



Academy for Educational Development

ARMENIA ENERGY TRAINING PROGRAM

Contract No. LAG-I-00-98-00011-00, Task Order Two

Technical Report

Course on Grid Code and Contracting Practices in the Electric Power Industry

April 14, 1999

Submitted to U.S. Agency for International Development

Submitted by the Academy for Educational Development
with Hagler Bailly Services

ARMENIA ENERGY SECTOR TRAINING PROGRAM

Technical Report

Course # 1: Grid Code and Contracting Practices in the Electric Power Industry

USAID Strategic Objective 1.5	A more economically sustainable and environmentally sound energy sector
Intermediate Result 2	Increased economic efficiency in the energy sector
Participant profile	Armenia's energy companies, government ministries and regulatory entities with competence over the energy sector

A. Course Purpose

Armenia's energy sector is in the process of restructuring its electric power sector. Under the proposed new structure, power will be sold into the national power grid by power generators and purchased from the grid by the distribution companies. The goal of this training course was to introduce show how grid codes fit into the proposed restructuring, and to provide participants with an overview how grid codes work. The course focused strongly on the contractual relationships that need to be established for the grid code to be successful, and the rights and obligations of the parties to the different contracts.

B. Dates/Trainers/Attendees

The course was conducted February 8-12, 1999. Jake Delphia served as the primary course instructor. Boris Shapiro, Jamila Amodeo, and Armen Arzumanyan, also taught sections of the course. All of the trainers received positive evaluations from course participants on the course evaluation form. The list of participants is shown as Table 1. Participants represented a variety of Armenian energy sector organizations, including energy producers, transmission companies, distributors, and the Energy Regulatory Commission.

TABLE 1: LIST OF PARTICIPANTS

#	Name	Employer	Feb. 8	Feb. 9	Feb.10	Feb.11	Feb.12
1	Levon Vardanyan	Ministry of Energy	•	•	•	•	•
2	Svetlana Ganjumyan	Institute of Energy	•	•	•	•	•
3	Karen Khechumyan	ArmEnerg	•	•	•	•	•
4	Hayk Avetisyan	ArmEnerg	•	•		•	•
5	Yuri Galumian	ArmEnerg	•	•	•	•	
6	Minas Minasyan	ArmEnerg		•	•	•	
7	Misha Bagramyan	High-Voltage SJSC	•	•	•		•
8	Eduard Harutiunyan	High-Voltage SJSC	•	•	•	•	•
9	Yuri Budaghian	ERC	•	•	•		
10	Anahit Avetisyan	ERC	•	•	•	•	•
11	Samvel Sujyan	Yerevan Network	•	•	•	•	•
12	Gagik Avagyan	Yerevan Network	•	•	•	•	•
13	Razmik Sardaryan	Central Electric Network	•	•	•	•	•
14	Gevorg Parsadamyanyan	Central Electric Network	•	•		•	•
15	Gagik Avetisyan	Northern Network	•	•		•	•
16	Anahit Sargsyan	Yerevan TPP	•	•	•	•	•
17	Albert Kazaryan	Razdan TPP	•	•	•	•	•
18	Ruben Aleksanyan	Sevan-Razdan Cascade	•	•	•	•	•
19	Hakob Dingchyan	Vorotan Cascade	•	•	•	•	•
20	Aram Melkumyan	Vorotan Cascade	•	•	•	•	•
21	Aleksander Galoyan	ANPP	•	•	•	•	•
22	Shalico Hobosyan	ANPP	•	•	•	•	•
23	Khachik Ghahramanyan	ANPP	•	•	•	•	•
24	Edvard Abrahamyan	ANPP	•	•	•	•	•
25	Mkrtich Jalalyan	Energy State Control	•				
26	Karen Arabyan	Energy State Control	•	•	•	•	•
27	Spartak Hakobyan	Armenergonaladka	•	•		•	•

C. Material Covered

The seminar focused on Hagler Bailly's reform proposal dated September 1998. The seminar presented the overall reform proposal, with a focus on the proposed Armenian Grid Code and power contracts to support the reform. The course explained why a Grid Code is needed, and on the contractual relationships that need to be put in place for a Grid Code to function effectively.

The course provided a review of sections of the Grid Code, an overview of new contracts, and the need for consistency with market rules for all of the governing power sector documents. The course agenda is attached as Appendix A. Course materials presented are Attached as Appendix B.

D. Participant Evaluations

AED administered an exit questionnaire to assess participant satisfaction with the course immediately after its conclusion. The following key points emerged from the evaluation.

- Most of the participants believe that the course will be very useful for them, and that it was conducted at their level of expertise. While slightly over 80% of those who participated considered the program to be directly relevant to their work, the remaining participants did not. Slightly more than one-fourth of the participants indicated that they do not anticipate that they'll be able to apply what they learned in their work. These figures suggest that not all of the attendees may have been the most appropriate people from their organizations to attend the course. These numbers are in contrast to the attendance for the second course on Tariffs, where all of the participants indicated that the material would be relevant to them. AED will continue to monitor this issue over the remainder of the courses to see ensure, to the extent possible, that course attendees are those who will benefit from most from the material presented.
- Participants gave the instructors high marks for the course. Most participants indicated that they have made arrangements to maintain contact with the instructors and/or each other through e-mail, telephone, etc.
- The instructors' knowledge of Russian made their interaction with the audience very close and comprehensive. Participants were satisfied with the interpretation overall, but requested that more attention be paid to the technical document interpretation.
- Participants considered the program to be well-designed and well-organized, and to have met its objectives. They liked the balance between theory and practice in the course.
- While several participants indicated that they would like to see a longer course on the subject, most considered the length of this course to have been appropriate for the content presented.

E. Anticipated Outcomes:

Short-Term: The seminar participants resolved to continue working together and planned to schedule monthly meetings to develop a market member organization. (The resolution that the participants passed on the last day of the seminar is attached as Appendix C.) The participants indicated that the program gave them an overall

understanding of the current situation in the Armenian power sector as well as a structural understanding of the different international models which could be applied in Armenia. One representative of the Armenian Nuclear Power Plant stated he would use the program materials and notes to conduct a seminar with his colleagues.

The discussions during the seminar and before it showed that setting up the NEA would be the key element to make the energy reform in Armenia successful. There are some issues that need to be further contemplated: the legal status of the organization, its authority, membership, level of government participation, etc. Next steps in this direction would be setting a Work Group comprised of the representatives from various energy sector entities, who would develop the charter of the NEA and other documentation.

Long-Term: The National Energy Association will begin operations with operating, planning and market operations committees, and is likely to play a key role in implementing the proposed Grid Code.

F. Recommended Follow-up

- Translation of the US Grid Code into Armenian and its distribution to seminar participants.
- Seminar participants have expressed interest in a more advanced grid code seminar as the power sector reforms move forward.

G. Conclusions

Overall, the workshop was positively received and was given high marks by the attendees. This seminar seems to have met its objectives and to have helped advance the reforms being undertaken under the Armenia Power Sector Reform project by increasing knowledge about grid codes and the contractual relationships that accompany them.

APPENDIX A

Seminar Outline

Grid codes and Contracting Practices in the Electric Power Industry

Seminar Outline

Armenian Power Sector

Grid Code and Contracting Practices in the Electric Power Industry

Course Instructor: Jake Delphia, Hagler Bailly

Day 1

Topic 1 Power Sector Restructuring Goals

Topic 2 Power Sector Restructuring in Other Countries

Topic 3 "Reform Proposal" for the Armenian Power Sector

- Reforms to date
 - Electricity Law
 - Restructuring of Armenergo
 - Formation of Joint-Stock Companies
 - Generators
 - Distribution companies
 - Transmission company
 - Private power producers (small hydro developers)
 - Creation of the Energy Commission
 - Tariff Reform
- The Single Buyer/Single Seller Wholesale Model

Day 2

Topic - Reform Proposal (continued)

- Contractual/legal framework for power market
 - Laws
 - Energy Commission and Regulations

- Grid Code
- Contracts for power and related services
- Additional reforms needed
 - Revisions to the Electricity Law
 - Privatization of the Joint Stock Companies
 - Licensing of all power sector entities
 - Contract Development
 - Grid Code Development
 - Complete Tariff Reform
 - Develop the Framework and Procedural Guidelines for the Energy Commission

Day 3

Topic - Grid Code

- Overview: What is a Grid Code?
- Purpose: Why have a Grid Code?
- Market Rules
- Operating Procedures
- Settlement Procedures
- Funds Administration Procedures
- Planning Procedures
- Connection Rules
- Terminology
- Grid Administration

Day 4

Topic 1 - Power Contracting

- Wholesale Market Operator
- Planning (Load and resource requirement forecasting)
- Negotiations (Tariff vs. negotiated rates)
- Administration
- Exporting and importing

Topic 2 - Contracting for Related Services

- Transmission Access and Wheeling
- Distribution Access and Wheeling
- Interconnection and connection agreements
- Ancillary Services
- Dispatch Power
- Wholesale Contracting
- Settlements
- Funds Administration

Topic 3 - Role of the Energy Commission

- Licensing
- Tariffs for Monopoly Services
- Market oversight for Competitive Markets
- Develop effective energy policy
- Balancing interests of electric companies and retail customers
- Dispute resolution between market entities, and between market entities and ratepayers
- Promoting high efficiency and reliability at reasonable cost
- Monitoring and reinforcement of the rules

Day 5

Topic 1 - Interrelationship between Grid Code, Licenses, and Contracts

- Rights and obligations of the Generators
- Rights and obligations of the Distribution Companies
- Rights and obligations of the Dispatch Operations
- Rights and obligations of the Transmission Company
- Rights and obligations of the Settlements Center
- Rights and obligations of the Funds Administrator

Topic 2 - Implementation of the Market

Topic 3 - Conclusions

APPENDIX B

Seminar Materials

Grid Code and Contracting Practices in the Electric Power Industry



Hagler Bailly

Seminar
Contracts and Grid Code
for the
Armenian Power Sector

PRESENTED TO:

Armenian Government and Power Sector Representatives

PRESENTED BY:

HAGLER BAILLY

SPONSORED BY USAID

Yerevan, Armenia

February 8-12, 1999



Seminar Schedule

Day 1. Introduction of the Participants and Speakers

Reasons of the Reform Program

Challenges of the Reform Program

Power Structures in other Countries

Existing Power Sector Structure in Armenia

Power Market in Transition - Reforms to date

Proposed Reformed Power Market - Single Buyer Model

The Market Participants

The Service Organizations



Seminar Schedule

Day 2. The Role of the Energy Commission and the Energy Ministry

Legal Basis for the Power Market

Additional legal reforms needed

Typical contract terms and conditions

Day 3. Contracts for energy and capacity

Connection agreements

Contracts for services



Seminar Schedule

Day 4. Grid Code

Market Rules

Operating Procedures

**Settlements Procedures and Funds Administration
Procedures**

Other Sections

Day 5. The relationship of Licenses, unbundled tariffs and contracts

Concluding remarks



Day 1

Contracts and Grid Code for the Armenian Power Sector

February 8, 1999



Reasons for Reform

- **Armenergo constructed as part of UES**
- **Generation and Transmission built for regional dispatch and sales of energy and capacity to other republics**
- **Soviet Union breakup left Armenia with facilities that do not fit Armenian power customer requirements**
- **Reduced sales of energy and capacity to other countries**
- **Significant change to network size and organization needed to make power sector efficient and reliable**
- **Power Sector is a burden on the State Budget**
- **Need to replace old generation**



Challenges of the Reform Program

- 1 - Encourage investment into the Armenian Power Sector**
- 2 - Create transparent revenue collection system and payment for services**
- 3 - Increase cash flow to all power sector entities**
- 4 - Power sector should be commercial and self-sufficient**
- 5 - Improve reliability of the Power Sector**
- 6 - To rid the power sector of corruption & collusion**
- 7 - Create a system where members of the energy system of Armenia have clear rights, obligations, and liabilities**



Power Market Structures in other Countries

- **Integrated Utilities**
- **Single Buyer (Generation competition)**
- **Transmission Access (Direct Wholesale Contracts)**
- **Distribution Access (Retail Competition)**



Power Market in Armenia Today

- **Separated System**
- **No legal basis for Power Market or system operations**
- **Lacks a system of fair treatment and rules**
- **Regulator with little authority**
- **Competition in generation non-existent and will not exist under current generation structure**
- **Severe non-payment and commercial loss levels**
- **Sales outside of the country provide best opportunity for revenue growth**

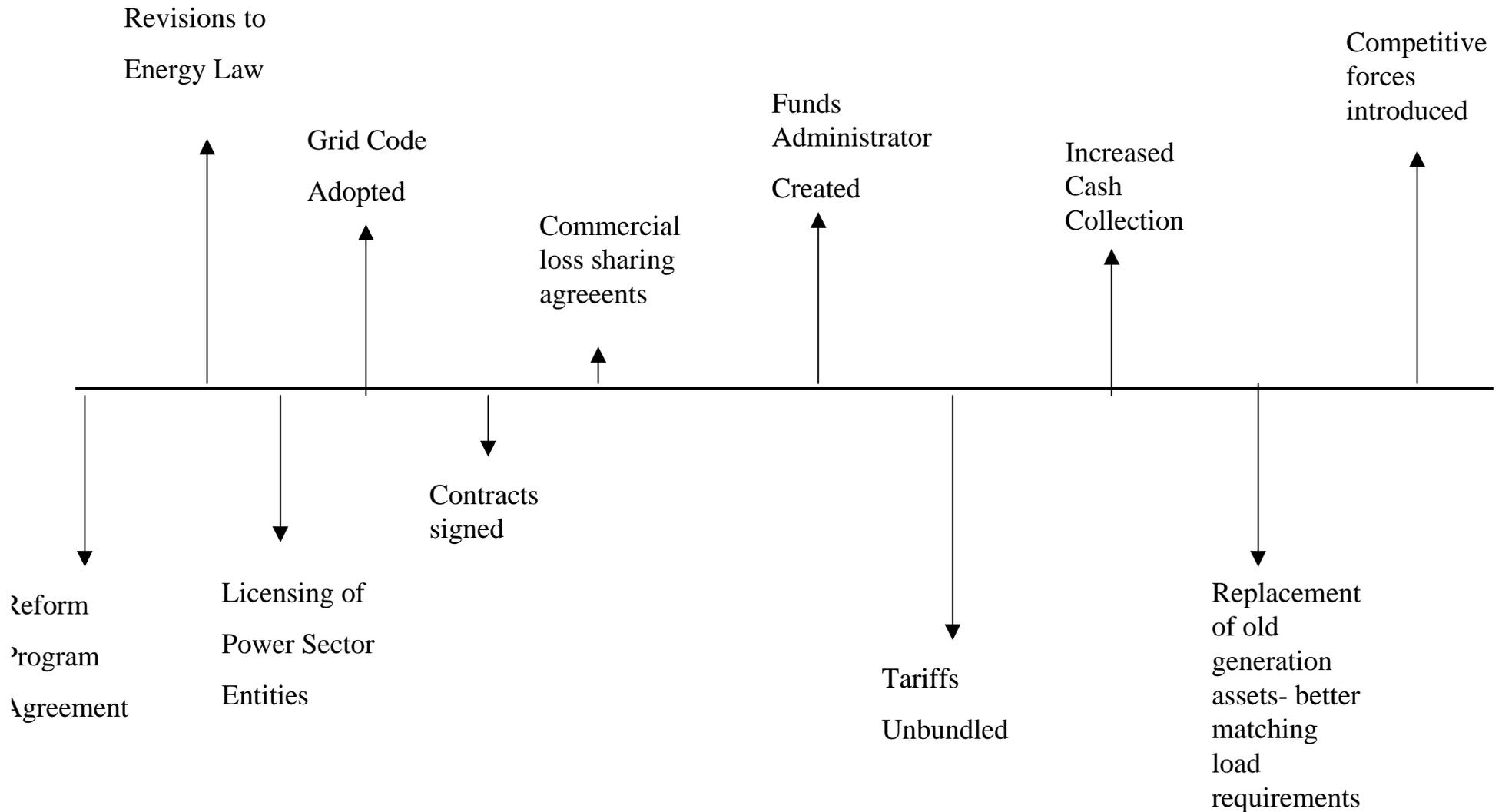


Power Market in Transition

- **There is a need to develop a transitional plan**
- **Commercial losses should be eliminated over a specific time with the cooperation of all government bodies - Distribution companies must develop a business plan incorporating their strategy for eliminating non-payments and commercial losses and liability of failure falls on distribution companies.**
- **Funds Administrator (a bank account) for transferring revenues from retail customers and distributing the funds based on allocation factors**
- **Possibilities for evolving into increasing competitive market once the system is working on a credit worthy basis**



Migration to a Competitive Power Market



FEB. 8-12, 1999

Seminar - Grid Code and Contracts

11



Generating Companies (GENCOs)

- **Hydro Cascades (2) & Dzora (1)**
- **Small Private Hydro Generators (13)**
- **Nuclear Power Plant (1)**
- **Thermal Power Plants (2)**

Two-Part Tariffs - Energy and Capacity

- **Energy = Variable Costs**
- **Capacity = Fixed Costs Adjusted For Availability**

Initially, revenue neutral



Central Dispatch

- **A segment of Armenergo and a service organization for the power market**
- **Responsible for power sector operations, market operations, coordination of maintenance, and long-term forecasting and analysis**
- **Will create a Settlements Center to determine the payments to all power sector service providers (generators, transmission, dispatch, Funds Administrator, distributors, Settlements Center)**
- **Needs a set of rules and procedures to operate the system and the power market - Grid Code**



Transmission Companies (TRANSCO)

- **ArmTrans separated from Armenergo in 1998**
- **Organization needs to be focused delivery of transmission services**
- **Rates will be based on revenue requirements adjusted for performance standards.**



Wholesale Power Contracting Group

- **Responsible for Securing Generation Capacity and Energy**
- **Wholesale Contracting Group also contracts for ancillary services (frequency control, voltage control, spinning reserve, supplemental reserve, load following, black start)**
- **First Three Years will Secure 100% of Distribution Companies' Needs**
- **Distribution Companies are responsible for forecasting needs**



Wholesale Power Contracting Group

- **The Generation Resources contracted by the Wholesale Contracting Group will be dispatched using economic dispatch by the Dispatch Center**
- **Capacity and energy imbalances will be priced at spot price plus a premium.**
- **Contracts will be between WPCG and Generators for purchase of power and WPCG and distribution Companies for sale of power**



Funds Administrator

- **Independent service organization**
- **Collects funds from retail customers**
- **Allocates funds according to Settlements Center Directions**
- **Keeps accurate record of receipts and payments**
- **Is open to audit**
- **Low-cost operation - basically running a bank account**



International Interconnections/Trade

- **Interconnection capacity need to be increased for potential sales**
- **Exports are to be handled by the Wholesale Contracting Group**
- **Internal Armenia power requirements satisfied by lowest cost generation before any sales are made outside of Armenia**
- **Interconnection agreements help in sharing operating reserve and/or increase reliability**

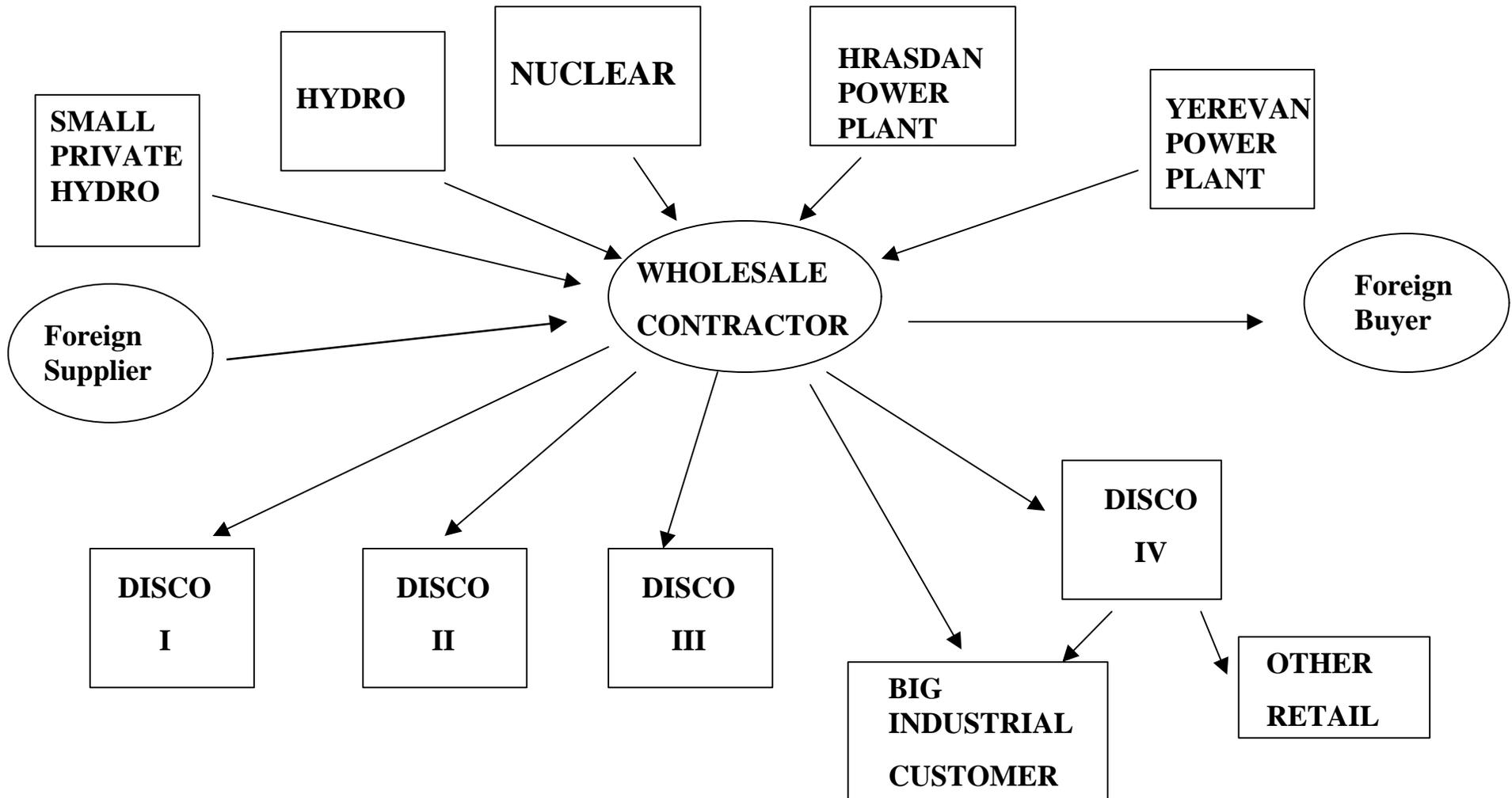


Power Sector Committees

- **Creation of the National Energy Association(charter, voluntary participation)**
- **Law on Public Association allows such an organization**
- **Central Dispatch will coordinate activities**
- **Possible Committees - Market Operations, System Coordination, Planning, Settlements**
- **Rules and procedures can be adopted and put in place to start the Power Market**
- **No real power market exists without Market Members' Participation**



Initial Proposed Structure





Day 2

Contracts and Grid Code for the Armenian Power Sector

February 9, 1999



Role of the Energy Commission

- **Develop Policy for the Power Market Development**
 - **Information Disclosure/Confidentiality Concerns**
 - **Extent of Access to Transmission/Distribution**
 - **Tariff Reform**
 - **Protection of Customers**

- **License all power sector Entities**
- **Approve tariffs for monopoly services**
- **Approve all contracts - power, transmission, distribution, services**
- **Provide oversight on Power Market Activities**



Role of the Energy Ministry

- **Develop National Policy on Energy Usage**
 - **Foreign Ownership of Facilities**
 - **Land Rights/Private Ownership**
 - **Right of Way Access**
 - **Environmental Improvements/Laws**
 - **Economic Development**
- **Coordinate negotiations with foreign governments on increased imports and exports of power**
- **Oversee governance of Government-owned power sector entities and coordinate transfers to private investors**

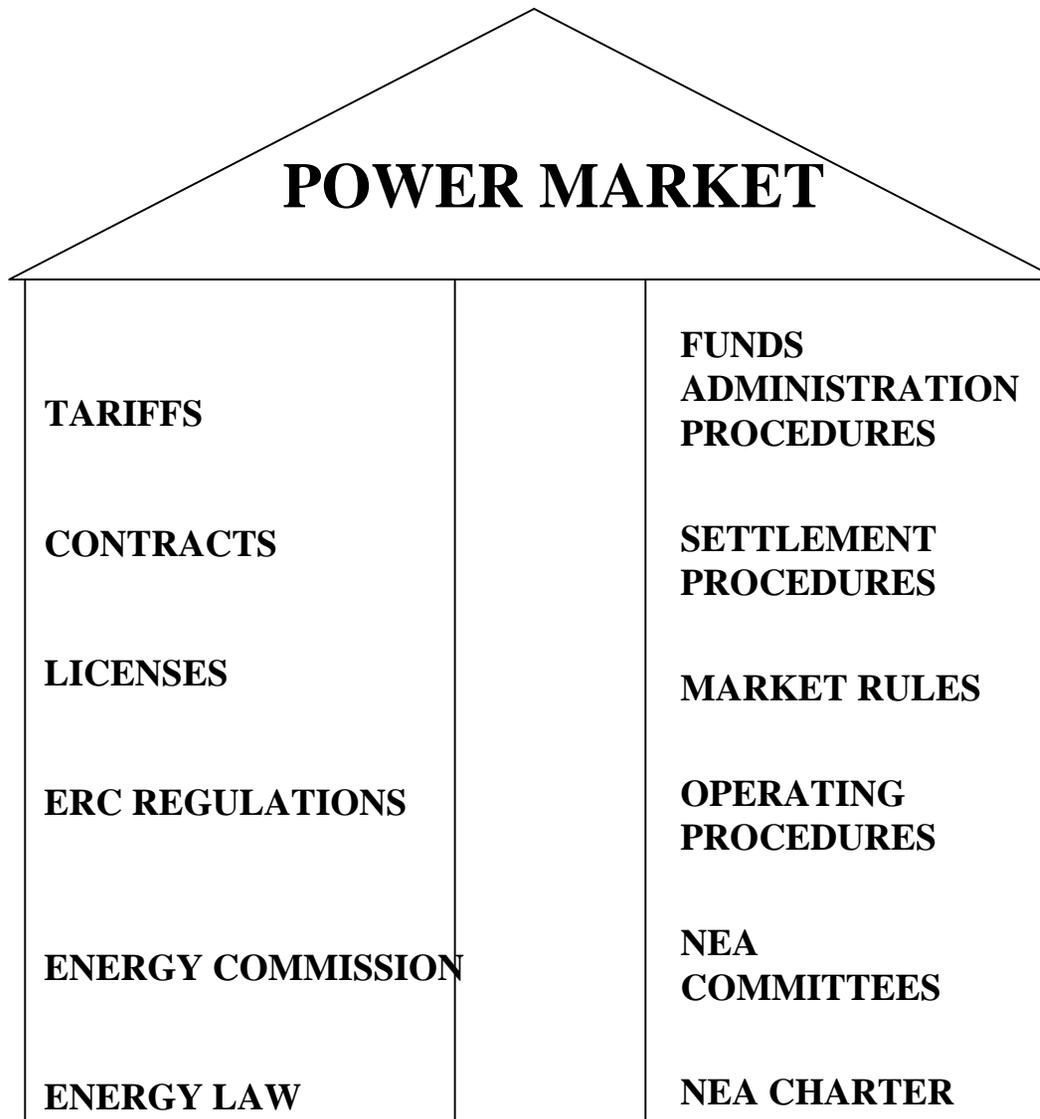


Role of the Energy Ministry

- **Mechanisms for Promoting Public Policy:**
 - **Draft Laws**
 - **Coordination with other Ministries**
 - **Negotiations with foreign governments on power trade**
 - **Board of Directors of State-owned enterprises**



Legal basis for Power Sector





Legal Basis for Power Sector - Energy Law

Energy Law Requirements:

- **Separate state policy from independent regulation**
- **Establish powers and obligations of the Energy Commission**
- **Energy Commission powers are:**
 - **Setting tariffs**
 - **Insuring that the market rules and procedures are followed**



Legal Basis for Power Sector - Energy Law

Relationship of Energy Law with other Laws of Armenia:

- **Constitution**
- **Civil Code (governs contracts, including energy supply contracts, ownership rights, lien, rent, mortgages, right of eminent domain, basic principles of land ownership, and non-profit associations)**
- **Criminal Code (governs criminal aspects such as bribery, types of penalties and violations to which penalties are applied)**
- **Joint Stock Companies**
- **Land Code**



Legal Basis for Power Sector - Energy Law

Relationship of Energy Law with other Laws of Armenia:

- **Tax laws, Tax Code is in progress**
- **Draft Energy Efficiency Law**
- **Code of Ethics/Conduct, which is indication that the Criminal Code provisions are fully incorporated and people who work in the ERC acknowledge the fact they are aware of that Law**



Additional Legal Reforms Needed

Revisions to the Energy Law:

- **Need terminology list**
- **Clear status of the Central Dispatch Center**
- **Clear structure and area of governance of the Law:**
 - **Reflect the separation of: government policy, independent regulation and commercial activities of energy enterprises**
 - **Need long-term oriented provisions**
 - **Detailed and clear transitional provisions**
 - **Recommended topics: Quotas, Funds Administration, Sub-consumers**



Typical Contract Terms

- Identification of the Parties
- Definitions
- Description of services to be provided
- Agreement to Purchase and Sell
- Term of Agreement



Typical Contract Terms

- Rights and Obligations of the Parties
- Condition of Delivery
- Purchase Price/Tariff
- Method of Payment



Typical Contract Terms

- Indemnification
- Guarantees
- Defaults and Remedies
- Arbitration/Dispute Resolution
- Force Majeure
- Security Deposits



Typical Contract Terms

- Representations, Warranties, and Covenants
- Insurance
- Correspondence
- Entirety
- Taxes, Duties and Levies



Typical Contract Terms

- Changes in Law
- Assignment of the Agreement



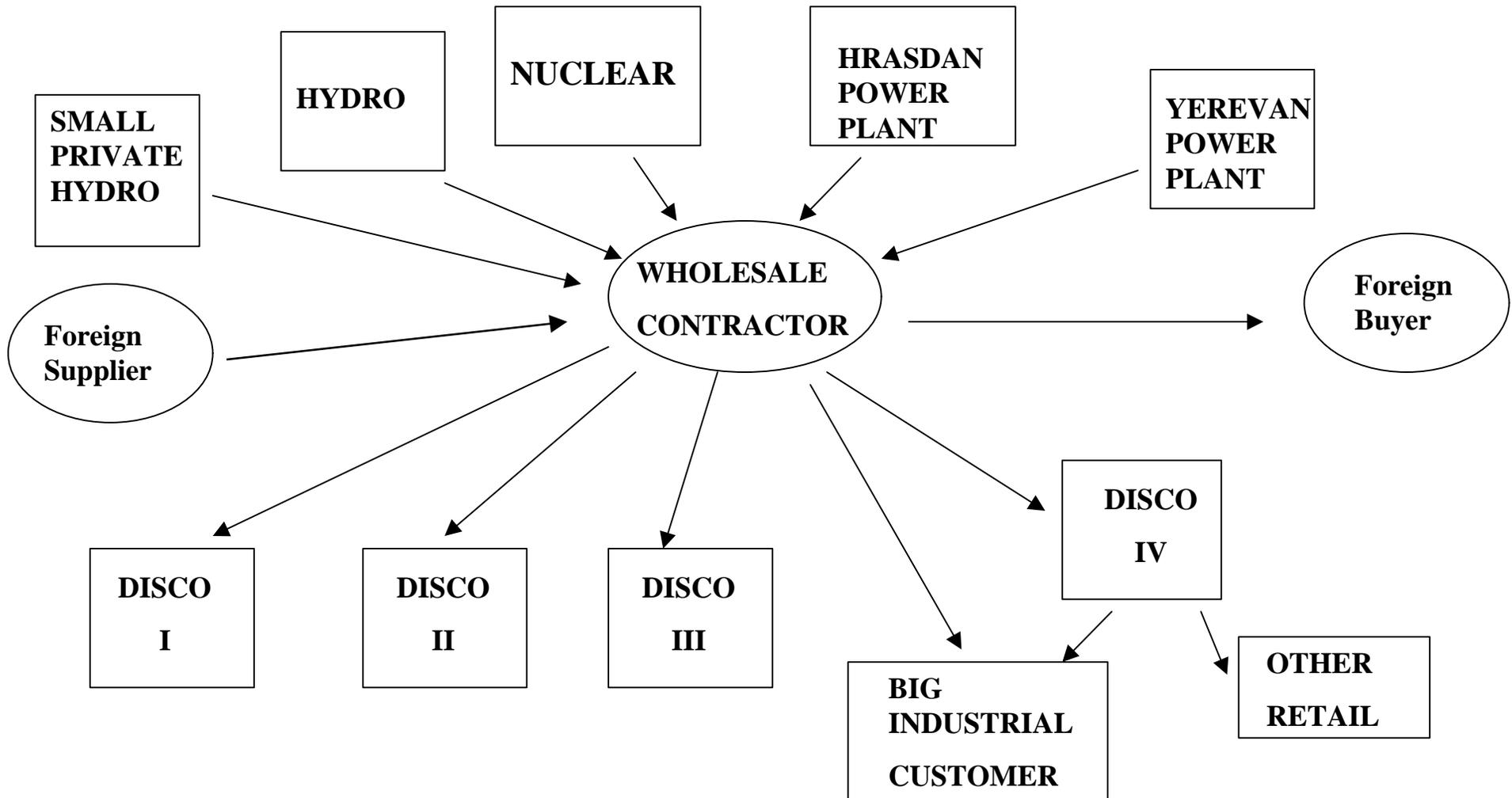
Day 3

Contracts and Grid Code for the Armenian Power Sector

February 10, 1999

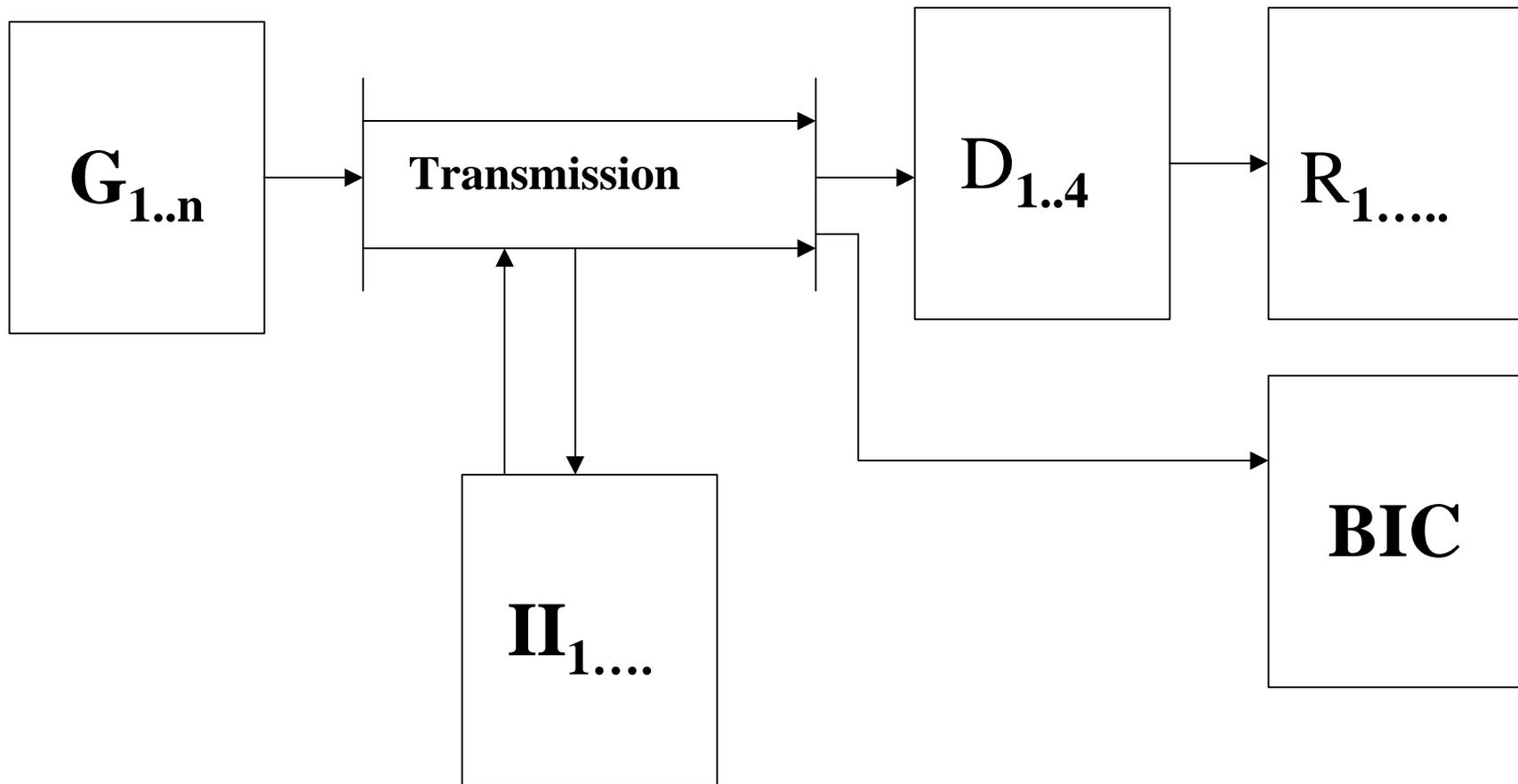


Initial Proposed Structure



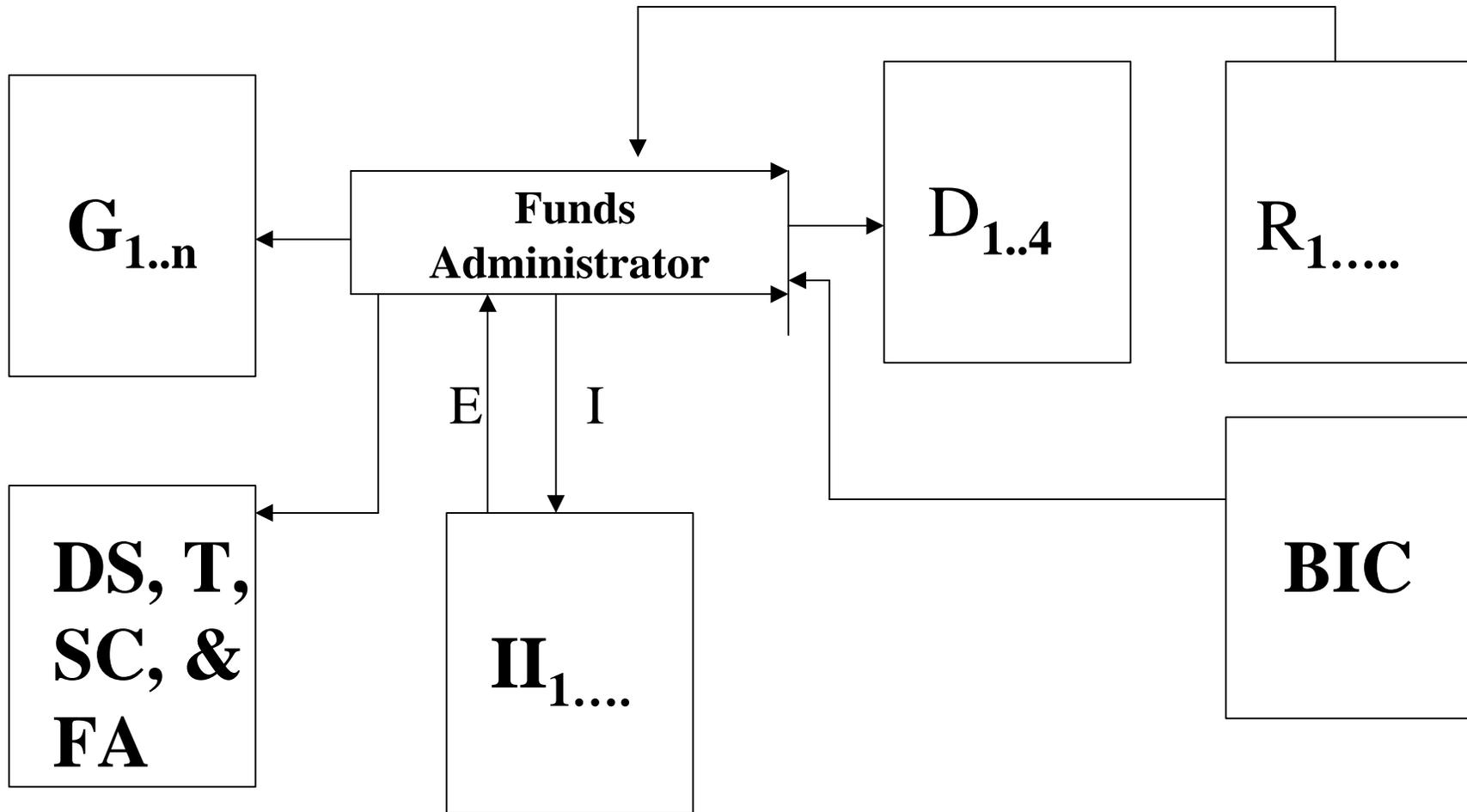


Electrical Flows





Cash Flows





Wholesale Contractor

- Negotiates/Contracts for energy/capacity from generating resources
- Negotiates/Contracts for ancillary services
- Negotiates/Contracts for transmission access and wheeling
- Negotiates/Contracts for sales to distributors
- Negotiates/Contracts for sales to large retail customers
- Negotiates/Contracts for export/import energy and capacity
- Power contracts specifications and use in dispatch



Power Markets

Internal Purchases (served first)

- **One year ahead**
- **One month ahead**
- **One day ahead**

Exports -Energy, no firm capacity



Service Descriptions

➤ Wholesale Contracting Group

Determines Total System Needs (C&E)

Contracts for C&E, Ancillary Services

Contracts for Transmission Services

Contract for All other Services

➤ ARMTRANS

Owns and operates transmission

Develops long-term planning scenarios

Meters all points on the wholesale market

Connects new customers/additions

➤ Central Dispatch

Maintains Grid Code

Determines ancillary services requirements

Schedules, commits, and dispatches generators

Coordinates short-term planning

Obtains all market information for Settlements

➤ Settlements Center

Calculates services provided and payments due

Calculates services received and payments to be recovered

Determines monthly allocation factors

➤ Funds Administration

An escrow account for receiving and paying funds -based on allocation factors



Day 4

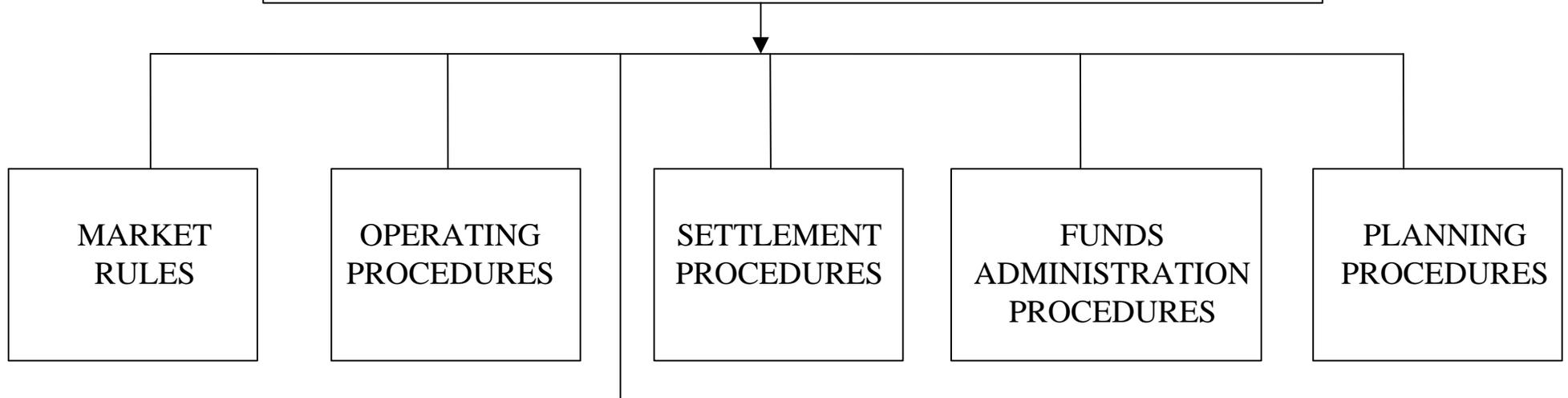
Contracts and Grid Code for the Armenian Power Sector

February 11, 1999



Legal Basis for Power Sector - Grid Code

GRID CODE (MARKET RULES AND PROCEDURES)



ADDITIONAL SECTIONS

- TERMINOLOGY
- GRID CODE ADMINISTRATION
- CONNECTION REQUIREMENTS



Market Rules

- Dispatch instructions
 - Start-up generating unit
 - Shut down generating unit
 - Ramp unit to specified level (up or down)
 - Increase/decrease reactive power
 - Change system frequency
 - Open breaker/close breaker
 - Etc.
- Generating unit commitment (demand plus operating reserve)
- Generating unit dispatching
- System Clearing Price



Market Rules

- Short-Term Maintenance scheduling
- Unit commitment and economic dispatch
- Data base management on all information collected
- Handling of confidential information
- Contract performance reporting to Settlements Center
- Invoicing
- Periods of excess generation
- Periods of limited generation
- Payments/Penalties through Funds Administration



Operating Procedures

- Data base management on all information collected
- Communication, SCADA, EMS, system software
- Load shedding
- Switching
- Relay protection schemes
- Interconnection equipment and testing(including metering)



Implementing the Grid Code and Contracts

- Frequency control
- Voltage control (Reactive power control)
- Operating reserve requirements
- Operating during emergency situations
- Operating during extreme low power periods
- Reporting outages and coordinating responses
- Reporting meter readings



Settlements Procedures

- Governance
- Establishment of initial rules and future modification to Rules
- Parties to receive compensation
- Information to be provided to the Settlements Center from each Party
- Testing/auditing of metering equipment
- Relationship of market rules to payments
- Loss calculations - point of delivery
- Calculation of payments
- Calculation of payments during a shortfall of funds
- Dispute Resolution
- Accounting and reporting
- Audit



Funds Administration Procedures

- Governance
- Financial control
- Timing of funds transfers
- Late payments
- Defaults
- Escrow requirements
- Payment disputes and resolutions
- Electronic funds transfer
- Accounting and reporting
- Audit



Planning Procedures

- Plant and transmission facilities forecast availability
- Load Forecast for total system
- Forecast of operational limitations (generators and transmission)
- Load flow analysis
- System stability and security analysis
- Hydro power plant scheduling
- Nuclear and thermal power plant scheduling
- Long-Term Maintenance Scheduling
- Equipment specification - relays, metering, controls



Additional Sections

- TERMINOLOGY
- GRID CODE ADMINISTRATION
- CONNECTION REQUIREMENTS



Implementing the Grid Code and Contracts

Development of Contracts and Grid Code

- **Creating National Energy Association Committee to discuss details of the various Grid Code**
- **Finalize Grid Code and receive approval from NEA executive board and Central Dispatch**
- **Develop model contracts for each type of service and negotiate terms and conditions**
- **Seek and receive approval from the ERC**



Training and Infrastructure Improvements

Training

Infrastructure Improvements

- **Data Acquisition Hardware**
- **Short-term planning software and Computer hardware**
- **Metering**



Day 5

Contracts and Grid Code for the Armenian Power Sector

February 12, 1999



Legal Basis for Power Sector - Licensing

- **Types of Licenses**
 - **Generation**
 - **Transmission**
 - **Dispatch**
 - **Distribution**
 - **Export/Import**
 - **Funds Administration**
 - **Wholesale Contracting**
 - **Construction**



Legal Basis for Power Sector - Licensing

- **Major Documents**
 - **Energy Law**
 - **Licensing Regulations**
 - **Terms and conditions of the Licensed Activities**



Legal Basis for Power Sector - Licensing

- **Purpose of Licensing**
 - **protection of interests of licensees**
 - **protection of interests of the ratepayers**
 - **regulation of relations between licensees and regulatory agency**
 - **control over licensed activities**
 - **application of the license fee for the Commission budget**



Development of Licenses

Issue of Licenses and Acquisition of License Fees by Energy Commission

- **Licensing - continuing effort**
- **Collection of License fees**



Legal Basis for Power Sector - Tariffs

- **Conventional Method:**

Revenue Requirements =

[(cost of capital - depreciation) * rate of return] + operation costs



Legal Basis for Power Sector - Tariffs

- **Tariff is set for each customer class**
- **Tariff = ratio of revenue requirements and forecasted sales of energy (capacity)**
- **Alternative method: price cap**
- **Under any method, tariffs reflect real costs for each customer class**
- **No cross-class subsidies**



Legal Basis for Power Sector - Tariffs

- **Factors affecting rate of return:**
 - **compatible with similar companies' profits**
 - **ability to provide credibility and attract investors**
 - **quality of service**
 - **reliability, quality of power supply**
 - **number of complaints from customers**



Legal Basis for Power Sector - Tariffs

- **Basic test for inclusion of cost in base rate while determining working capital**
 - **capital must be used**
 - **capital must be useful**
 - **capital was used in a most efficient way**



Modifications of Tariffs

Modification of Tariffs

- **Introduction of unbundled Tariffs**
 - **Two-part tariffs for generators**
 - **Connection charge and wheeling tariff for ArmTrans**
 - **Service rates for Dispatch, Wholesale Contracting, Funds Administration, Settlements Center**
 - **Bulk supply tariff (3 part, connection charge, energy, demand)**
 - **Distribution wheeling and connection charge**
 - **Retail rates (bundled reflecting all costs)**



Legal Basis for Power Sector - ERC Regulations

- **Fundamental Targets of Regulation**
 - **a substitute where no competition exists**
 - **economic efficiency**
 - **fairness**
 - **gaining trust of customers, investors, creditors, government, and staff**
 - **basic principle: balance of ratepayers' and investors' interests**



Legal Basis for Power Sector - ERC Regulations

- **Means to Achieve the Targets**
 - **competence**
 - **independence from monopolies**
 - **independence from excessive political influence**
 - **effective, clear, and exhaustive legal basis is in place**
 - **government policy in the area of regulation is stable**
 - **transparency and openness of the regulatory procedures and decision-making**



Legal Basis for Power Sector - ERC Regulations

- **Means to Achieve the Targets**
 - **interface on a regular basis between public, regulatory agency, and those affected by the decisions**
 - **availability of appeal of the regulator decisions in court**
 - **integrity and proficiency of the regulatory commissioners and staff**
 - **availability of the adequate resources for regulation and for implementation of the decisions**



Legal Basis for Power Sector - ERC Regulations

- **Basic Methods of Regulation**
 - **development and following rules, regulations, and other legal acts**
 - **development and following operating procedures**
 - **licensing**
 - **tariffs**



Development of ERC Regulations

- **Organizational Rules**
- **Operating Procedures (hearings, complaints, petitions, confidentiality, transparency, etc.)**
- **Technical Rules (terms and conditions of service, quality of service, metering, equipment, reporting)**
- **Relations between customers and electric companies**
- **Tariffs and special contracts**



Contracts Regulations

- **ERC develops model contracts**
- **ERC will review contracts approved, but not yet signed**
- **Significant modifications to model contracts must be justified**
- **Final approval by ERC is required before the signing by the Parties**



Concluding Remarks

APPENDIX C

Participant Resolution

Grid Code and Contracting Practices in the Electric Power Industry

THE *GRID CODE AND CONTRACTING PRACTICES IN THE ELECTRIC POWER INDUSTRY* WAS HELD IN YEREVAN, ARMENIA ON FEBRUARY 8 THROUGH FEBRUARY 12, 1999. THE PARTICIPANTS OF THAT SEMINAR DISCUSSED THE NEED FOR CONTINUED REFORM OF THE ARMENIAN POWER SECTOR AND WOULD LIKE TO EXPRESS THEIR CONSENSUS ON THE FOLLOWING MATTERS.

BE IT RESOLVED THAT:

1. THE ARMENIAN POWER SECTOR REQUIRES ADDITIONAL DEVELOPMENT TO ENCOURAGE FUTURE INVESTMENT INTO THE POWER SECTOR ENTITIES.
2. THE ARMENIAN POWER SECTOR NEEDS TO BECOME COMPLETELY INDEPENDENT OF THE ARMENIAN NATIONAL BUDGET.
3. THE POWER MARKET SHOULD INCLUDE DISTRIBUTION COMPANIES, GENERATORS, A FINANCIAL ADMINISTRATOR, A WHOLESALE CONTRACTOR, A SETTLEMENTS CENTER, CENTRAL DISPATCH AND THE TRANSMISSION COMPANY.
4. A TRANSPARENT SYSTEM FOR ADMINISTERING FUNDS NEEDS TO BE CREATED AND HANDLED BY AN INDEPENDENT COMMERCIAL BANK. THE ACCOUNTS HANDLED SHOULD BE AUDITED ON A PERIODIC BASIS.
5. THE ERC SHOULD DEVELOP MODEL POWER CONTRACTS THAT SHOULD BE USED TO CONTRACT FOR ENERGY AND CAPACITY OF GENERATION, FOR THE TRANSMISSION OF POWER, FOR ANCILLARY SERVICES, FOR CONNECTION TO THE TRANSMISSION COMPANY AND FOR THE SERVICES OF THE CENTRAL DISPATCH, FUNDS ADMINISTRATOR, AND SETTLEMENTS CENTER. THE ERC WILL APPROVE ALL CONTRACTS BEFORE THEY ARE SIGNED BY THE PARTIES OF EACH AGREEMENT.
6. THE NATIONAL ENERGY ASSOCIATION, A VOLUNTARY ASSOCIATION, SHOULD BE CREATED AND A CHARTER ESTABLISHED FOR ITS ACTIVITIES.
7. A SET OF RULES FOR THE OPERATION OF THE POWER MARKET, THE SO-CALLED "GRID CODE", SHOULD BE DEVELOPED BY THE NATIONAL ENERGY ASSOCIATION WITH COOPERATION OF THE CENTRAL DISPATCH GROUP OF ARMENERGO.
8. TARIFFS FOR EACH POWER SECTOR ENTITY, ESTABLISHED BY THE ENERGY REGULATORY COMMISSION, SHOULD ENCOURAGE SAFE, RELIABLE, AND ECONOMIC OPERATION OF EACH ENTITY.
9. A PLAN SHOULD BE DEVELOPED FOR EACH DISTRIBUTION COMPANY FOR THE ELIMINATION OF COMMERCIAL LOSSES AND NON-PAYMENT ACCOUNTS. THE PLAN SHOULD SPECIFY THE TIME FOR SUCH ELIMINATION AND THE ALLOCATION FACTORS FOR REVENUES TO BE USED FOR EACH POWER SECTOR ENTITY UNTIL THE DISTRIBUTION COMPANIES BECOME COMMERCIALY VIABLE AND

CAPABLE OF PAYING ALL THEIR DEBTS. THE GOVERNMENT OF ARMENIA SHOULD MAKE IT A POLICY FOR THE ELIMINATION OF SUCH LOSSES AND NON-PAYMENTS AND PROVIDE SUPPORT FOR THE DISTRIBUTION COMPANIES IN OBTAINING THEIR GOALS.

10. THE ENERGY LAW SHOULD BE REVISED AS SOON AS POSSIBLE TO BE CONSISTENT WITH THE ABOVE CONCEPTS.