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# Priorities for privatization of Kosovo's electricity distribution network and supply : [presented May 17, 2010]

Avdush Ibishi

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American University in Kosovo  
Master of Science Degree Program in Professional Studies  
With Service Management and Infrastructure Development Concentration

Capstone Project

Priorities for Privatization of Kosovo's Electricity  
Distribution Network and Supply

Avdush Ibishi

May 2010, Prishtine

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**Acronyms:**

KEK j.s.c	Kosovo Energy Corporation joint stock Company
KOSTT j.s.c	Kosovo Electricity Transmission, System and market Operator joint Stock company
KEDS j.s.c:	Kosovo Electricity Distribution and Supply joins stock company
ERO	Energy Regulatory Office
MEF	Ministry of Economy and Finance
DSO	Distribution System Operator
ITSMO	Independent Transmission System and Market Operator
O&M	Operation and Maintenance
KV	Kilovolt
MW	Megawatt
GWh	Giga Watt hour
CCP	Customer Care Package
GDP	Gross Domestic Product
CAPEX	Capital expenditures
OPPEX	Operating expenditures
SEE	Southeaster Europe
IFC	International Financial Corporation
NGO	Non-Government Organizations
SCADA	Supervisory Control and Data Acquisition
MTU	Master Terminal Unit
RTU	Remote Terminal Unit
PLC	Programmable Logic Control

**Abstract**

Historically nationalized industries have had a low performance and generally speaking, the privatizations of these industries increased dramatically their efficiency and effectiveness. For these reasons, the Kosovo's government has decided to privatize the Distribution System Operator (DSO) and Electricity Supply. This privatization is set to take place in the second part of 2010.

There are several priorities that need to be considered for an effective transfer of ownership of Kosovo's Distribution network from the government control to private investors. The top three priorities in this project are considered to be:

- Legislation and regulation for distribution
- Economic and electricity demand growth
- Technical and commercial losses in distribution network

Furthermore, the following priorities will also need to be considered:

- Global finance for electricity investments
- Distribution technologies and infrastructure
- Distribution area, customers and population density

## **Chapter 1**

### **1. Introduction**

#### 1.1 KEDS j.s.c ,KEK j.s.c, KOSTT j.s.c

Currently, the Distribution System Operator (DSO) and Electricity Supply are operating as divisions of the same company –KEK J.S.C (Power Corporation of Kosovo). However, in order to be privatized, these units will need to be split up and the process of separating them is expected to be finished in the first half of 2010. This is a complex and a challenging process.

This Capstone Project will address the complexity and some of the challenges and obstacles that the process of privatizing the DSO and Electricity Supply will be faced with. Furthermore, this project will consider other factors such as managerial, economical and technical, and highlight not only what would happen, if these factors were to be improved but also point out the improvements that must be done. Interaction between all those companies will be more important in post privatization period than it is now, because all relations between each other will be regulated through formal and bedding contracts, which will need to be respected in full, otherwise there, could be many problems in relations between those players.

#### 1.2 Government, Energy Regulatory Office and New Owner

The government has an important role to play in this process and its involvement before, during and after the process of privatization will have to be very high. Indeed, the government as the current owner of the company and tax maker in Kosovo is the most important actor in this process. Government and regulatory together are going to have important role in making a substantial contract with new potential buyer, which contract will have high impact in future behavior and performance of privatized company. In this contract, many things will be determined and clarified, such as tariffs, bad debt, risk sharing, losses and many other details.

An important issue that must be prescribed in details is Power Purchase cost, and how these costs will be reflected in electricity tariffs and how many times per year. All this things will be explained and describe in more details in this capstone project.

#### 1.3 Potential Political, Economical and Social Impact

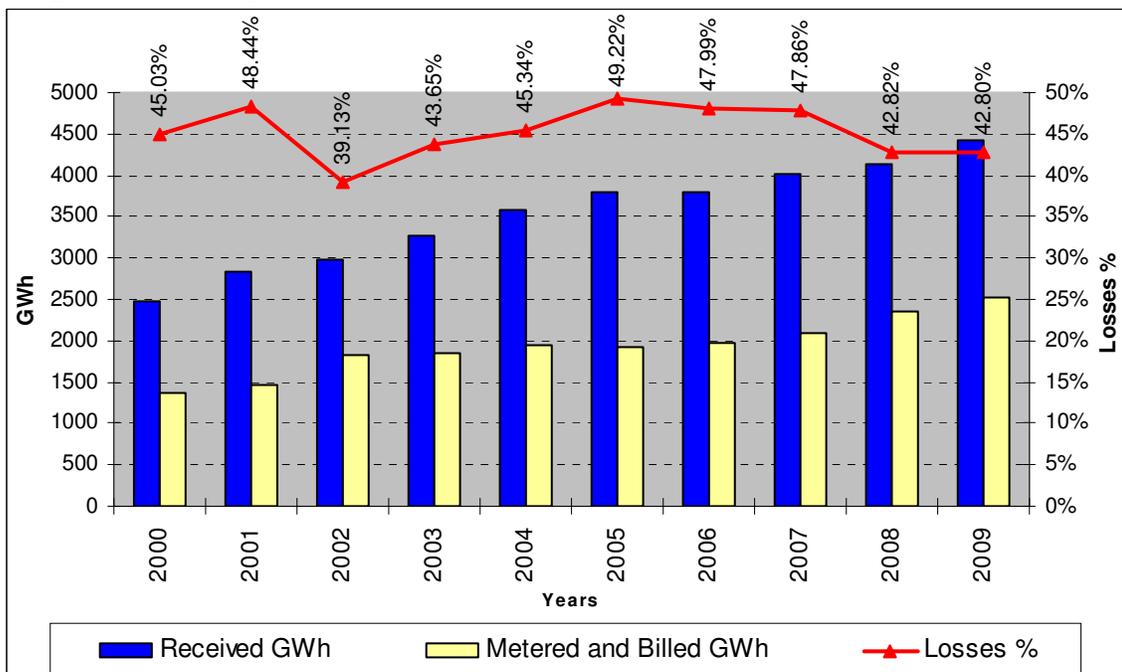
The impact of Kosovo's political, economical and social factors cannot be ignored during process of privatization of the KEDS j.s.c .Political factor is the important one because there must be a political decision to make privatization of any public property in Kosovo and there could be and already are many unsatisfied parties in this process who claim for transparency, evaluation an many other details. Economical impact cannot be ignored as well, because KEDS j.s.c is quite a big company for Kosovo and any

movement such as new investments, increase in electricity price etc. will reflect economically in Kosovo’s market. Social impact is linked with other two factors mentioned above, and taking in account that in some countries such as Albania had even protest agent’s increase price of electricity and thinking that Kosovo’s GDP and welfare is lower than in Albania, social impact could be higher.

## Chapter 2 2. Problem Background

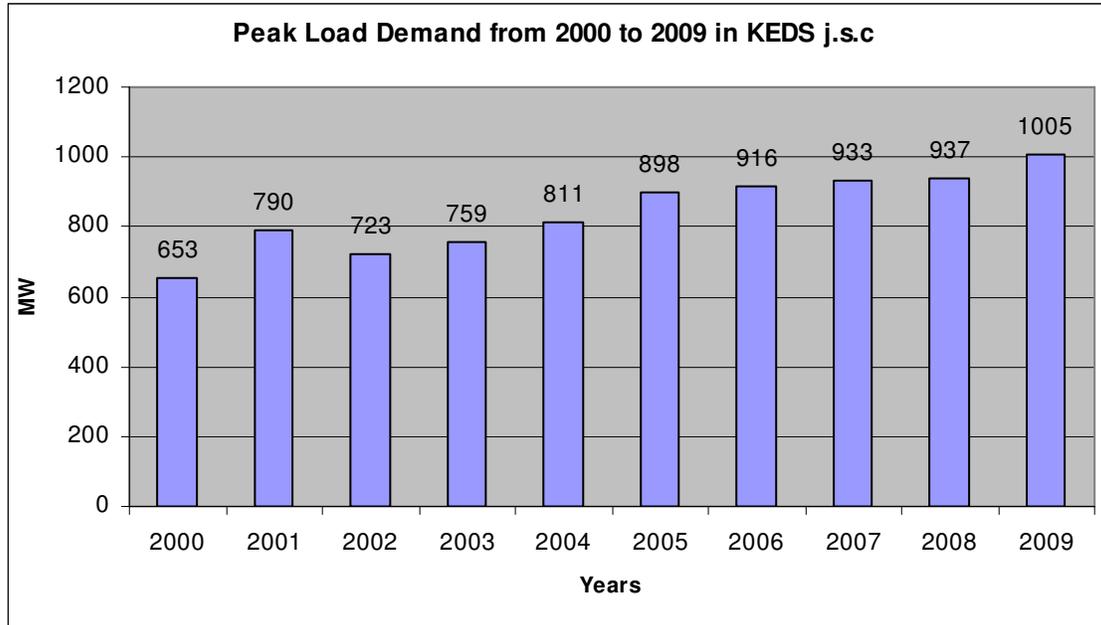
Present situation in distribution system operator and electricity supply, especially level of losses both technical and commercial, determines a fast action of all interest parties to solve this problem. Figure .2.1.shows levelof losses from 2000 until 2009 and Figure.2.2. Shows peak load demand for ten years ago. For ten years total loses in DSO were above 40%; this level of loses tells us about low level of performance in this part of KEK J.S.C . Total losses in average for those ten years were 45%, 20% of them are technical and rest of 25 % are non-technical or commercial, high level of technical losses about 20%, are caused due to lack of investments for many years in DSO, factor that caused degradation of electricity network and increase level of technical losses. Also, electricity losses accrued in an electrical network but are not caused by technical effects such as Joule effect, are called Commercial losses. In Kosovo’s Distribution network, level of those losses is unacceptable high, about 25%. Some authors have defined commercial losses as low-level management of the company and as phenomena that happens to companies that are not customer driven.

Fig .2.1Electricity received-metered and billed and losses from 2000-2009



Source of Data KEK J.S.C

Fig.2.2 Peak Load Demand from 2000 to 2009 in KEDS j.s.c



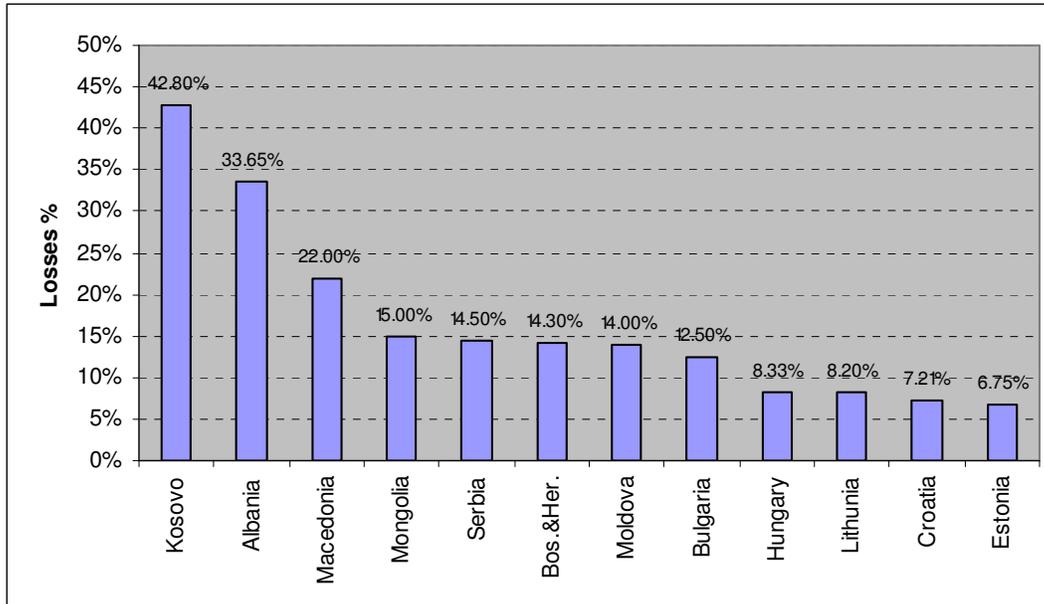
Source of Data KEK J.S.C

This level of losses causes chain effect because company had to increase electricity tariffs to cover cost of losses, as result higher retail price have taken place, with low level of services, price had been increased not because of increase in investments but because of cost of losses. In this way, level of satisfaction of the customers did not increase, and therefore, KEK j.s.c have been faced with high level of non payment of electricity bills and incredibly high level of bad debt.

### 2.1 Regional Experience

Below are explained main events in some countries, from different part of the world, merely countries that have pass through process of transition and had been faced with almost the same problems to stabilize their electricity networks. Figure.1.3. shows level of losses in different countries, for year 2009. In some of those countries process of privatization have taken place and in some it has not yet taken place. Level of losses in any particular country shows the conditions of networks of those countries. Level of losses in Kosovo’s DSO is the highest, and there is a lot of work that needs to be done to improve the performance of DSO and electricity supply. Furthermore, the experience of those countries and the lessons learned from them would help Kosovo’s KEDS j.s.c to improve its present situation.

Fig.2.3 Distribution Electricity losses in various countries



Source of data: [www.erranet.org](http://www.erranet.org)

## 2.2 Overall Energy structure in Kosovo

There are many players in Kosovo's Energy market; the behavior of these players is regulated by Law on Energy, Law on Electricity and law on Energy Regulator, all approved by Kosovo's assembly in 2004.

Based in law of regulatory in 2004 was set up the Energy Regulatory Office (ERO) and in December 2004 was formed the Ministry of Energy and Mines.

Based on the current legislation and the treaty of Athena, the ITSMO (Independent Transmission System and Market Operator) was established in July 2006, which is also known as KOSTT j.s.c. It is important to mention that KOSTT j.s.c have been separated from the KEK j.s.c, part of which was before 2006.

Also, KEK j.s.c is an important actor in Kosovo's energy market, and currently it is responsible for coal production, electricity production, distribution of electricity, and electricity supply. There are many services within KEK j.s.c to support all this process from coal mines to the end users. Soon some parts of this company will be privatized, specifically Distribution Network and Electricity supply. How this process is going on, it will be described further in this capstone project. More importantly, there will be more explanations on how this process will be implemented from an economical and social impact, role of government and regulatory office, past and present situation of this part of the KEK j.s.c, and what is very important to all parties, the valuation of it.

## 2.3 Government's policy for energy sector

Government is implementing its policy based in Law of Energy and Law of Electricity through Ministry of Energy and Mines and based on LPoE (law on publicly owned enterprises) through Ministry of Economy and finances.

Government, thorough Ministry of Energy & Mines is implementing politics and strategies for sustainable development of energy sector in Kosovo, to ensure continues supply with electricity for household customers and businesses. Also, the Ministry of Energy & Mines is responsible for new investments in sector of energy and creation of environment for those investments, according to laws of Kosovo and European directives.

## **2.4 Role of Energy Regulatory Office**

The regulator is an independent entity created by law on regulatory. ERO is responsible to issue and complete all the secondary legislation including tariff methodology in cooperation with foreign and local experts. ERO also is responsible to adapt a structure with the necessary number of people to monitor the implementation of this legislation by the licensees. Regulatory must act according to the law, to be independent and neutral in process of privatization.

Role of Regulatory in process of privatization is:

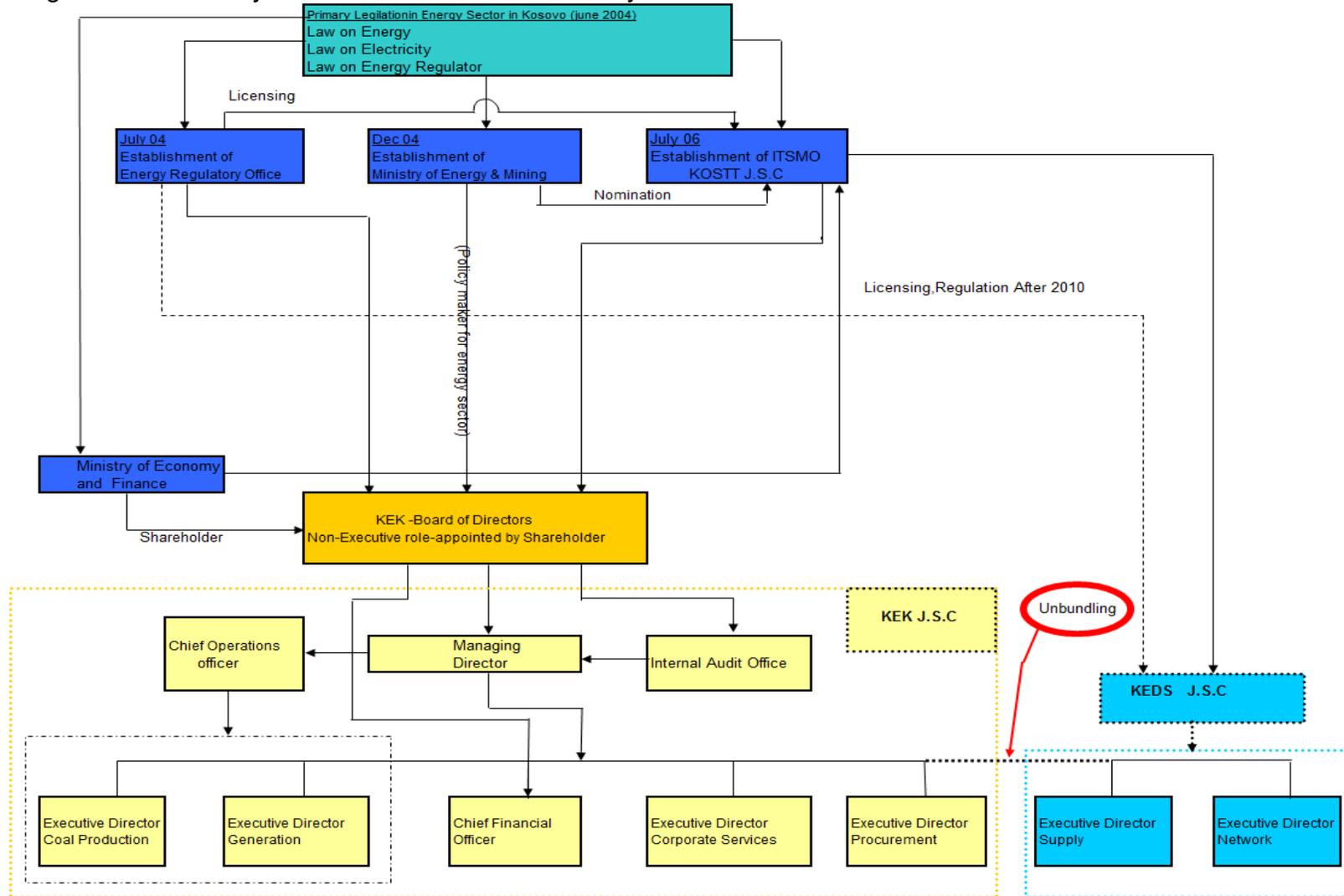
- Providing advice to the Government on its privatization strategy and energy policy
- Participating in preparation of the tendering documents
- Meeting with potential bidders
- Demonstrating its skills as regulatory

The Regulator's most important role in a privatization is to provide potential strategic investors with regulatory reassurance in three areas:

- Tariff
- Process
- Licenses

Detailed hierarchy of all players in the energy sector is showed below in fig.2.4

Figure.2.4 Hierarchy of actors in Kosovo’s Electricity Market



Source of Data KEK J.S.C –prepared by author of capstone

## 2.5 KEDS J.S.C Asset

As it is mentioned earlier in the second part of 2010, the privatization of the KEK's Distribution System Operator (DSO) and Electricity Supply, or KEDS j.s.c is going to take place.

There are three types of privatizations,<sup>[17]</sup>

- a. Share issue privatization (SIP) - selling shares on the stock market
- b. Asset sale privatization - selling the entire firm or part of it to a strategic investor,
- c. Voucher privatization - shares of ownership are distributed to all citizens, usually for free or at a very low price.

Which of this type will take place in KEDS j.s.c ,it has yet to be decided, but before that about supply and specially about DSO ,and that is defining what are assets ,and what is value of those assets .As it is well known, the Electricity Supply have very small number of assets, comparing with DSO.

To count the number of assets in DSO already is going on a project, and most probably will be finished during first part of 2010, which will create opportunity for a fair privatization, hence all parties involved in this process will be satisfied.

In financial accounting, assets are economic resources owned by business or company Anything tangible or intangible that one possesses, usually considered as applicable to the payment of one's debts is considered an asset. Simplistically stated, assets are things of value that can be readily converted into cash -although cash itself is also considered an asset.<sup>[17]</sup>

As it is explained above there is a project going on KEK j.s.c to identify and evaluate the assets of DSO and Supply. Identifying assets is just a part of the process, valuations of them is another important issue. Some of the asset that those days is using DSO are donations ,some of them are more than 30 or 40 years old, hence assets that are more than 30 years old have very low or no value at all.

## 2.6 Human Resources

An important issue during the process of privatization is humane recourses, number of employees and their professional skills are very important in this phase, because new owner of the DSO would need, more than anything, professional and skilled staff. Not having professional employees would create many troubles to the new owner and to the employees.

It is obvious that human capital is the most important asset and improving this asset is crucial issue to actual management with intention to improve actual level of services and increase the value of company, to prepare it for process of privatization.

This is particularly important for our organization, taking into account that the employee cost is the second highest cost in our operation and therefore in order to increase

efficiency and reduce the costs, management should improve strategy of the company in relation to our human capital.

At the present, management is not very effective at using our workforce to their full potential. Indeed, a survey on this subject showed some very distressing results, which include:

- Large portion of employees are not qualified for the posts they cover
- There is a lack of training and support for new employees
- The workforce does not feel valued or motivated
- There are many talented and educated people that are doing simple jobs where their expertise are not utilized
- There is a perception that the work force is not selected on their merit and that there are elements of nepotism and political interference on the recruitment process
- There is no clear understanding of the expectation, goals or targets
- The work force is not flexible and adoptable to the changes of the market place, etc.

Obviously, this makes KEDS j.s.c services inefficient, not cost effective and the company vulnerable to market competition. Accordingly, it is essential that these issues are addressed and more adequate human capital strategy is adopted, including reviewing and restructuring our service operations.

## Chapter 3

### Privatization and regulation for Distribution network, and Cases of Privatization

#### 3. KEDS j.s.c Regulation and Cases of Privatization

The best way to solve the problem of privatization of the KEDS j.s.c, is to find an example in any part of the world, from privatization of electricity distribution network in any of those countries and/or combination of methodologies used in those countries, because there are many examples of privatization, for e.g. only in Latin America during 15 years there were 50 distributions privatized, and that all because of they low efficiency and effectiveness.[13]

##### 3.1 Regulation by contract, a new approach, to privatize Electricity Distribution Network.

Following Several widely publicized setbacks, many investors are questioning whether private investments in electricity distribution are viable in most countries with emerging economies. Referring to different countries in which privatization already have take place, sometimes some consumers groups through NGO are opposed to distribution privatization. In fact, opposition is so strong that some governments are fearful of even using the word privatization. To make “non pain full” privatization in sector of electricity distribution, some observers have recommended regulation by contract as an alternative to regulatory independence .The essence of regulation by contract is pre-specification, in one or more formal or explicit agreements. The application of this concept has yield different operational definitions. One definition is “regulation without regulator”[13]. The regulatory contract does not replace the regulator but substantially limits the regulatory discretion. In particular, it forces the regulator to set tariffs on specific formula rather than just general principles.

Particular emphasis is places on how certain key design elements, pass-trough of power purchase costs, foreign exchange fluctuation, technical and commercial loss reductions and obligations to serve –are dealt with in regulatory contract. Some private investors argued that there is an existing and working model in the power sector for regulation by contract. The regulatory contracts are more difficult to negotiate than numerous power purchase agreements (PPAs) because of large number of customer demand, high visibility of the retail price and the need for ongoing investments.

To be sustainable, regulation by contract must achieve three goals:

1. to protect customers from monopoly prices
2. prevent inferior quality of service
3. attract investors who will make the investments to provide better service and affordable prices.

- Georgia Case

The Georgian National Electricity Regulatory Commission (GNERC) was intensively involved in the privatization of Telasi. At the time of privatization, Telasi had Technical and commercial losses of up to 40% as a part of privatization negotiation and constricting process with the American firm AES. GNREC required that AES would make investments and take actions so the commercial losses would decrease. In Exchange, the company had a ten-year tariff extending to the year 2008. As result, the company made appropriate investments to reduce commercial and technical losses to approximately 10%. As part of the incentive to reduce commercial losses, AES was allowed to recover only the cost associated with technical losses in tariffs. Ultimately Georgia aimed to reduce combined technical and commercial losses to 10 percent. <sup>[14]</sup>

- India Case

Several Indian states have announced their intention to privatize their state – owned distribution systems. To achieve this goal, the World Bank has recommended that Indian regulators move to a form of “regulation by contract” for potential private distribution companies that would be more asking to what exist in Latin America and elsewhere”. In India, this new regulatory system is called “performance-based multiyear tariffs” or “medium-term fixation” Like Latin America ,the key elements of the proposed system are 1)automatic pass-through of cost elements that are largely beyond the distribution entity’s control (such as power purchases and taxes) and 2) indexing and efficiency targets for cost elements that can be controlled (such as losses and labor cost).A newly proposed national electricity law seems to encourage its adoption .But even if Indian state electricity commissions were to replace their current annual cost-of-services system with multi-year price or revenue cap ,there would still remain a major problem of regulatory credibility.[13]

### 3.2 Sharing of the Risk

Many disagreements in designing the regulatory contract have to do with whether the company, its customers or the government should bear particular risk. From the potential bidder’s perspective, the allocation of risk in the “regulatory contract” will ultimately affect one of three things:

- a) the price that it can charge,
- b) the cost that it can cover, and
- c) the quality of electricity that it can sell. [13]

Further on there will be described the type of the risk that is more common of an Electricity Distribution company.

- Pass-through of power-purchase costs. This issue is very important for new potential owner because partial or delayed pass-through of power purchase costs could bankrupt a distribution company because those costs usually constitute 50% to 80 % of its total costs. For this reason, most private investors seek total and automatic pass-through of all power-purchase costs, arguing that such costs are largely beyond their control. In contrast, regulators generally fear that automatic pass-through will lead to corruption and inefficiency and therefore, they want the company to bear some risk of non-recovery trough benchmark or some other regulatory mechanism.
- Loss reduction targets. The quantity of power-purchase that the regulator will allow the KEDS j.s.c to recover in tariffs depends largely on level of technical and commercial losses on the Electricity Distribution Company that is agreed to be acceptable. Currently the level of losses in Electricity Distribution Network is 42%, which is quite high to be covert in tariffs, so the key question is: what should be initial level of losses that could be covered in tariffs settings? And how quickly can losses be reduced? The answers to those questions determine how the cost of losses is allocated between customers and company. Privatized distributions companies have been very successful in reducing losses. This has largely been due to a high degree of motivation and control over employee and support from government.
- Obligation to supply. The obligation to serve has often failed in state owned systems because of lack of money, ongoing political interferences in operating and investment decisions, and perhaps most important, lack of performance based salary incentives. In designing the regulatory contract for the new private owner, the key question to ask is: Who must be served? What are the initial and phased technical and commercial standards for service? What are the penalties if the company fails to meet those standards? Are excuses allowed?

### 3.3 Dealing with Disputes

A distribution utility can be involved in many disputes. The three p types of disputes are those (1) between the distribution company and its customers,(2)between the distribution company and (3) other industrial actor, and between the Distribution Company and regulator. The capstone focuses on disputes between customers in some problematic parts of Kosovo and company, and between the Distribution Company and regulator over either the substance of the regulator's decision or the process by which the regulator reached those decisions.

To solve disputes between new distribution utility and customers in some part of Kosovo, specifically in northern part of Kosovo, the government must be involved because without governments help the new electricity distribution company cannot operate. This is a pure political impact in process of privatization .Regulation by contract is a positive factor in this case, because Kosovo's government and new owner must specify all the roles and responsibilities in a contract, and more specifically how the new owner of Electricity Distribution Company is expected to solve problems with its

customers in all the regions in Kosovo on issues such as non-payment of electricity bills, electricity theft, etc. All these problems must be described and regulated by contract between new owner from one side and government from another side. Regulations of all those issues by contract will mitigate risk and clarify what level of risk bears each side: government, customer and new owner. There are different approaches for solving the disputes:

- The local court system. Local court system generally deals with regulatory disputes because they have an objective point of view and fight corruption.
- International arbitration. This is necessary and appropriate backstop for regulatory disputes in countries with no record of accomplishment for impartial resolution of such disputes. But it is best used as a last resort for dealing with disputes. Its principal value is derived from the simple fact that it exists, even if it is never used.[13]
- Mediation. Alternative Dispute Resolution (ADR), of which mediation is the most common form, typically involves the facilitation of structured efforts (e.g., expert panels and mediation) by the parties to settle dispute for themselves without going to a local court. However, no binding resolution can occur unless and until an agreement is reached and committed to writing. In general, it does not work for regulatory disputes because regulators have little or no incentive to enter in mediation.[13]
- Expert Panel. To adopt expert panel for regulatory contract, the distributor must have the unilateral right to convene the panel, and there must be an effective mechanism for enforcing the experts' decision. One promising hybrid technique is to create a standing expert panel that can act as a both an expert fact-finding panel and arbitration panel.[13]
- A specialized appeals tribunal. The real world experience with special appeal tribunals in most countries has generally been positive. They tend to produce quick, well-informed, inexpensive decisions, and can be created without having to reform the existing court system.[13]

### 3.4 Athens Treaty Establishing the Energy Community on 2005

The Parties, being -The European Community on the one hand, and the following contracting parties on the other hand:

- The Republic of Kosovo, the Republic of Albania, the Republic of Bulgaria, Bosnia and Herzegovina, the Republic of Croatia, the former Yugoslav Republic of Macedonia, the Republic of Montenegro, Romania, the Republic of Serbia [19]

Resolved to establish among the parties an integrated market in natural gas and electricity, based on common interest and solidarity,  
Considering that, this integrated market may involve at a later stage other energy products and carriers, such as liquefied natural gas, petrol, hydrogen, or other essential network infrastructures.

Determined to create a stable regulatory and market framework capable of attracting investment in gas networks, power generation and transmission networks, so that all Parties have access to the stable and continuous gas and electricity supply that is essential for economic development and social stability,

Determined to create a single regulatory space for trade in gas and electricity that is necessary to match the geographic extent of the concerned product markets,

This treaty and the Athens process that preceded it are “text book” examples of an initiative that:

1. fosters regional co-operation;
2. Expedites integration into the EU through adoption of EU acquires; and
3. Has demonstrated excellent donor co-ordination and co-operation.[19]

Taking this opportunity to highlight the excellent leadership role-played by the European Commission and in particular it’s Directorate General for Transport and Energy since the launch of this initiative.

The Stability Pact’s role in this initiative has been to complement the European Commission’s leadership by generating political consensus among the SEE countries and promoting the process to the international business community - potentially a valuable source of expertise and finance for the region.

Apart from specific political interventions in SEE and with EU Member States, we have held high level meetings with Senior Advisers to SEE Prime Ministers and organized information seminars for SEE parliamentarians, who will, after all, have to ratify this treaty.

With the signing of the Treaty the role of member states will evolve somewhat. Member states will continue to work with parliamentarians on this issue and to highlight opportunities to the private sector. But also seek to focus attention on the potential socio-economic impact of this Treaty. Encouraging both the countries of the region and the international community to develop and implement suitable policies and programs that can help limit the possible negative impact in areas such as restructuring of companies and tariff reform.

All of us here today have a role to play in ensuring that the progress that have been made to date results in the further stabilization of SEE, provides much needed sustainable economic growth and expedites SEE’s integration into European structures. Make no mistake, this treaty is a highly ambitious one – it sets high standards for SEE to reach and short deadlines for action. Therefore, member states cannot sit back and think that the job is done once the signatures have been placed on the document. In fact, member states should probably work even harder! [19]

## Provision of Energy to Citizens

### Article 31

The Energy Community shall promote high levels of provision of Network Energy to all its citizens within the limits of the public service obligations contained in the relevant acquit communitarian on energy.

### Article 32

For this purpose, the Energy Community may take measures to:

- (a) Allow for the universal provision of electricity;
- (b) Foster effective demand management policies;
- (c) Ensure fair competition.

### Article 33

The Energy Community may also make Recommendations to support effective reform of the Network Energy sectors of the Parties, including inter alia to increase the level of payment for energy by all customers, and to foster the affordability of Network Energy prices to consumers.

## The Regulatory Board

### Article 58

The Regulatory Board shall:

- (a) Advise the Ministerial Council or the Permanent High Level Group on  
The details of statutory, technical and regulatory rules;
- (b) Issue Recommendations on cross-border disputes involving two or  
More Regulators, upon request of any of them;
- (c) Take Measures, if so empowered by the Ministerial Council;
- (d) Adopt Procedural Acts.

Subject to paragraph 2 below and Article 24 of this Treaty, each Contracting Party shall implement within twelve months of the entry into force of this Treaty:

Each Contracting Party must ensure that the eligible customers within the meaning of the European Community Directives 2003/54/EC and 2003/55/EC are:

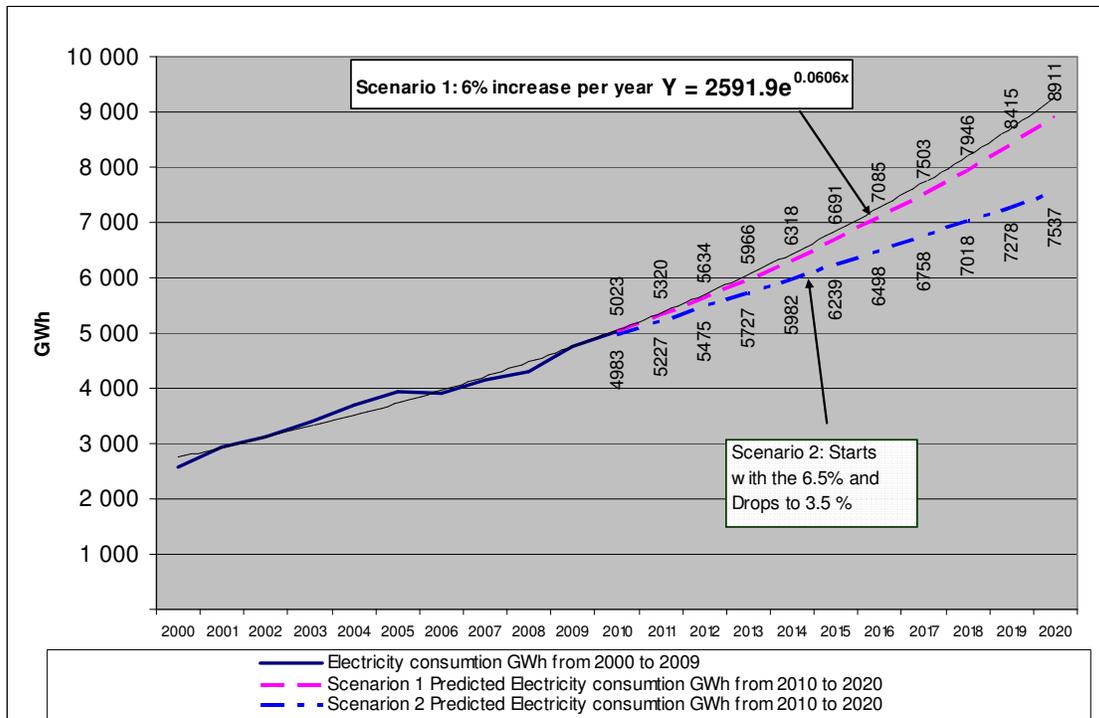
- (i) From 1 January 2008, all non-household customers; and
- (ii) From 1 January 2015, all customers. [19]

## Chapter 4 Economic and Electricity Demand Growth

### 4.1 Electricity demand Growth

After research and data collection has been initiated on different issues, such as Peak load demand, Electricity Billed, Electricity Received, Losses, number of Customers, Collection Rate, and Accumulated Receivables that are shown in Table 4.1, there is an analysis on data that could help all interest parties during process of privatization. The trends for Electricity demand growth is shown in Figure 4.1.1 and in Figure 4.1.2 is shown Peak Load Demand growth.

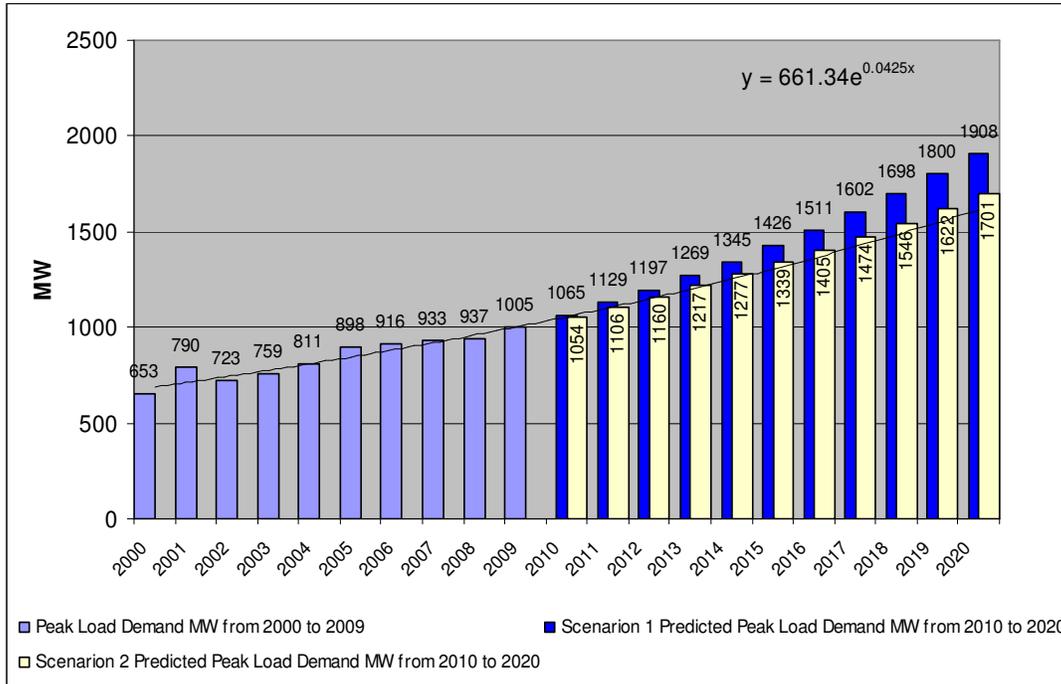
Figure 4.1.1 Electricity consumption from 2000 to 2009 & Electricity Demand Forecast from 2010 to 2020



Source of data: KEDS j...s.c, forecasts are done by author of capstone

In Figure 4.1.1. is shown the consumption of electricity in the distribution network from 2000 to 2009 and two forecasts, which most probably will happen in the future. First forecast follows exponential function ( $y = 2591.9e^{0.0606x}$ ) of increase of consumption during ten pas years, and second forecast is starting from 6.5 % in firs year and continue with slight decrease to reach level 3.5% in 2020. Such consumption of electricity could fall slightly because of use of alternative types of energy; Kosovo's electricity market could be fed up with electricity and decrease of consumption of electricity due to non-ability of roughly 60% of customers to misuse it. This because of high performance of new private company to take control over electricity consumption.

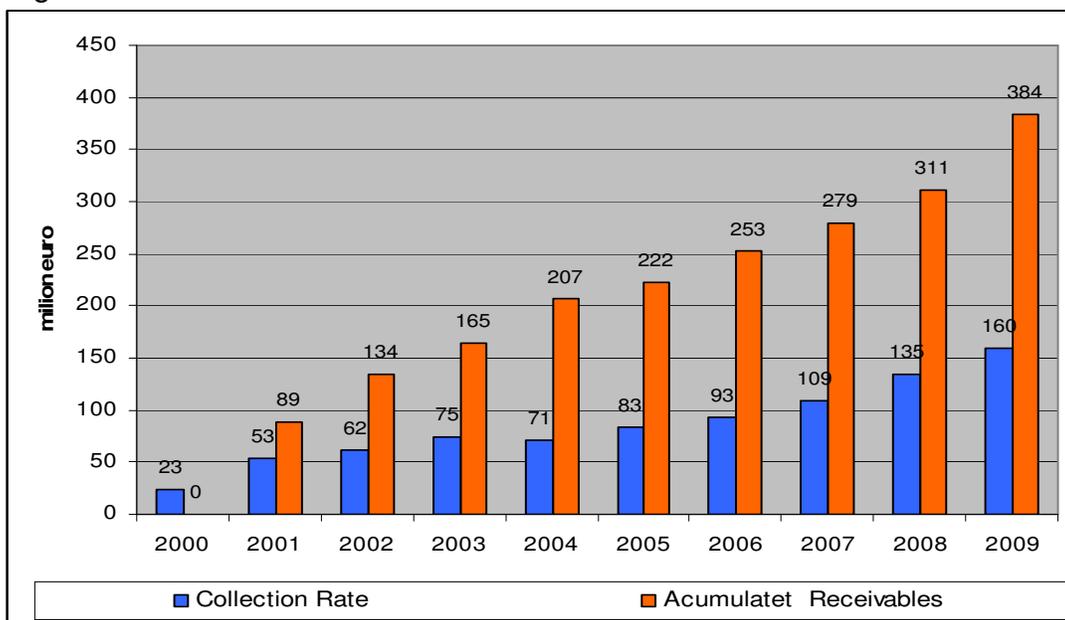
Figure 4.1.2 Peak Load Demand from 2000 to 2009 & Peak Load Demand forecast from 2010 to 2020



Source of data: KOSTT j..s.c, forecasts are done by author of capstone

Peak load demand is in slight increase, average incremental increase was 42 MW per year, in past 10 years. In figure 4.1.2 is shown this peak, and two forecasts, that most probably are going to happen in next ten years. First one is high scenario, or increase 6% per year and second one peak load demand is predicted in that way that should follow increase in peak load demand from previous years, by exponential equation  $y=661.34e^{0.0425x}$  or 4.9% increase per year.

Figure 4.1.3. Collection rate and accumulated receivables from 2000 to 2009



Source of data:KEDS j.s.c

Collection rate especially during recent years have had a dramatic increase, it is very encouraging trend, however the biggest concern now is fact that collection rate is followed by high increase of level of the accumulate receivables, or bad debt. It causes many economical and financial difficulties. With such high level of non-payment of electricity bills, company has many difficulties to be financially viable, because as it is well known distribution and supply with electricity is very costly, including fact that company needs to import amount of electricity to cover peak load demand of electricity. In figure 4.1.3 are shown the amount of accumulated receivables and collection in the KEDS.j.s.c ,from 2000 to 2009

Table.4.1 Data for peak load demand, Consumption of Big Customers, Electricity Received and Billed, losses, Number of customers Collection Rate and accumulated receivables

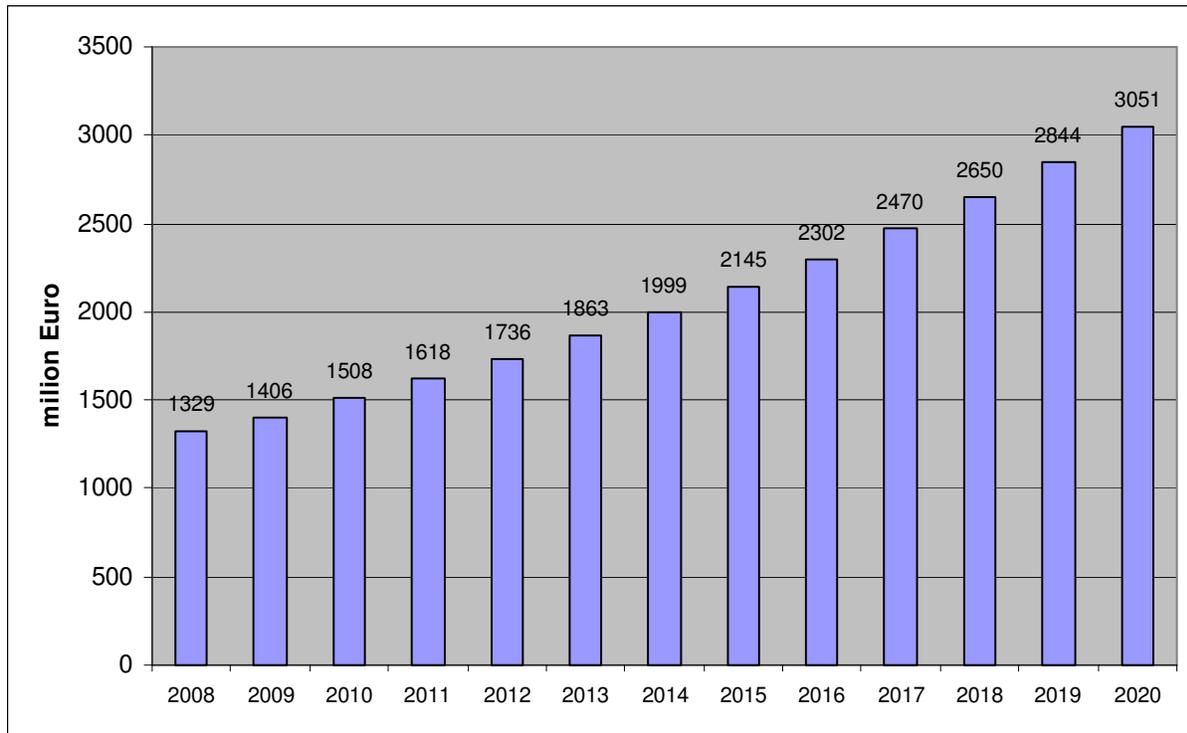
	Unit	Years										
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	
Big Customers	Peak Load Demand	MW	653	790	723	759	811	898	916	933	937	1032
	Ferronickel (connected in 220 kV)	GWh	N/A	2	4	2	1	1	3	122	390	460
	Sharrcem (Connected in 110 kV)	GWh	N/A	N/A	N/A	46	41	40	48	52	63	63
	Trepca (Connected in 110 kV)	GWh	N/A	44	37	20	18	16	24	21	21	21
	Mines (Connected in 110 kV)	GWh	86	66	96	82	87	85	74	74	105	253
Consumption and losses below 35 kV	Electricity Received by KEDS j.s.c	GWh	2 480	2 828	2 990	3 278	3 579	3 801	3 795	4 012	4 133	4 428
	Electricity billed by KEDS j.s.c [35 kV,10(20)kV,0.4kV]	GWh	1363	1458	1820	1847	1956	1930	1974	2092	2363	2533
	Total Losses	GWh	1117	1370	1170	1431	1623	1871	1821	1920	1770	1895
	Technical losses	%	19.31%	18.91%	18.71%	18.62%	18.42%	18.22%	17.93%	17.19%	16.62%	17.07%
	Commercial losses	%	25.72%	29.53%	20.42%	25.03%	26.92%	31.00%	30.06%	30.67%	26.20%	25.73%
	Total Losses	%	45.03%	48.44%	39.13%	43.65%	45.34%	49.22%	47.99%	47.86%	42.82%	42.80%
	Number of Customers (are not included customers in northern part of Kosovo)	nr.	251 017	267 125	285 211	299 177	315 214	331 844	347 419	364 949	383 089	402 521
Collection Rate	(million € )	23	53	62	75	71	83	93	109	135	160	
Accumulated Receivables	(million € )	0	89	134	165	207	222	253	279	311	384	

Source of data: KEDS j.s.c and KEK j.s.c

### 4.2 Economic Growth

Predicted rate of economic of growth of 7.3% in real terms requires investments that are shown in the figure 4.2.1. by each year until 2020. Those investments will have the Unemployment rate and bring it to 20%.

Figure 4.2.1. Predicted investments in Kosovo until 2020



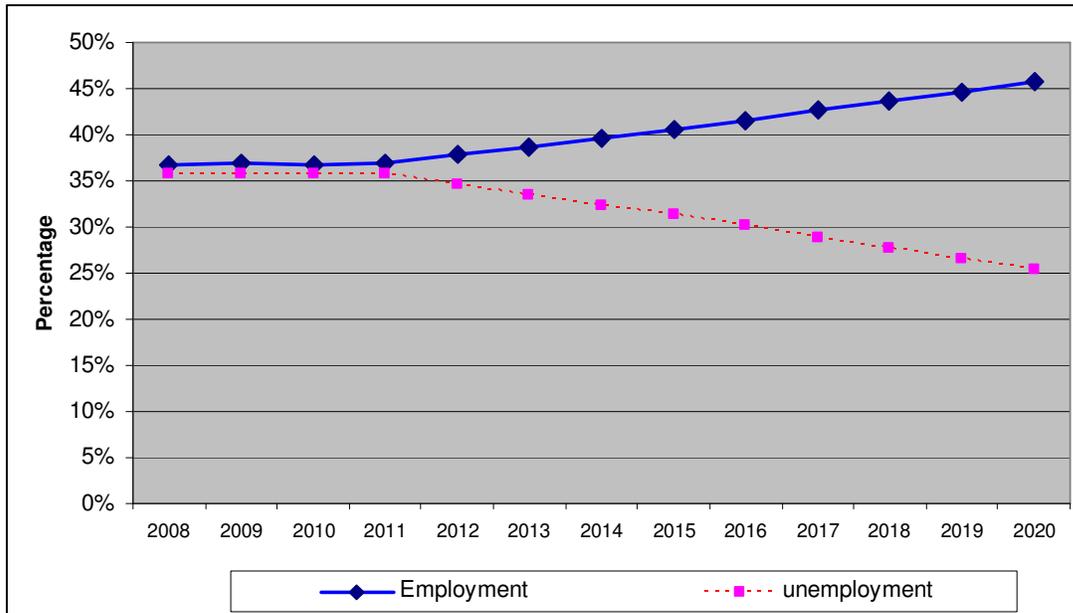
Source of data: Macroeconomic department-MEF

Levels of investments calculations are done using the assumption of constant returns to scale, which is a corollary of steady state growth (see appendix B for algebra)[23]. The investment numbers given should be interpreted as year 2008 euros. From what emerges from all of the above, it is fair to say that even at solid rates of growth, the unemployment problem in Kosovo will persists in years to come.

The projections show that there is a steady decline in unemployment rates and a gradual increase in employment. In 2010, employment rate surpasses the unemployment rate. Over the medium run, on average, a one-percentage point increase in output leads to a 0.234 percentage point reduction in unemployment. This somewhat low value is driven by labor force dynamics.

Table below shows the evolution of unemployment and employment rates until 2020

Figure 4.2.2 Predicted Employment and Unemployment Rates until 2020



Source of data: Macroeconomic department-MEF

From what it can be inferred from above, in a balanced growth path a rate of 4.7% [23] in real terms is only sufficient to keep the unemployment rate constant. Interesting enough, these figures show that at this rate of growth, there is an increase in the number of people unemployed. It is perhaps useful to move further and ask what the unemployment rate would be in say year 2020 if GDP growth were to be kept constant at the average rate of 6.43% [23], which is projected for the medium run. For such a projection was take the value of 0.611 for the employment elasticity of output, since this is consistent with a balanced growth path.

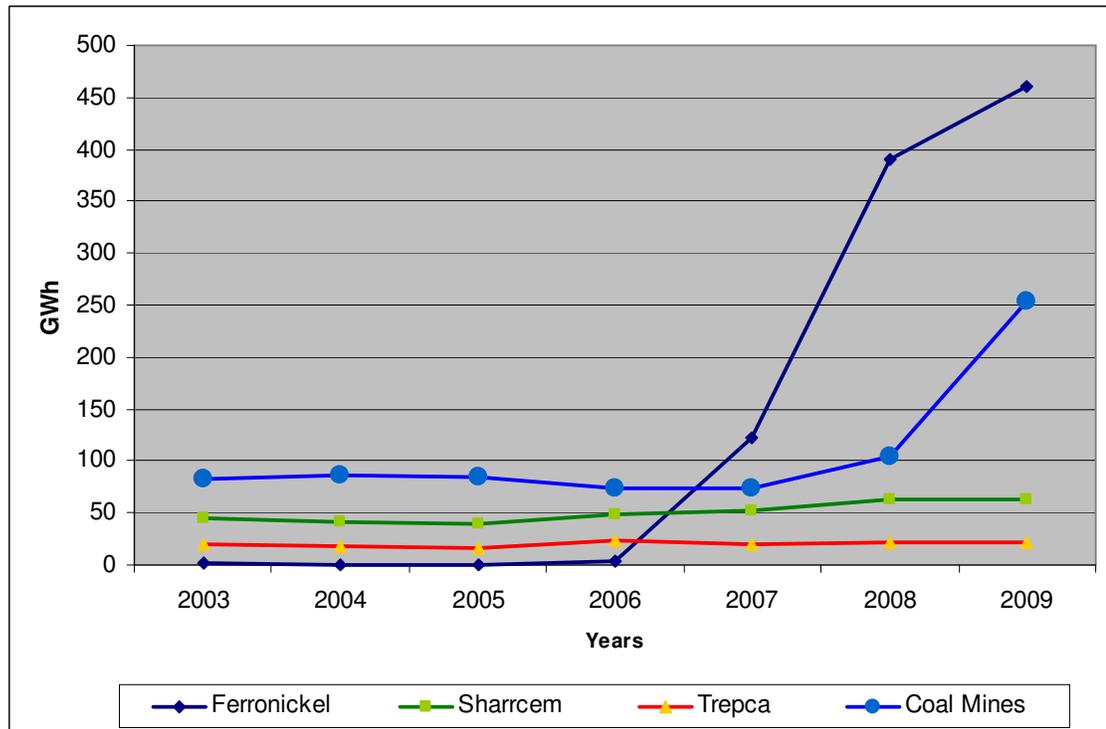
Energy consumption increases as incomes increase, and according to prediction of the economic growth that are explained above, economy will grow in such case number of employees will be higher ,hence electricity consumption will growth because of increase in investments and because households in future years are going to have more incomes. Increase of incomes per household will have another positive impact that is higher ability for payment of electricity bills by households, hence significant increase of revenues of Electricity Distribution Company.

#### 4.2 Big Customers of Electricity

There are four big customers that are connected in electricity network of Kosovo. Three of them are commercial, NEW.Co Ferronickel.L.LC, Sharrcem Gmbh and Trepca and fourth one is mines Mines. So far, Mines have been treated as internal consumer of electricity, but after unbundling most probably will be treated as another big customer of electricity.

- NEW.co Ferronickel.L.L.C. is recently privatized in 2007 during process of privatization of public companies. This company is connected in substation 220/35 kV and currently its load demand is 74 MW. In the beginning of process of production, load demand was much lower, starting from 14 to 44 to 52 MW. Electricity consumption for year 2009 was 460 GWh. This customer is eligible customer and has rights to buy electricity from different suppliers .Because this customer is connected direct to the high transmission network, its consumption does not have impact on cost for O&M and capital investments that can be related to the KEDS j.s.c and should not have any impact during process of privatization of the KEDS j.s.c
- Sharrcem GmbH is privatized in 2003, with special procedure of privatization called “spin off”. This factory is connected in substation 110/6 kV, with load demand from 7 MW to 12 MW in recent years. Electricity consumption of this factory in 2009 was 63 GWh as it is shown in figure 4.2. This consumer is connected to the KEDS j.s.c network, but is treated as big customer and its consumption is not part of calculation of the losses, but has impact in O&M and Investments, hence during process of privatization must be part of negotiating, between stakeholders.

Figure 4.2 Shows consumption of for big customers in GWh for years 2003 to 2009



Sours of data :KEK j.s.c and KEDS j.s.c

- Trepca, is a public company, since after the war in 1999 is running with just part of its capacities, because of unsolved political problems in this part of Kosovo. This company is more a potentially big customer than a big customer is. Substation shupkovc 110/35 kV in which is connected this company has an installation capacity 150 MW, but uses only about 3 MW. If this company would run with all its capacities, it would have a huge impact in electricity demand in Kosovo. Also electricity consumption of this company is not included in calculation of losses of the KEDS j.s.c
- Mines, historically have had its own power supply substation 110/35 kV Palaj, and since after the war and because of KEK j.s.c have been vertically integrated company, the consumption of the mines through this substation have been treated as internal consumption of the entire company, hence this consumption does not generate any revenues for the company. After the unbundling consumption of the mines must probably will be regulated in different way, and KEDS j.s.c must be paid for its services to the third parties including mines

## **Chapter 5**

### **Technical and Commercial Losses**

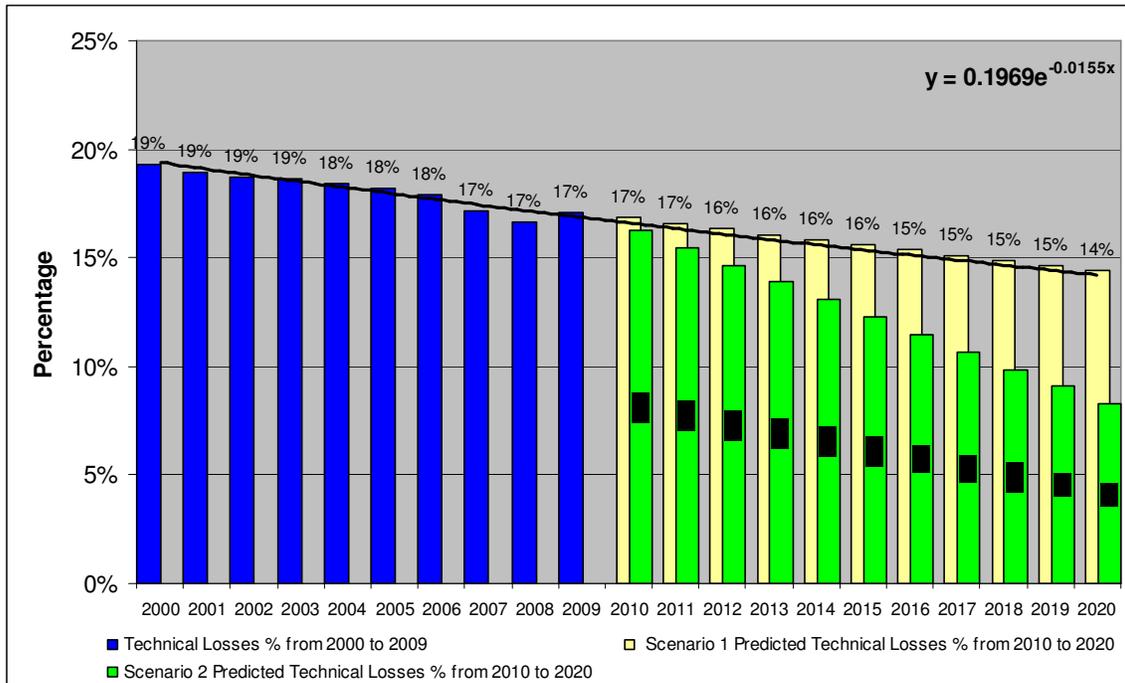
#### **5.1 Technical Losses**

There are many substations in electrical network, with different installed capacities, and with many lines connected to them. Some of them are recently installed but some of them are almost 30 years old. Approach to solve problems in Distribution Electrical Network will be a step by step. Electricity Demand Forecast in Distribution electricity Network company which is responsible to dispatch electricity to the end of user, is very important issue, as long term and precise is this forecast it is better for the company, because then could be forecasted all investments that have to be done, to meet this load demand in increase

Production and Dispatch of Electricity is a relatively difficult process, that because of its nature of real time production and dispatch. Every kWh produced in fraction of second, must be dispatched to end of user almost in same time. In KEDS j.s.c, problem of dispatching of the electricity becomes more complex, because of many factors that have impact in increase of level of technical losses.

Amount of investments that are needed to make improvements in all elements that are outlined above, how much investments are needed for those improvements, are shown in Table 6.5.1. Time for implementation of these investments, will be medium run, until 2015. Those investments will have impact in decrease of technical losses in level of 16% until 2015.

Figure.5.1.1. Technical losses in Electricity Distribution network, historical data 2000-2009, and forecast for 2010-2020



Source of data: KEDS j.s.c –forecast was done by author of capstone

In figure 5.1.1 above are shown level of technical losses in past 10 year and two predictions for the future. The first forecast follows trend of decrease of losses in years 2000 to 2009. According to this forecast level of losses will be 14% by 2020, with incremental yearly decrease by 0.24%.The second forecast predicts acceleration in level of investments in Electricity Distribution Network, incremental decrease of level of losses is predicted to be 0.8% per year, in 2020 level of technical losses will fall in reasonable level of 8%.

### 5.1.1 Overloaded Substation & Lines

There are too many over loaded lines, some of them are in such bad conditions and those lines not only cause lot o technical losses of electricity, but they are and permanent risk for environment .Some of lines are 40 and more kilometers long and taking in account that resistance of conductors is in direct function with their linear longwise, Joule effect will be higher hence technical losses are going to be higher. Reason mentioned above have direct impact in many substations in Kosovo’s Electricity Distribution Network.Either some of substations are 30 to 40 years old and are in limits of their life line, with no investments to substitute them with new ones.

### 5.1.2 Voltage Stability in many parts of electricity network

In lot of areas voltage level to end of user is very low, some times it is 50% lower than it should be, and all this because of reasons mentioned in above. Voltage level drop has impact in increase of technical losses, hence negative effect in distribution network are multiplying, in this way KEDS j.s.c could not deliver profitable value to its customers for what is responsible. For this reason many customers are unsatisfied and some times they refuse to pay their electricity bills with justifications that their household equipments does not work at all, or even they have many hazard in they equipments.

### 5.1.3 Low Power Factor in some substations

In some substation, this factor is far beyond limits, and needs immediate improvements, because low Power Factor means presence of high level Reactive Energy in electricity network. Which energy increase level of technical losses in Distribution Electricity system, decrease ability of conductors to conduct more electricity, and has impact on voltage drop, and instability.

### 5.1.4 Old and out of date of many measurement equipments

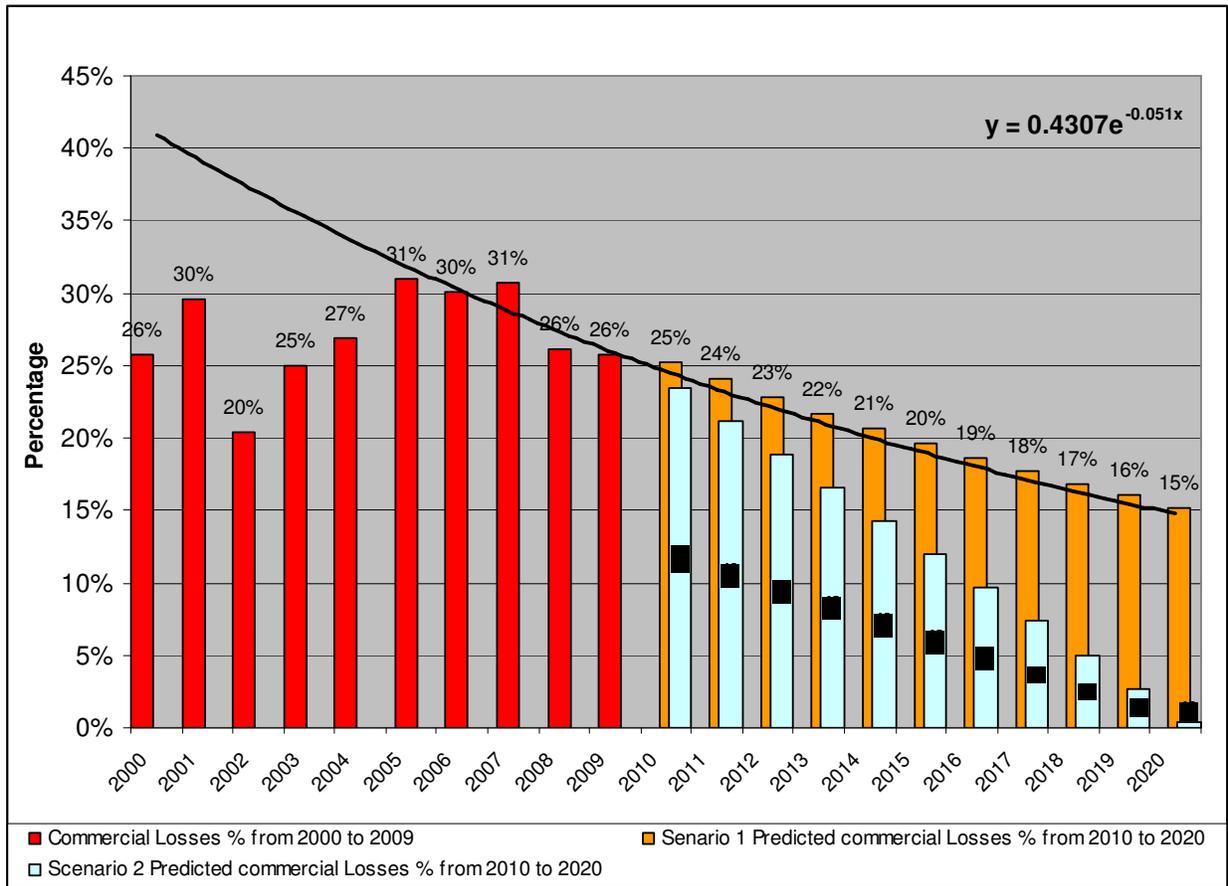
Measurement equipments in some parts of distribution electricity network are quite old and out of date, only recently have been taken some steps toward improving an making them reliable and modern, with ability of remote control

## 5.2 Commercial losses

Since after the war in KEK, politics had huge impact, especially in appointment higher and middle level management, nonetheless of their professional skills and abilities, their lack of knowledge and non-ability to have a multidisciplinary approach in problem solving. Main argument to justify this claim is high level of losses, specially high level of commercial losses.

Need for privatization is more than obvious, which process will make changes in policy of human resources in the company. Privatization is one of the best ways to improve managerial performance and performance of the company in general, to promote customer driven concepts, and creating profitable value for both customers and company. Privatized distribution in different parts of the world have made dramatic improvements in decreasing of commercial losses. This is an argument that privatization is a great opportunity for improvement.

Figure.5.1.2. Technical losses in Electricity Distribution Network, historical data 2000-2009, and forecast for 2010-2020



Source of data: KEDS j.s.c –forecast was done by author of capstone

In Figure 5.1.2 above is shown level of commercial losses in past ten years from 2000 to 2009 and forecasts for next ten years from 2010 to 2020. As it is shown in figure above level of commercial losses had fluctuation during past years, only in recent five years there was slight decrease of commercial losses. Trend of this decrease is used for forecast of the future of losses for next 10 years. According to this trend level of average incremental decrease will be 0.96 % per year. Hence in 2020 level of these losses will reach level 15%. Again the level of these losses is high, another forecast of commercial losses was done, in which level of average incremental decrease of losses is forecasted to be 2.3 %, to reach level of (zero) 0 % in 2020. This target could be reached after privatization and substantial changes in managing of the company.

### 5.2.1 Lack of Managerial Skills

Managerial staff is not concentrated on their responsibilities and priorities and they often lack knowledge and experience because managers tend to be politically appointed. Privatization of the company will change this “habit”, selecting managerial staff by meritocracy which fact would have positive impact in improving efficiency and

effectiveness of the company and would transfer company in customer driven system, decrease commercial losses and increase credibility.

### 5.2.2 Load Shedding

Even though KEDS j.s.c is not only one player responsible, in case of lack of electricity (there are Generation and KOSTT) suffers a lot of technical damages. Switching off and switching on equipments such frequently, degrade them very fast. Continuous supply will save equipments of the company and in same time to keep customers satisfied. This will have an impact in decrease of commercial losses, and especially increase the level of payment of electricity bills.

### 5.2.3 Customer Codifications

KEDS j.s.c is responsible to Supply 401 296 Customers, maintenance, and update CCP (Customer Care program) where are all data about customers, such as ID, addresses, monthly consumption of electricity, and amount of debt and update it in daily basis. Every customer has a unique code that tells as where we can find it in database and in terrain. Some of customers have wrong code that have many implications in power balance of feeders, sending them bills and reading their meters of electricity. Problems caused because of wrong codifications have impact in making customers unsatisfied and decrease credibility of the company in front of the customers. Privatizations of the company will solve those problems, which will decrease level of commercial losses.

## Chapter 6

### Global Finance for investments in Electricity Distribution

#### 6.1 The Global Finance

Global Finance approaches every deal to see if the seller can be given a fair price, the management the opportunity to grow their business to its long-term potential and the firm's stakeholders the prospect of earning a substantial return on investment. One of the most interesting actor in the global financial market is the IFC, also part of the World Bank.

IFC provides a wide variety of financial products and services to its clients and can offer a mix of financing and advice that is tailored to meet the needs of each project. However, the bulk of the funding, as well as leadership and management responsibility, lies with private sector owners.

Like other private sector investors and commercial lenders, IFC:

- Seeks profitable returns;
- Prices its finance and services in line with the market; and
- Fully shares risks with its partners.[20]

The Global Finance uses the experience and expertise of its team to ascertain whether it can add value to each prospective investment. It evaluates all opportunities through a due diligence process that analyses a company's financial strength, market growth prospects, competitive advantage, management capabilities and exit options.

## 6.2 The IFC - general description of the institution and its role in international project finance:

IFC is one of the major multilateral finance institutions. It promotes investment to the private sector especially in emerging economies with aim to increase welfare. This institution is a World Bank member with its headquarters in Washington DC. Its primary objective is in line with the World Bank objective to improve the quality of human lives in developing countries. That being said, IFC plays a huge role as a multilateral source of loans and equities given to emerging economies with more emphasis in private sector growth. The IFC's approach to pursuing their development mandate includes the following:

- Making medium- and long-term loans and purchasing clients' debt instruments, none of which carry sovereign guarantees with special focus in private sector development;
- Making equity investments, both directly and through investment funds;
- Mobilizing funds from other lenders and investors through co financings, syndications, underwritings, and guarantees; and
- Providing a variety of financial and technical advisory services to businesses and governments.

In terms of ownership and management, IFC has a membership of 182 member countries, which have equal right to determine its policies and approve investments. Its share of capital is in proportion to the amount provided by its member countries, and voting is in proportion to the number of shares held. IFC's authorized capital is \$2.45 billion [20].

## 6.3 Assessment of the institution's role in international development and project finance

The IFC plays an important role mainly in helping developing emerging economies grow in the private sector. In this case, importance of this association is very high, because financing electricity/energy sector through soft loans will improve the economic and social well-being of Kosovo's citizens.

The IFC is known for its support to assist governments in drafting legislative framework to create a suitable environment for private investment. In assisting any country, IFC needs to establish performance measures or a program that will have an oversight over the government or a company to monitor how the money is spend. In terms of project

financing, IFC is lender and financing in developing countries that are rich with human and natural resources is crucial to generate cash flow.[20] At the end, managers need to maximize wealth, and therefore, they need to follow a decision-making process to research economic and technical viable projects and select the best projects with greatest investment value. Often, it is very difficult to count on those measures especially when investment can be risky due to political instability. Nonetheless, IFC can implement more transparency and measure the future risks that may arise in a specific countries where it already has invested in the past. This suggests a basic capital investment rule that investing in some of the most corrupt countries may be beneficial because of their natural capacity to produce natural and human resources.

#### 6.4 Requirements Expected from Future Bidders

Perhaps one of the greatest area of uncertainty in the process of privatization is how distribution services will be provided and by whom. In case of KEDS j.s.c privatization question is, what will new private distribution companies look like and what experience have had this company in the past, in electricity distribution and supply services? It is well known that Electricity distribution and selling process is quite complex, because of that government should have knowledge about new bidder, what strategies will they employ, due to their experience in this field. Important issue is also what quality of services will new Distribution Company offer, and how they are planning and expect to decrease losses according to their experience. What are the key opportunities and threats, most of them treated in this capstone, and defining those opportunities and threats from point of view of the new company which will privatize KEDS j.s.c ,based in their past experience .As much as experience would have new company in this field ,that is more probably they will be clearer in defining what are factors that will influence their business strategies. Outcomes of this discussion is that new company which will privatize KEDS j.s.c should have at list more than 30 years experience in Electricity distribution and Supply in an competitive market.

#### 6.5 Investment Cost, Operating Cost, and Total Revenues in KEDS j.s.c

After data analysis and defining what the current situation is, Electricity Demand Forecast will be done and will be known as accurate as possible - what Peak Load Demand in Distribution electricity Network is going to be in every voltage level. Because Electricity Network is spread throughout of a wide area, and is needed to be known in which particular area peak load demand is expected to increase faster, in that way investments will be prioritized much more properly.

It very important that CAPEX and OPEX target the critical points, overloaded substations and lines, lower power factor and high level losses which are in some parts of the network.

Long period of low CAPEX, caused high level of technical losses almost 20 %, because load demand has been increased faster then investments, to improve situation with

quality of supply and decrease losses in reasonable level, should be increased level of capital investments in KEDS j.s.c. The table below shows investments for every voltage level for years 2009 to 2015. Such investments are expected to improve quality of supply for KEDS j.s.c customers.

Table 6.5.1 Investment cost in KEDS j.s.c Network, from 2009 to 2015

35kV network		2009	2010	2011	2012	2013	2014	2015
Incremental load	MW	30	28	28	8	8	8	0
Investments	mil. Euro	5	5	5	2	2	2	0
10kV (20kV) network		2009	2010	2011	2012	2013	2014	2015
Incremental load	MW	20	52	63	65	63	55	45
Investments	mil.euro	12	8	9	10	9	8	7
0.4kV network		2009	2010	2011	2012	2013	2014	2015
Incremental load	MW	60	52	63	65	63	55	45
Investments	mil.euro	13	8	9	10	9	8	7

Sours of data: KEDS j.s.c

Low OPEX, caused amortization of the equipments, and directly contributed in increase of technical and commercial losses. Management of company should react faster to increase Operating Expenditures to improve level of O&M, because the maintenance function has the greatest impact on the condition and, ultimately the capacity of assets. O&M of assets is core of the business, especially for a business such as distribution and supply with electricity, due to its complexity. The table below show the total cost needed for both distribution and supply of electricity for years 2009 and 2010.

Table 6.5.2 allowed costs for KEDS j.s.c distribution for years 2009 and 2010

Distribution		2009	2010
Operating expenditures	Mil.euro	76	71
Depreciation	Mil.euro	0.65	1.19
Allowed return	Mil.euro	1.23	4.31
Total costs	Mil.euro	78	77

Sours of data: KEDS j.s.c

Table 6.5.3 Allowed revenues for KEDS j.s.c supply for years 2009 and 2010

Supply		2009	2010
Operating expenditures	Mil.euro	38	17
Depreciation	Mil.euro	0.14	0.65
Allowed return	Mil.euro	0.07	0.06
Total costs	Mil.euro	38	17

Sours of data: KEDS j.s.c

Not only increase of expenditures but also and making O&M more efficient, will have impact in increase of asset value. Maintenance of company has two types of costs,

labor costs and material costs. Usually 1/3 of total cost of maintenance per year are wasted, hence management of company could save those cost through efficiency.

### 6.6 Northern Part of Kosovo- Unsolved Issue

Another important issue that should be defined and solved before process of privatization is going to take place, is northern part of Kosovo, and electricity network and customers in this part, shown in Figure 6.6. Part of network where is operating KEDS j.s.c is colored in blue, part of network in which KEDS .j.s.c can not operate is colored in red.

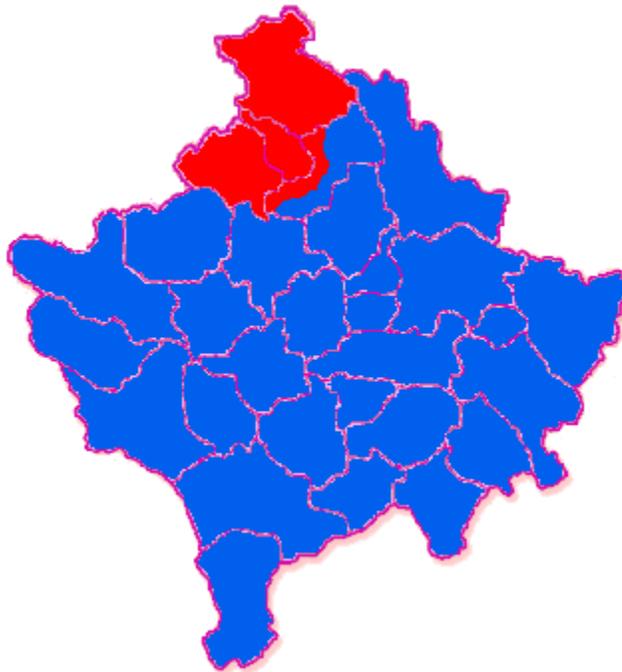


Figure 6.6 Map of Kosovo, colored in red is part where KEDS j.s.c is unable to operate  
Source of Map: [http://en.wikipedia.org/wiki/File:Kosovo\\_Municipalities.PNG](http://en.wikipedia.org/wiki/File:Kosovo_Municipalities.PNG) Modified by author of capstone project.

KEDS j.s.c could not operate since after the war in Kosovo in 1999. In this part of network, all customers missing in the database, number of assets and anything else related to Kosovo's electricity distribution network.

## **Chapter 7**

### **Distribution technologies and infrastructure**

#### **7.1 Electricity distribution expansion vs. technology**

Privatization and liberalization of the electricity market, needs a better control over equipments with intentions to increase sustainability of electricity distributions, in this case KEDS j.s.c.,

The distribution system includes substations, wires, poles, metering, billing, and related support systems involved in the retail side of electricity delivery. The need for expansion of distribution infrastructure and install new distribution equipment to meet customers demand growth, require continues investment.

As distribution electricity companies invest in distribution system upgrades, they will be focused on new technologies such as SCADA to help them meet the increased demands of customers ,because those days customers do not demand only electricity but also different type of services (e.g real time meter reading ,billing ,history of consumption etc.) and to communicate more effectively with their customers. Advanced metering infrastructure includes new communications networks and database systems that will modernize Kosovo's electricity Distribution network and provide important benefits to the company itself and consumers.

After installing the SCADA system, distribution will be controlled and in many parts maintain remotely .Also command over many parameters, connecting and disconnecting, will be more easy. This way electricity distribution will decrease costs and increase efficiency; hence, cost decrease will have impact in more affordable price for the customers. Every company that invests in technology will be more competitive and will have more chances to survive in a competitive market.

Number of substations, lines and other equipments in all voltage levels, planed and non planed- events ,needs huge number of intervention and configuration in equipments of electricity distribution ,in this way is very important remote controlled of the distribution network .Simultaneity with privatization should go as project also and installing and remote controlled system of the KEDS j.s.c

Automatisation of the entire Distribution Network, requests implementation of systems with mutual swap, which systems consists from other different systems and equipments, those equipments can be divided as follows:

- Intercommunication equipments in all objects in the network( primary equipments in substation in medium voltage and low voltage level, and overhead lines ,to ensure remote control over them)
- Indicator's of equipments in the objects  
equipment for data acquiring from those objects
- equipments for communication system
- computer system in center for monitoring and distant command

## 7.2 SCADA system

SCADA is an industrial system for measurement and regulation that consist of: Command center or SCADA-MTU. One or more units in terrain for data acquiring and for regulation, usually called RTU or/and PLC. There are number of standard software's, some of them that usually are used for monitoring and regulation of different elements remotely that are situated in remote distances. SCADA system consists from this element:[21]

- SCADA –MTU control centre
- Communication network
- Remote controlled stations
- Terrain equipments

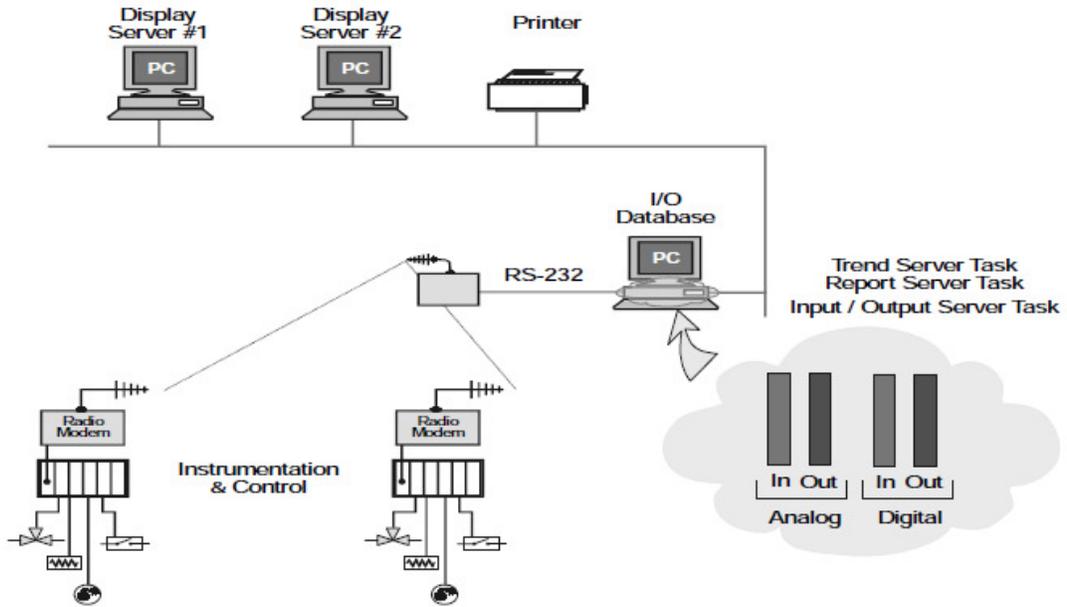
SCADA-MTU determines the location of the main computer. This centre usually contains more than one computer that has different destinations (e.g., one computer can be used for data acquiring, another one for communicating with other parts of the SCADA system, another one for graphic display of the system etc.) In this centre is installed software HMI (human machine interface).

Communication network is used as interface between different parts of the network and can be realized through radio waves, telephone lines, cables, optic fibers etc.

Remote stations (that consists from RTU or/and PLC) are installed in substations and are situated in remote distances and are monitored and controlled by main computer, but those equipments have certain independence from the main computer

Terrain equipments are called all sensors and actuators that directly are linked with equipments in the terrain and could be monitored and controlled. These kinde of the equipments are generating digital and analogue signals, which are monitored by remote stations and these signals are compatible with in/out of the RTU and PLC remote stations. In figure 7.2 below is shown components of SCADA system

Figure. 7.2. Components of the SCADA system



Source of scheme: Practical SCADA for industry

### 7.3 Importance of implementation of SCADA in KEDS j.s.c

Implementation of the automatisisation process in electricity distribution network is quite complex process and do not have any template for implementation. From experience of different companies that already implemented this system, best way for implementation is level-by-level and step by step. Implementation of this project in electricity Distribution Company will make it sustainable company and allow it to decrease time between failures. Through SCADA System, company will be able to know what load flow in every node of the system is or make an exact power balance. Having all those data for company is an big advantage, because will be able to make exact calculating about technical losses and where they are indeed appear the most in electricity network .The SCADA system will improve control of overall electricity network an make easy to switches on and off very easy any equipment in the network

## Chapter 8

### Distribution area, customers and population density

#### 8.1 KEDS j.s.c districts and their electricity consumption

KEDS j.s.c consists from seven different districts. These districts are named by largest cities in those, Pristina, Prizeren, Mitrovica, Ferizaj, Peja, Gjilan and Gjakova. These seven districts have different geographical areas and different number of customers. Figure .8.1.1 shows map of Kosovo and districts.



Figure .8.1.1 Kosovo map divided by districts of KEDS j.s.c

Source of the Map: ESTAP I project-Word bank Project 2002

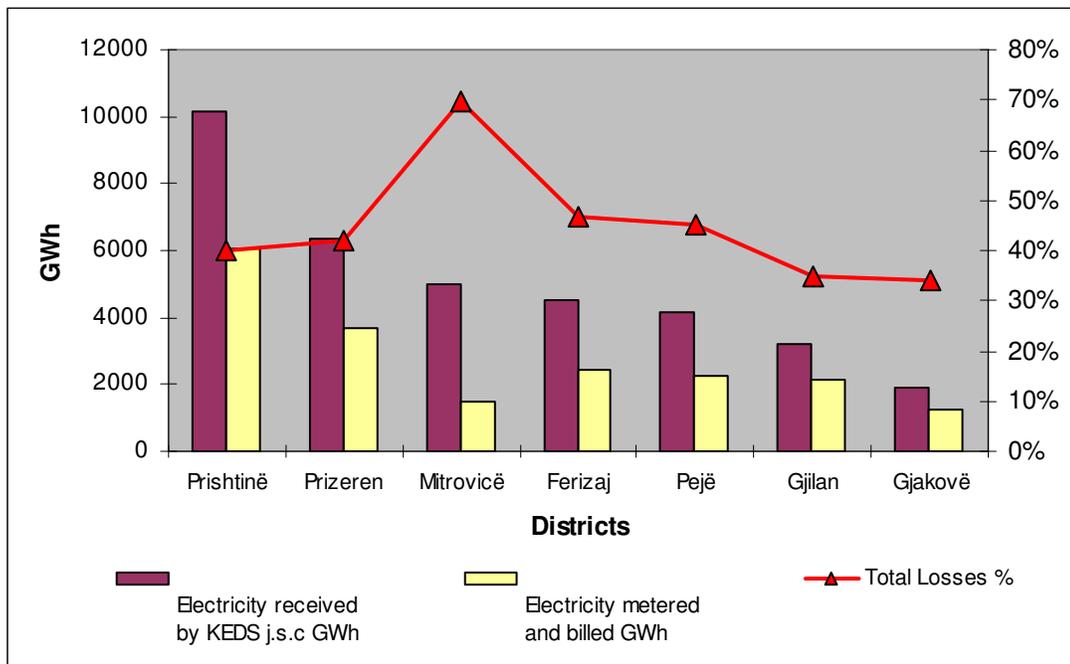
Due to different number of customers it is logical to have various consumption of electricity district. Also performance of every district is various, in some of them losses are higher in some is lower, table 8.1.1: shows consumption and losses for every district from 2000 to 2009

Table 8.1.1: Electricity consumption by Districts of KEDS j.s.c from 2000 to 2009

	Districts	Electricity received by KEDS j.s.c	Electricity metered and billed	Total Losses	Participation in Consumption
		GWh	GWh	%	%
1	Prishtinë	10157	6088	40.06%	28.75%
2	Prizeren	6367	3691	42.03%	18.02%
3	Mitrovicë	4969	1497	69.87%	14.07%
4	Ferizaj	4538	2417	46.73%	12.85%
5	Pejë	4131	2262	45.24%	11.69%
6	Gjilan	3234	2110	34.75%	9.16%
7	Gjakovë	1928	1271	34.09%	5.46%
	Total	35323	19336	45.26%	100%

Source of data: KEDS j.s.c

Figure 8.1.2 Electricity consumption by Districts of KEDS j.s.c from 2000 to 2009



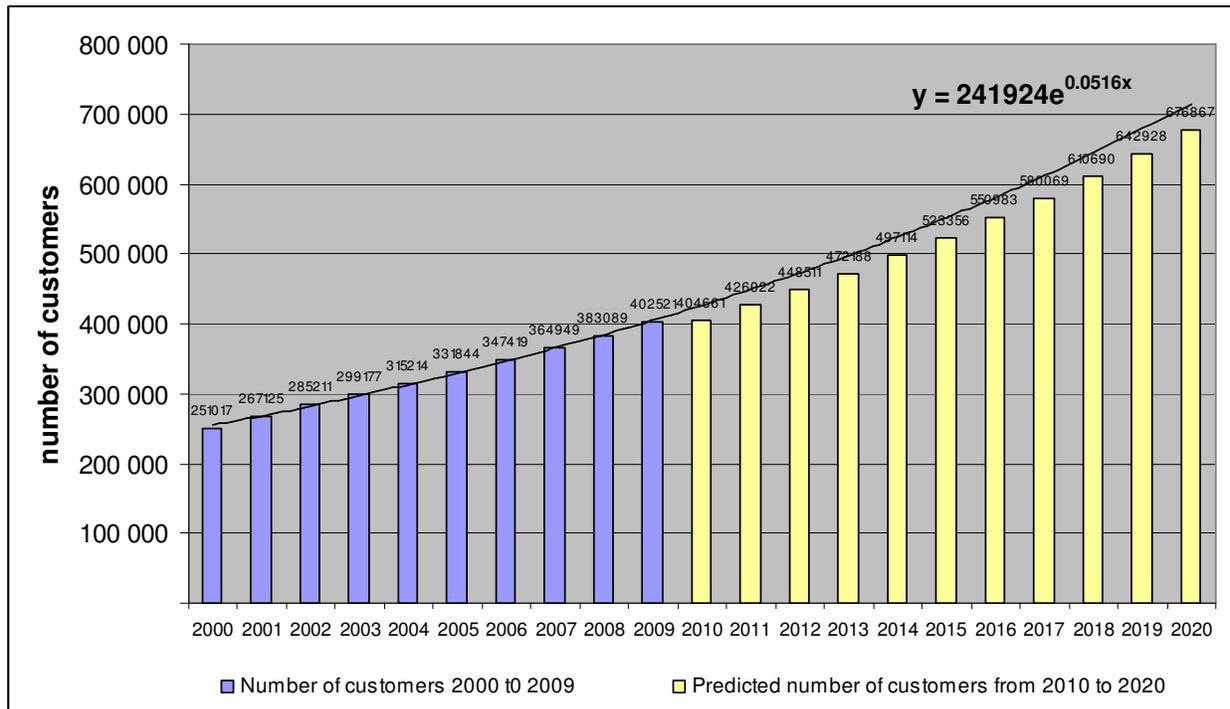
Source of data: KEDS j.s.c

Findings from Table 8.1.1 and Figure 8.1.2 are very important for process of privatization because potential bidder can have a clearer idea about KEDS j.s.c way of organizations and future planning for particular districts, and how this bidder is expecting to improve performance in each of them with main focus in districts where level of losses is higher.

### 8.2 Number of Customers

KEDS j.s.c serving 402,541 customers through out Kosovo. In this number are not included number of customers in northern part of the country; these customers are supplied but are not included in payment and billing system. Number of customers increases due to increase of number of population and because in Kosovo usually number of inhabitant per house is higher and it is expected that with improvement of economic conditions, this number will be lower, when in mean time number of houses will increase. In this way, those houses will be new customers for the company.

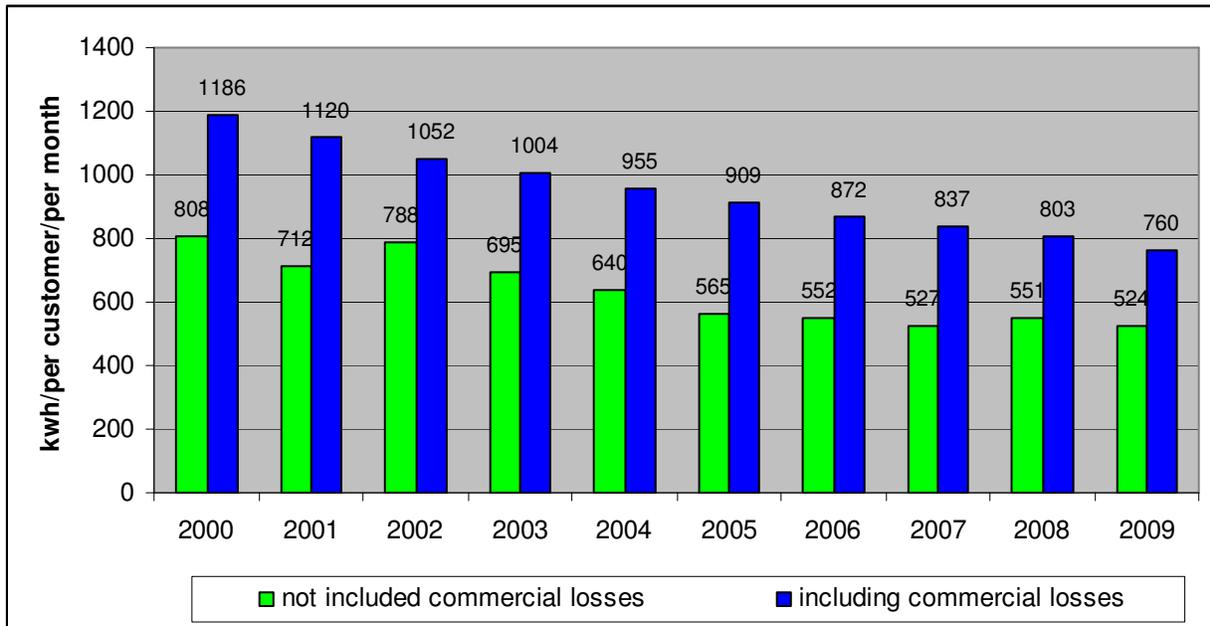
Figure 8.2.1 Number of customers of KEDS j.s.c and predicted number of customers from 2010 to 2020



Source of data: KEDS j.s.c –forecast was done by author of capstone

In Figure. 8.2.1 above is shown graphically number of costumes from previous years. Average incremental increase of customers per year was 16833, as numbers of customers have been increased, electricity consumers increased. Average consumption of energy per consumer changed during the years, as it is shown in Figure 8.2.2 . Average consumption per customer slightly decreased, even though number of customer has been increased that because number of household have been increased faster than number of population .It is shown in figure 8.2.2 that average consumption in 2003 per consumer per month before commercial losses was 1004 kwh and after commercial losses it was 695 kwh. Average consumption in 2009 evaluated and it was 760 kwh before commercial losses and 524 kwh per month after commercial losses.

Figure 8.2.2. Average electricity consumption per consumer from 2000 to 2009, including and not included commercial losses



Source of data: KEDS j.s.c

Electricity consumption increases as population increases, because of that is important knowing number of customer, and predicting what would be number of them in the future, also their behavior in electricity network. Electricity consumption, shown in Figure 8.2.2, time of the use, are very important for every company that distributes and sell electricity, to predict future needs of its customers.

Findings from those analysis are very important for all parties involves in process of privatization, government and potential bidder, to have an clear big picture what had happen in previous 10 years and what most probably is going to happen in the future ,specially in firs years of privatization.

## **Chapter 9**

### **Discussions, conclusions and recommendation**

#### **9.1 Discussion**

According to all issues that are treated above, a new potential bidders and governments as seller of those assets, have to take in account many issues and to make as much as possible detailed contract. Further, details about perspectives of the government and the potential bidder are discussed.

In many countries (e.g. Georgia, India, etc.) many companies suffered from privatization, not because of the lack of engagement, but because the contractual undertakings were not well defined between government and the private owner. Therefore, one of the capstone project recommendations is to make “privatization based in contract” because this system has been successful in many countries. This way the privatization consists of specifications of all details between the new owner and the government.

The Energy regulatory office is an important actor in Kosovo’s energy market. Every potential investor in this field has to apply for a license and must be certificated by the regulator to start any activity in Kosovo’s electricity market. After starting its activity, the company must justify its cost to the energy regulatory office with intention to get allowance revenues. Based on these revenues, that are allowed by the regulator, to set up tariffs at certain levels. According to the tariff methodology issued by the ERO, application must be on a yearly basis. Important issues for a new owner will be how its activity is to be regulated. The ERO uses “Performance based regulation” to regulate activities of the companies which distribute and sell electricity. This means if a company has higher performance and qualitative services, it will be allowed to set tariffs at higher levels rather the company which has a lower performance which will not be allowed to increase tariffs.

There are two predictions for electricity demand, first scenario is faster. According to this scenario, electricity demand forecast is expected to be 8911 GWh in 2020 and peak load demand is going to be 2035 MW, that are shown in Figure.4.1.1 and Figure.4.1.2 The second scenario of electricity demand growth is slower. The reason for this is because customers will use alternative sources of energy such as LPG, wood or another conventional fuel for space heating

Electricity and economic demand growth are closely linked to each other. Increase of investment in Kosovo in the next ten years are predicted to be as it is shown in figure 4.2.1. Number of private investors in services, in manufacturing will be increased, and will have impact in employment rate which is shown in figure 4.2.2. Investments in 2020 are going to be up to 3 billion euro that is as much as double of value of investments in 2010, that are expected to be 1.5 billion euro. These levels of investments are going to create new job places and increase welfare of customers of electricity, which customers

now are going to use more electricity because of increase of household incomes; this would be another factor that will have impact in increase of electricity demand.

Other important improvements that occur when the companies are privatized are that levels of losses being decreased services being improved. Electricity losses are a huge problem in KEDS j.s.c. In 2009, they were 42.5 % of all volumes of electricity that inflows from network of the KOSTT j.s.c. From these levels of losses 25.73 % are commercial and 17.07% are technical. Comparing levels of losses in KEDS j.s.c with various DSO in the world as it is shown in Figure.2.3,in KEDS j.s.c level of losses is the highest. To make improvements or to decrease this level of losses is a high priority issue in Kosovo.

With these trends of improvement, level of total losses in 2020 will decrease in reasonable level of 8%, or total losses are going to be equal of technical losses, because in that time there will not be anymore commercial losses, shown in Figure 5.1.1 & 5.1.2. These improvements will have multiplayer positive effect on the company because there will not be any charge of electricity theft in electricity tariffs. Electricity price would reflect only real costs. This fact will avoid misunderstanding with regulatory and customers.

Global finance is another important factor, especially in post privatization period. Borrowing money and getting different financial support from international finance organization such as World Bank, IMF, IFC is very important, particularly for big investments that are needed in privatized electricity distribution and supply. IFC is part of the world bank that helps mainly private sector in different parts of the world, with soft loans.

Distribution area, of the KEDS j.s.c is divided by the seven districts, every district has different number of customers and consumption of electricity. Highest number of customers are concentrated in district of Pristina, which also has highest consumption of electricity, almost 1/3 of all electricity consumption in KEDS j.s.c. Figure 8.1.a Shows map of Kosovo and how it is divided by districts in table 8.1.b is shown consumption by district during 10 years.

## 9.2 Conclusions

Years of inefficiency were the main reasons that “pushed” the government to launch the process of privatization of the electricity distribution company. Privatization of this sector has been proved to be successful and would have had an impact on the entire economy. Because of high efficiency and effectiveness of private electricity distribution, company improvements in quality of services, and supply, have had an important impact in the development of the entire economy. The main cause was the encouragement the foreign investors to invest in these economies, and multiplied effect of development due to continue and qualitative supply with electricity.

It is expected that the level of the technical losses will decrease after privatization of the company according to trends which show a decrease shown in Figure 5.1.1. Two scenarios have been predicted for technical losses. The first scenario is to follow the trend of decrease for the past ten years and according to that trend was forecast decrease of level of the losses by 2020, which are predicted to be 14%. Otherwise if new owner would accelerate level of investments and increase capacities of electricity distribution network, level of losses will decrease faster. In the second scenario is expected that this level in 2020 will meet reasonable level of 8%, shown in Figure. 5.1.1. Notwithstanding there are needed huge amount of financial investments for decrease level of technical losses in these levels. It will be justified return on those investments, because there will be significant improvement of quality of services and electricity supply. Hence, with quality improvements, customers are going to have better experience with company; hence, payment of electricity bills will be higher.

Level of commercial losses should be decreased, as it is shown in figure 5.1.2. The level of these losses had fluctuation during past ten years .There are two predictions about future of commercial losses. First prediction is the trend of decrease of losses in past five years that because before these years data are unreliable because there were no electricity measurement to many customers, and update of CCP was wary weak, until 2005. Accordingly, the first scenario predicts no extra engagements in managing of the company level of commercial losses of decrease in level of 15%.But this level of commercial losses is still very high for a commercial company. Private owner will improve managing of company and improve services, hence commercial losses are going to decrease faster then before to meet zero level in 2020.

Current level of losses also will have impact in evaluation of assets of the company. If the losses are higher, value of company is expected to be lower, due to potential buyer would need more engagements and costs to decrease these losses. This will be achieved through investments on building of new capacities, new technologies and investment to increase level of education of humane resources, with intention to improve quality of services.

Importance of global finance stands in getting loans with lower interest rates by KEDS j.s.c what would be very important in creating affordable tariffs for end of user; in this sense, ability of customers to pay their bills would be higher. Hence, everyone would have its benefits from an international finance invested project in the future in the distribution network.

Technologies in KEDS j.s.c in many parts are not up-dated for many years, need for improvement is higher with explanation of electricity distribution network. To improve quality of services new owner of distribution network needs to be closer to the customers, and this is achievable only if there is used modern technology for remote reading, billing, connecting and modification of different parts of the network that are needed. Implementation of the SCADA system will allow management of company to be closer to the customers, make significant improvements in quality of services, and make distribution company customer oriented

Number of customer by end of 2009 was 402541, this number is expected to be 676867 by 2020. Increase of number of customers will have impact in electricity consumption, hence private investor must consider this fact, to make step forward with new investments with intention to meet demand for electricity in future years.

### 9.3 Recommendations

According to findings of the capstone and experience of different countries in process of privatization, it is expected that this process will have positive effects in improvements of quality of services for customers. For process of privatization of the Electricity Distribution and Supply Company, the main recommendations are:

- Government should privatize KEDS j.s.c to the company that has more than 30 years experience in electricity distribution and supply, in a competitive market. These due to, in 2015 according to European Community Directives 2003/54/EC and 2003/55/EC every customer of electricity will be an 'eligible customer' to make privatization of this sector more effective and with less open issues in the future.
- Important recommendation is, that are needed increased investments to meet peak load demand and demand for electricity, to increase value of distribution asset sale during privatization and to sell the entire firm to a strategic investor,
- Government and the new owner should make as much as detailed contract, and make "Privatization based in contract" – this way that has been applied in many countries throughout the world, and is proved to be very successful.
- Before privatizations government as owner should upgrade infrastructure of the distribution company as much as possible with intention to decrease level of losses. Implementation of the SCADA system will make significant improvements in quality of services, and make distribution company customer oriented, in this way will be increased value and selling assets.
- Regulatory should up-date tariff methodology and other rules, to create long term and sustainable legislation environment that has to do with electricity distribution and supply, to ensure better regulation for privatized electricity distribution.
- Government and the new owner should make detailed contracts with each other, to avoid misunderstanding and misinterpretation in years that has to come. It is supposed that during an process of selling and buying detailed contract will take place, notwithstanding many problems could appear, specially about power purchase cost due to fluctuation of the electricity price in spot market and way how these costs are going to be charged in electricity tariffs

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## Appendix A

### Evaluation of KEDS j.s.c Assets

Table.A1&A2 Below shows how much have been sold every particular DSO in countries in the region, and calculated selling utility for KES j.s.c

Table.A1 Data for price of selling, square Km, population, density of population and year of privatization for some of the countries in region.

State	Square km	Selling Utility (mil.Euro)	Population	Density (Inh./km2)	euro/inh.	Electricity Consumption GWh	Losses %	Year of Privatization
<b>Albania</b>	28 900	102	3 639 453	126	28	3607	33	2009
<b>Macedonia</b>	25 713	260	2 066 000	80	126	7933	23	2006
<b>Bulgaria</b>	110 879	693	7 204 678	65	96	32520	12	2004
<b>Albania +Macedonia+ Bulgaria</b>								
Coeff./Total	Total Square km	Total Selling Utility (mil.Euro)	Total Population	Density (Inh./km2)	Average euro/inh	Total Electricity Consumption GWh	Total Losses %	
15.22	165492	1055	12 910 131	78	83	44060	16	
State	Square km	Calculated Selling Utility (mil.Euro)	Population	Density (Inh./km2)	euro/inh.	Electricity Consumption GWh	Losses %	Year of Privatization
<b>Kosovo</b>	10870	69.30	2 473 000	228	28	5225	42	2010

Source of data: [www.erranet.org](http://www.erranet.org) & [www.cia.gov/library/publications/the-world-factbook/geos/al.html](http://www.cia.gov/library/publications/the-world-factbook/geos/al.html)

Table.A2 Calculated Selling Utility taking in account level of losses

mil.Euro/ % of losses	Difference of losses % (between Kosovo and countries in region)	Value of difference of losses (mil.euro)	Calculated Selling Utility including losses factor (mil.Euro)
1.65	26.30	43.39	25.90

Those data are used in this capstone project to determine what could be most probably selling price of the KEDS j.s.c .This methodology of evaluating of KEDS j.s.c is quite simple but very effective. Table.A1 above contain all necessary data for this calculation .Logic of calculation is as follows: Albania, Macedonia and Bulgaria are already privatized their Electricity and Distribution Supply for certain prices. Those countries have their surface where is spread electricity network; also customers are spread in same surface with certain density. Firstly is summarized surface of those three countries, then summarizing selling price of the electricity distributions, and supply in these countries, that are calculated by formulae below:

$$Sqttotal = \sum_{i=1}^n Sc(i) + Sc(i + 1) + Sc(i + 2) + ..... + Sc(n) \quad \dots\dots\dots (1)$$

*Sci – square km for country i*

$$Upttotal = \sum_{i=1}^n Up(i) + Up(i + 1) + Up(i + 2) + ..... + Up(n) \quad \dots\dots\dots(2)$$

*Upi –Selling price of utility for country i*

to find link between selling price in those countries and selling price in Kosovo ,must be divided summed of surface of those three countries ,in this way there will be calculated a coefficient that tells as that all those three countries together have an surface 15.22 times bigger than Kosovo ,formula below shows that,

$$Ccoeff = \frac{Sqttotal}{SqCx} \quad \dots\dots\dots(3)$$

*SqCx –Square km for county x*

If selling price in those three countries together was 1055 mil.Euro ,that means Kosovo most probably could sell its Electricity Distribution and Supply with price that will be 15.22 lower than price of selling utility in those three countries together ,and that can be obtained if selling price in those three countries will be divided by coefficient 15.22. Hence selling price for KEDS j.s.c will be 69 mil.euro ,this calculation is done by formulae below,

$$CalcUpCx = \frac{Upttotal}{Ccoeff} \quad \dots\dots\dots(4)$$

To be more precise about selling price should be taken in account level of losses too ,because if level of losses is lower that means utility is in better condition hence selling price could be higher and if level of losses is higher that means utility is in bed conditions and selling price could be lower. To make a comparison there ,must be reference point ,in this case reference point is level of loses in those three companies of regional countries which level after smoothing is 16% , calculated with a formula below,

$$Lcoeff \%C(i - n) = \frac{\sum_{i=1}^n [Eci * Loss\%i] + [Ec(i + 1) * Loss\%(i + 1)] + [Ec(i + 2) * Loss\%(i + 2)] + ..... + [Ec(n) * Loss(n)]}{\sum_{i=1}^n E(c)i + Ec(i + 1) + Ec(i + 2) + ..... + Ec(n)} \quad \dots\dots\dots(5)$$

*Eci – Electricity consumption per year for country i*

*Loss%i – Electricity losses per year for Country i*

According to calculations that are done above value of KEDS j.s.c is 69 mil.euro, without taking in account losses factor, but if level of losses in KEDS j.s.c is 42% and in

three similar companies together in region losses after smoothing are 16% that means in KEDS j.s.c they are 26,3 % higher, calculated with a formula below,

$$LossDiff \% = Loss\%Cx - Lcoeff \%C(i - n) \dots\dots\dots(6)$$

Loss%Cx- Losses in percentage for country x

,and as it is shown in Tabele.A2. If 69 million euro would be selling price of KEDS j.s.c before losses factor, that means 1.65 mil.euro could be allocated to 1% of losses ,using the formula below,

$$euro / loss\%(Cx) = \frac{CalcUpCx}{Loss\%Cx} \dots\dots\dots(7)$$

If so, 26.3 % of losses are valuable 43.39 mil.euro, calculated with formula below,

$$VDL = (euro / Loss\%Cx) * LossDiff \% \dots\dots\dots (8)$$

Hence, that means, that offering price for KEDS j.s.c could be 25.9 milion euro, or will be decreased for level of losses, calculated with formula below,

$$CalcUpInLoss = CalcUpCx - VLD \dots\dots\dots (9)$$

to make them the same as companies of three regional countries that are taken as reference point for evaluation of the KEDS j.s.c.

This methodology of calculation is used because of complexity of evaluation of assent of the electricity network .As it is well known there is no international marked which we can use as reference point for comparison of selling price for shares of assets of our distribution network. Using this methodology somehow there has been created a reference point for comparison, and it is selling price in three countries in our region, as it is explained above.

**Appendix B**

Given the standard investment equation:

$$K_t = (1 - \delta) K_{t-1} + I_t$$

Where:

$K_t$  - capital at year  $t$

$K_{t-1}$  - capital at year  $t-1$

$I_t$  - investment at year  $t$

$\delta$  - Depreciation rate

Solving for capital in formulas below:

Given a Cobb-Douglas production of the following form:

$$Y = A_t K_t^\alpha L_t^{1-\alpha}$$

Where:

$Y$  - output

$K_t$  - capital stock

$L_t$  - labor supply

$A_t$  - total factor productivity

Taking logs and rearranging, this production function is used to derive the growth in labor input as follows:

$$I_t = (y_t - \lambda_t - \alpha k_t) / (1 - \alpha)$$

Where:

$I$  - growth in labor input

$y_t$  - output growth

$\lambda_t$  - growth in total factor productivity

$k_t$  - growth in capital stock

$\delta$

$\alpha$  - elasticity of potential output with respect to capital

and plugging in the standard investment equation, we get the

Following expression for investment:

$$I_t = (K_t / \alpha) (y_t - \lambda_t - (1 - \alpha) I_t) + \delta K_{t-1}$$

With terms defined above.