

AMERICAN UNIVERSITY OF ARMENIA

A STUDY OF THE ENERGY SECTOR PRIVATIZATION IN ARMENIA:

A PATH TO FOLLOW

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## TABLE OF CONTENTS

	Page
List of Tables .....	5
List of Abbreviations .....	6
Abstract .....	7
Research Questions and Hypothesis .....	8
Employed Methodology .....	9
1. Introduction .....	10
2. What is Privatization and Why Privatize? .....	11
3. Background on Privatization in Armenia .....	15
4. Legislative Background for Privatization .....	16
5. Background on Energy Sector in Armenia .....	17
6. Process of Energy Sector Privatization .....	20
7. Achievements of Privatization .....	25
8. Drawbacks.....	33
9. Conclusions and Recommendation .....	34
References.....	38

## **LIST OF TABLES AND CHARTS**

Table 1. Metered Domestic Consumption, GWh..	27
Table 2. Transmission Losses by Year.....	30
Table 3. Technical Losses by Year ..	30
Table 4. Commercial Losses by Year ..	30
Chart 1. Bulk Supply to Distribution ..	27

## LIST OF ABBREVIATIONS

AMD	Armenian Dram
ASRA	Accounting Standards of the Republic of Armenia
AEN	Armenian Electricity Network
EDC	Electricity Distribution Company
FSU	Former Soviet Unions
GDP	Gross Domestic Product
HPP	Hydroelectric Power Plant
NPP	Nuclear Power Plant
RA	Republic of Armenia
TPP	Thermal Power Plant
USAID	United States Agency for International Development

## ABSTRACT

Privatization is one of the tools that governments of transition countries employ in order to decentralize the centralized economic system and create favorable conditions for operational market economy. Privatization takes place with the purpose of providing competition in the market, improving efficiency in the sphere of providing goods and services and management of enterprises.

This essay studies the process and results of privatization of the energy sector in Armenia. The essay describes the changes occurred in the sector due to privatization, examines the differences in power generation, demand, supply, transmission and consumption in the process of privatization, year by year. The essay stresses the fact that in the midst of the collapse of one political regime and acquisition of another, the government used relatively well-worked out mechanism for privatization in the power sector.

The essay point out that today Armenian energy sector is a branch of economy that is fully operational and cost-effective.

**RESEARCH QUESTIONS AND HYPOTHESIS IN THE STUDY OF  
“PRIVATIZATION OF ENERGY SECTOR IN ARMENIA” ARE AS FOLLOWS:**

- 1) What were the priorities of the Armenian government in privatizing the Armenian energy sector? Was the objective of the government met?**
- 2) What tools and techniques did government use to achieve the objectives?**
- 3) How does privatization of the power sector relate to the shifts in the operation of the energy sector? Did privatization of the energy sector in Armenia lead to the improvement of the sector’s performance in terms of power generation, demand, consumption, supply, transmission and distribution?**



## **EMPLOYED METHODOLOGY IN THE STUDY OF ENERGY PRIVATIZATION IN ARMENIA**

This study employed the method of content analysis of data published in official Internet sources and academic writings relevant to the topic. The unit of analysis is energy sector in Armenia.

Content analysis helped to relieve the process of privatization in the energy sector, methods and techniques employed by the government of the Republic of Armenia. The study describes and analysis the process of privatization, pre-requisites and post-results.

## **Introduction**

The purpose of this Master's Essay is to describe the process of privatization in the energy sector in Armenia and identify the achievements and challenges encountered during the process. The core line of this essay is to show that in the atmosphere of collapse of one political regime and establishment of a new political way, in the absence of competitive market and supporting conditions, privatization in the energy sector in Armenia tends to be a relatively successful example of privatization. The model and steps taken by the government of the Republic of Armenia (RA) in the case of privatization in the energy sector were strategically justified actions towards improvement of the sector and increase of efficiency. Having had the unsuccessful example of daily energy cut offs in the years 1989 to 1993, the government of RA put the issue of security and independence of the energy sector in the base line of its activities. This basic understanding of the strategic importance of the independent, cost-effective, fully operational energy network in Armenia brought upon realization of relatively well-organized privatization process of the sector. Due to the mechanism of the operation of the energy policy the corresponding sector is considered to be the only branch of the economy that is operational and cost-effective.

In the countries of Former Soviet Union (FSU) the importance of privatization was stressed after the collapse of the command economy and its supporting ideology. In that period building a new market economy was an important tool and a necessary factor towards democratization. . The characteristic feature common for most transition countries was the state ownership of the production and distribution of goods and services. To support decentralization most FSU countries adopted extensive privatization, this process being difficult because of political instability, changing of the ideology, etc. (Hargas, 2000).

Shifts in the economic system, taken by the Armenian government, were planned to be a move from Soviet planned economy to market oriented economy. Government of RA initiated commercialization process of the power sector, with the purpose to overcome the problems of the sector, to achieve economically sustainable energy system. It aimed at regulating further business development and entrepreneurship, to break up monopolies, to suppress corruption and attract foreign investors. The above-mentioned steps were meant to accomplish the following points:

1. Bring energy into the market economy
2. Create competition in the sector
3. Optimize utilization of the system assets
4. Improve the quality of the service

The government of RA aimed to fully commercialize the sector, to exclude all non-measured losses in the metering system, further develop legal environment.

### **What is Privatization and why privatize?**

In the second half of the 20<sup>th</sup> century a crucial shift took place in the conception of government intervention in the economy. Government is no more provider of goods and services, but rather creator of the environment in which the entrepreneurial activities are carried out (Hargas, 2000).

*Privatization* refers to the transfer of assets from public to private ownership. According to Adam et al (1999) privatization is “the transfer from the public to the private sector of the ownership and/or control of productive assets, their allocation and pricing, and the entitlement to the residual profit flows generated by them” (13). Privatization can be done through partial sale of assets by the state, transfer of assets to the private sector under leasing

arrangements, and introduction of management contracting arrangements (Adam et al, 1999). Governments privatize in order to lower costs and provide customers with more and optimal choices in an environment of competition (Peters, 1991). Another reason for privatization is the need to decentralize the government (“The Privatization Debate; Proponents and Opponents”, 2000).

According to Berg and Berg (1997), privatization has great impact on increasing productivity, income and welfare. This is because of the fact that government officials do not have the same incentives to work productively as private owners have. Public officials are more apt to corruption than those in the private sector (Hargas, 2000).

During the transition period, privatization is often criticized because of its methods and effectiveness (Hargas, 2000). There are two extremes of privatization - full privatization on the one hand and contracting; franchises, subsidies on the other (vouchers in between them) (Peters, 1991). Achieving effective privatization in the transition period can be very difficult (Berg and Berg, 1997).

Adam et al (1999) stress the condition that policy makers should know how a portfolio of assets should be sold so that the country achieves economic growth. Privatization is generally assumed to fulfill the following:

1. Achieve greater efficiency or efficiency improvement
2. Contribute to the state treasury at the moment of sales of public assets
3. Bring higher revenues
4. Increase the level of private participation in the policymaking or transfer of ownership.

In order for privatization to be successful necessary supporting conditions and policies should be present. Adam et al (1999) point out several prerequisites for successful privatization:

1. Strategic choice of sale
2. Actual choice of sale
3. Proper valuation
4. Appropriately timed sequence

The presence of favorable economic environment is also important for the success of privatization. Adam et al (1999) also find an important relationship between deregulation and privatization. Deregulation refers to price liberalization, ceasing of imports control, etc.

Privatization is directed towards efficiency increase, this being achieved under private rather than public ownership. It “leads to lower-cost production and forces down consumer prices so that they are closer to the marginal cost of production” (Adam et al, 1999, 12).

Public ownership may pursue non-commercial goals, which will lead to efficiency decrease; supervising management and monitoring can be low productive. Under public ownership no individual in a corporation has incentives to bear the costs of more productive work. Managers can have their own objectives from poor management. On the other hand, in private ownership, management is generally more productive and timed. Decisions are quick and efficient. So, privatization (private ownership) as discussed in Adam et al (1999), is superior to public ownership; because “...the switch from public to private ownership should result in more precise and more measurable objectives on the part of the owners, which in turn should create the environment and incentives to monitor and control management more effectively” (25).

Privatization brings to new income distribution, emergence of capital markets and the development of private sector. It has greater impact and more visible results, when foreign investment takes place. An analysis of the example of privatization in Kenya by Adam et al

(1999) showed that while there was no significant difference in performance of either the public or private manufacturing firms, ventures with foreign capital invested had more results.

In this respect, Adam et al (1999) distinguish between three types of privatization:

1. Privatization is realized by a single institution within the government
2. Privatization is realized through complete decentralization, each institution being responsible for the privatization of elements of portfolio
3. The third model is the hybrid in which there are a small number of institutions or bodies with a relatively broad scope of functional responsibility.

Governments as a rule implement various selling techniques. Armenia, for example realized sales through auction, on the first stage there being no law on privatization. The most common method is the direct sales of an enterprise to a domestic or foreign purchaser. According to Adam et al (1999), privatization is political process. Privatization policies are often formed under the influence of political objectives. Privatization techniques may vary on case-by-case basis. On the one hand there are fields, which are very profitable, such as winery, tourism, and on the other hand there are fields, which, in spite of being profitable, are also of great security concern for the state; examples of this type of businesses are telecommunications, electric power sector, airlines, and banking

It is with this understanding of the security importance of the energy sector in Armenia, that the government of RA started and implemented the process of power sector privatization in Armenia.

## **Background on Privatization in Armenia**

Armenia was one of the first FSU republics to start privatization of state owned property. During 1997-2001 many industrial firms were privatized and large privatization was in process. Privatization in Armenia was accomplished in several phases. Agricultural land was the first to be privatized. The former Soviet farms ceased to exist and were replaced by peasant farms. The next to be privatized was housing. Simultaneously with land privatization, former apartments owned by the state, which were leased to the inhabitants, were transferred to them free of charge. In 1992 privatization of small, medium and large enterprises started. The Law on Privatization of State Enterprises and Unfinished Construction Projects adopted by the Armenian Government regulated the process. The public participation in the process was carried out by the voucher sale at 10000 AMD nominal prices to the citizens of Armenia. By the end of mass privatization program in December 1998, the RA had transferred the ownership in more than 1400 medium and large enterprises and more than 6000 small businesses (Markossyan, 1999).

Many of the major sales included international actors. Among the largest transactions were the sale of Armentel in 1998, Yerevan Brandy Company, Hotel Armenia and Hotel Ani. The sale of Armenian telecommunications to OTE, though being a large transaction at the time, didn't fulfill expectations connected to privatization, because except for mobile telecommunications, in other spheres the company retains its monopolistic role, leaving no space for the advantages given by the competition. Sales of the hotels and Yerevan Brandy company brought to more achievable results, not only because there is competition in the field but also because these enterprises are not of the same security concern as telecommunications.

It is state security concern that made the Armenian government not to offer for privatization power generation sector, but only electricity distribution, and transmission.

### **Legislative Background For Energy Privatization**

The most important piece of legislation dealing with restructuring of the energy sector is the Energy Law, adopted by the government in 2001. The law on Energy Distribution Company (EDC) privatization was adopted to make amendments to the 1998-2000 State Property Privatization project and on privatization of Yerevan Distribution Joint Stock Company, Northern Distribution Joint Stock Company, Southern Distribution Joint Stock Company and Central Distribution Joint Stock Company.

According to the Law, Share Purchase Agreement was to be signed with the strategic investor- that is the winner of international privatization tender. The government of the republic of Armenia supposed to sell at least 51 % of the Electricity Distribution Company shares during the 'privatization process.

According to the Law, the privatization of EDCs aimed at:

1. Enhancement of EDC management efficiency and distribution network reliability, reduction of electricity losses
2. Expansion and development of EDCs, attracting private capital investment
3. Enhancement of collections for electricity provided in order to improve the financial status of the energy sector entities
4. Provision of financial resources for the state budget

The law defines Tender Committee to regulate the privatization process (Article 6).



According to Article 7, minimum of 51 % of shares of the EDCs included in each package is to be privatized through International Tender to pre-qualified bidders. Up to 20 % of shares of each EDC included in each package can be sold directly to an International financial institution. The rest of the shares are considered the property of RA. The shares of foreign investor can be sold only upon the consent of the RA. The pre-qualified bidder proposes tender proposal consisting of two parts - technical and financial. In the technical part information about the bidder and its expertise, documents confirming the compliance with the tender requirements are covered, methods and directions of investment, etc. The financial part of the tender proposal contains the proposed purchase price of the share package, as well as willingness to make other required payments. The tender proposals should be opened and studied in a manner open to mass media. The prices offered by individual bidders should be made public.

Among the tender requirements is that the investor should give priority to obtaining equipment from local generators and service producers. In emergency situations it is the priority of the government of RA to regulate the operation of the energy sector. The Law also regulates the cases when there is a need to cut down the power supply. EDCs were also given opportunities for tax regulation. The EDCs were exempt of tax obligations occurred as a result of activities prior to the moment of privatization and discovered and registered after it (Article 16 of the Law).

### **Background on the Energy Sector in Armenia**

GENERATION. Armenia has significant domestic electricity generation resources, notwithstanding its lack of fossil fuel. To compensate this, Armenia tries to use the renewable resources - the solar and wind potential, though a significant stage has not been achieved yet.

In Armenia non-thermal domestic electricity generation accounted for almost 60% of total generation in 2002 (32% nuclear and 26% hydroelectric). Armenia has high hydro potential, estimated as 21.8 TWh/year, of which about 85 % are the potential of large and medium rivers and the remaining 15 % of the small rivers. For a small country like Armenia this is a rather impressive number. Hydroelectric power accounts for 81% of generation. The largest rivers in Armenia are Hrazdan and Vorotan, their hydro potential being rather developed. The third hydro station is Pambak-Dzorabet-Debet, which also has great potential, but is not very well developed. There were 17 Hydroelectric Power Plants (HPP) on small rivers, with an annual capacity of 120-130 GWh. The projected power generation of the two cascade power plants and the small HPPs is about 1500 GWh, which is only 25% of the economically exploitable potential. The potential of HPPs was not fully explored; instead, power generation was reduced to 500 GW/year, to prevent the reduction of the water in lake Sevan. The total installed capacity of the HPPs is a little more than 1000 MW. The Sevan-Hrazdan cascade (7 plants) accounts for 55 % of this capacity. The Vorotan cascade (3 plants) contributes with about 40 %, and the remaining 5% is the installed capacity of the small HPPs. According to Armenian legislation, the following independent power plants were established:

1. Hrazdan Thermal Power plant
2. Yerevan Thermal Power Plant
3. Vanadzor Thermal Power Plant
4. Medzamor Nuclear Power Plant
5. Sevan-Hrazdan Cascade Hydro Power Plant
6. Vorotan Hydro Power Plant

7. Several small Hydro Power Plants (“Energy and Nuclear Power planning study for Armenia”, 2004)

Armenian Nuclear energy is produced by a large nuclear power plant (NPP) Metcamor. It started operation between 1976 and 1980. The NPP is of great safety concern for the republic. After the 1988 earthquake, the 2<sup>nd</sup> Unit of the NPP was stopped in 1989, but later, the energy crisis in Armenia made the government make a desperate decision of reopening the unit in 1995, after renovation. The opening of the unit considerably increased the energy production and boosted Armenia’s electricity generation, enabling the country to supply the surplus energy to Georgia starting in the late 1998 and contributing decisively to the stabilization of the power system.

Despite HPPs, and NPP Armenia also has three Thermal Power Plants (TPP) – Yerevan TPP, Hrazdan TPP, Vanadzor TPP. Vanadzor TPP, which has 94 units, has stopped producing power since 1997. Yerevan TPP, with its 550 Units, produces over 500 GWH of power generation in Armenia. The biggest share of power generation belongs to Hrazdan TPP, which produces about 2000 GWH of energy with its 1100 units. The TPPs operate with mazout and gas. The total capacity of the Armenian power system is 3200 MW, with expected demand of 2100 MW in 2010. The high voltage transmission network of Armenia consists of 1323 km of 220 KV lines. There are 14 substations of 220 KV and 119 substations of 110 KV. The capacity of the existing high-voltage network is considered sufficient for the current and the forecasted domestic loads.

Armenia experienced outages in January 2003, when natural gas line from Russia was accidentally ruptured, this resulting in power outages, total shutdown of public transportation. Several other malfunctions left the populace without power for days at a time. In response to

these problems, regional players have proposed an integrated regional utility network.

Capitalizing on this suggestion, Russian electricity monopoly Unified Energy Systems (UES) has effectively taken control of the Caucasus electricity industry, paralleling maneuvers by Gazprom in the Caucasus' natural gas industry.

According to Armenian authorities, in 2002 HPPs produced 31.91% of the total energy, TPPs -27.94% and NPP- 40.15%. In 2003 the share of energy generation of HPPs increased to 37.96%, Thermal Power generation decreased to 26.99% and NPP power generation constituted only 35,05 % of the produced energy. In 2004 Nuclear power generation increased to 38.74%, HPP energy production was 35.18% and TPP energy production was 26.99%.

As for power generation, in July 2003, UES offered to cancel out Armenia's sizeable debt for nuclear fuel through the acquisition of Armenia's aging electricity infrastructure. UES also has been granted license to operate Armenia's sole nuclear power plant Metcamor as well as other thermal and hydroelectric facilities.

### **Process of Energy Sector Privatization**

The privatization in energy sector was a two-stage process. The energy sector of Armenia started the privatization process in 1993 The Ministry of Energy of RA initiated the subdivision of energy enterprises into legally and economically independent units. On February 1993, on the initiative of the Government of RA, the list of entities to be privatized by International Competitive Bidding was approved. The list included:

1. Areni HPP
2. Azatek HPP
3. Ijevan HPP

4. Airum HPP
5. Martuni HPP
6. Meghri HPP
7. Gyumri HPP
8. Sisian HPP
9. Vokhi-3 HPP
10. Armavir HPP
11. Agarak HPP
12. Jermuk HPP.

In 1997 the RA Law “1998/2000 Year project on Privatization of State Property of the Republic of Armenia” was adopted. Upon the adoption of the Law Vanadzor TPP was also privatized and sold to “Andrgasnavtshik-Prometevs” JSC with 100 % property rights. During several months privatization of several small HPPs took place by the Resolutions of the government of RA. Simultaneously privatization of 4 Electricity Distribution Companies (EDC) started. After nearly 2 years of preparation, on April 21, 2001, the International Tender was carried out on the privatization of the EDCs. As no Bidders were received from the pre-qualified companies, the tender was considered a failure. To overcome the failure, another tender was announced in the end of August 2001. The holders of the bidders were the following companies:

1. AES Silk Road
2. Electricite de France
3. Union Fenosa
4. ABB, pre-qualified from the previous bidder

A new Tender Committee was formed headed by the Prime Minister. The Committee reorganized the privatization process, taking into account the proposals and recommendations from the potential bidders during. The privatization process took place in accordance with “Law on making Amendments to the 1998-2000 State property privatization Project and on privatization of Yerevan Distribution CJSC, Northern Distribution CJSC, Southern Distribution CJSC and Central Distribution CJSC”.

. Another step forward was the splitting of the electricity transmission and dispatch. After all, enterprises of the energy sector were reorganized into closed joint stock companies. There is the independent Regulatory Commission, which regulates the tariffs, service quality, and licensing and contract oversight. In spite of the regulatory Commission, The Ministry of Energy of the republic of Armenia maintains the full control over the operations, settlements and flow of the funds at the sector.

Transmission function was separated from “ArmEnergo”, which carried out energy generation, transmission and distribution. During the privatization process it was effectively unbundled into Production, Regional Distribution and Local delivery units, and a High Voltage Company has been created; interconnections, dispatch and wholesale functions were assigned to ArmEnergo State Closed Joint Stoke Company. This company was a wholesale buyer-reseller of generated electricity. It also took responsibility to realize dispatching with the purpose of efficient supply of the electricity. Thus, Armenergo was buying power from generators and selling it to the distribution company, as well as exporting to Karabagh region and Georgia and implementing power swap with Iran. Also, Armenergo was paying to the Settlements Center, Power System Operator, and High Voltage Network for the services provided to the power market. With the introduction of a new market structure, in the last

quarter of 2004 Armenergo ceased to be the single buyer of energy power in Armenia. EInetArm came into power as single buyer of all energy generated in Armenia. It also made all the payment for the system service. AEN signed direct contracts with Generators and service providers: the Settlements Center, Power System Operator, and High Voltage Network. AEN is also obliged to make all payments for the services rendered after October 1, 2004 based on effective tariff. Although Armenergo ended its role as a single buyer, it still collected receivables and made payments in the power sector through the end of 2004. The introduction of a new market structure suspended the consistency of some data regarding sale and purchase by Armenergo and transition of market responsibility to AEN. Recently adopted Electric Energy (Capacity) Metering Procedures established new commercial metering points at Generator-Transmitter-Distributor-Exporter Separation points.

Due to the change of the electricity market structure some pieces of information on electricity consumption is lost and will no longer be available. Thus, the following data is no longer available:

- The amount used for Own Consumption by Generation companies is prescribed in the direct contracts with AEN and will no longer be published.
- AEN exports power to Karabagh region from October 1, 2004, although the information regarding payment and tariffs is not published.

In November 2004 the Government of Armenia signed an agreement to transfer the title of Hrazdan TPP to the Russian Federation.

Armenia has privatized much of its electricity industry, and much of the country's distribution network is either owned or operated by foreign investors Privatization of the

distribution companies is completed, and 80 % of generation is privatized (“Energy and Nuclear Power planning study for Armenia”, July 2004).

In 2003 the USDA (United State’s Development Agency) evaluated Armenian energy sector as corrupt, due to the widespread theft of electricity by various level government officials. According to various estimates, total losses exceeded 50 million \$ in 2001(Nations in Transit, 2003).

Before 2001, Armenian power grids were run by the state. These power grids were joined together into one Armenian Energy Network (AEN) and sold according to the bidder to a British Company Midland Resources Holding in 2002. The deal was completed for 37 million \$. The deal was not approved and supported by the West, because they considered that Midland Resources Holding Lacks expertise and funds to remedy the sector. At that point The Armenian Government considered the Holding able to bring reforms to the sector (Nations in Transit, 2003) The Holding has 80 % share in the distribution network.

Armenia’s sizeable debt to Moscow was 100 \$ million. In order to cancel out that debt, two years ago the government handed 5 Armenian firms to Russia in order to cancel out that debt. The Russian government didn’t take proper measures of investment in these companies. In the meeting of the Armenian Prime Minister Andranik Margaryan with the Russian Foreign Minister Sergey Lavrov, the latter promised fast reopening and reconstruction of these companies. But his promise still remains as a promise. Russia’s interest in the Armenian electric sector is based on strategic considerations. By maintaining control over energetic sector in Armenia, Russia can balance with the growing Western influence in the South Caucuses. 75-80 % of power generation in Armenia belongs to Russian UES (United Energy



System), a state-controlled company; that's Sevan-Hrazdan HPP, Hrazdan TPP and the Armenian NPP (Martirosyan, 2005).

Russian UES is interested in buying the share of the British Midland Resources Holding in the Distribution network. Starting from early 2005, Russia intensified maneuvers over the purchase of that sector. In June 2005 UES became de facto owner of the Armenian Electricity Network. UES realized the deal with Midland Resources Holding through one of its subsidiaries called Interenergo BV. This company paid 73 \$ million for signing the "management contract", according to which Russia operated the system and gained the profits. This contract could not be considered legal. It was not considered legal also by the World Bank and the USAID. According to the contract of privatization between the government of RA and Midland Resources Holding Company, the latter could not sell its shares of the company without the Armenian government's approval. The Government of RA had this regulation technique over the buying and selling of the already privatized assets of the power sector arising out of the security concerns. At first the two sides of the deal did not want the Armenian government to interfere into the deal, but as they saw the disapproval from the World Bank and other Western forces, they started the legalization of the deal. So, we can see that the Armenian government had to approve of a deal, which was not supposed to take place after the government's approval/ disapproval, but a deal, which had already taken place. .

### **Achievements of Privatization**

Due to privatization process improvements took place in the energy sector. Since 1996 it became possible to supply the population of Armenia with energy 24 hours a day, while only a year before in the crisis in 1993-1995, it was possible to provide only 2-3 hours per day.

Today the energy sector structure in Armenia is relatively unbundled, comprising four distribution companies dealing with electricity distribution and five relatively large generation enterprises with capacity of 2800 MW. The transparency, accountability and self reliance of the sector has been achieved by reforms, institutionalization, and physical infrastructure upgrades. The process of development of the sector was regulated by Armenian Energy Regulatory Commission, created in April 1997 by decree; an independent body, responsible for setting tariffs, issuing operating licenses and approving the rules that govern the energy market, the Energy Research Institute which was also created with the purpose of elaboration of the programs of development, policies and strategies of the energy sector and with the help of USAID's programs.

The first implementation of the development policy 1998-2001 was focused on measures of financial improvement and strengthening of financial discipline, measures on continuous upgrades of the metering and billing system of electricity consumption, measures on reduction of technical and commercial losses of electricity, implementation of flexible regulatory tariff policy; improvement of operation and maintenance level existing assets, commencement of implementation of measures on power sector renovation. The second phase of development for 2001-2015 will ensure transition of energy sector of Armenia to a qualitatively new level of operation. It is envisaged that on this stage of package of measures targeted at the total re-equipment of the power sector will be implemented, new technologies will be performed for utilization of national energy resources.

In 1992 a USAID energy program started in Armenia, which aimed at helping Armenia to develop an efficient, reliable and cost-effective energy sector, with stable growth pace. USAID provided technical assistance and demonstrated projects, with the purpose to promote

economic and environmental efficiency, diversify energy sources. The programs implemented by USAID are:

1. “Electricity and Natural Gas Sector Reform Program”, which supported the privatization
2. “Utility Partnership”, which encourages private participation in the energy sector  
“Municipal Energy Efficiency Network”, which supports Armenian participation in the energy network.

In 2000 all companies of electric sector shifted to the Accounting Standards of the Republic of Armenia (ASRA), adopted by the RA government. The achievements of energy sector in Armenia are evaluated by USAID as measurable and progressive

The commercial operation of the power market has improved; a nationwide network of transmission and distribution is built. The Armenian energy sector has made dramatic moves towards sustainability, with current estimates of the sector revenues at 63 % of costs, as compared to 39 % in 1997. The energy efficiency has improved. Armenia’s energy sector is 10% more efficient than in 1997, as measured by the amount of energy needed to produce a unit of GDP.

The sector financial performance has improved since 1991, commercial losses were reduced , and collections of billed amounts were increased. Drastic changes took place in the technical performance of the sector, such as the stabilization of the system frequency and reliability restoration. The rules and policies of the electricity wholesale were also revised (Klyan and Keyan, 2005).

In 2004, *Net Internal Demand* (energy) increased by 0.3% as compared to 2003. Peak Internal Demand (Capacity) in 2004 was 1161 MW, which is 16 MW lower than in 2003.

***Metered Domestic Consumption*** in 2004 increased by 8.4% (from 3,654.4 GWh in 2003 to 3,961.6 GWh in 2004) due to substantial decrease in commercial losses and increase in consumption. Consumption by the residents increased by 3.8 %, as compared to 2002. One of the reasons of increase in consumption of residents is that previously non-recorded and non-reported losses, which essentially constituted part of demand that was not paid for, are converted into sales and customers pay for it now. Industrial customers also increased consumption; instead of 8.4 % in 2002, consumption by industrial firms reached 14.6 % in 2004. The lion share of the industrial purchase belongs to mining industry (35 %), and then comes other industries (31 %), Nairit (16 %), and the cement factories (15 %). The increase in consumption by industrial firms is due to the fact, that many industries and factories are reopened and operate either on native or foreign investment. Budgetary organizations reduced consumption from 25.9 % in 2002, reaching to 9.2 in 2004. Budgetary organizations reduced consumption, because they became self-sustained, depending on annual allocations from the government. Consumption by water companies decreased up to 19 % in 2004. This was because of the fact that EinetArm enforced payment. Transportation sector also decreased consumption by 0.5 % (See Accompanying Table 1).

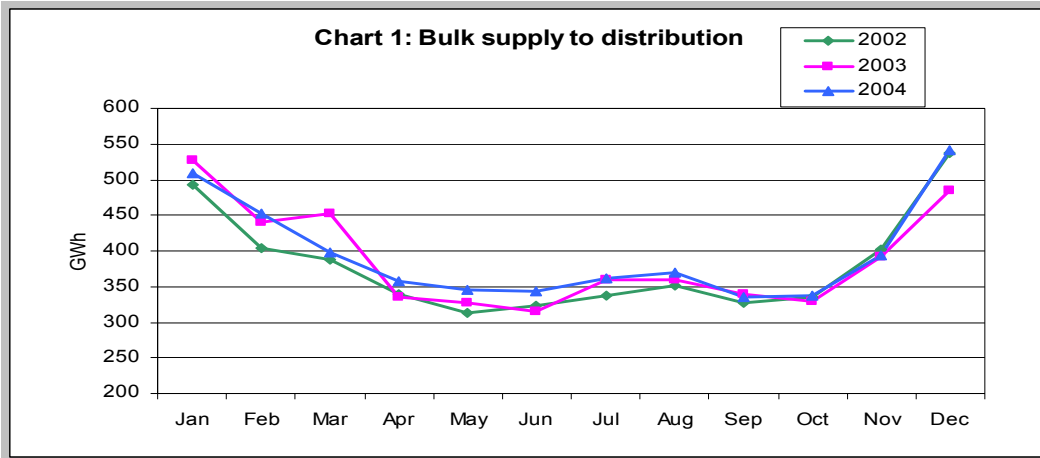
**Table 1: Metered domestic consumption, GWh**

	<b>2002</b>	<b>2003</b>	<b>2004</b>
Residential	1,221.1	1,345.4	1,436.9
<i>Change, %</i>	<b>3.0</b>	<b>10.2</b>	<b>6.8</b>
Industrial	768.0	794.8	911.0
<i>Change, %</i>	<b>8.4</b>	<b>3.5</b>	<b>14.6</b>
Budgetary Organizations	292.1	183.5	200.3
<i>Change, %</i>	<b>25.9</b>	<b>-37.2</b>	<b>9.2</b>
Irrigation	228.1	222.9	260.7
<i>Change, %</i>	<b>-41.7</b>	<b>-2.3</b>	<b>17.0</b>
Drinking Water	275.2	255.0	206.6
<i>Change, %</i>	<b>-5.5</b>	<b>-7.3</b>	<b>-19.0</b>
Transportation	123.5	119.5	118.9
<i>Change, %</i>	<b>2.6</b>	<b>-3.2</b>	<b>-0.5</b>
Other Consumers	492.0	733.3	827.3
<i>Change, %</i>	<b>-2.7</b>	<b>49.0</b>	<b>12.8</b>
<b>Metered Domestic Consumption</b>	<b>3,400.1</b>	<b>3,654.4</b>	<b>3,961.6</b>
<i>Change, %</i>	<b>-1.0</b>	<b>7.5</b>	<b>8.4</b>

Source: Armenian Authorities

Increase in consumption is accompanied by increase in *collection rates*. Thus, EInetArm reached its collection bills to 96.1 % in 2004, instead of 90.0 % in 2002. This achievement speaks of well-organized administrative work. Non-payers did not have electricity supply until debt to the sector has been paid. The amount billed by generators to Armenergo and AEN increased from \$79.6 million in 2003 to \$91.3 million in 2004 due to increased generation (Klyan and Keyan, 2005).

Monthly Bulk Supply to Distribution for 2004 increased in comparison with 2003 and 2002, the overall change mostly due to substantial decrease in transmission losses and increase in consumption (see Chart 1).



. *Net Exports* in 2004 increased by 477.1 GWh (172.7%) as compared to previous year due to significant increase in export to Georgia and Iran. In 2004 net Export to Iran increased by 218.4 GWh. Armenia and Iran have also linked their grids allowing power sales in both directions, driven by seasonal differences in demand between the two countries. Armenian and Iranian energy ministers signed the swap deal between the two countries in late 2004. Under the contract, Iran will provide roughly 35 cubic feet of natural gas to Armenia for electricity production, for every three kilowatt- hours of power exported back to Iran. Armenia provided Iran about 90 MW during peak and off-peak hours and received equal power during the rest of the day for the January through April period. The daily exchange balance was maintained at zero. Starting from May, 2004 Armenia exported power to Iran and only imported some amount in late July. Import from Iran was higher than export in November and December. The above resulted in an increase of export to Iran in 2004 by 170.7 GWh as compared to previous year. Thus Armenia repays its debt for the construction of Agarak switching substation and Sjuniq-Kentron transmission line. Overall, Net Export to Iran increased by 218.4 GWh in 2004. The swap deal also entails the expansion of a power line between Armenia and Iran. A new 220 kw line began service during November 2004, another line with similar capacity will be completed in two years. The companies constructing the

project have pledged the interconnect would have a capacity of approximately 450 MW by the time the third transmission line is finished (National Development report, 2001). Since October 2004, Vorotan Cascade realizes export of electricity to Iran, though the latter doesn't have separate license for export (Klyan and Keyan, 2005)..

Exports to Georgia increased by 262.1 GWh (123.2%) and amounted to 474.6 GWh. It should be mentioned that the lack of market rules allowed the system operator to game the exports to Georgia. Thus, 133.1 GWh out of 412.5 GWh totally delivered to Georgia by International Energy Corporation (formerly Sevan-Hrazdan Cascade) were generated by the hydro power plants, which are the inexpensive energy "resource" and according to the Energy Law shall be consumed by the domestic power market. Although, it can be pointed out that the technical requirements of hydro power plant operation dictate either to spill water during high levels of precipitation or to generate electricity. Since the internal power market was completely satisfied, IEC exported the surplus to Georgia. Exports to Karabagh region also increased

Due to increase in demand (Net Internal Demand plus Export) *Net Generation* of energy also increased by 493.4 GWh (9.5%) in 2004. There also took a shift toward increasing nuclear generation and decrease in hydro and thermal power generation. Thus, in 2004 nuclear generation was 38.7 %, thermal power generated by Hrazdan TPP and Yerevan TPP was 26.1 %, hydropower generated by Sevan- Hrazdan HPP, Vorotan HPP, Dzora HPP and small HPPs was 35.2 %. Generation by NPP was 14.5 % (2,078.3GWh) in 2002 and increased to 21.1 % (2,200.9 GWh) in 2004. Thermal power generation increased to 5.8 % in 2004. Hydropower generation decreased from 72.5% in 2002 to 1.5 % in 2004. Due to adequate nuclear fuel NPP operated at full capacity until August at which time it was shut down for a scheduled outage

for refueling and maintenance for two months. The high level of precipitation allowed for the use of the hydro generation at its full capacity during the entire period of the winter and spring months of 2004(Financial Performance of the Armenian Power Sector, 2005).

**Transmission** losses also decreased in 2004 and the quality increased, the reason being the assistance gained from USAID programs, through which data and metering acquisition system was introduced into the high Voltage Network (See accompanying Table 2).

**Table 2. Transmission Losses by Year**

Transmission Losses	Year
4.2% /229GWh	2003
3.6% /217.1 GWh	2004

*Technical* losses in distribution increased in 2004,as compared to 2003, due to the increase of supply to the consumer (See accompanying Table 3):

**Table 3. Technical Losses by Year**

Technical Losses	Year
11,2%	2003
11.6%	2004

Improved performance of the sector brought upon decrease in *commercial* losses in 2004 as compared to 2003 (See accompanying Table 4):

**Table 4. Commercial Losses by Year**

Commercial Losses	Year
21.7%	2003
17.3%	2004



In 2004 Financial Losses in distribution in Dollar terms decreased by 31% due to the decrease in Commercial Losses. The high-voltage transmission network has current operational connection with Georgia and Iran, connection lines with Azerbaijan and Turkey being out of use, due to political dispute. Total Distribution Losses (technical and commercial), expressed as a percent of Bulk Supply to Distribution, decreased from 21.7% in 2003 to 17.3% in 2004 due to substantial decrease in commercial losses (by 45.4%). It should be noted that for 2004, PSRC has allowed 17% losses in AEN's tariff. Hence, AEN collects almost 100% of the losses through tariff. The PSRC adopted a resolution in 2004 and increased tariffs for all sector entities effective January 1, 2005 (Klyan and Keyan, 2005).

### **Drawbacks**

Armenia is poor in fossil fuel resources; 70-80% of natural gas and nuclear fuel for energy needs are imported, this process is interfered with interrupted political disputes in the Asian area. Though Armenia has operational connections of import and export with neighboring Georgia and Iran, there are no economic ties with Azerbaijan and Turkey, which is due to political disputes between the countries.

The only nuclear power station Metcamor generates nuclear power. The plant was of great safety concern for the population in 1980s. The separation from the Soviet Union in Armenia started as an ecological movement, demanding shut down of the plant. Though closed for some period of time, the NPP was reopened because of energy crisis in the country. Still, nuclear power generation is not safe. The primary supplier of electricity Metcamor NPP does not meet Western standards, because of lack of containment facility, shortage of cash, etc.

Corruption is largely spread among the officials of the energy sector. Though the energy losses have been reduced, still, there is no full control over the energy metering system.

Tariffs increase year by year. If we look at the figures we see that from 1995 to 2004, tariffs have increased from 10.5 dram per KWh to 21.4.

## **Conclusions and Recommendations**

The essay studied privatization of the energy sector in Armenia. The essay described the process of privatization, policies and laws acquired by the Armenian authorities to insure efficient privatization. The essay also described and analyzed the achievements of privatization, in terms of changes in power generation, demand supply, consumption, differences in transmission, technical and commercial losses before and after privatization. Finally the essay sums up with the notion that privatization of the energy sector in Armenia, is a relatively effective model to follow. It aims to be cost-effective and operational.

The government created a rather unbundled system in the power sector, where there is the Independent Energy Regulatory Commission, which regulates the tariffs, service quality, and licensing and contract oversight. In spite of the regulatory Commission, The Ministry of Energy of the Republic of Armenia maintains the full control over the operations, settlements and flow of the funds at the sector.

Recent developments in June and September 2005 put a question mark as to the exercised authority of the Regulatory Commission. Midland Holdings sold Armenian Electricity Networks to the Russian State monopoly UES (Unified Electricity Systems) under a contradictory “management contract”, without the government’s approval, as the government was not notified of the deal beforehand. Only after, the deal has already carried

out, under the pressure of such authorities as the World Bank and USAID, the government legalized a deal between a buyer and a seller that was effectively done in June.

The existence of state regulation in case of power monopoly is also important from the point of price regulation. Unlike a competitive firm, which always equates price and Marginal Cost, since its price is also its marginal revenue, monopolies choose to set a price that exceeds marginal cost. Monopolies if not properly regulated, will choose to produce the quantity where Marginal revenue equals marginal cost and prices are the highest. They act as price setters. So, the importance of the Regulatory Commission is also stressed from the point of price regulation.

In comparison with privatization in other sectors in Armenia, the government doesn't hurry to privatize as quickly as possible, instead, the government implements the policy of "lower but further" attitude. The government, having the discouraging examples of such monopolies as Armentel and Yerevan Brandy Companies, is determined not to lose the regulation tool over such a strategically important sector as energy. Privatization in this sector is more like to a buying-selling regulation, where the government and independent regulatory commission have their own word to say.

Armenia is poor in energy resources; there are no oil wells, gas wells, or refineries in Armenia, and there is also no coal production. Armenia's geographical and political situation is of such character, that any strategic sale needs long consideration on the part of government officials. Sustainable development of the energy sector of Armenia as a country with limited energy resources is based on diversification of energy resources and the use of efficient technologies. The state energy policy of Armenia should consider priority the development of own renewable sources of energy as one of the main conditions of ensuring the energy

security. The encouragement of investors and facilitation of implementation of modern technologies in energy sector, esp. in the field of renewable energy and clean energy technologies should go along with creation of appropriate legislative fields and an advantageous environment for investment activities. Energy sector is one of the sectors, which has strategic importance for the nation. The Armenian government understood this importance and took and takes steps to improve the sector's financial and technical performance. It should implement various techniques and methods in order to guarantee safe operation of the network. To diversify its fuel supplies, Armenia should develop and further the implementation of pipeline projects that would obtain natural gas from Iran. The only domestically produced primary energy is electricity from the hydroelectric plants and the single NPP. In order to guarantee productive and safe operation, foreign investment should be attracted to renovate the Metcamor NPP. This would insure safe operation of the system, production of surplus energy, export to neighboring countries. Many of Armenian HPPs have already had their lifetime; they need complete reconstruction, in order for safe and effective operation and reduction of technical losses.

Armenia should fasten the pace of political negotiations with neighboring Azerbaijan and Turkey. Agreements on political arena would result in establishment of economic ties. This In case Metcamor NPP is renovated and meets Western standards, and in a situation of stable economic ties with neighboring Turkey and Azerbaijan, Armenia has the possibility to become a country of energy export.

Up to now tariffs on energy have been increased, though, there is a decrease in tariffs as compared to 2003. Armenian energy sector should take into consideration that more increase in tariffs, would result in reduction of energy consumption by residents and budgetary

organizations, and why not by industrial firms. With the settlement of relatively cheaper gas infrastructures in the households and organizations may prefer to intensify the use of gas, rather than energy.

Thus, the following recommendations can be put forward in order to insure safe and efficient operation of the power sector:

1. Strengthening regulatory techniques
2. Diversification of energy resources
3. Attraction of more foreign investment
4. Renovation of Metcamor NPP
5. Complete reconstruction of HPPs
6. Establishment of new mechanisms reduction of corruption
7. No more increase of tariffs on energy
8. Increase of export, reduction of import

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