain metering equipment located within its borders Commercial metering equipment must be meteorological equipped

32 The accuracy of the metering equipment must be verified by means of appropriate tests no less than once a year or on the basis of substantiated request by the Party herein

33 In cases of outage of metering equipment due to tests or repair the points of commercial metering for this period are deemed to be readings of the commercial metering of the opposite end

34 The start-up point of the reading of the commercial metering equipment shall be at 00 00 hours of the last day of the respective month

35 The Parties are obligated to check the metering devices and eliminate the inaccuracy when the difference in readings of the commercial meters located at the both ends of the international transmission line is more than 3.5 percent with the account to the losses in the transmission lines

36 Commercial metering points are defined in the Supplement 4

37 The Parties have to notify each other five days prior to any planned alterations in the commercial metering of electric energy, like replacement of the metering devices or any work in the auxiliary circuits which may affect the accuracy of the readings. In the cases inaccuracy of the metering devices is detected the Parties have to notify each other immediately

4 Wheeled power and terms of payment for it

41 By "wheeled power" is understood electric power received from the other Party or other power systems and transmitted through the power grid of the either Party. Neither Party has the rights to hinder the wheeling of such power through its power grid within its technical capability

42 The compensation of expenses related to the wheeling to Lithuania through Latvia from Lithuania is determined to be 5 percent

The supply of energy to Lithuania exceeding the amount received from the Lithuanian power system is deemed to be wheeled power from the Northern power systems and is determined as the difference between the received and supplied electric power, accounted according to the meters defined in the Supplement Nr 4. The Accounts based on the accounting balance of supplied and received power are performed by DC Baltija taking into consideration transmission losses and the payment for wheeling which is determined to be 8,3% of the amount of the wheeled power

43 Monthly accounts of the power wheeled through the systems of the Parties is performed by the DC Baltija

5 Planning and operational regime

51 Planning and operational regimes necessary to provide the performance of the Agreement are determined by the DC Baltija in accordance with the multilateral agreement on parallel operation among the DC Baltija and separate power systems of the Baltic Interconnected System for the year 1993

6 Billing procedure

61 The billing period is deemed to be one calendar month. Control is performed on the incremental basis. Mutual supplies in the billing period are balanced and payments are executed by the Party to which the balance is showing the surplus

62 The Party acting as a Buyer is executing the payment to the Party acting as the Seller by payment order on 5, 11, 17, 23, 29 day of the month. The amount of the payment is set to be 1/5 of the planned amount of the supply of the balance. The amount of the last monthly payment may be made based on the planned supply at the respective month. In case the payment day falls on Saturday, the remittance is performed the preceding day, in case it is Sunday or state holiday - the next working day

63 The final billing for the actual supplies of electric energy (including the payment for the wheeling) is performed by the second regular payment of the following month

64 In case of delayed transfer of regular payments, the Buyer is obligated to pay penalty of 03 percent for each delayed day beginning with the first day following the due date of payment until the day of actual payment inclusive. Such penalty is included in the next regular payment and marked in a separate item

65 Verification of mutual accounts on the basis of supplied and received electric energy is done by exchange of notices between the parties by fax no later than the 5th day of the month following such verification

66 All the duties and other deductions related to this Agreement stipulated by the law of the Republic of Latvia and the Republic of Lithuania are paid by the respective Party in their countries and they waive the rights to any claims for such payment

7 Force Majeure

71 The Seller and the Buyer are not responsible for the failure to supply or receive in full or in part the amount of the electric energy or power when such failure is caused by the Act of God (flooding, storm etc) or civil disturbance (war actions, sabotage, blockade etc) and in cases when such delivery caused to be impossible due to decisions by legislative bodies or the governments of the parties under the agreement

72 The Parties shall immediately notify each other on the occurrence of the force majeure circumstances

8 Liabilities of the Parties

81 The parties shall assume commitment not to incur damage to the other party under scope of this Agreement

The Parties under this Agreement shall have no rights to assign unilaterally their rights or the rights of the other party under this Agreement to a third party unless there is a written agreement between the Parties

In case of the transfer of property (sale, leasing etc) designed to generate, transmit and distribute electric energy, the successor by receiving such rights assumes obligations under this Agreement equal to the initial Party herein

82 In case of the failure of the Buyer to take the agreed monthly amount of electric energy (more than 10%) (Supplement 2), the amount not taken is to be paid for by the Buyer on the basis of 10 percent of a price for one kWh (Supplement 2) as per data on the actual deviation from the balance of the electric energy of the Seller

83 In case such failure to deliver in full or in part the monthly agreed amount of electric energy (more than 10%) has caused the Buyer to purchase electric energy from

a third party for a tariff higher for 1 kwh, the Seller is obligated to indemnify the difference in the tariff

8.4 Financial penalties in accordance with the Articles 8.2 and 8.3 are applied on the basis of the document signed by the Parties and DC Baltija

9 Confidentiality

9.1 The parties agree not to disclose the commercial terms of the Agreement to any third party without prior consent by the other party

10 Arbitration

10.1 All the matters under dispute arising in the course of execution of this contract, the parties shall try to settle amicably. In case it is impossible to resolve a matter amicably, the disputed matter shall be submitted to the authority considering business disputes in the country of the defendant

10.2 In dispute settlement is applied the governing law of the country where dispute is considered

11 Term and duration of this Agreement

11.1 This Agreement shall enter in force upon its signing and shall remain in force until its termination

All prior written or verbal agreements related to this Agreement are invalid and void and may not be used in the construction of this Agreement

11.2 The Agreement may be terminated at any time by mutual consent of the Parties

11.3 All the changes and amendments to the present Agreement are executed in written form and with the mutual consent of the Parties. Unilateral changes or amendments to the existing Agreement are unacceptable

11.4 Each Party may waive its obligations under this Agreement. The Party announcing such waiver must notify the other party six months in advance, provided that the Party agrees to perform earlier assumed obligations

11.5 This Agreement is executed in Russian in 4 (four) equal copies each one having equal legal force. The Parties have signed the four copies of the Agreement and two copies are kept by each Party. All the copies have equal legal force

12 Supplements, legal addresses and bank requisites of the Parties

12.1 The following supplements for an integral part of this Agreement

- 1 SUPPLEMENT 1 Approximate planned interchange of the electric energy per year with the lay-out for quarters

- 2 SUPPLEMENT 2 Monthly commercial Contracts
- 3 SUPPLEMENT 3 Spot commercial Contracts when signed during the respective month
- 4 SUPPLEMENT 4 Points of commercial metering between the Latvian and Lithuanian power systems
- 5 SUPPLEMENT 5 Operating reserve, terms of billing and payment

12.2 Legal addresses of the Parties and bank requisites
Lithuanian state power system
2748, Republic of Lithuania, Vilnius, Zveju 14, Fax 753271
Current account 07080591 at a VITIS bank in Vilnius bank code 260101596

The state enterprise LATVENERGO
LV-1230 Riga, Ganību Dambis 12, Latvenergo
Current Account 0002212208 in the Riga City Council Bank, bank code 310101311

General Director
Lithuanian Power System

General Director
Latvenergo

V Sirutis

J Pāvuls

SUPPLEMENT 1

Approximate planned mutual interchange of electric energy for the year 1993 with the lay-out for quarters

	I	II	III	IV	T-I
Amount of electric energy supplied from Lithuania to Latvia (million kwh)	52	0	0	215	267
Amount of electric energy supplied from Latvia to Lithuania (million kwh)	0	0	0	0	0

General Director
Lithuanian Power System

V Sirutis

General Director
Latvenergo

J Pāvuls

SUPPLEMENT 5

Operating reserve, terms of billing and payment

The operating reserve means the amount of capacity (MW) which can be available within three minutes and which can be activated in the in the moment of contingency

1 The amount of operating reserve subject to be paid by the Lithuanian power system is calculated by DC Baltija for each day according to the following principles

- availability of the operating reserve in the Lithuanian power system itself,
- availability of the operating reserve in the Latvian power system,
- availability of the operating reserve in the Baltic interconnected system received from other power systems

2 The amount of the operating reserve is calculated according to the following method

$$P(\text{operating reserve}) = P(\text{Latvian reserve}) - (P \text{ Lithuanian reserve} + P \text{ reserve Interconnected System})$$

$$P(\text{Latvian reserve}) = P(\text{installed reserve Hydro plant}) - (P \text{ repair of Hydro plant} + P \text{ load of Hydro plant})$$

$$P(\text{Lithuanian reserve}) = P(\text{Kaunas Hydro plant reserve}) + P(\text{Kaishadoras pump storage reserve})$$

$$P(\text{Kaunas hydro plant reserve}) = 100,8 - (P \text{ repair} + P \text{ load})$$

$$P(\text{Kaishadoras pump storage reserve}) = 400 - (P \text{ repair} + P \text{ load}) \text{ provided headwater of the Kaishadoras pupm storage plant is higher than 140 0 m}$$

Operating reserve of the Baltic interconnected system is equal to 300 MW

Components of the amount of operating reserve subject to be paid by the Lithuanian power system are integrated every hour and every day

3 The payment for the availability of the operating reserve is determined in amount of 1 (one) percent of the potential generation based on the actual reserve capacity and is billed at the final account for the preceding month

DC Baltija present to the Parties integrated components which determine the amount of the operating reserve subject of payment (MW), integrated amount of the operating reserve subject of payment and eventual generation (MWhr) derived from that amount

General Director
Lithuanian Power System

General Director
Latvenergo

V Sirutis

J Pāvuls

NB This supplement is not signed but the parties have agreed on the terms of this supplement and they assigned the DC Baltija to work out the procedure for the technical implementation of this supplement using electronic equipment. It is assumed that when such procedure is ready it will be signed and enforced.

CONTRACT

ON SUPPLY OF ELECTRIC ENERGY AND POWER BETWEEN THE STATE ENTERPRISE "EESTI ENERGIA" AND THE STATE ENTERPRISE "LATVENERGO" FOR THE FIRST QUARTER OF 1993

The present contract is signed with the purpose of promoting in the best possible way the business relationship between the parties herein in the energy area. Business relations between the state enterprise EESTI ENERGIA and the state enterprise LATVENERGO are based on mutually beneficial principles, equitable cooperation and the maximum benefit from the joint cooperation. This contract is concluded on the basis of the legislation of the Republic of Estonia and the Republic of Latvia.

1 Parties in the contract

The parties in the contract are the state enterprise EESTI ENERGIA of the Republic of Estonia represented by the general director Udo Lehtse, hereinafter referred to as the "Seller," and the state enterprise LATVENERGO represented by the general director Jānis Pāvuls, hereinafter referred to as the "Buyer."

2 Subject of the contract and terms of delivery

The parties have agreed on the delivery of electric energy and capacity on the following terms:

2.1 The Seller shall deliver and the Buyer shall receive electric energy and power according to the firm delivery based on the accounting balance of interchange power in the interconnected system 250 MW with permissible deviations +/- 10 percent (i.e., an amount of power between 225 MW and 275 MW) at any period of day and night from 01.01.93 till the spring flood period on the river Daugava.

From the beginning of the spring flood in the hydro electric station of the Daugava cascade (exceeding 600 m³/sec) the Buyer may refuse to receive electric energy as per the firm delivery based on the accounting balance of interchange power in the interconnected system.

2.2 The volume of electric energy delivered by the Seller according to the firm delivery based on the accounting balance of interchange power in the interconnected system shall constitute:

January	no less than 186 million kWh
February	no less than 168 million kWh

March approximately 90 million kwhr depending on the commencement and intensity of the spring flood

23 The Seller has the right to deliver and the Buyer to receive electric energy and power beyond the aforesaid amount in Articles 21 and 22 herein, in part as the accounting balance of interchange power in the interconnected system up to 600 MW (approximately) and in part as the following

January 300 million kwhr (approximately)

February 300 million kwhr (approximately)

March 150 million kwhr (approximately)

24 Price for 1 kwhr of electric energy delivered by the Seller shall be 0.022 DM/kwhr

The price may not be changed for electric energy delivered by the Seller in accordance with the firm delivery based on the accounting balance of interchange power in the interconnected system equal to 250 MW

The price may be changed for the electric energy delivered by the Seller in excess of the firm delivery based on the accounting balance of interchange power in the interconnected system by mutual agreement between the parties, but no later than 14 days prior to the regular payment

3 Measurement of the delivered power and electric energy under this contract

31 The amount of the supplied energy is measured

a) transmission line 330 kw Tartu-Valmiera by meter L-301 at the substation Tartu,

b) transmission line 110 kw Tsirgulina-Valka by meter L-677 at the substation Tsirgulina,

c) transmission line 330 kw Tsirgulina-Valmiera by meter L-354 at the substation Tsirgulina,

d) transformer 110/20/10 kw at the substation in Valga by meter T-2035,

e) transmission line 110 kw Ruusmae-Aluksne by meter L-683 at the substation in Rheums

32 The volume of the received energy is measured

a) transmission line 330 kw Valmiera-Tartu by meter at the substation in Valmiera,

b) transmission line 330 kw Valmiera Tsirgulina by meter L-354 at the substation in Valmiera,

c) transmission line 110 kw Valka-Tsirgulina by meter L-677 at the substation in Valka,

d) through transformer 110/20/10 kw at the substation Valga by meter T-2035 at the substation Valga,

e) transmission line 110 kw Aluksne-Ruusmae by meter L-683 at the substation Aluksne

33 Deviation from the actual amount of 250 MW +/- 10 percent as per Article 2 herein is metered by every hour (in cumulative result with interval of 30 sec) through the energy management system of dispatch centre Baltija. The results of these measurements are presented to the Seller and Buyer with the maximum interval five days

34 The commercial accounts of the supplied electric energy are conducted by the dispatch centre Baltija based on the commercial meter readings defined in Articles 31 and 32 (Article 34 is incorporated in this contract as amendment duly signed by the parties in this contract on February 8, 1993. On behalf of LATVENERGO signed by R. Leveiko, deputy director general and on behalf of EESTI ENERGIA by Enn Kallikorm, deputy director general)

4 Wheeled power

41 By "wheeled power" is understood electric power received from a third party which is transmitted through the Seller's power grid and designated for the Buyer

42 The Buyer shall compensate the Seller for expenses related to wheeling of electric power through the Seller's power grid on the basis of 83 percent of the amount of the wheeled power. Seller may receive this compensation in kind or in payment according to the tariff defined in Article 24

5 Planning and operating regime

51 All the questions related to the planning and operating regimes under this contract are determined by dispatch centre Baltija pursuant to the agreement on parallel operation among the DC Baltija and power system participants of the interconnected system Baltija for 1993

6 Billing procedure

61 The billing period is deemed to be one calendar month. The Buyer shall settle accounts with the Seller following the actual receipt of the electric energy and issuance of payment documents sent by cable on 3, 8, 13, 18, 23, 28 day of the month. In case the payment day falls on Saturday, the remittance is performed the preceding day, in case it is Sunday or state holiday - the next day

The final billing for the preceding month is performed by the first regular payment of next month

In case the regular payments or billing are not executed in due time, the Buyer is obligated to pay 0.5 percent for each delayed day beginning with the first day following the due date of payment until the day of actual payment inclusive

6.2 Verification of mutual accounts on the basis of supplied and received electric energy is done by exchange of notices between the parties by cable with consecutive confirmation sent by mail no later than 3rd day of the month following such verification

7 Term of the contract

7.1 This contract enters into force from January 1, 1993 and remains in force until March 31, 1993

8 Amendments, termination and rights to extend the contract

8.1 All the amendments to the contract are executed in writing by mutual consent of the parties

8.2 In case the Buyer is willing to purchase the electric energy and power following the expiration date of this contract, he has to notify the Seller no later than one month prior to the expiration of the term. In this case the parties are entitled to extend the contract for a new mutually agreed term by exchange of appropriate letters or by concluding a new contract

8.3 Termination of the contract in the period of its effective term by one party is not admissible. The party wishing to terminate the sale or purchase of electric energy on the expiration date of the contract has to notify the other party no later than one month prior to this date

9 Liability of the parties

9.1 The parties assume commitment not to incur damage to the other party under scope of this contract

9.2 In case of the failure of the Buyer to take the firm delivery of power based on the accounting balance of interchange power in the interconnected system, the amount not taken (up to 250 MW) is to be paid for by the Buyer on the basis of a price of 0.022 DM/kwhr based on the actual amount not taken, performed in accordance with Article 2 of this contract by DC Baltija

9.3 In the event that the Seller's failure to supply in full or in part the required power (250 MW) causes the Buyer to experience spillage of storage reservoir on the hydrostations on the Daugava cascade below the normal headwater level (Plavina Hydro water level lower than 71.00 meters), the Seller is obligated to indemnify the Buyer for damage incurred due to the operation in the lower level, and the amount of

damages shall be determined for each separate case. In case such failure to deliver in full or in part causes additional generation of electric energy on the Buyer's thermal stations, the Seller is obligated to indemnify the fuel component of the production costs for 1 kwhr in the condensing regime providing justifying accounts and confirmation by DC Baltija with regard to the start-up of the Buyer's thermal stations in the condensing regime with the indication of the amount of electric energy generated in such regime in the period of the Seller's failure to deliver power in full or in part. In addition the Buyer informs the Seller, by means of DC Baltija, immediately about the time of command to start-up of thermal unit in condense regime and the actual time of start-up of such equipment. In case such failure to deliver in full or in part has caused the Buyer to purchase electric energy from a third party for a tariff higher than 0.022 DM/kwhr, the Seller is obligated to indemnify the difference in the tariff.

9.4 The Buyer is obligated in due time and order prescribed in this contract to pay for the electric energy received from the Seller. For each delayed day the Buyer is obligated to pay a penalty in accordance with the provisions of Article 6.1 herein.

9.5 On all changes in the measurement system of electric energy, replacement of meters and recorded inaccuracies, and the work in auxiliary circuits that may affect the accuracy of measurement, the parties are to inform each other immediately.

9.6 No remedies are applied in the cases prescribed in Article 9.2 and 9.3 in case the Seller or the Buyer have to perform emergency work or testing provided for the appropriate consent by the Seller, the Buyer or DC Baltija. This consent should be taken into account by developing short time operation regimes and submitting operational information to DC Baltija. No remedies are applied in the cases when such failure to deliver in full or in part is caused by the actions of a third party or by operational restrictions issued by DC Baltija, subject to approval by DC Baltija.

9.7 The requirements defined in Article 9.2 and 9.3 are not effective during the adjustment period (ending on January 31, 1993) under the new system of billing for the deviations from the firm delivery based on the accounting balance in the interconnected system (250 MW +/-10%).

10 Force Majeure

10.1 The Seller and the Buyer are not responsible for the failure to supply or receive in full or in part the amount of the electric energy or power under this contract when such failure is caused by the Act of God (flooding, storm etc.) or civil disturbance (war actions, sabotage, blockade etc.) and in cases when such delivery is impossible due to decisions by legislative bodies or the governments of the parties in the contract.

10.2 The parties immediately shall notify each other on the occurrence of force majeure.

11 Confidentiality

11.1 The parties agree not to disclose to any third party without prior consent by the other party financial data related to the contract

12 Dispute settlement and governing law

12.1 All the matters under dispute arising in the course of execution of this contract, the parties shall try to settle amicably. In case it is impossible to resolve a matter amicably, the disputed matter shall be submitted to the authority considering business disputes in the country of the defendant.

12.2 In dispute settlement is applied the governing law of the country where dispute is considered.

13 Legal addresses and payment requisites of the parties

Seller

General director

State enterprise

EESTI ENERGIA

Udo Lehtse

Buyer

General director

State enterprise

LATVENERGO

Jānis Pāvuls

Commentary on the contract

Under the Soviet system of power interchange, payments were made for the delivery of energy but not for the guarantee of capacity. The concept of a capacity contract was therefore unfamiliar to power system officials when Estonia and Latvia became independent countries. This contract represents the first agreement among Baltic nations in which there is an explicit consideration of the amount of power in MW as well as the amount of energy in kWh. However, this is not really a capacity contract. This contract establishes a certain price level for the energy in kWh associated with the delivery of at least 225 MW and not more than 275 MW of power.

The contract does not specify whether this level of power in MW is an average over some time period (quarterly, monthly, daily, or hourly) or an instantaneous measurement. In May 1993 Eesti Energia sent a letter to the Baltija Dispatch Center declaring that the contract should be interpreted to require a delivery of 225 MW to 275 MW of power on an hourly average basis. Latvenergo did not accept this interpretation, and the dispute has not yet been resolved.

The concept of "firm delivery" does not involve the delivery of a specific amount of MW specified in the contract. The contract provides for "firm delivery" despite the fact that a level of firm capacity is not specified. In the Soviet system the concept of "firm delivery" meant that the quotas established by central planners must be fulfilled, in this case, the Seller must deliver the amounts of kWh and MW specified in instructions issued by the Baltija Dispatch Center.

It is understood that the contract will be administered in accordance with instructions from the Baltija Dispatch Center, which is not a party to the contract. The "accounting balance of interchange power in the interconnected system" is prepared by the Dispatch Center and is either (a) a monthly or daily plan showing planned power transfers or (b) an accounting record showing actual power transfers.

Charles Zimmermann
Manager, RCG/Hagler, Bailly, Inc
May 14, 1993

**MULTILATERAL AGREEMENT AMONG THE STATE
ENTERPRISE EESTI ENERGIA, STATE ENTERPRISE
LATVENERGO AND LITHUANIAN STATE POWER
SYSTEM ON THE PARALLEL OPERATION OF THE
POWER SYSTEMS OF ESTONIA, LATVIA AND
LITHUANIA**

The state enterprise *Eesti Energia* represented by the general director U Lehtse acting on the basis of the charter of the state enterprise Eesti Energia, the state enterprise *Latvenergo* represented by the general director G Koemecs acting on the charter of the state enterprise Latvenergo and *Lithuanian State Power System* represented by the general director B Sirutis acting on the basis of the charter of the Lithuanian State Power System, hereinafter referred to as "the Parties", with the aim of providing a reliable power supply to the customers and implementing economically mutually beneficial supplies of electric power and energy, have concluded the multilateral agreement on the parallel operation of the Baltic interconnected power system

1 General provisions

1.1 The present agreement has been made based on the agreement on parallel operation of the power system of the Republic of Latvia, the Republic of Estonia and the Republic of Lithuania signed on 07.01.1992 by the Energy Ministers based on the government assignment of the respective countries

1.2 The present agreement shall be the basic legal instrument governing the terms of parallel operation of the power systems in the Baltic Interconnected Power system and the obligations, rights and responsibilities of the Parties under this Agreement

The agreement shall be effective upon its signing and the duration of the agreement is not limited

1.3 The amendments and Appendices to the Agreement may be performed by mutual agreement among the Parties

1.4 The Agreement may be terminated in the following cases

- by mutual consent of the Parties,
- by a notice of any Party one year prior the termination of the parallel operation in the Baltic Interconnected Power System,

1.5 The highest body empowered to decide the cardinal issues related to the parallel operation of the Baltic power systems shall be the Council of the Baltic Interconnected Power System

2 Terms of parallel operation

2.1 The parallel operation of the Estonian, Latvian and Lithuanian power systems shall be carried out through existing and planned intersystem transmission lines of 330 kV and, if it is technically acceptable and economically feasible, through 110 kV lines

2.2 The detailed schemes of parallel interconnection for the characteristic seasons of the year shall be prepared by the Dispatch Center Baltija taking into account the actual regimes and the planned repair subject to be coordinated among the Parties

2.3 The Baltic Interconnected Power System shall normally operate in parallel with the Single Power Grid (of the former USSR) and the Belarus Interconnected Power system. The Central Dispatch Center of the Single Power Grid shall provide frequency control, but the Baltic power system shall provide the control over the accounting energy balance specified by the Dispatch Center Baltija

2.4 The following deviations from the normal operational regime are accepted

2.4.1 Parallel operational regime with the Single Power Grid only through one interconnection either Estonian power system - North West Single Power Grid or Lithuanian power system - Belarus Interconnected power system

2.4.2 The operation regime providing for a split within the Baltic Interconnected system, preserving the parallel operation of its separate parts with the North West Single Power Grid and the Belarus Interconnected power system

2.4.3 The operational regime providing insulation of the Baltic Interconnected system from the Single Power Grid and the Belarus Interconnected power system but preserving the parallel operation with Pskovenergo and Kaliningradenergo

2.5 The operational regimes stated above, as a rule, should not be long lasting and should be filed in the form of claim subject to be agreed upon among the Parties

2.6 The agreements on the parallel operation with the Single Power Grid and the Belarus Interconnected power system based on the assignment by the Parties are concluded by the Dispatch Center Baltija and the Central dispatch center of the Single Power Grid and the Dispatch Center of the Belarus Interconnected power system

3 Reliability of parallel operation

3 1 The reliability of the parallel operation among the Parties is provided by meeting the adopted reliability standards and by coordinating the actions affecting the operation of the other Parties through Dispatch Center Baltija

3 2 The Parties have agreed to put as the basis for the reliability standards the principle accepted by NORDEL and UCPTÉ to provide reliability in the situation of loss of any element in the network or loss of any generating unit (principle N-1)

3 3 The principles of operation of existing and planned relay protection devices, regime and anti-accident automatic devices affecting the parallel operation of the Baltic Interconnected Power System and the choice in selection of such devices shall be carried out by the Parties in cooperation with the Dispatch Center Baltija in accordance with the Appendix 2

3 4 If an emergency situation occurs in the Baltic Interconnected System affecting the interests of several Parties, the liquidation of such emergency situation shall be performed under the guidance and coordination of the chief operator of the Dispatcher Center Baltija

3 5 The investigation of the accidents affecting the interests of several Parties shall be carried out by the Parties concerned with the participation of the Dispatch Center Baltija, and if it is necessary, with the Central Dispatch Center of the Single Power Grid and with the Belarus Interconnected power system

3 6 If the members of the commission performing the investigation cannot agree on the common decision, the issue shall be considered by the Energy Council of the Baltic Interconnected Power System

4 Planning of active capacity reserve

4 1 The reserve is necessary for the following purposes

4 1 1 To cover the consumption in cases of a deviation from the projected consumption. In addition, this reserve must be computed for the increased active load in power stations in the peak hours and for the decrease of the active load in the off-peak hours. The amount of this reserve must be within 3-5% of the consumption. The utilization of this reserve (spinning) could be on the hydro station and on hydro pump storage station (to 7 minutes) and in thermal station (up to 30 minutes) by altering the load of the switched-in equipment

4 1 2 To cover the loss of generation capacity in the result of the emergency outage of equipment in the power stations

In this case of instantaneous black-out of the equipment, the reserve from the Single Power Grid is automatically utilized (by means of altering the external energy balance of the Baltic Interconnected Power System) with the subsequent utilization of the spinning reserve on the hydro station, pump storage power stations and thermal and heat power station

If the decreased generating capacity cannot be covered with the spinning reserve of the Baltic Interconnected Power System and the agreed reserve from the Single Power Grid, by the order from the Dispatch Center Baltija and provided approval from the Parties the rest of the reserve equipment is utilized (cold reserve)

4.2 The amount of spinning reserve for each power system is planned by the Dispatch Center Baltija for a week with the adjustments for each day

The amount of the spinning reserve with the consideration of the effect of the anti-accident equipment should make it possible to continue with the parallel operation without reliability violation and without an inadmissible overloading of the network equipment

4.3 During the start-up of the cold reserve, if necessary, by the direction from Dispatch Center Baltija and accident disconnection and restrictions on consumers in accordance with the Regulation on the emergency disconnection and restriction on the consumers in the Baltic Interconnected Power System provided parallel operation with the Single Power Grid

4.4 The indemnification of the economic damage incurred to one Party caused by the utilization of any sort of reserve due to the emergency event in the power system of another Party shall be resolved in each separate case by the Parties involved based on the data presented by the power systems and the Dispatch Center Baltija

4.5 In addition to the above mentioned types of reserves, the instantaneous reserve shall be available, this reserve shall be utilized automatically by regulating the speed of revolutions on hydro units and turbines at the decreased frequencies

The amount and the speed of utilization of this reserve depends on the tuning of the revolution regulatory device (static, sensibility) and the parameters of the boilers

5 Economic relations among power systems, and the provision of mutual supplies of electric power and energy

5.1 The economic relations among the power systems are based on the bilateral agreements and monthly supply contracts of the electric energy products and should not contradict to the provisions of the present agreement

5.2 The power systems shall provide the Dispatch Center Baltija in due time with the all contractual and operational documentation necessary for planning and operational regimes

5 3 Dispatch Center Baltija shall provide the operational regime based on the adopted monthly contracts, bilateral agreements and the provisions of this agreement

5 4 Dispatch Center Baltija shall regularly inform the power systems on the results of the performance under the contracts for the preceding period and on the prospects of future performance

5 5 Should there be considerable deviations from the amounts defined by the contracts, the Dispatch Center Baltija shall arrange spot and emergency supplies and shall decide on the changes in the operational regime in coordination with the power systems affected by such changes

6 *The procedure of execution of bilateral Agreements among the Baltic power systems and adjoining power systems on mutual supply or wheeling of electric power and energy*

6 1 The subject of the Agreement and the list of agreement documents

6 1 1 The subject of the agreement concerning the supply of energy products may be

- supply of electric energy,
- supply of electric capacity,
- wheeling of electric energy,
- supply (compensation) of reactive energy,
- capacity reserve,
- fuel supply

6 1 2 The contracting parties depending of the needs in the given types of energy products may conclude agreements between the Parties on all or part of the products described in the Approximate Mutual Supplies of Energy Products for a Year with the Allocation in Quarters

6 1 3 The annual supplies are adjusted every month, in amount and in terms, by preparing Monthly Commercial Contracts thereof

6 1 4 In addition to the monthly contracts short term additional and emergency energy or capacity supplies may be performed on terms other than in the monthly contracts

6 1 5 Any of the contracting parties (power systems) may act as an agent in execution of the "direct" contracts between separate companies within respective country (buyers) and the companies in another country (suppliers) provided that the payment for the supplied products is any of the above energy products. Such transactions should be taken into account into monthly or spot contracts

6 2 The procedure and term to prepare contract documents

6 2 1 The agreement "On Approximate Mutual Supplies of Energy Products for a Year" must be prepared, agreed upon with the Dispatch Center Baltija, and signed no later than a month before its effective date

6 2 2 The monthly commercial contracts must be signed no later than 3 days before the beginning of the month

Data on monthly contracts are to be submitted to the Dispatch Center Baltija no later than 10 days before the beginning of the month

The Dispatch Center Baltija shall present its considerations concerning contracts to the power systems no later than 5 days before the beginning of the month

The monthly contracts with external suppliers (or buyers) must be coordinated with the Central Russian Dispatch Center of the Single Power Grid

6 2 3 If the tariffs change for the supplied products the Party initiating the changes is obligated to notify in writing the other party no later than 15 days prior the effective date of the changes

6 3 The basic requirements to the content of the bilateral agreements and commercial contracts

6 3 1 The amount and the terms of supplies are to be determined based on the natural energy flows and not in contradiction to the separate provisions of this agreement, only such terms can be accepted which are subject to operational control, based on the existing technical informational level

6 3 2 The basic content of bilateral agreement must be available to the employees of the Parties and the Dispatch Center Baltija, providing performance of these Agreements

6 3 3 The monthly contracts must contain the list the equipment utilized in cases of emergency and the price of electric energy generated using such equipment The Dispatch Center Baltija, if necessary, shall provide emergency supplies based on the presented data The data concerning the tariffs on emergency supplies cannot be deemed to be commercial secret

6 3 4 The agreement should state the location and commercial metering devices of electric power and energy, billing procedure, force majeure, indemnification of losses, responsibilities of the Parties, arbitration, term and terms of the agreement

6.4 All the bilateral agreements and contracts must be subject to the expertise by the Dispatch Center Baltija, but agreements with the power systems in Russia and Belarus must be coordinated with the Central Dispatch Center of Russia of the Single Power Grid

7 Schedule of equipment repair in the generating stations and in the network

7.1 The Parties agree to coordinate the schedule of equipment repair in the stations and in the portion of the network under operational management of the Dispatch Center Baltija for every calendar month and every year

The coordination of the proposals submitted by the Parties concerning the repair of equipment in the stations and network shall be performed by the Dispatch Center Baltija shall forward the schedules coordinated with the Parties to the concerned Parties

7.2 The Parties present their proposal concerning the monthly schedules of repair until 20 day of the respective month, but annual schedules of equipment in the stations until August 1 and concerning the network equipment - until November 1

The Dispatch Center Baltija shall inform about the coordinated with the Parties repair schedules to the concerned Parties in five day term concerning monthly repair schedules and in a month term - concerning annual schedules

8 Perspective planning in the Baltic Interconnected Power System

8.1 The parties agree to undertake coordinated actions regarding the construction of energy objects and the installation of automatic devices affecting the operation of the Baltic Interconnected Power System

8.2 The Party intending to construct energy object or devices affecting the operation of the Baltic Interconnected Power System shall inform the other parties thereof and the Dispatch Center Baltija at the meeting of the Energy Council of the Baltic Interconnected Power System

8.3 The Parties agree if necessary form working groups for specific cases to consider and coordinate issues of perspective planning among the Parties

The working groups shall be formed by the representatives from the Parties concerned and the Dispatch Center Baltija and are approved by the Energy Council of the Baltic Interconnected Power System

9 System of operational power system dispatching in the Baltic Interconnected Power System

9.1 All technical, economic and organizational matters of operational dispatching are solved independently by the Parties within the respective power systems

9.2 The overall operational dispatching of the Baltic Interconnected Power System with consideration of the parallel operation with the Single Power Grid and the Belarus Power system and other countries is assigned to be performed by the Dispatch center Baltija pursuant to the Articles of Association of the Dispatch Center Baltija and other governing regulations

9.3 Operational and dispatching interrelations with Central Dispatch Center of the Single Power Grid and dispatch Center of the Belarus Interconnected System are determined in the Agreement on parallel operation with the Single Power Grid and the Belarus Interconnected System. The Dispatch Center Baltija concludes the above agreement with the Central Dispatch Center of the Single Power Grid and dispatch Center of the Belarus Interconnected System

10 Obligations of the Parties

10.1 The power systems operated within the Baltic Interconnected Power System and tied up with the unified technological process of generation and distribution of electric energy may not by their uncoordinated actions incur damage to other power systems, decrease the quality of electric energy and reliability of the energy supply, to jeopardize the stability of the parallel operation of the Baltic Interconnected Power System in general

10.2 To perform the load schedule for power stations and consumers specified by the Dispatch Center Baltija, based on the data presented by the power systems

10.3 To provide the mutual supplies of electric power and energy in accordance with the annual agreements, monthly contracts and spot transactions and wheeling of electric energy of other countries within technical limits

10.4 To provide reliable operation of the transmission lines of mutual energy interchange pursuant to the established service borders and the relay protection devices, operational and anti-accident automatic equipment, communication means and telemechanic means of intersystem importance

10.5 To install new devices of relay protection operational and anti-accident automatic equipment, communication means and telemechanic means of intersystem importance by mutual agreement with Dispatch Center Baltija and the Parties

10 6 To follow instructions by the Dispatch Center Baltija concerning the restriction and disconnection of electric power and energy in cases of power and energy deficit in accordance with the regulations on the emergency disconnection and restriction on the consumers in the Baltic Interconnected Power System

10 7 To present the following information to the Dispatch Center Baltija necessary to provide planning and reliability and efficient operational regime of the Baltic power systems and the Baltic Interconnected Power System in general

10 7 1 Proposals on annual, quarterly, monthly energy balance of power and energy

10 7 2 Repair schedules for station and network equipment for every year and every month being under operational management of the Dispatch Center Baltija

10 7 3 To inform the Dispatch Center Baltija and if necessary to the other Party teleinformation on the operation regime of the main network and power stations

The list of transferred teleinformation shall be mutually agreed upon

10 7 4 To provide functioning of communication means used by the Dispatch Center Baltija to conduct operational communication with the power systems

10 7 5 To cover the costs of the operation of the Dispatch Center Baltija in accordance with the present Agreement based on the budget approved by the energy council of the Baltic Interconnected Power System allocated equally among three Parties

11 Rights of the parties

11 1 To conclude bilateral agreements and contracts on the sale and purchase of electric power and energy among themselves and other Parties

11 2 Based on mutual agreements among the Parties, to set the terms for transit of electric power and energy

11 3 Based on the agreements with the Dispatch Center Baltija and the other Party, to change the monthly contracts on delivery of electric power and energy

11 4 To set tariffs for the delivered electric power and energy

11.5 To apply to the Dispatch Center Baltija to make the necessary system calculations which are possible to be made only with the data on the closed circuits of the power system

11.6 To participate in the investigation of the accidents of another power systems provided that this accident has caused violations in the normal operation and incurred damage to this power system

12 Responsibility

12.1 To perform the obligations defined in the clause 11

12.2 For the damage incurred to the other party by its actions

12.3 To perform the contracts between the Parties and with the Dispatch Center Baltija

12.4 For performance of the resolution by the Energy council of the Baltic Interconnected Power System

12.5 Disputes arising with regard to the present agreement must be solved by the energy Council of the Baltic Interconnected Power System

13 Operation of the Dispatch Center Baltija

13.1 The Parties in this agreement have stated the obligations, rights and responsibility of Dispatch Center Baltija in accordance with Appendix 1, subject to the agreement of the Dispatch Center Baltija

14 Legal addresses of the Parties

**Resolution Concerning
the Results of Technical Cooperation
on Electricity Pricing and Contracting arranged by USAID
Seminars in Riga 1992-1993.**

The members of the working group formed by the Baltic Energy Council to address the issues of electricity contracting among Baltic countries on September 9, 1992 on the permanent participants of all the seminars on behalf of all the participants of the seminars would like to state that U S - Baltic experts cooperation in the seminars has found practical application

Namely

1 Concepts used in North America power contracts are included in the draft Multilateral Agreement among Baltic countries among the State Enterprise Eesti Energia, State Enterprise Latvia and the Lithuanian State Power System

2 Information about North American experience was used to prepare bilateral agreements, including the Estonia - Latvia power agreements and the Latvia - Lithuania power agreement and Lithuania and Belarus

3 After the bilateral power agreements were negotiated between Estonia and Latvia and Latvia and Lithuania, these agreements formed the starting point for negotiation of other bilateral agreements on energy interchange including Lithuania - Belarus and Latvia - Russia

4 These agreements have increased the reliability and security of electric power supply in the Baltic countries

Chief of Working Group

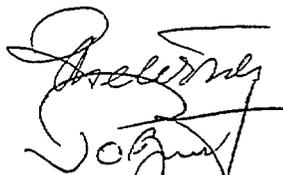
Chief Ing DC Baltija



M Vonsovich

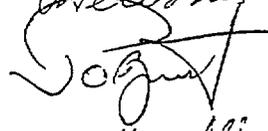
Members

Chief Dispatcher Eesti Energia



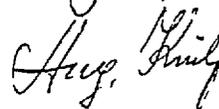
V Peterson

Chief Dispatcher Latvenergo



E Rozental

Chief Dispatcher Lithuania PSPS



A Kisielius

Chief of the Dispatch Service
of the Dispatch Center Baltija



J Ositis

**Proposed Reports by DC Baltija Experts for the Conference on
Exchange of Experience on International Electric Power Agreements**

**Part 1 International agreements on parallel operation of power systems,
on active power (capacity) reserves, and on the wheeling of power**

**1 1 Agreements on parallel operation among the power systems of the Baltic states
and also with the interconnected power system of the CIS**

1 1 1 Formation of the Baltic Energy Council, ownership and legal structure
of Dispatch Center Baltija, procedure for negotiating international agreements
in the electric power sector, organizations authorized to sign agreements

1 1 2 The existing circuit schemes of power systems and actual operational
schedules

1 1 3 The existing agreements with the Central Dispatch Center of Russia and
Dispatch Center of Belarus on assistance in the technical implementation of
operational schedules within the framework of the parallel operation

1 1 4 Principles of commercial sale of electric energy within the power
systems of the Baltic countries and power systems of neighboring countries

**1 2 Principles of maintenance of generating capacity reserves in the power systems of
the Baltic countries**

1 2 1 The actual allocation of generating reserves among the Baltic power
systems during the year

1 2 2 The existing agreements with regard to generating reserves within the
power systems of the Baltic states and neighboring power systems of CIS

1 2 3 The possibilities of future contracts on generating reserves among all the
participants(power systems) having parallel operation (Baltic power systems
and respective CIS countries)

1 3 Problems related to the wheeling of power in the interconnected power systems

1 3 1 The operation of the power systems of the Baltic states in the circuit
330 kV-750 kV

1 3 2 Experience in international wheeling of electric energy Power transit
to the Yantar power system (Kaliningrad) through power systems of the Baltic
states

1 3 3 Problems related to the wheeling of power in the framework of
anticipated interconnection with NORDEL and UCPTE

The reports will be prepared by V Kreslinsh. He will analyze documents submitted by power systems of Central Asia and assess the current situation in these countries.

Part 2 Maintenance of reliability, regulation of reactive power and voltage, and application of anti-emergency protection devices

2.1 Provision of reliability and stability of operation in the interconnected system

2.1.1 Problems related to the provision of stability of the main circuit of the Baltic interconnected system during parallel operation with the circuits of the interconnected systems of the CIS

2.1.2 Problems of transition from the stability criteria applied in the former USSR to the new Western European criteria and requirements

2.1.3 Improvements of planning methods (calculation) and operation analysis

2.2 Regulation of reactive power and voltage in the main circuit of the high-voltage network of the Baltic power system

2.2.1 Excess of reactive power in the main transit lines of 330kV of the Baltic interconnected system

2.2.2 Comparison among methods of compensating for reactive power in the Baltic interconnected system and in NORDEL

2.2.3 Regulation of reactive power flows in the power systems and payments for reactive power compensation in a market economy

2.3 Anti-emergency protection devices of the interconnected power system in the present stage of development

2.3.1 Interdependency of power systems in providing effective anti-emergency management - a consequence rooted in the original formation of these power systems as one system in the earlier period

2.3.2 Improvement of anti-emergency management to meet West-European standards

2.3.3 Account of damage incurred to another party as a result of the application of anti-emergency management

Reports will be prepared by Yuri Pervushin. He will analyze documents presented by power systems of Central Asia and assess the present situation in these countries.

Part 3 Direct and indirect methods of load management in power systems

3 1 Load profile in the power systems of the Baltic states

3 1 1 Changes in load profile in the interconnected power system in the latest years

3 1 2 Economic effect of shifts in load profile shown on the example of one power system

3 2 Time-of-use metering of electric power

3 2 1 Transition to two-part tariffs for electric energy in the Baltic power system

3 2 2 Technical devices in use in the Baltic interconnected system at present and in the future

3 3 Direct load management (Demand side management)

3 3 1 Application of demand side management at present in the power systems of the Baltic states

3 3 2 The possibilities for the future use of DSM

Reports will be prepared by Yuri Pervushin. He will analyze documents presented by power systems of Central Asia and assess the present situation of these countries