

# PRIVATIZATION OF POWER SUPPLY IN LEBANON

by

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Diploma in Civil Engineering  
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Submitted to the Department of Civil and Environmental Engineering  
in partial fulfillment of the requirements for the degree of

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## **ABSTRACT**

Plagued by corruption, illegal connections, mismanagement, and more than \$300 million in annual deficit, Electricite du Liban (EDL), the vertically integrated government owned Power Company, has become a financial burden on the Lebanese public sector. The following paper proposes a strategy for its privatization.

We first start by exposing the relevant characteristics of the country, the current socio-economic situation and the factors that have led to the recent calls for privatization. We then focus our discussion on the power sector and on EDL, identifying the problems that have undermined its operations.

The second part of the paper tries, based on an overview of three case studies, to define the different market models available and the requirements, strengths and weaknesses of each model.

Finally, based on the country's and sector's specificities, we recommend a two-phase privatization strategy that calls for a corporatization and restructuring transitional phase preceding a limited form of wholesale competition.

Thesis Supervisor: Fred Moavenzadeh

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## **CHAPTER 1: Introduction**

In 1993, after 17 years of civil war that shattered the country, the Lebanese government launched an ambitious infrastructure re-building plan, the National Emergency Reconstruction Program (NERP), that was supposed to steer the nation towards the challenges of the 21<sup>st</sup> century and the expectations of regional peace.

Eight years later, with a public debt amounting to more than \$25 Billion and a budget deficit close to 51%<sup>1</sup>, Lebanon finds itself on the verge of a bankruptcy. Privatization is seen by many as the only path towards salvation.

Among all the sectors to be privatized, the power sector will undoubtedly be the most challenging one. Indeed, in spite of more than \$1.5 Billion invested in capital improvements during the last decade, the country is periodically plunged in total blackouts; EDL, the state owned monopoly, has drained more than \$300 million yearly from the government's budget to cover its annual deficits.

Under these conditions, the need for private involvement has become undeniable. However, the timing, nature and extent of this involvement are yet to be determined: we will try, through this paper, to achieve this task.

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<sup>1</sup> Year 2000 Budget Figures. Ministry of Finance.

## **CHAPTER 2: Country Overview**

### **2.1 Historical Background<sup>2,3</sup>**

#### **2.1.1 The Birth of a Nation and The Pre-War Era (1926-1975)**

Lebanon, as defined by its present day boundaries became a state in 1920 by decree of the head of the French troops in the Levant. A constitution was adopted on May 25, 1926 establishing a democratic republic with a parliamentary system. The state remained under French mandate until November 22, 1943 the country's Independence Day.

Over the next 30 years, Lebanon became a true melting pot with a diverse cultural heritage. The instability in the surrounding countries caused it to experience large waves of immigration from neighboring countries and attracted thousands of skilled labor, entrepreneurs and intellectuals. With a competitive, free-market orientation and the most liberal banking regime in the Middle East, the country prospered in the midst of regional instability. The economic strength of the republic, essentially based on the services sector, revolved around its entrepreneurs and private initiatives characterized by a strong laissez-faire from the government.

#### **2.1.2 The Civil War (1975-1990)**

Even though the war started in 1975, the roots of the conflict go way back. The main factors that provoked this burst were:

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<sup>2</sup> Ministry of Finance Website: [www.mof.gov.lb](http://www.mof.gov.lb).

<sup>3</sup> CountryWatch.com

1. A constitution that failed to guarantee the rights of, and achieve a political equilibrium between more than eighteen different confessions.
2. The regional instability and conflicting relations between neighboring countries, who used Lebanon as a fighting ground: the civil war is actually viewed by many Lebanese people as the 'war of the others on their land'.

The conflict, which started as a confessional struggle, rapidly evolved to become a bloody confrontation between various warlords, the central government gradually losing its authority. More than 150000 people lost their lives, the country's infrastructure was completely devastated.

### **2.1.3 The Taif Agreement and the Post War Years**

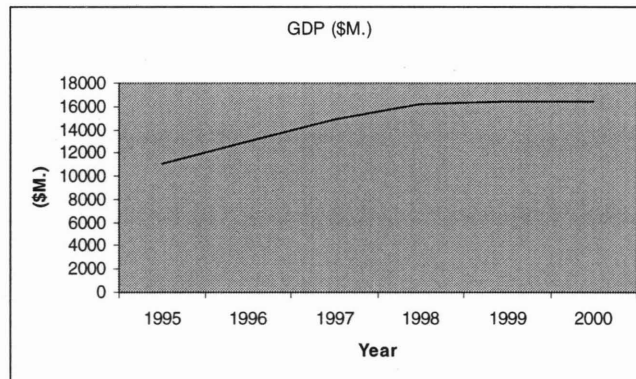
The war came to an end in October 1990. With the backing of the world community, the parliament met in the Saudi town of Taif and signed an agreement which would essentially act as a new constitution. This unique constitution formalized power sharing between Lebanon's eighteen officially recognized religious confessions and led to the election of a new president and the formation of a new government. The task laying before the state was huge: A country had to be rebuilt.

With a strong belief that regional peace was within reach, and that Lebanon had to be prepared for the opportunities ahead, the government embarked in 1993 in an ambitious and challenging 5 years infrastructure rebuilding program funded exclusively by the public sector with the backing of the donors community: the National Emergency and Reconstruction Program (NERP). With several billions

of dollars spent in capital investments, the plan spurred a substantial growth in the economy. Nevertheless, several pundits argued that this growth was 'artificial', based on public spending in a country where the private sector has always been the main catalyst: they were not wrong. Once the prospects for peace started vanishing and the pressures of the mounting debt slowed public spending, GDP growth decelerated at the end of the 90's and came to a complete stop at the turn of the century.

Year	1995	1996	1997	1998	1999	2000
<b>GDP (\$M.)</b>	11,122	12,996	14,867	16,167	16,462	16,462
<b>RealGrowth Rate</b>	6.5%	4%	4%	3%	1%	0%

Source: Central Bank, Ministry of Finance



Source: Central Bank, Ministry of Finance

#### 2.1.4 The Presence of Foreign Troops

In May of 1976, Syrian troops entered Lebanon as part of the 'Arab Deterrent Force'. As the conflict persisted, the Syrian forces stayed while the other Arab forces departed. Today, Syria maintains approximately 30000 troops on the Lebanese soil and acts as an influential power broker in the country. The presence of these troops is currently being debated among various leaders. In its

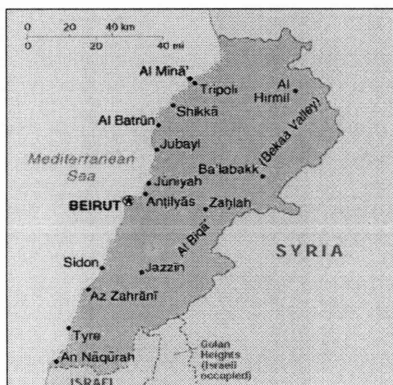
policy statement, the government declared that the presence of Syrian troops is ‘ legal, temporary and necessary’.

Israeli troops entered the country twice, in 1978 and 1982 and maintained a presence in South Lebanon until mid-2000 in what was known as the ‘border strip’. During the 1990’s, in retaliation for resistance operations against its soldiers, the Israeli army targeted on several occasions the country’s infrastructure including its electricity facilities. On May 24, 2000 Israel withdrew its forces from the ‘border strip’ in application of resolution 425 of the United Nations. Nevertheless, the Lebanese government has constantly maintained that this application has been partial, and that Israel is still occupying an area known as the ‘Shebaa Farms’. The main resistance movement ‘Hezbollah’ has vowed to continue its operations until the restitution of the disputed area and the liberation of Lebanese prisoners held in Israel.

## 2.2 Geography and Demography

### 2.2.1 Location and Geography

The Lebanese Republic is a small and densely populated country situated on the eastern shores of the Mediterranean.



Source: CountryWatch.com



'With a total area of 10,452 Km<sup>2</sup> it is one of the smallest countries in the region and at its widest point it stretches around 85 km from its western to eastern borders. Lebanon has 212 Km coastlines and is bordered to the North and East by Syria and to the South by Israel. It is a mountainous country with more than half of its land at altitudes of 1000m and above.

The republic is defined by two mountain ranges broadly parallel from North to South (known as the Lebanon and the Anti-Lebanon), a 15km wide plain separating these two ranges (the Bekaa valley) and a tight coastal plain<sup>4</sup>. The majority of Lebanon's largest cities are situated along this coastal plain<sup>4</sup>.

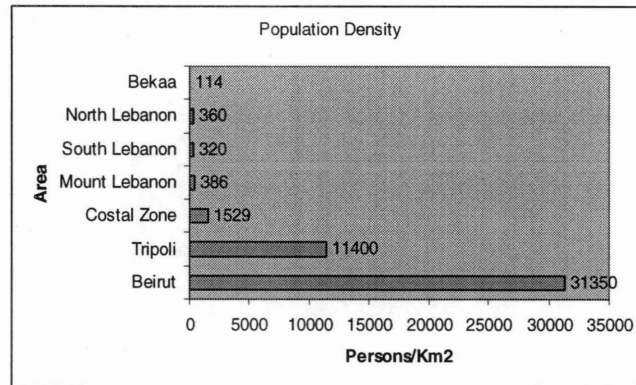
### **2.2.2 Demography**

The main characteristic of the Lebanese population is undoubtedly its diversity: with more than eighteen different religious communities, this diversity has been seen as both, a blessing in times of peace and a burden in times of war.

Because of the centralization of economic and political activity in the capital, the last century has seen a sustained internal migration towards the cities (mostly Beirut). The latest World Bank statistics shows that the urban population represents 90% of the total population: Beirut and its suburbs alone shelter approximately 50% of the population.

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<sup>4</sup> Investment Development Authority of Lebanon (IDAL).



Source: Central Administration for Statistics.

Below are some key figures summarizing the country's demographic profile:

Year	2000
Population, Total (million)	4.3
Population Growth	1.3%
Population Density (p./km <sup>2</sup> )	423.1
Life Expectancy (Years)	70.2
Urban Population (% of total)	90%
Illiteracy Rate	14%
Electric Power Consumption/Capita (KWh)	1650.7*

Source: The World Bank Group.

\*:1996 Figures.

### 2.3 Current Political System

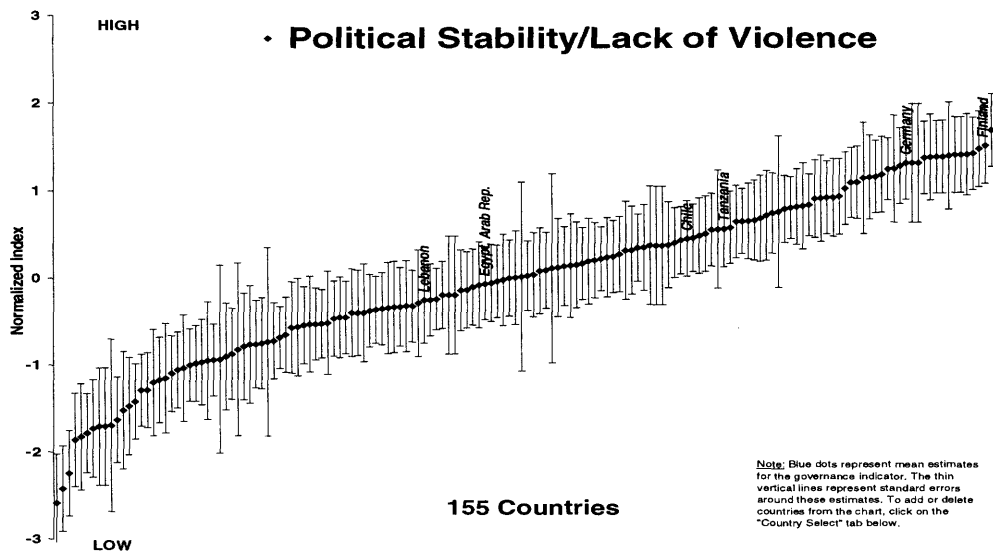
The last decade witnessed the election of 2 presidents, the appointment of 4 prime ministers and the formation of 8 different governments.

The country's political scene is actually as diverse as is its population. A mix of warlords, traditional politicians, and post war newcomers, the political class has constantly been drowned in bickering and cross accusations of corruption. Achieving a consensus on even the most sensitive national matters is practically impossible.

Furthermore, the country cannot be isolated from its surrounding region. The events that took place over the past 10 years on the peace process front, and the

rapidly evolving situation in the Middle East and its uncertainties may influence the internal balance of power and take its toll on the country.

Below is a comparative chart of the country's political stability indice (as measured by the World Bank) and 5 other benchmark countries.



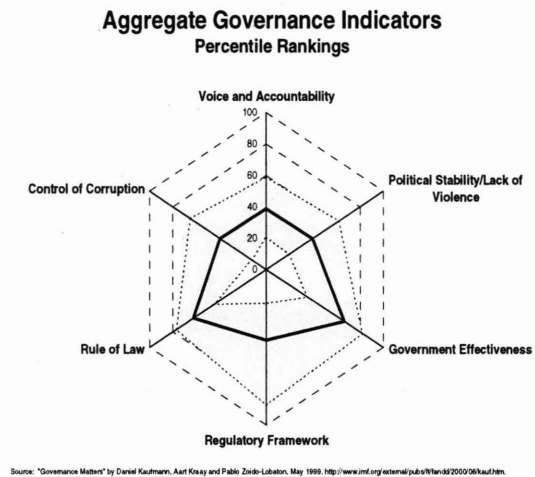
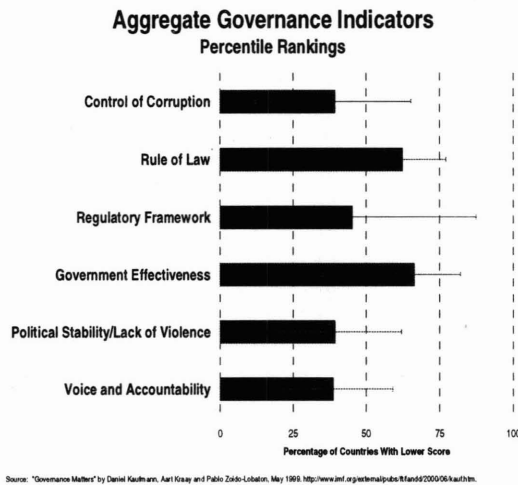
Source: "Governance Matters" by Daniel Kaufmann, Aart Kraay and Pablo Zoido-Lobaton, May 1999. <http://www.imf.org/external/pubs/ft/andd/2000/06/kauf.htm>.

## 2.4 Governance, Corruption and Legal Framework

The problems of corruption and governance are closely correlated. Reasonably tamed, during the Pre-1975 era, the corruption phenomenon was greatly amplified by the inertia of the central government during the war. As a consequence, virtually every Post-war era government has had to deal with this problem: none of them has succeeded. Every attempt to restructure the administration has been torpedoed by various political interests taking advantage of the current situation.

Spread at practically every level of the state, it is estimated that corruption has cost the government more than 40% of its current public debt.

The World Bank governance indicators summarize very well the actual situation.



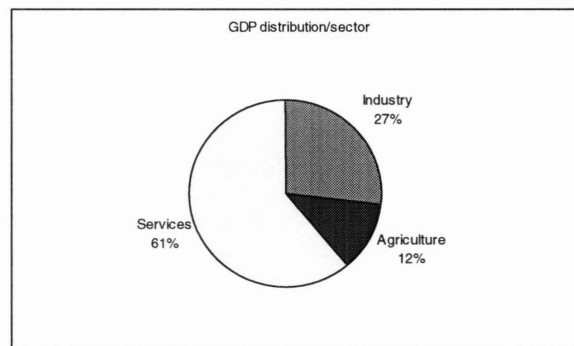
The judicial system, which held better than the public administration during the 1975-1990 period, is currently facing 2 major challenges:

1. The set of laws in place have become obsolete and need to be revamped. Most of the legislation texts go back to the French mandate years. In fact, an active legislation reform movement is taking place both in the parliament and through committees formed by the Central Bank and the Ministry of Justice to modernize the Lebanese Law.
2. Although, the constitution insisted on the independence of the 3 governing bodies: Legislative, Executive and Judicial, the latter is constantly suffering from the meddling of the political leadership in its affairs. It is also struggling

with a lack of human capacities: Litigations may take several years to be settled in a court of law.

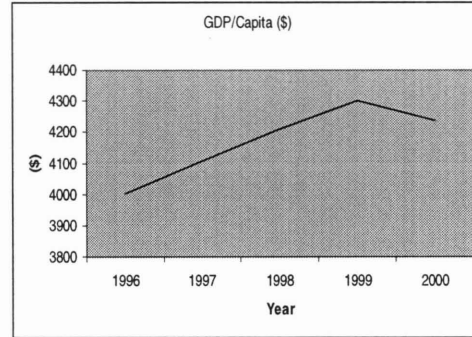
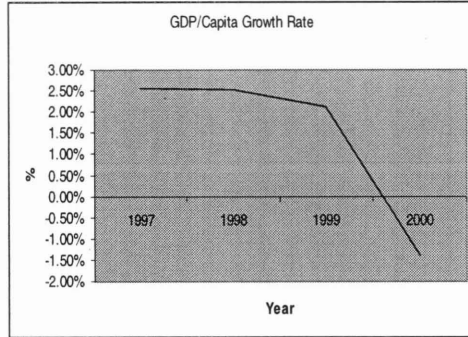
## 2.5 Current Socio-Economic Situation

With no natural resources, the Lebanese economy is marked by its dependence on the services sector. For the past 10 years, the country has been trying to re-define its economy and the role it should play within its entourage. The time where Lebanon used to be the financial hub of the Middle East seems to be revolved and the political leadership is still looking for a new 'Economic Identity'.



Source: Ministry of economy, 1999

The slowing government spending has plunged the economy in a state of pseudo-recession for the past 2 years and the GDP/capita has actually decreased indicating deteriorating living standards.



Source: CountryWatch.com

This, combined with the availability of a cheap foreign labor, has led to a surge of unemployment levels. Official numbers put the jobless rate at 10%, but some economists claim that the actual rate is around 20-25% with 30-35%<sup>5</sup> unemployment among young people.

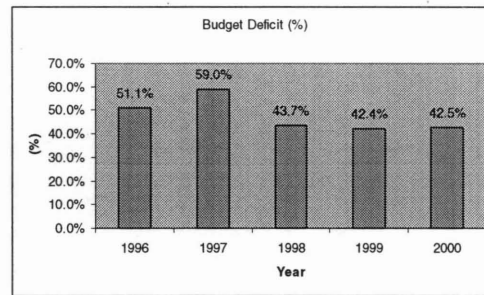
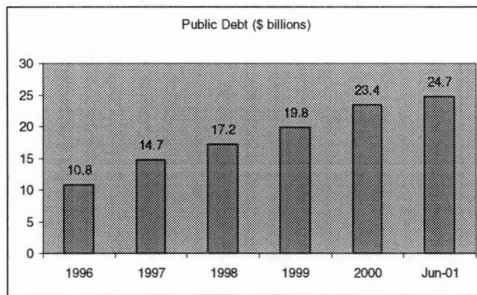
Consequently, the emigration of educated young Lebanese has become a serious problem for the economic and social development of the Lebanese society.

The fall of the past two governments can partially be attributed to their failure in addressing these social concerns.

## 2.6 A Public Sector on the Verge of a Bankruptcy

When the NERP was launched in 1993, the public debt stood at \$3 billions. As of May 31 2001, this debt amounted to more than \$25 billions.

<sup>5</sup> U.S Embassy in Beirut. 'Country Profile'. 2000.



Source: Ministry of Finance

5 elements have contributed to this trend:

1. The Infrastructure rebuilding program which relied exclusively on government funding. Private participation under alternative financing schemes was limited and virtually inexistent.
2. The government has had to bare annual budget deficits averaging 47% over the past 5 years<sup>6</sup>. A large part of this deficit is actually due to loss making, government owned companies such as EDL.
3. An overwhelming cost of debt, which peaked at 35% on government treasury bonds. Although the latest eurobonds issues substantially lowered this cost.
4. The heavy burden of corruption within the administration.
5. The Central Bank's commitment to the stability of the Lebanese Pound.

With a debt ratio standing at 145% of GDP<sup>7</sup>, the country's default risk is at its highest (Lebanon has actually never defaulted on his debt, even in the gloomiest years of civil war). Citing this risk, S&P and Fitch (two major rating agencies) downgraded Lebanon's foreign and domestic debt rating from B+ to B- in August 2001.

<sup>6</sup> Ministry of Finance 1995-2000 Budget Laws.

<sup>7</sup> Ministry of Finance Figures. June 2001.

In a confidential executive summary issued on September 13, 2001 the International Monetary Fund (IMF) warned that, even if the government managed to implement its fiscal and economic reforms, the debt ratio would increase to 175% of GDP by 2002, one of the highest ratios in the world.

Knowing that the local banking sector, which is the backbone of the Lebanese economy, is deeply exposed to treasury bonds, the effects of such a default will be devastating on the sector and consequently on the country as a whole.

In short, if the government doesn't find a fast way to substantially reduce both its debt and its deficit, the country will certainly tumble into bankruptcy. Privatization might be the only solution.

## **CHAPTER 3: The Privatization Solution**

### **3.1 Driving Forces and Objectives**

The August 2000 legislative elections led to a landslide victory of the opposition whose program essentially revolved around economic recovery. At the heart of this program laid an ambitious privatization plan articulated in the Policy Statement of the government that was consequently formed in October:

***“The Government will pursue privatization, which will help spur economic growth, promote private sector initiative and investment, improve efficiency and effectiveness of the services provided. According to the privatization law, privatization proceeds will be used to reduce public debt...”***

*Government Policy Statement at the Oct. 2000  
Parliament session.*

These orientations received the valuable blessing and backing of the IMF during a visit of its chairman M. Wolfhanson to Beirut. The bank insisted on the necessity of these measures as part of a broader ‘Salvation Plan’.

We agree with the view that privatization alone cannot be the magic remedy for the issues facing the economy; it will have to be associated with various reforms both economic and political. Nevertheless, its benefits can be considerable:

1. The use of the proceeds for the repayment of part of the outstanding public debt will defuse the risk of default and relief the government budget from a

substantial amount of annual debt service (Interest expenses accounted for more than 49% of the 2001 budget<sup>8</sup>).

2. Similarly, the divestiture of some of the loss making public companies will improve the annual budget deficit transferring both risks and benefits/losses to the private sector.
3. It will liberate public funds that could be dedicated to 'social spending' such as Education, Health Care...
4. The resulting foreign private investments will help ease the pressure on the Lebanese Pound.
5. These investments will help spur economic growth, provide jobs for the local businesses and workforce.
6. Privatization will improve the efficiency and the services provided by some of the concerned sectors by way of a better management, capital investments (each dollar of privatization revenue generates 38 cents in new investments<sup>9</sup>) and the improvements in productivity. The draft of the 2002 budget law reduces capital spending by more than 30%<sup>10</sup>, signaling the scarcity of public funds and the inability of the government to address the capital needs of these sectors.
7. The introduction of competition in some of these historically monopolized sectors could lower the tariffs paid by the consumers.

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<sup>8</sup> Ministry of Finance 2001 Budget Law.

<sup>9</sup> P. Young. 'Lessons of Privatization'.

<sup>10</sup> Ministry of Finance. 2002 Draft Budget Law

### **3.2 Analysis of the Political Consensus**

Whereas virtually all of the political class agrees on the necessity of privatization, the sectors concerned and the implementation of the program are still being debated.

The major sectors and public companies concerned are: the National Airline (MEA), the National Television (TL), the Telecommunications Sector, the Water Sector and finally the Power Sector.

The Power Sector has been at the center of these debates. Several political figures have voiced their opposition to its privatization arguing that it was of national interest and thus, should by no mean be divested.

In fact, the strategic importance of this sector and the various interests that may be concerned and endangered by its privatization make it very difficult to achieve a complete consensus on any plan.

### **3.3 Relevant Legislation**

On the 31<sup>st</sup> of May 2000, the parliament endorsed the 'General Privatization Law', which can be summarized by the following:

1. The creation of the 'Higher Council of Privatization' whose mission will be: *"to plan and implement the privatization program. This council is composed of*

*the Prime Minister, the ministers of Economy, Finance, Justice, and Labor, and the Minister overseeing the concerned sector”<sup>11</sup>.*

2. For each of the sectors, the government will have to develop a specific privatization plan, which in turn, will have to be approved and endorsed by the parliament.
3. Competition ought to be introduced whenever circumstances allow it.
4. The award process ought to be transparent and fair.
5. When competition is not possible, activities within the sector ought to be overseen by a regulatory entity.

Based on this generic law, the government has started elaborating a specific plan for the Power Sector. For this purpose, an Investment Bank was chosen to fulfill an advisory role. The plan, which is still under elaboration, seems to recommend the following<sup>12</sup>:

1. The introduction of a strategic partner who will be in charge of the managing and restructuring the sector. This partner will acquire a minority stake in EDL.
2. Following this period of restructuring, the government will proceed with the full privatization.

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<sup>11</sup> ‘General Privatization Law’. The Official Journal. May 2000

<sup>12</sup> L’Orient le Jour. May 2001

### 3.4 Past Failures

#### 3.4.1 The Wireless Telecommunications

The Wireless Telecommunications saga started at the end of 1994 when the government auctioned two ten-year BOT licenses. The award process, which was heavily criticized for its lack of transparency and the involvement of political interests, gave birth to two operators:

Cellis, with France Telecom as the major shareholder, and Libancell owned by a group of local investors with Finland's Sonera as a minority stakeholder.

Over the next five years, the GSM BOT experience seemed to have become a landmark success and a benchmark for future privatization and infrastructure rebuilding programs:

- *Two state of the art GSM networks were built expanding telecom infrastructure to approximately 700000 lines.*
- *The sector achieved a 17% penetration rate equaling the rate the fixed network had achieved in more than 40 years.*
- *More than \$500 millions were invested in the construction and expansion of the network.*
- *Treasury revenues (fees and taxes on the communications) exceeded \$800 millions.*
- *1500 direct jobs and over 8000 indirect jobs were created*<sup>13</sup>.

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<sup>13</sup> Hussain Rifai. 'Privatization and Liberalization of Telecom in the Middle East and North Africa'. June 2000.

Unfortunately, things started deteriorating at the end of 1999 when the minister of telecommunications claimed that the companies had breached a clause of the contract that limited their capacity to 500000 lines and asked for \$600 millions in compensation<sup>14</sup>. The minister insisted that both companies were “cheating on billing and giving unauthorized services to their customers”. A mediator was assigned and negotiations started on March 3<sup>rd</sup> 2000.

During the course of these negotiations, which lasted more than a year and survived a change in government, Cellis and Libancell proposed to pay each \$1.35 Billion in return for the transformation of their BOT rights into 20 years licenses. The government refused.

On June 14, 2001 the Higher Council of Privatization terminated the BOT contracts<sup>15</sup> signed with both operators basing its decision on the clause of the agreement that limited their capacities to 250000lines/operator. Cellis and Libancell both argued that this clause had been cancelled 4 years earlier by mutual consent. The decision affirmed that the operators would be compensated and appointed an international auditor to determine the compensation amount.

A subsequent ruling by the highest judicial authority (majless al shoura) granted Cellis the right to pursue international arbitration, citing the fact that its majority shareholder (France Telecom) is non-Lebanese. Given its ownership structure (local majority), Libancell’s request for international arbitration was denied.

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<sup>14</sup> The Daily Star. October 1999.

<sup>15</sup> The Daily Star. June 2001.

### 3.4.2 The Postal Services

The Postal Sector was one of the major victims of the Lebanese war. As a result, Lebanese people almost forgot the meaning of postal services for a long time. This came to an end in 1998 when the government awarded a 12 years BOT contract to Libanpost, a Lebanese-Canadian consortium with Montreal's SNC Lavallin as the major shareholder (67%) and Canada's Post System Management Limited as the Operator.

The consortium promised to invest an initial \$20 million in developing a postal service that will meet the standards set by the United Postal Union, and an additional \$50 million in an upcoming phase. In return, the government granted it a monopoly of the sector.

The contract stipulated that the public treasury would perceive 5% of the mail handling revenues rising to 40% after 12 years.

In a short period of time, the company's achievements could be felt all over the country:

- *Libanpost installed letterboxes across the country and refurbished its point of sales.*
- *Its retail outlets started selling stamps, money orders and other services.*
- *The company improved and modernized the mail collection and the sorting operations by computerizing essential parts of its business.*

- *From 40000 letters being sorted daily in 1998, 100000 were being sorted daily as of Jan.2000.*
- *The company's workforce grew to approximately 1000 employees<sup>16</sup>.*

Nevertheless, as was the case for the wireless sector, the success of the first years contrasted with the failure of the following years.

In May 2001, SNC Lavallin announced it was pulling out of the consortium as a result of its substantial losses. The group which threatened to lay off its 1000 employees' entire workforce, blamed its losses on the following:

- Excessive government bureaucracy.
- Intense competition from private courier companies (DHL, FedEx...).
- Lower than expected revenues.

After intense negotiations that required the intervention of the highest political leadership of both countries, an agreement was reached on Sept.5, 2001: A Lebanese firm (Lebanon Invest) took over SNC Lavallin's shares for \$12millions, and the government extended the consortium BOT contract to 15 years instead of the original 12 years<sup>17</sup>. Post Management System Limited remained as the operator.

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<sup>16</sup> Nabil Azar. 'The Libanpost Success Story'. Lebanese American University. May 2000.

<sup>17</sup> The Daily Star September 2001.

## **CHAPTER 4: The Electricity Sector: Past, Present and Future?**

### **4.1 Brief Historical Perspective**

#### **4.1.1 From the Private to the Public Sector**

The private sector involvement in the production and distribution of electricity in Lebanon is as much a concept for the future as it is a reality from the past. In fact it all started in March 1908 when the Ottoman rule granted the *“Beirut Gas Company, a concession to produce and distribute electricity to the public”*<sup>18</sup>. Similar concessions were granted to various operators in different regions. The company continued to operate under the name of “ Tramways et éclairage de Beyrouth” until July 1954 when the GOL decided to nationalize the sector.

Later, in 1964, Law #16878 was issued creating EDL: it provided that all new installations will be financed by the State and turned over to EDL to run, maintain and operate.

Afterwards, in 1985 and 1995 respectively, the government revoked the Kadisha and Nahr Brahim concessions (two minor private Hydro-generation facilities) turning over the assets to EDL. Several litigations concerning the compensations due to the former operators are still pending<sup>19</sup>.

#### **4.1.2 The Civil war and the NERP**

The Lebanese power supply system suffered considerable damage during the war. As a result, supply to consumers from the public system was severely

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<sup>18</sup> C. Abi Said and R. Barudi. ‘The Lebanese Electricity Power Sector-A Case Study’. January 2001.

<sup>19</sup> C. Abi Said and R. Barudi. ‘The Lebanese Electricity Power Sector-A Case Study’. January 2001.

restricted. Small, noisy privately operated diesel generators proliferated in urban areas as a result of the frequent black outs.

Under the National Emergency and Reconstruction Program (NERP), initiated in 1993, the government promised to restore by 1996, 24-hour power supply to most of Lebanon. The 'mitigated' results were achieved with significance assistance from the community at a cost of US\$1.539 billion<sup>20</sup>. However, the pressing need to address the shortage of power took precedence over the sector's financial and institutional rehabilitation. Thus, the government has had to bear the company's losses, which have amounted to nearly US\$ 500 million over the 1992-1995 period. Furthermore, the sector has had to cope with repeated Israeli attacks on the generation, transmission and distribution facilities. Below is the chronology of the latest attacks:

<b>Date of Attack</b>	<b>Target of Attack</b>
April 14, 1996	Jamhour and Bsalim sub-stations
June 24, 1999	Jamhour and Bsalim sub-stations
February 8, 2000	Jamhour and Deir Nbouh sub-stations
May 5, 2000	Bsalim and Deir Ammar sub-stations

Source: EDL

Alone the damages from the Feb. 8<sup>th</sup> 2000 raid on Jamhour were estimated at \$30 million<sup>21</sup>.

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<sup>20</sup> EDL. 'Financial Statements 1991-1996'.

<sup>21</sup> L'Orient le Jour. February 12<sup>th</sup> 2000.

## 4.2 Current situation

### 4.2.1 Assets in place

#### A. Generation

Before the NERP, EDL generated approximately 700MW with an estimated demand of 1100MW. The three-stage reconstruction program, which involved the construction of 4x34MW gas turbines in Baalbeck (1996) and 2x440MW combined cycle plants in Zahrani and Beddawi improved considerably the production capacities.

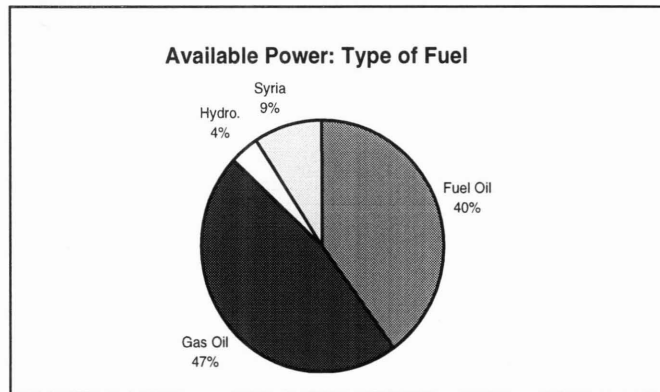
Currently, the installed power is 2348.3MW of which 1973 MW is actually available<sup>22</sup>.

Furthermore, the country draws on average, 150-225MW from the Syrian network.

Plant	Fuel Burnt	Installed (MW)	Available (MW)
Zouk (Steam Turbines)	FO	607	540
Zouk (Gas Turbines)	GO	30	16
Jieh (Steam Turbines)	FO	347.5	284
Hrayche (Steam Turbines)	FO	75	47
Baalbeck (Gas Turbines)	GO	67	67
Tyr (Gas Turbines)	GO	67	67
Zahrani (Combined Cycle)	GO/NG	440.1	433
Beddawi (Combined Cycle)	GO/NG	440.1	433
Litani (Hydraulics)	-	196.5	86
Kadisha (Hydraulics)	-	78.3	0
Total		2348.5	1973

Source: EDL

<sup>22</sup> C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector-A Case Study'. January 2001.

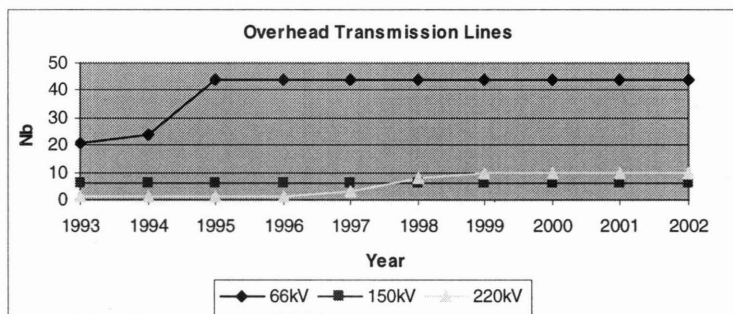
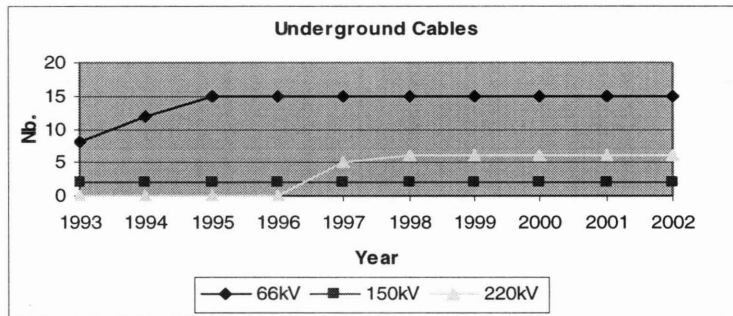


Source: EDL

Given their accumulated running hours, the Jieh units are expected to be partially decommissioned by 2005 and fully decommissioned by 2010. Whereas the Zouk and Hrayche units will be decommissioned by 2015.

### **B. Transmission and Distribution**

Although the peak demand is estimated to be 1700MW, lower than the company's generation capacity, customers still suffer from shortages. One of the reasons is the lack of transmission capacity, which mainly results from the lines specifications: the transmission network mainly consists of 150 and 66KV lines and only few power plants are connected to 220KV lines. Whereas the focus of investment in the past lied on generation plants, it will be shifted to the transmission and distribution in the future.



Source: C Abi Said and R. Barudi.

## 4.2.2 Financial Performance

### A. Five Years Financial Statements

The latest financial results summarize very well the state's failure to tackle the company's institutional and operational problems, which will be exposed in the following paragraphs.

Indeed, over the past half-decade, EDL has accumulated losses amounting to more than \$750M. The company is actually projecting a \$360M deficit for year 2001<sup>23</sup> alone, a deficit that will be largely financed by government funds.

Below is a summary of the company's financial statements for the past five years. It is to be noted that these statements may entail some imprecision due to the differences in accounting systems and the blurriness surrounding the firm's results.

<sup>23</sup> EDL Budget Proposal 2001.

### Five Years Income Statements (\$ millions)\*

YEAR	2000	1999	1998	1997	1996
Operating Revenues	434.7	432.4	395.4	365.8	291.2
Non-Operating Revenues	2.4	2.5	1.8	2.9	3.1
<b>Total Revenues</b>	<b>437.2</b>	<b>434.9</b>	<b>397.3</b>	<b>368.7</b>	<b>294.3</b>
Purchased Power (Syria)	69.8	53.5	49.0	50.3	60.7
Fuel Costs	376.7	251.4	238.8	260.9	200.6
Salaries	77.6	44.1	77.0	99.0	49.6
Material	13.9	33.7	19.3	10.1	11.5
Administrative Expenses	3.8	3.4	3.9	3.9	4.5
Depreciation	103.6	99.8	79.3	36.9	44.5
<b>Total Costs</b>	<b>645.5</b>	<b>486.1</b>	<b>467.3</b>	<b>461.1</b>	<b>371.5</b>
<b>Gross Profit</b>	<b>(208.3)</b>	<b>(51.2)</b>	<b>(70.0)</b>	<b>(92.3)</b>	<b>(77.2)</b>
Interest Expenses	74.6	97.1	52.6	34.2	8.0
<b>Net Profit</b>	<b>(282.9)</b>	<b>(148.3)</b>	<b>(122.6)</b>	<b>(126.5)</b>	<b>(85.2)</b>

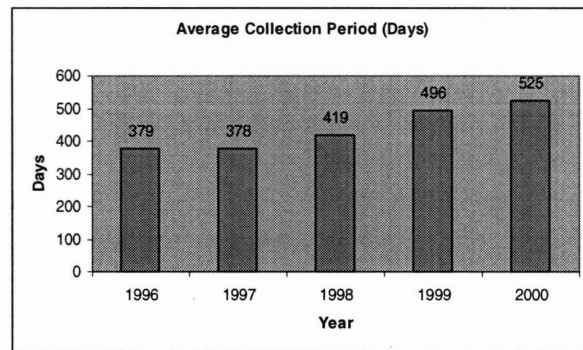
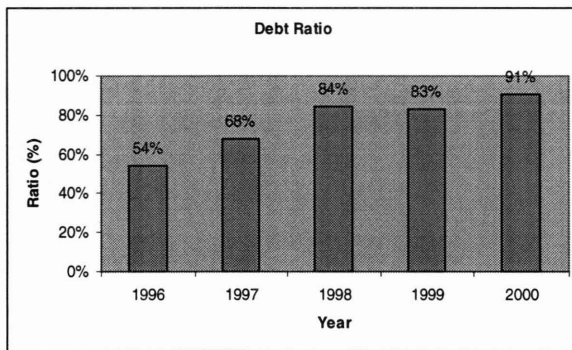
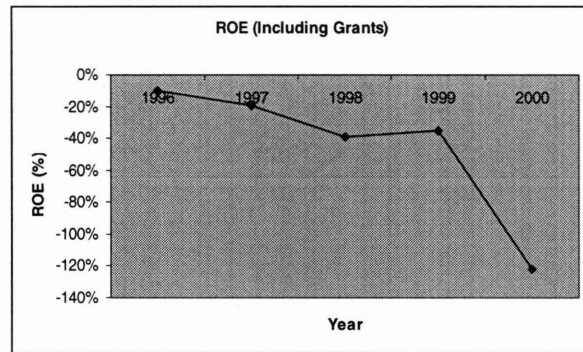
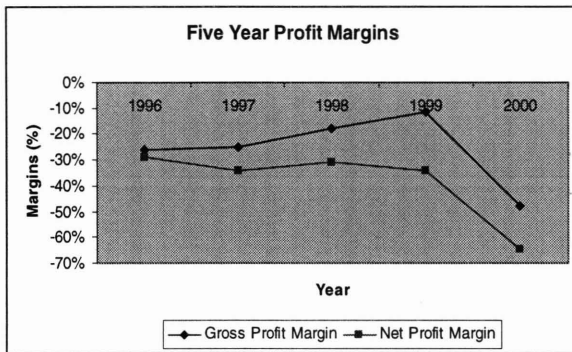
<b>Gross Profit Margin</b>	<b>-48%</b>	<b>-12%</b>	<b>-18%</b>	<b>-25%</b>	<b>-26%</b>
<b>Net Profit Margin</b>	<b>-65%</b>	<b>-34%</b>	<b>-31%</b>	<b>-34%</b>	<b>-29%</b>

### Five Years Balance Sheet (\$ millions)\*

YEAR	2000	1999	1998	1997	1996
<b>ASSETS</b>					
<b>Fixed Assets</b>	<b>1,623.2</b>	<b>1,539.7</b>	<b>1,370.3</b>	<b>1,360.1</b>	<b>1,118.0</b>
Current Assets					
Inventories	50.3	57.5	66.5	72.4	52.2
Receivables	637.4	598.9	461.8	387.1	309.5
Provisions for Doubtful Accounts	(154.9)	(138.2)	(316.3)	(187.9)	-
Other Debtors Accounts	256.8	249.9	242.6	209.5	195.9
Cash	96.3	104.6	185.1	150.4	133.2
<b>Total Current Assets</b>	<b>886.0</b>	<b>872.7</b>	<b>639.8</b>	<b>631.5</b>	<b>690.8</b>
<b>Total Assets</b>	<b>2,509.1</b>	<b>2,412.4</b>	<b>2,010.1</b>	<b>1,991.6</b>	<b>1,808.7</b>
<b>EQUITY &amp; LIABILITIES</b>					
<b>Equity and Grants</b>	<b>231.4</b>	<b>417.1</b>	<b>311.8</b>	<b>634.3</b>	<b>833.8</b>
<b>Long Term Debt</b>	<b>1,667.4</b>	<b>1,487.1</b>	<b>1,340.8</b>	<b>1,115.1</b>	<b>803.1</b>
Current Liabilities					
Long Term Debt Payable Within a Year	128.3	95.5	55.4	12.5	2.0
Short Term Debt	180.4	160.5	105.5	85.8	72.7
Other Creditors Accounts	301.6	252.2	196.6	143.9	97.1
<b>Total Current Liabilities</b>	<b>610.4</b>	<b>508.2</b>	<b>357.5</b>	<b>242.1</b>	<b>171.8</b>
<b>Total Liabilities</b>	<b>2,277.8</b>	<b>1,995.3</b>	<b>1,698.3</b>	<b>1,357.3</b>	<b>974.9</b>
<b>Total Equity &amp; Liabilities</b>	<b>2,509.1</b>	<b>2,412.4</b>	<b>2,010.1</b>	<b>1,991.6</b>	<b>1,808.7</b>
<b>Debt Ratio</b>	<b>91%</b>	<b>83%</b>	<b>84%</b>	<b>68%</b>	<b>54%</b>
<b>ROE (Including Grants)</b>	<b>-122%</b>	<b>-36%</b>	<b>-39%</b>	<b>-20%</b>	<b>-10%</b>
<b>Average Collection Period (Days)</b>	<b>525</b>	<b>496</b>	<b>419</b>	<b>378</b>	<b>379</b>

Source: EDL. Financial Statements 1996-2000

\*Based on a 1500LBP/\$ exchange rate



Source: EDL. Financial Statements 1996-2000

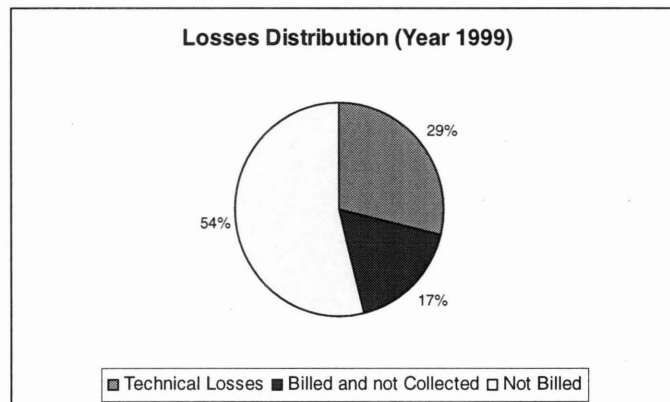
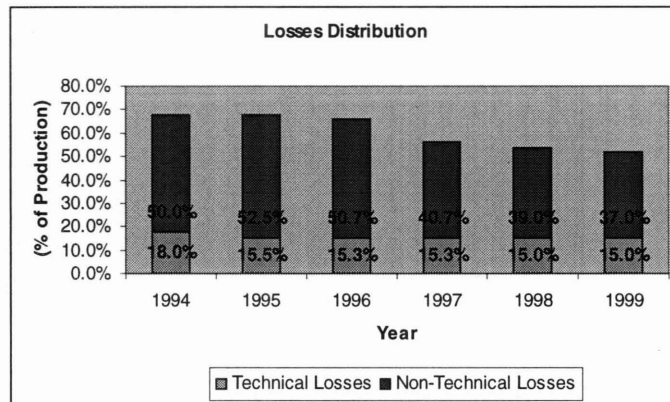
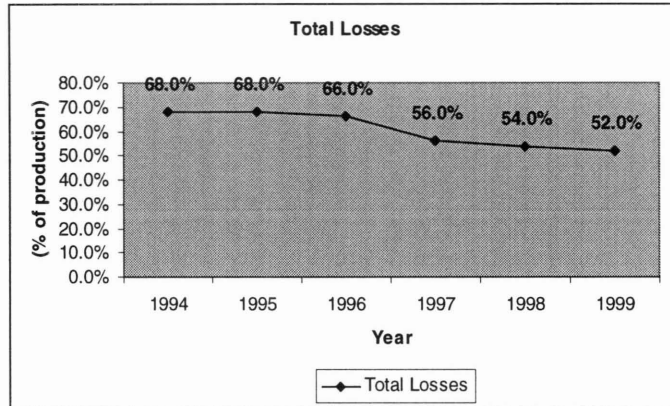
### 4.2.3 Analysis of Losses

EDL operational losses can be classified in two main categories:

**Technical losses:** mainly due to poor maintenance, obsolete equipment (the 66kV transmission lines...) and misuse of assets (the newly constructed combined cycle plants in Beddawi and Zahrani are running, below their efficiency levels, on fuel oil instead of the less expensive and more efficient gas oil)

**Non-technical losses:** undoubtedly the main loss component and an area where substantial improvement can be achieved, it includes power delivered but not billed (mainly due to widespread illegal connections) and power billed but not collected.

The following graphs illustrate EDL's losses and their distribution.



Source: M. Yehia. January 2000.

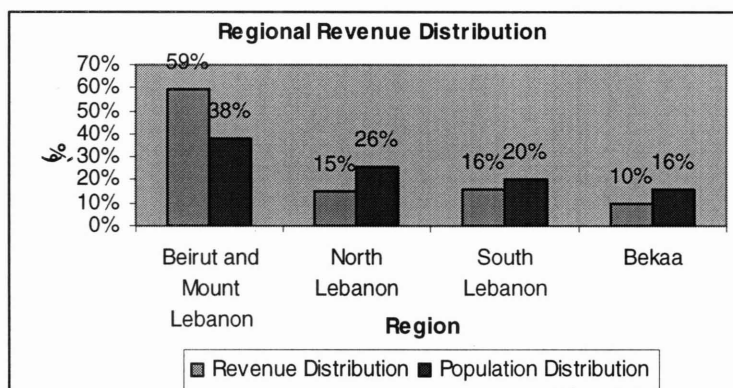
Mr. Antoine Rabbath<sup>24</sup>, the government's former delegate to the Board of directors, estimates that the cumulative amount of non-technical losses over the past five years is above \$1Billion. During these years, the management emphasized on improving the company's collection performance. The result was a substantial increase in the collection ratio (power collected / power billed),

<sup>24</sup> Interview with the Author. June 2001.

which climbed to 85% in 2000<sup>25</sup>. Nevertheless, EDL's policies failed to tackle the main component of non-technical losses: Unbilled Power.

Illegal connections, under the protection of local warlords, started proliferating during the civil war when the central government was unable to fully exercise its power and duties. Later, political intervention stood in the way of EDL's repetitive attempts to put an end to these unlawful practices. The latest statistics show that more than 400000 people consume power without paying any bills, mainly because they are not even billed (without accounting for 250000 Palestinians refugees who stopped paying after 1997).

One of the striking characteristics of this phenomenon is the disparity in payment discipline that exists between different regions as shown by the following graph:



Source: EDL and Central Administration for Statistics.

In short, this disparity creates an implicit cross subsidy between regions with high payment ratios and regions with poor payment records. These “implicit cross subsidies” will play a determining role in the privatization strategy that the government will adopt undermining the aggregate divestiture value and creating an uneven distribution of risks between different regions.

<sup>25</sup> C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector-A Case Study'. January 2001.

Furthermore, in addition to EDL's stated losses, the company has accumulated over the years a substantial amount of unpaid receivables. A large chunk of these amounts, which averaged about 7% of the production value over the past 3 years, is not likely to be retrieved in the future and should, therefore be considered as an additional loss to the company.

Here, it is important to underline that the government's institutions and ministries are one of the main debtors: in 1997, Mr Hobeika, minister of electricity and water resources, threatened to cut off the power of each ministry or public entity that doesn't fulfill its financial obligations towards EDL...these threats were left undone. The government argues that, as EDL's sole source of funding, it should be exempted from paying any bills.

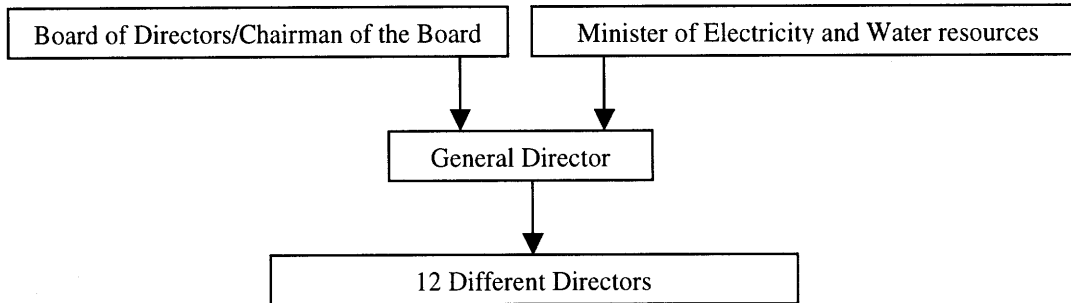
#### **4.2.4 Management Issues**

On the 24<sup>th</sup> of October 2001, Mr. Fuad Hamdane, chairman of the board of EDL resigned. In his resignation letter, submitted to the minister of electricity and water resources, Mr. Hamdane stated that the main reasons behind his departure were *"...the administrative contradictions that even the most skillful employee would not be able to solve"*<sup>26</sup>. A closer look at the company's organizational structure helps us identify these 'contradictions'.

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<sup>26</sup> The Daily Star. October 2001.

### EDL Organizational Chart<sup>27</sup>



The members of the board, being appointed by the council of ministers, share equal power as the minister of electricity and water resources. Furthermore, over the last decade, with the backing of prominent players in the political arena, the general director has often risen to levels close or even equal to the minister and the chairman of the board, in terms of influence and company leadership: From a pyramidal structure with the minister at its top, EDL organizational chart has mutated to a horizontal structure with three different heads. This has led to numerous struggles between the different parties and, as a consequence, to often conflicting directives flowing down the chain of command.

This phenomenon was accentuated by the repetitive and multiple changes in government over the past five years: each change in the political agenda having its repercussions on the politics within the company and thus, on EDL's priorities. One crying example of these conflicts and of political interventionism within the company is the case of the supply department where five different directors were appointed and replaced within the past two years. Obviously, under these

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<sup>27</sup> Adapted from C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector-A Case Study'. January 200.1

circumstances and in the absence of any continuity, long term strategic planning is practically impossible.

#### **4.2.5 Information Systems/Technology**

One senior member of EDL's board summarizes very well the situation in the following terms<sup>28</sup>: *"After two years spent as member of the board, I still don't know what are the assets that EDL owns and how much power it produces..."*.

Actually, the use of advanced and reliable Information technology systems in the different areas of collection, system modeling, and workflow procedure... is practically inexistent.

Furthermore, when trying to forecast future demand, the company has no reliable common database: each division calculates its own figures and indicators<sup>29</sup>. As a consequence, the information flowing up the company's organizational structure towards the high management is often conflicting and non-corresponding. This seriously undermines any short, medium or long term planning.

#### **4.2.6 The Workforce Obstacle**

In 1985, in an attempt to reverse the wave of 'political hiring' that was crippling the company, the Lebanese government decreed a general freeze on all new recruitment in the Power Sector. This freeze is still in place until now.

EDL manpower gradually decreased from a total workforce of 4283 in 1985 to 2914 by 1998's end, while the number of customers increased by 50% and the

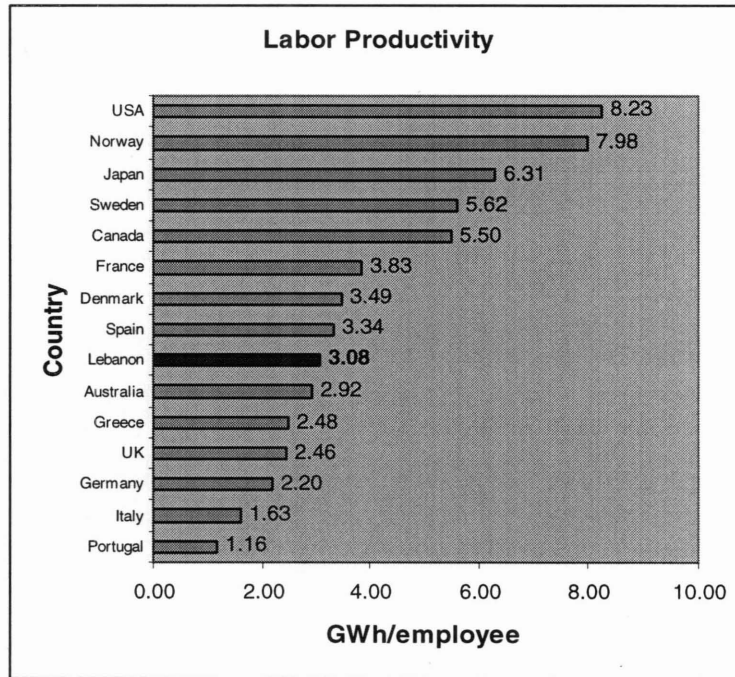
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<sup>28</sup> Interview with the Author. August 2001

<sup>29</sup>G. Badelt and M. Yehia. 'The way to restructure the Lebanese electric power sector: a challenge for the transitional management'. The Journal of Energy Policy. May 2000

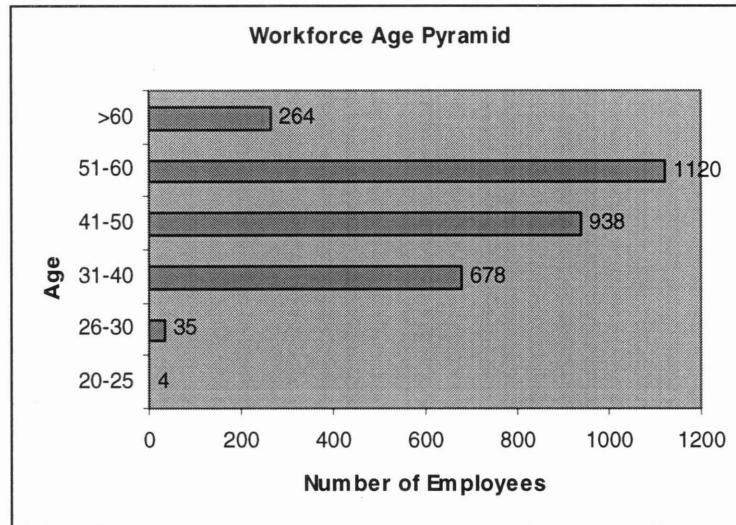
energy generated nearly tripled. Consequently, the Labor productivity improved from 1.059GWh/employee in 1985 to 3.08GWh/employee in 1998.

Below is a measure of EDL's labor productivity compared to international benchmarks:



Source: C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector...'. January 2000

On the one hand, the 1985 recruitment freeze decree substantially improved Labor productivity, but on the other hand, it prevented the company from injecting 'fresh young blood' in its ranks. The result was an aging workforce as reflected by its age pyramid:



Source: C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector...'. January 2000

*"Every year, some 100 to 120 people reach the retirement age. At this rate, if the recruitment freeze persists, it is expected that EDL's workforce will drop to 2102 employees by 2005"<sup>30</sup>.*

Another factor that further enhances this outflow of qualified manpower is the unattractive salary structure, which does not provide any incentives for employee performance, and fails to match the private sector's levels.

As a result the company is in dire need for supervisors, engineers and medium level managers as shown by the current distribution of employees by qualification levels:

<sup>30</sup> C Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector-A Case Study'. January 2001.

Category #	Description	% of Total Workforce
2/1	Directors	4%
2/2	Managers	
3	Engineers and University Graduates	12%
4	Assistant Engineers and High Grade Technicians	
5&6	Simple Technicians, Workers, Collectors and Low Level Staff	84%

Source: C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector...'. January 2000

In the next ten years, if no action is taken, the over representation of the blue coats would increase further; the management and the supervisors being the categories in which departures are proportionally the highest.

More importantly, the workforce's acceptance of any privatization strategy that the government plans to implement might prove to be the biggest hurdle to overcome. Indeed, over the years, given their low salary levels, some employees sought alternative sources of income: the failure of the billing system is not solely due to illegal connections. Indeed, many legal customers are actually illegally 'not billed', in return for a 'payment of services' made directly to the collector...a recent report claims that one employee yielded as much as *\$2 million from these unlawful practices*<sup>31</sup>.

These employees view the restructuring and privatization of EDL as a threat to their deeply rooted interests and may be determined to fight it by any means.

As recently as July 2001, in response to a government decree eliminating some of the employees' privileges as a first step towards restructuring, the EDL

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<sup>31</sup> Le Commerce du Levant. March 2001.

workers union staged a 2 day strike and published a list of political and public figures who haven't been paying their bills. The action, which was largely covered by the media, ignited a long wave of political bickering and cross-accusations. The next day, EDL counters were flooded with more than \$1.3 million of payments on accrued receivables.

This event clearly illustrates the workforce apprehension of privatization and the lack of communication and dialogue with the firm's management.

#### 4.2.7 Tariffs and their viability

In 1996, EDL adopted a new tariffs structure that was supposed to recoup the company's operational costs, interests on debt and future capital investments. The ultimate goal back then was to achieve a complete financial independence from the Lebanese government. Prices were set for each customer category as following

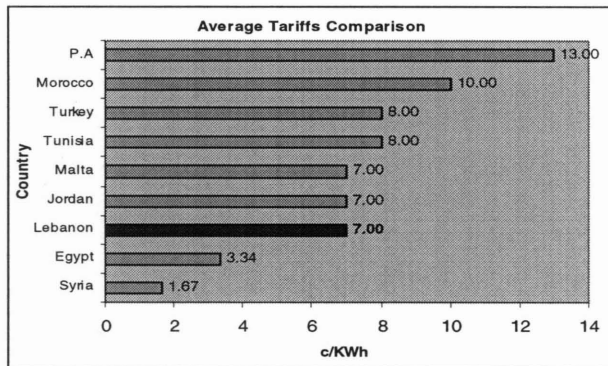
<b>Electricity for Industry</b>	<b>Electricity for Households</b>	
Tariffs (c/KWh)	Tariffs (c/KWh)	Monthly Consumption (KWh)
8.75	2.8	1 to 100
	4.06	101 to 200
	4.06	201 to 300
	5.6	301 to 400
	8.12	401 to 500
	13.12	>501

Source: C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector'.2000

The resulting average tariffs (Revenues/Collected Energy) since then have varied between 6.45c/KWh and 7.65c/KWh. These tariffs are comparable to most

of the neighboring countries' power prices. Nevertheless, taking into account the fact that most of these countries, contrary to Lebanon, have access to abundant resources of oil and natural gas for their production of electricity, the viability of such tariffs can be put in question.

Country	Average Tariff (c/Kwh)
Syria	1.67
Egypt	3.34
<b>Lebanon</b>	<b>7.00</b>
Jordan	7.00
Malta	7.00
Tunisia	8.00
Turkey	8.00
Morocco	10.00
P.A	13.00



Source: C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector'.2000

Furthermore, having not been indexed to oil prices, this tariff structure made the company bear all the risks related to the cost fluctuation of its main input. Indeed, when oil prices reached their late 90's levels, the break-even forecasts based on 1996 crude oil prices became quickly obsolete, and the illusion of financial independence completely vanished.

Various recent studies addressed the tariffs problem, trying to determine a break-even level that would insure EDL's viability. According to the company's 1998-2002 business plan, the long term marginal costs, including the future investments amount to 7.8c/KWh: just 2% more than the year 2000's average of 7.65c/KWh.

A study by M. Yehia<sup>32</sup> shows that, if all the losses, interest on debt and principal repayment are to be included in the cost structure, the long term marginal cost would amount to 12.6c/KWh; 65% higher than the latest average.

The three following points have to be taken into account when addressing the tariffs question:

- *'It is very questionable if a tariff of 12.6c/KWh would be affordable in social terms: A Lebanese household, would in this case, be obliged to spend 7% of its monthly income on electricity, whereas a German household for instance spends less than 5%.*
- *From an economic point of view, such a tariff increase would support inefficiencies, because it gives the illusion, that any inefficiency can be transferred to the consumer and, thus, discourages efforts to improve the performance in the sector.*
- *If the tariff is increased by 65%, the government would run the risk to loose a lot of popularity and acceptance. Due to this risk, the political decision makers would renounce raising the average tariff to 12.6c/KWh<sup>33</sup>.*

In short, it is true that the current tariffs have to be raised. However, the key is to determine an optimal level of increase that would be high enough to achieve financial viability and low enough to avoid popular unrest.

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<sup>32</sup> G. Badelt and M. Yehia. 'The way to restructure the Lebanese electric power sector: a challenge for the transitional management'. The Journal of Energy Policy. May 2000

<sup>33</sup> Based on G. Badelt and M. Yehia. 'The way to restructure the Lebanese electric power sector: a challenge for the transitional management'. The Journal of Energy Policy. May 2000

In fact, any tariff reform should be viewed as just one part of a broader solution and not as the solution itself.

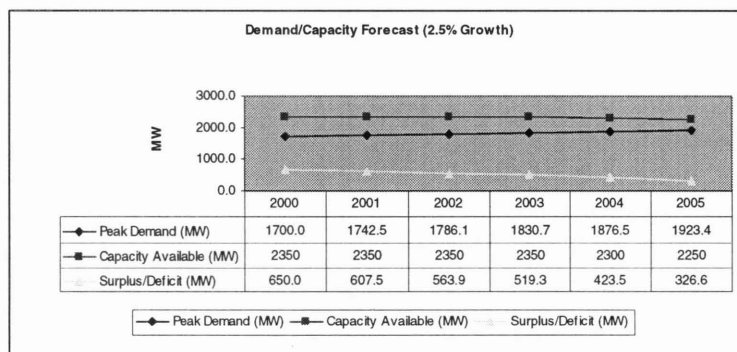
### 4.3 Future Needs and Shortfalls

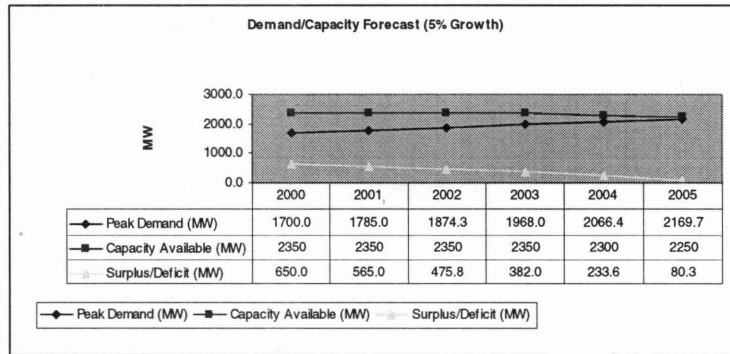
#### 4.3.1 Demand and Capacity forecasts

Any demand projections assume a reliable database, which is lacking in Lebanon. Because of the various information system issues, that we mentioned in paragraph 4.2.5 it is even difficult to determine the current real power demand. Most estimations range between 1500MW and 1900MW; we will adopt 1700MW as an average estimate.

Demand growth is even harder to predict. M. Yehia forecasts it to be at 2.5%, whereas a study done by R.Barudi and C. Abi Said adopts a 5% average growth rate. We think that, given the current worldwide economic slowdown and the modest GNP growth rates over the past 2 years, the former estimate is more accurate.

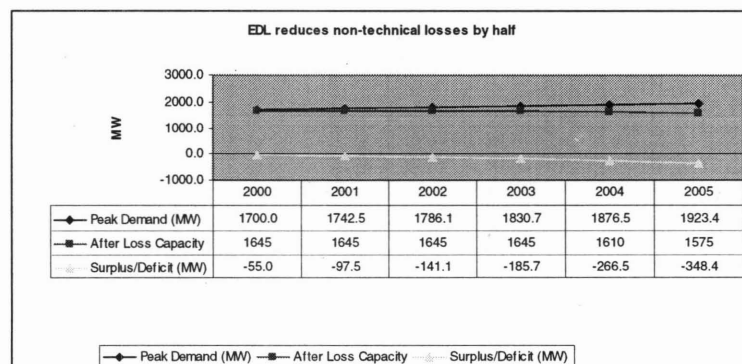
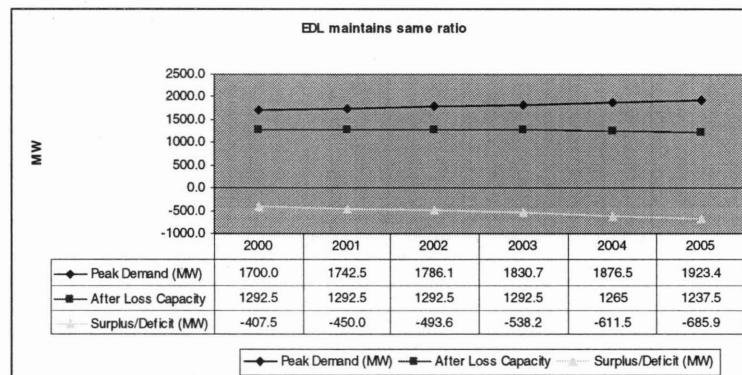
Under these assumptions, the forecasted power balance is as follows:

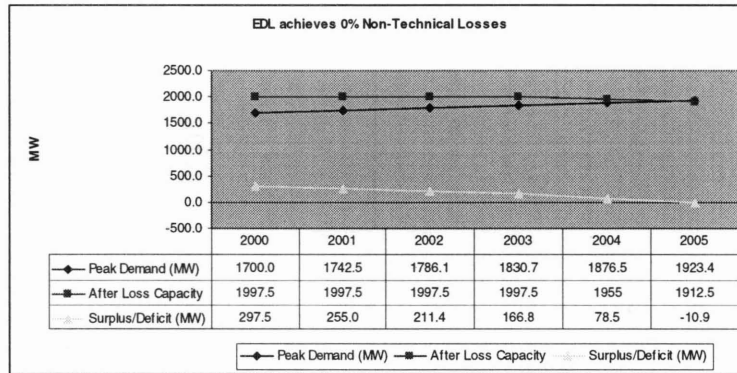




Adapted from: C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector'. 2000

Under a 0% loss assumption, the country will not be facing any power deficit over the next 5 years. Nevertheless, knowing EDL's historical loss ratios and the impossibility of achieving 0% technical losses, there may be some need for future investment in the generation capacity. Below are some projections with a 2.5% demand growth and different loss ratio assumptions: current levels, in case EDL reduces its non-technical losses by half and in case EDL has 0% non-technical losses (assuming that the company maintains a 15% technical losses ratio).



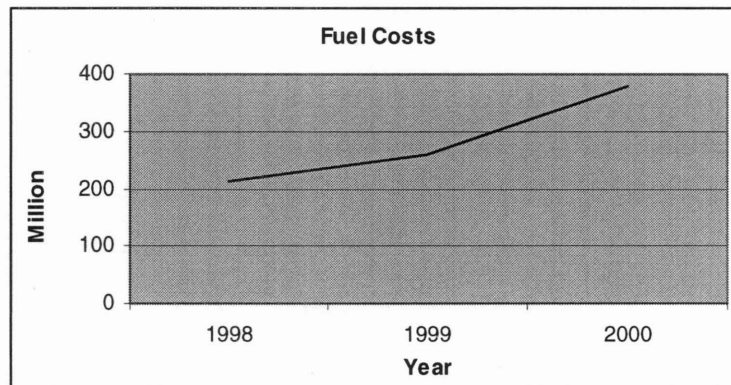


Adapted from: C. Abi Said and R. Barudi. 'The Lebanese Electricity Power Sector'.2000

From this analysis we can conclude that, unless EDL achieves an unlikely 0% non-technical losses, the country will need to expand its generation capacities within the next 5 year: a task which, given the current public deficit, the government will be unable to finance.

#### 4.3.2 The Gasification Plan:

Over the years, the company has been struggling with an ever-increasing oil bill. Relying heavily on fuel oil and gas oil, EDL's input costs have risen by 74% between 1998 and 2000.



Source: EDL Income Statements 1996-2000.

In an effort to reduce this mounting burden, and following a worldwide trend, the management decided in 1998, under a five-year gasification plan, to substitute the Fuel Oil and Gas Oil used in its generation facilities with Natural Gas.

*'Natural Gas compared to Gas Oil has a lower price, requires less maintenance, favors a longer life span and is environmentally friendly compared to Fuel Oil. It also reaps substantial environmental benefits and is nearly 50% more efficient when used in a combined cycle plant'<sup>34</sup>.*

The commissioning of the two combined cycle plants at Beddawi and Zahrani, which are designed to burn dual fuel Gas oil and Natural Gas was the first step of this plan. Unfortunately, two main obstacles stand in the way of its full implementation:

1. A reliable supply of Natural Gas is yet to be found. The Syrian government guaranteed a continuous supply to EDL of 3 million m<sup>3</sup>/day: the construction contract for the 105Km on shore pipeline that has to be built is facing some serious financing difficulties. The government, is currently exploring the feasibility of a private financing under a BOT scheme. Another option includes the supply of Liquefied Natural Gas from the Gulf Area; this will require the construction of an LNG terminal and a re-gasification facility.
2. A substantial amount of capital investment is needed in order to finance the conversion of some of the existing steam generating plants into Natural Gas 'burners'. Given the scarcity of public funds, the future of the plan is in jeopardy.

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<sup>34</sup> G. Badelt and M. Yehia. 'The way to restructure the Lebanese electric power sector: a challenge for the transitional management'. The Journal of Energy Policy. May 2000

### **4.3.3 Investment Needs in Transmission and Distribution:**

As we mentioned in paragraph 4.2.1.B, investments need to focus on the transmission and distribution networks where the bulk of the losses is occurring.

Three main projects are in the pipeline<sup>35</sup>:

1. The Completion of the 220Kv transmission network. A project of utmost importance if the government intends to fully profit from the available generation capacity.
2. The construction of the National Network Control Center, tying the supply of power from various generation facilities to end users all over the network. No competition at the generation level is possible without its completion.
3. The purchase and installation of more than 50000 meters for the next two years alone.

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<sup>35</sup> G. Badelt and M. Yehia. 'The way to restructure the Lebanese electric power sector: a challenge for the transitional management'. The Journal of Energy Policy. May 2000

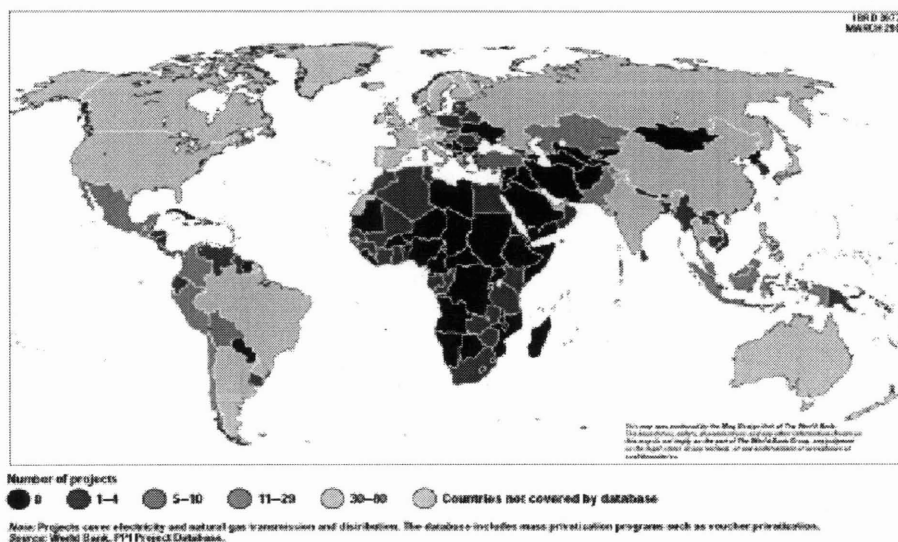
## CHAPTER 5: Available Strategies

### 5.1 Private Participation in Energy<sup>36</sup>

The past decade has seen a wave of liberalization and privatization of infrastructure activities in developing countries. By the end of the 1990s the private sector had become an important financier and long-term operator of infrastructure activities.

As in other infrastructure businesses, private activity in energy has been driven by the need to expand capacity and increase reliability in an environment of tight public budget constraints. Private participation and competition have also been propelled by new technological developments that have reduced the minimum size of competitive power plants and increased the efficiency of grid utilization.

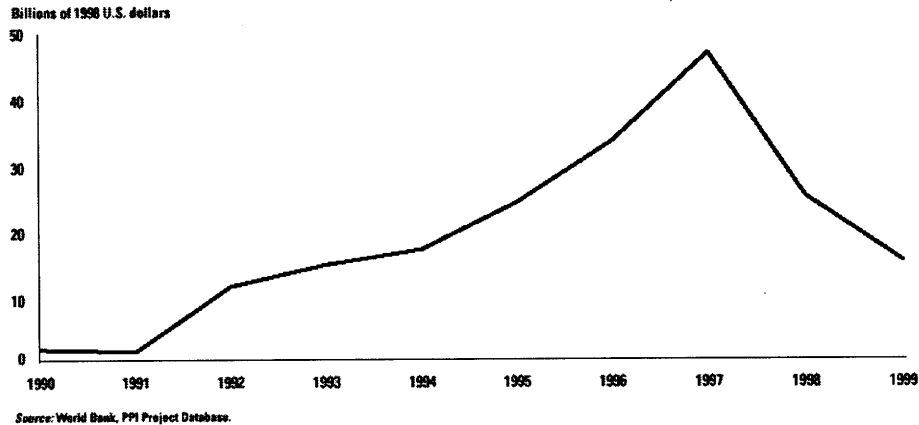
In 1990-99 seventy-six developing countries introduced private participation in energy. These countries awarded the private sector more than 700 energy projects, representing investments of almost \$187 billion.



<sup>36</sup>Extracted from Public Policy for the Private Sector. Private Participation in Energy, May 2000.

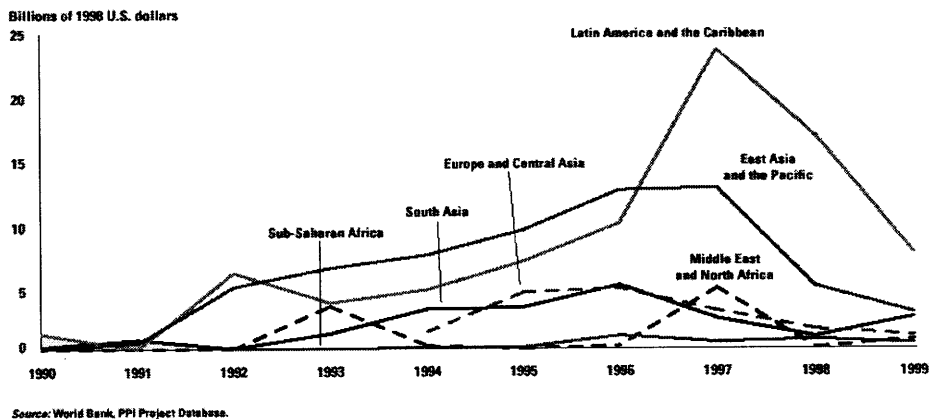
Private activity in energy, which boomed in 1990-97 rising from less than \$2 billion to \$46 billion, fell in 1998 and 1999 as a result of the financial crises in developing countries that dampened demand.

**FIGURE 2 TOTAL INVESTMENT IN ENERGY PROJECTS WITH PRIVATE PARTICIPATION IN DEVELOPING COUNTRIES, 1990-99**



Investments in the Middle East and North Africa regions have been pale compared to the capital invested in Latin America or East Asia. Higher 'perceived political risks' and slow reforms have largely contributed to this gap.

**FIGURE 3 TOTAL INVESTMENT IN ENERGY PROJECTS WITH PRIVATE PARTICIPATION IN DEVELOPING COUNTRIES BY REGION, 1990-99**



Nevertheless, tighter fiscal constraints, faster reforms, overexposure of foreign capital to some specific regions and its need for diversification are likely to reverse this tendency within the next decade.

## **5.2 Formulating a Strategy**

Two primary variables and two secondary ones define the model that a government adopts for restructuring its power sector. The primary variables are: 'Ownership' and 'Structure & Competition'. The secondary variables are 'Type of Regulation' and 'Price System'.

### **5.2.1 Ownership<sup>37</sup>**

Depending on the degree of private involvement and on the distribution of risks, several ownership structures are possible:

#### **A- Service Contracts:**

Service contracts are the simplest form of private sector participation, whereby the public authority retains overall responsibility for operation and maintenance of the system, except for the specific, limited-scope services that are contracted out or outsourced. The public authority also bears all the commercial risk and must finance fixed assets as well as working capital.

#### **B- Management Contracts:**

Management contracts are a more comprehensive arrangement, where the public authority transfers to a private company responsibility for the entire operation and maintenance of a system. This gives the private company the freedom to make day-to-day management decisions without assuming any commercial risks. The private contractor acts at all times on behalf of the public authority, and yet it will not get paid unless rates are collected from the consumers. Payments to a management contractor are usually performance

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<sup>37</sup> Adapted from Private Sector Participation in Water Supply and Sanitation in Latin America.

based, proportional to some physical parameters such as improved efficiency. The government retains financial responsibility for the service and has to provide funds for working and investment capital. In many cases, management contracts precede concessions or divestitures. In this case, their main purpose is to put the utility in order when the quality of service is poor or when accounting, consumer records, and information on the physical facilities are not reliable.

**C- Lease Contracts:**

Lease contracts, are arrangements whereby a private operator rents the facilities from the public authority for a certain period and is responsible for operation, maintenance, and management of the system. The public authority, which remains the sole owner of the assets, is responsible for capital expenditures for new projects, replacement of major works, debt service, and tariffs and cost-recovery policies. The risks involved in a lease arrangement tend to be limited, which allows a private firm to be acquainted with the system and pave the way for more extensive involvement in the future.

**D- Franchise:**

In a franchise, the private contractor has overall responsibility for the services, including operation, maintenance, and management, as well as capital investments for the expansion of services. The fixed assets however remain the property of the government or public authority. The advantage for combining responsibility for operations and investments in the same entity is that it provides an incentive for the operator to make efficient investment decisions.

### **E- BOOT Contracts (BOT & BOO):**

Under a BOOT contract, a firm or a consortium of firms finances, builds, owns, and operates a specific new facility or system. Contrary to a BOO system where the private operator keeps ownership of the assets, in a BOT contract, ownership of the facility is transferred to the public authority after a predetermined period of time. BOOT arrangements are attractive mostly for new plants (Greenfield projects) that require large amounts of financing.

Under a BOOT agreement, the public authority is often responsible for determining the demand for the service being contracted and therefore, the size of the facility. Demand is often guaranteed by the contracting agency, and problems may arise if there are differences between real and estimated demand (The Dabhol plant crisis, in the Indian state of Maharashtra, is a crying example of such risks).

### **F- Divestiture:**

A divestiture is a process whereby the public authority gives up complete ownership of its assets to the private sector. The latter assuming all commercial, financial and political risks. The government's role evolves from the provision of power to the regulation of its provision.

Below is a comparison of these different options in term of allocation of responsibilities, risks and typical duration of contracts.

Option	Asset Ownership	Operations and Maintenance	Capital Investment	Commercial Risk	Duration
Service Contract	Public	Shared	Public	Public	1-2 years
Management Contract	Public	Private	Public	Public	3-5 years
Lease	Public	Private	Public	Shared	8-15 years
Franchise	Public	Private	Private	Private	25-30 years
BOOT	Private	Private	Private	Private	20-30 years
Divestiture	Private	Private	Private	Private	Indefinite

Source: The Private Sector in Infrastructure: Strategy, Regulation, and Risk.

Whatever the ownership structure the public authority opts for, it will have to fulfill, prior to implementation a set of requirements that differ in importance from a structure to another. Below is a comparison of these different prerequisites and of their degree of importance to the process.

Option	Political Commitment	Cost-Recovering Tariffs	Good Information About the System	Developed Regulatory Framework	Good Country Credit Rating	Potential Benefits of the Option
Service Contract	Unimportant	Not necessary in the short term	Possible to proceed with limited information	Minimal monitoring capacity needed	Not necessary	Low
Management Contract	Low to moderate levels needed	Preferred but not necessary in the short term	Sufficient information required to set incentives	Moderate monitoring capacity needed	Not necessary	
Lease	Moderate to high levels needed	Necessary	Good information required	Strong capacity for regulation and coordination needed	Not necessary	
Franchise	High levels needed	Necessary	Good information required	Strong capacity for regulation and coordination needed	Higher rating will reduce cost	
BOOT	Moderate to high levels needed	Preferred	Good information required	Strong capacity for regulation and coordination needed	Higher rating will reduce cost	
Divestiture	High levels needed	Necessary	Good information required	Strong capacity for regulation and coordination needed	Higher rating will reduce cost	

High     
 Low  
 Moderate     
 Not Significant

Source: The Private Sector in Infrastructure: Strategy, Regulation and Risk.

## 5.2.2 Structure and Competition

The Power Sector activities can be divided into 3 separate tasks: Generation, Transmission and Distribution. The sector has historically been seen as a 'natural monopoly' - an industry where both economies of scale and economies of scope are substantial. Thus these 3 services have over the past, been integrated into one monopolistic entity usually owned and managed by the public sector.

Nowadays, there's an overwhelming belief that market forces and competition can improve the production and delivery of infrastructure services. Technological changes and, even more important, regulatory innovation are making competition possible in many forms. These innovations have also made possible the unbundling of activities – the separation of activities in which economies of scale are not important from those in which they are.

Unbundling promotes competition by isolating natural monopoly tasks, detaching activities that were earlier performed in monolithic organizations and opening them to various forms of competitive provision.

Such 'vertical unbundling' –separating electricity generation, transmission and distribution- has been effectively adopted throughout the late 80's and during the 90's in many developed and developing countries.

Depending on the degree of separation and on the competition at each level of services, 4 main models have been adopted:

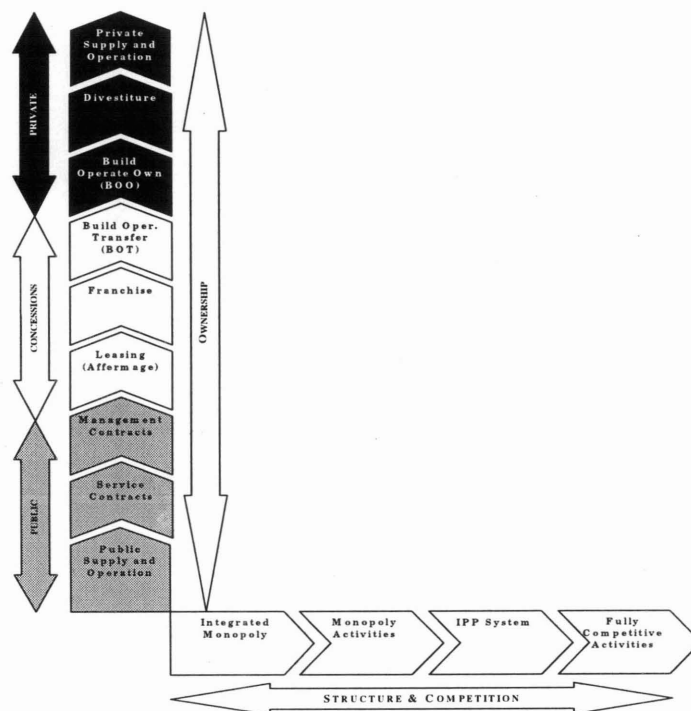
**A. Integrated Monopoly:** Whereby Generation, Transmission and Distribution are regrouped under one monopolistic entity.

**B. Monopoly Activities:** Generation, Transmission and Distribution are separated in three different sectors. A state of monopoly is maintained in each of these sectors.

**C. Independent Power Producers (IPP) System:** The three activities are separated in three different sectors. Competition is introduced at the generation level.

**D. Fully Competitive Activities:** The three activities are separated. Competition is introduced at every level.

By looking back at the two precedent paragraphs, one realizes that, the options available for the reform of power sectors constitute in fact a 'continuous array' determined by two main variables: 'Ownership' and 'Structure and Competition'. These variables can be chosen from the various models listed above or can be designed as a 'hybrid' of these different models.



### **5.2.3 Type of Regulation<sup>38</sup>**

Once reforms are put in place, the public authority's role evolves from a provider of electricity to a regulator of the power sector.

Regulation can be implemented in a variety of ways. A helpful framework for analyzing the options is to array them along a continuum according to the degree to which public officials are involved in specifying the prices and services of the firm: at one extreme public officials dictate prices and quality and at the other extreme public officials have no say over prices or quality.

There are three main groups of regulation strategies: Discretionary Regulation, Contract Regulation and Hybrid Strategies.

#### **A- Contract Regulation**

Under a contract regulation, a contract signed straight after the award process, spells out in details the services that the private operator must provide and the prices it can charge over the life of the concession. The document provides a complete description of the obligations and rights of both parties. A regulatory agency is usually established to monitor whether the concessionaire is complying with his contract but that agency does not have the authority to unilaterally change the prices, service quality or other terms set out in the contract.

The most obvious advantage of contract regulation is that it makes the commitment of both parties more explicit and arguably stronger: because the contract is enforced by the courts rather than a specialized agency, there is less likelihood that the government will be able to unilaterally break it.

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<sup>38</sup> Extracted from J. Gomez-Ibanez. Commitment and Flexibility: Strategies for Regulating Privatized Infrastructure. October 1998

The major disadvantage lies in the fact that even carefully drawn contracts are unlikely to anticipate every contingency, especially when uncertainty is great and duration is long: the failure of the wireless communications contracts signed with the two private operators are a clear example of the limits of contractual regulation in the context of Lebanon.

The experience strongly suggests that this type of regulation works best in a relatively stable environment with low levels of uncertainty about economic activity and investment needs.

### **B- Discretionary Regulation**

Under discretionary regulation, a regulatory commission or an individual regulator is given substantial discretion to set prices and service standards for the regulated firm. The commission or individual regulator is usually insulated from politics to some degree. They are typically appointed to fixed terms and cannot be removed except for cause.

The advantages and disadvantages of discretionary regulation are simply the reverse of those of contract regulation.

The main advantage is that discretion gives the regulator flexibility to adapt to new and unexpected circumstances. The government does not have to foresee all the eventualities and write contingencies for them.

The principal disadvantages are that it may be both politically and technically difficult for the discretionary agency to strike a reasonable balance between consumer and producer interests when setting prices and service standards: Completely isolating a regulatory agency from politics is impossible.

In developing countries, where the political environment is less predictable or harder to understand, investors typically prefer the clearer commitment of a contractual regulation.

### **C- Hybrid Strategies:**

Picking one of the above strategies can be difficult in uncertain environments where it is difficult for the government or the investor to foresee every possibility and to agree upon adequate contingencies for them.

The public authority should seek a balance between the clear commitment that the investor is seeking for and the flexibility that will allow it to cope with ever-changing situations: this is the main feature of hybrid strategies combining characteristics from both the discretionary and the contractual systems.

The developing countries are the principal laboratories for experimentation with these hybrids, because neither conventional discretionary nor conventional contract regulation works well in their political and economic environment. These regulations give the regulatory agency much more flexibility than a contract system would, but they also constrain the regulator to a greater extent than is traditional in developed countries such as the US or the UK.

Some of these systems involve efforts to make contract regulation a little more flexible by, for example, developing better arbitration devices and more workable buyout provisions. Others involve making discretionary regulation a little more politically secure

Chile and Argentina, which policies will be discussed later, illustrate some of the most interesting possibilities.

#### **5.2.4 Price System<sup>39,40,41,42</sup>**

There are three different approaches for regulating power prices at both the generation and the distribution levels: Price Caps, Rate-Of-Return (ROR) regulation, and Spot Pricing.

##### **A- Rate-of-Return (ROR)**

Rate of Return regulation has been used for more than a century in the USA where it was originally motivated the concern over the market power of railroad companies.

Also known as cost of service regulation, it allows companies to pass through costs which are deemed necessary by the supervising regulatory body to ensure that an adequate level of services is provided to end users. In order that appropriate levels of capital investment are undertaken, the supervising regulatory body estimates the appropriate rate of return for the regulated utility, based in part on its cost of capital.

The defining feature of this form of regulation is that the returns accruing to equity holders are directly proportional to the amount of capital deemed to be in use by that entity. In particular, fluctuations in the strength of demand for regulated services and in the costs of providing these services will not affect the earnings of the supplying firm, since it is entitled to adjust its prices so as to earn

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<sup>39</sup> Alexander and Irwin: Price Caps, Rate-of-Return Regulation, and the Cost of Capital. Public Policy for the Private Sector, September 1996.

<sup>40</sup> Armstrong, Cowan and Vickers: Regulatory Reform: Economic Analysis and British Experience.

<sup>41</sup> Ergas and Small: Price Caps and Rate of Return Regulation. May 2001

<sup>42</sup> J. Gomez-Ibanez. Commitment and Flexibility: Strategies for Regulating Privatized Infrastructure. October 1998

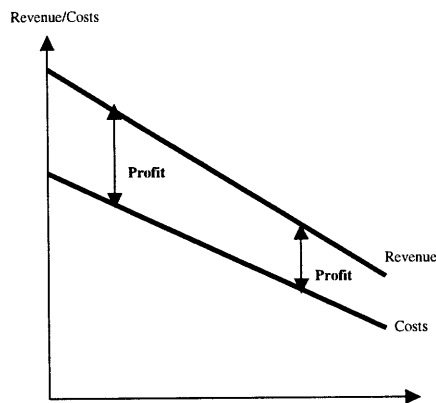
its allowed rate of return. Thus rate of return regulation can offer a company full insurance against variations in income.

The rate setting process is as follows:

1. The firm's costs are reviewed.
2. A rate of return, based on the company's cost of capital is calculated.
3. Prices are set to generate enough revenues to cover costs and provide a fair rate of return.

Nevertheless, over the years, this type of regulation has proven its limits and its weaknesses of which the followings are the most important:

- A. Prices being constantly held at level just sufficient to cover the supplier's costs and a fixed rate of return, the regulated entity has no incentive to become more efficient by reducing its costs since it will not capture the benefits of such improvements.



- B. The system fosters over-capitalization.
- C. Obtaining detailed industry data requires a large bureaucratic infrastructure.

## B- Price Cap Regulation

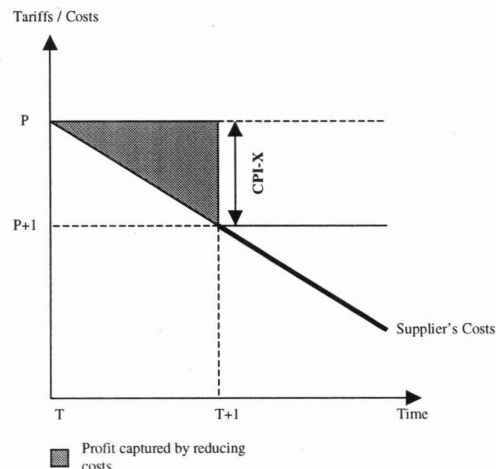
The most frequently used form of incentive regulation is the price cap method also known as “ performance based regulation” or” CPI - X”, notably used to regulate electricity transmission and distribution in the UK.

In essence, the regulator decides on an appropriate initial level of prices and then imposes a requirement that the real price must decline yearly by some X percent until the next review.

In contrast to the ROR system, utilities realize in a price cap regulation all gains achieved beyond the established benchmark up until the next regulatory review.

The system works the following way:

1. Let us suppose T our base year and P the price of electricity in this base year.
2. CPI is the change in the retail price index (inflation rate). X is generally considered to be a productivity improvement factor usually based on past performance and projected analysis of future productivity gains.
3. P+1 being the price of electricity at Year T+1 then:  $P+1 = P + \text{CPI} - X$ .



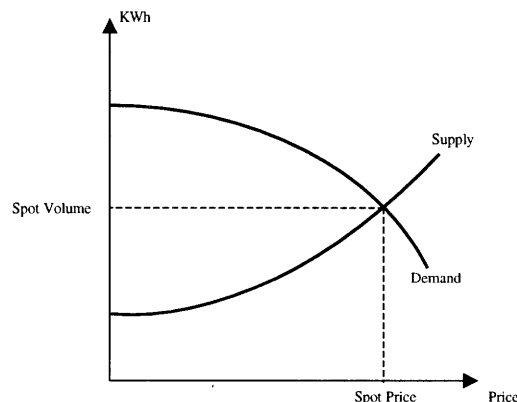
Other than providing utilities with strong incentive to reduce their costs, the CPI-X regulation was supposedly designed to reduce regulatory costs by requiring a lighter regulatory infrastructure than the ROR regulation.

However, the Price Cap system has some clear shortcomings both theoretical and practical. One problem is calculation of the appropriate initial level of prices. A second problem involves estimating X: future productivity gains. This has proven to be a rather problematic issue in the United Kingdom where the illusion of a lighter regulatory infrastructure rapidly vanished when 'Pr. Stephen Littelchild's (chairman of the regulatory entity) underestimation of the X factor induced a surge in the share prices of the regulated utilities'<sup>43</sup>.

### C- Spot Price System

This regulation is practically 'an absence of regulation' where spot prices, subject to the law of supply and demand, are regulated by the forces of competition. Notably used in certain US states and in the UK, the system can be undermined by market power practices whenever a minimum number of competitors is not achieved. Therefore it is usually more suitable for large markets.

Below is a schematic representation of the underlying concept:



<sup>43</sup> H. Lee. 'Price Cap: The UK's Efforts to Regulate Regional Distribution Companies'. Harvard University, Kennedy School of Government and Graduate School of Design. January 1998.

The UK for instance uses this type of regulation in pricing the power sold by the generators to the regional distribution companies. The process is as follows:

The generators sell all power to a pool. In this power pool (operated by the national grid company), generators bid to supply various units in half-hour slots during the next twenty four hours. Dispatch is carried out, at the highest price bid, by choosing plants in merit order of these bids, up to the point at which demand is satisfied.

## **5.3 Case Studies**

### **5.3.1 Chile<sup>44,45</sup>**

#### **A. Background**

Chile's privatization experience led the way in the developing world. As in most countries considering power sector reforms, the conditions that led to privatization included price controls, service rationing, overstaffing and large deficits in the public electricity utilities.

Chile adopted a three-phase strategy:

The first took place between 1974 and 1979. Its main purpose was intended to adjust the prices to allow the public utilities to achieve self-financing and to prepare for the future private sector participation.

The second stage which lasted from 1979 until 1986 led to the separation of generation and transmission from distribution, and continued with significant

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<sup>44</sup>Adapted from Estache and Rodriguez-Pardina. 1998. "Light an Lightning at the End of the Public Tunnel: Reform of the Electricity Sector in the Southern Cone." EDI Regulatory Discussion Paper.

<sup>45</sup>Adapted from J. Gomez-Ibanez. Commitment and Flexibility: Strategies for Regulating Privatized Infrastructure. October 1998

institutional reforms that included the introduction of a new regulatory framework in 1982. The two existing utilities, ENDESA and Chilectra were decentralized and regionalized. ENDESA, the largest company, had been divided into 14 companies: 6 generation companies (with capacities varying from 35 to 1832MW), 6 distribution companies (with customer bases varying from 5000 to 143000) and two companies combining generation and distribution.

The third and final stage, privatization per se, started in 1986 and took place mostly within the next 4 years (only two generation companies were left to be privatized by 1990 and have been privatized since).

Usually workers of the privatized utilities would get between 5 and 10% of the shares to insure their political support. The most important failure of that phase was the fact that ENDESA was privatized jointly with its transmission network, which is the largest in the country.

## **B. Structure and Competition**

Distribution (to small users) and transmission are considered natural monopolies whereas competition is the norm in generation and in the supply to large users (those requiring more than 2MW).

There are no limits to vertical or horizontal integration.

## **C. Ownership**

All of the assets are owned by the private sector, however access rules are different for generation, transmission and distribution.

The use of property for the generation of electricity requires a license. The granting of the license is organized as a competitive process in which projects

are ranked according to costs. Each year, the Energy Commission assesses the minimum cost expansion plan for the system and clears the conditions for entry.

For transmission, entry is free.

For distribution, concessions are needed for systems larger than 1500KW. These licenses are granted for an indefinite period, but they can be withdrawn when service quality falls below the legal standard.

#### **D. Type of Regulation**

Chile adopted a hybrid system based on a highly detailed regulatory statute that guarantee's insulation from political pressures. Whereas in the United States and Britain, the regulatory statute gives the regulatory agency only very general guidance about the factors it should consider in setting rates, in Chile the statute specifies in detail how tariffs should be calculated:

The law specifies that the tariff should be enough to allow an efficient firm to earn a reasonable return on assets. It specifies how the operating costs of an efficient firm should be estimated, the procedure to value assets, and the method of calculating a reasonable rate of return...Changing the law would be fairly difficult, since Chile has a bicameral legislature and often no one party has a majority in either or both chambers.

The sector is controlled by three key government institutions:

The National Energy Commission (NEC) proposes policies to be implemented through laws, decree or ministerial resolution. It sets tariffs and also grants licenses to public service distributors for specific areas.

The Economic Load Dispatch Center (ELDC) coordinates the activities of all generating companies (it is essentially a generators' pool). Its specific objectives are to achieve the minimum total operating cost for the system as a whole and ensure equitable market access to all generating companies.

The last key government actor is the Superintendance of Electricity and Fuels. It supervises compliance with the law and regulation and monitors the quality of services. Finally it, deals with users' and suppliers' complaints and prepares the information for the price-setting process carried out by the NEC.

#### **E. The Price System**

The price system consists of regulated charges for small customers and freely negotiated rates for large customers whose maximum power demand exceeds 2MW.

The regulated rates must be within 10% band of the average price of freely negotiated contracts. These contracts represent about 40% of the total consumption. The regulated price to final consumers has two components: a node price, at which distributors buy energy from generating companies, and a distribution charge.

The node price adds up to the sum of the marginal cost of energy, the marginal cost of peak power and the marginal cost of transmission. The Economics Ministry, with technical support from the NEC calculates node prices.

The distribution charge is actually a mix of ROR and Price cap regulations. It is recalculated every four years in a procedure that consists of determining the operating costs of an efficient firm and setting rates to provide a 10% real return

on the replacement value of assets. These rates are then applied to existing companies so as to ensure that the industry average return on the replacement value of assets does not exceed 14% or fall below 6%. The operating costs of an efficient firm and the replacement value of assets are obtained as a weighted average of estimates made by consultants hired by the industry and by the NEC, respectively, where the weight of the NEC estimates is two thirds.

#### **F. Outcomes**

Overall, performance has improved greatly with deregulation and privatization. Coverage rates have reached 97% and consumption has grown at an average rate of 8% between 1986 and 1997. Energy losses are about a third of their historical levels (less than 8% in recent years). Labor productivity has doubled.

#### **G. Weaknesses**

Although Chile's achievements were quite impressive, some weaknesses have appeared:

1. While the population has generally benefited from the coverage expansion and improvements in service quality as a result of privatization so far, the impressive efficiency gains have not necessarily translated into lower charges, even after two rate reviews. Drastic price reductions have only occurred in cases where competition has emerged. But in electricity distribution for instance, prices do not reflect the enormous reduction in distribution losses that has been achieved since privatization. This has led to significant increases in the profits of regulated distribution firms with regulated segments reporting much higher rates of return on equity than competitive segments in the same industry : The average

ROE among regulated distribution companies was 30% in 1995, whereas for unregulated generation companies serving large consumers the figure was 15%.

2. Although the regulatory framework entails competition in generation and supply to large users: ENDESA, the dominant firm in the system, together with its affiliates has 60% of installed capacity. It also owns the transmission grid and has links to 40% of the distribution sector through its parent company ENERSIS. ENDESA's ownership of the transmission grid gives it a substantial competitive advantage over its competitors and increases the risks for new firms that might be considering investing in the generation sector.

3. There are also some problems in supplying unregulated customers located in the franchise areas of distribution firms. Indeed, when a generator gains a free-price customer from a distribution firm, it has to negotiate with the latter a toll for using its electricity wires, in which the absence of agreements leads to arbitration.

### **5.3.2 Argentina<sup>46,47,48</sup>**

#### **A. Background**

Similarly to Chile, Argentina is also a precursor in power sector reforms, but more in terms of the scope and speed with which change took place. It managed to

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<sup>46</sup> Adapted from Estache and Rodriguez-Pardina. 1998. "Light an Lightning at the End of the Public Tunnel: Reform of the Electricity Sector in the Southern Cone." EDI Regulatory Discussion Paper.

<sup>47</sup> Adapted from J. Gomez-Ibanez. Commitment and Flexibility: Strategies for Regulating Privatized Infrastructure. October 1998

<sup>48</sup> Adapted from Estache and Rodriguez-Pardina. 1996. "Regulatory Lessons from Argentina's Power Concessions". Public Policy for the Private Sector.

improve not only on what Chile had achieved but many would argue also over what was achieved in the UK.

The main purpose of the reform of Argentina's electricity sector was to reach an efficient pricing and production levels in the short term, and an investment level sufficient to meet demand in the long run. This entailed a major restructuring of the sector which started in 1989 and is still going on in the provinces

Following partially the models adopted in Chile and the UK, and in order to allow competition in those stages of industry where it is possible, the new legal framework of electricity, which acted as the backbone of the restructuring program, vertically separated the industry: generation, transmission, distribution and supply (for large consumers) were unbundled and legal restrictions were put to prevent reintegration.

## **B. Ownership**

The process began when the federal government franchised the distribution and commercialization activities of Servicio Electricos del Gran Buenos Aires (SEGBA), the vertically integrated utility supplying electricity to more 13 million people in the greater Buenos Aires region. The main next step was in 1992, with the privatization of the electric generation and transmission activities that SEGBA was still carrying. With these two changes, the original public firm had been vertically disintegrated into seven business units: four generation firms and three distribution firms. These units were either sold or concessioned to the private sector through international bids.

### **C. Structure and Competition**

Following the promotion of competition principles established in the restructuring law, the sector was vertically and horizontally unbundled into separate activities. Generation and supply were opened to competition while transmission and distribution were concessioned as regional monopolies. There is no partial integration as allowed by Chile.

### **D. Type of Regulation:**

Following Chile's footsteps, Argentina also adopted a hybrid regulation strategy. The Argentinean system however is slightly different from the Chilean approach; in certain respects, it resembles a compromise between the British and the US discretionary systems.

The general objectives spelled out in the electricity law guide not only the overall design of the regulatory framework but also some of the regulatory decisions taken by the regulators.

The law also puts in place an independent regulator :the Ente Nacional Regulador de la Electricidad (ENRE) headed by a five-person commission, appointed to staggered five-year terms and removable only for specific causes. The agency also prepares its own budget and is financed by fees assessed on the electric companies. As in Britain, it sets price caps every five years. It is important to note that these functions and obligations are vested upon the regulator by the law, i.e the parliament and not by the executive power. This is a necessary condition to ensure the needed independence and accountability of the regulator.

The particularities of the Argentinean model stem from the terms of the concessions contracts. Indeed, the distribution companies were offered 95 years concessions with re-bids in the fifteenth year and every ten years thereafter. This periodical competition for the market, in the absence of a competition in the market, guarantees enough flexibility to cope with unforeseeable market conditions.

The winning bidders for the distribution companies received 51% of the stocks and the right to the 95 years concession. Their controlling block of stock cannot be transferred without the permission of the government. The remaining 49% of the shares were sold to the public and trade freely on the stock market. At the beginning of the re-bidding process, the regulatory agency announces its price cap for the next five years and the incumbent submits a sealed bid with the value it places on its controlling block of shares. If a challenger's bid is higher, the latter pays to the incumbent the value of its bid and pays the balance to the government.

#### **E. Price System**

Generation allows true market competition, maybe the most important aspect of the reform. The 25 operators at the generation level can sell electricity on a spot market or through contracts. This market matches electricity demand and supply with an hourly and reasonable price. The coordination is done by CAMMESA, a non-profit joint-stock company owned in equal proportion by the Energy Secretary and associations of generators, distributors, transmission carriers and large users.

The pricing of distribution and transmission, the two remaining non-competitive segments, is determined by the regulatory framework. In both segments, the tariffs are set in US\$ and are a version of the price cap formula: the regulation sets maximum prices with total pass through of the costs of energy and with an indexation to the US inflation.

In practice, transmission charges cover three components:

1. Connection Charge: a fixed charge differentiated according to voltage.
2. Capacity Charge: a fixed charge to cover all operation and maintenance of the existing equipment.
3. Energy Charge: reflecting the difference between the value of the energy received at a receiving node and the value of the energy at a sending node.

The first two components are fixed for the first five years only and can be reduced by no more than 1% yearly and 5% cumulative over each management period thereafter.

As for distribution, the main elements are an energy charge (based on seasonal electricity costs), a loss charge (corresponding to losses and equivalent to about 11% of the distributor purchases), the connection and transmission costs, the cost of capacity in the wholesale market and a fixed distribution charge.

## **F. Outcome**

While the experience is still relatively young and incomplete, the effects on the sector are evident. Labor productivity has increased by over 23% and service quality has improved significantly in the same direction.

However, the most quoted achievement is the cut in energy prices observed wherever private distributors rule. This cut is attributable to the competition at the generation level as proven by the spot prices below.

Year	Minimum	Average	Maximum
1992	20.47	41.85	80.59
1993	20.51	32.11	58.75
1994	18.41	24.99	78.15
1995	14.58	22.06	80.13
1996	12.85	20.57	68.83

Note: all prices are in \$/MWh.  
Source: Estache and Rodriguez-Pardina

An additional trend worth mentioning is the improved sale prices of distribution concessions as time passes by.

### 5.3.3 California<sup>49</sup>

The California crisis was undoubtedly one of the most mediatized power crises ever. As of Jan. 2000, the failure of the state's power sector regulatory model sent one of the world's most prosperous regions into rolling blackouts, undermining an already slowing economy and giving deregulation a bad name. What are the causes of this failure and what are the lessons that can be derived from it?

The California case is much more a failure of deregulation than a failure of privatization itself. Indeed prior to the 1998 reform, the sector was already in 'private hands':

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<sup>49</sup>Extracted from J. Besant-Jones and B. Tennenbaum. The California Power Crisis: Lessons for Developing Countries. April 2001

- Three-fourth of the state's consumption was supplied by three large vertically integrated, privately owned utilities: Pacific Gas & Electricity (PG&E), Southern California Edison (SCE) and San Diego Gas & Electric (SDG&E). The rest of the state was served by large and small municipal utilities.
- High electricity prices were caused by expensive nuclear power and green power.
- There was a surplus generating capacity just prior to the reform.
- Approximately 20% of California's electricity was imported from neighboring states.
- The three privately owned utilities were regulated by the California Public Utilities Commission (CPUC) under a traditional U.S style ROR system with some targeted incentive mechanisms.

California struggled with a major recession during the early 1990's. High unemployment and loss of industries to other states were partially blamed on high electricity prices (about 50% higher than the U.S national average in 1996) accelerating the adoption of a reform plan in 1998.

The key features of this reform are the following:

- The three privately owned utilities were 'encouraged' to sell off their generating plants but without any vesting contracts to buy back the output of these plants.
- In return, the utilities were allowed to recover there 'stranded costs' through a 'competitive transition charge' on consumers' electricity bills.

- The state government mandated a 10% reduction in retail rates. These rates were frozen for 4 years. Actual consumers bills went down little because the reduction in rates was largely offset by the competitive transition charge.
- Retail customers were given the right to choose alternative electricity suppliers.
- A non-profit, independent system operator (Cal ISO) was created to operate the transmission facilities owned by the private utilities. The Cal ISO also operated a bid-based real-time energy market.
- A separate Power Exchange (Cal PX) was created to operate a bid-based, centralized market for forward (day-ahead and day-of) power sales. The two largest private utilities were required to buy and sell all of their electricity through the Cal PX.
- Both the Cal PX and the Cal ISO were governed by large boards, each of which was made up of more than 30 stakeholder and non-stakeholder members.
- The retail electricity rates of individual privately owned utilities continued to be regulated by the CPUC. Even though the Cal PX and Cal ISO were under the regulatory jurisdiction of FERC (the national electricity regulator), the CPUC and the state government had substantial de facto influence over their actions. The two regulatory entities, the CPUC and FERC, sometimes issued conflicting orders.

A combination of structural weaknesses and exogenous factors led to the collapse of Jan. 2000. The main causes behind this crisis were:

- The major private distribution companies were not allowed to buy outside of the spot markets. Hence, they were totally exposed to the price volatility of the Cal PX spot markets.
- Distribution companies and others who serve retail customers were not required to own or have under contract sufficient generation capacity to meet peak demand.
- No provision was made for passthrough of wholesale purchase power costs to retail rates.
- The complicated design involved multiple, sequential wholesale markets operated by two new separate entities: Cal PX and Cal ISO. In other U.S regions, these entities are combined.
- The approval of the reform package was subject to intense political pressures and debates. The final version was actually a compromise between the various competing stakeholders.
- The highly contentious siting and permitting process for new generating plants blocked the installation of any major new generating plants for more than 10 years. California's installed generating capacity declined by about 1200MW between 1997 and 2000.
- A shift in market fundamentals occurred: large increases in electricity demand in California and neighboring states, reduced availability of hydropower in California and the Pacific Northwest, and big increases in the prices of gas and pollution permits to emit Nitrogen Oxides.

- Some evidence indicates that the growing shortage of generating capacity, combined with certain features of the complex wholesale market design, may have allowed some generators to exercise market power.

As a consequence, wholesale spot prices skyrocketed starting in the spring of 2000. California utilities paid around \$11 billion more for electricity in the summer of 2000 than in the summer of 1999. Similar wholesale price increases in neighboring states had less impact because only 5 to 10% of their overall supplies are purchased on the spot market.

Limited or no passthrough of wholesale costs to retail customers has forced the two largest private companies to incur around \$12 billion in unfounded liabilities pushing them closer to bankruptcy.

The Californian power crisis may have created in developing countries an impression that power reform is too risky. This failure does not justify such a conclusion, since it is mainly due to a poorly designed system. However, several lessons can be drawn from this saga:

- Spot markets for wholesale power require careful design of market rules and price regulation to allow participants to manage their trading efficiently.
- Competition requires adequate capacity to meet demand without experiencing supply constraints. The market must provide signals and incentives for investment in new generating capacity when needed. These can be provided by various means, such as imposing a capacity obligation on distribution companies purchasing power in the market, setting up a parallel capacity market to the energy spot market, or developing a forward energy

trading market whose prices signal expectations about future supply/demand balance.

- Competition requires that investors in new supply capacity face no major barriers to entry to the wholesale power market.
- The design of a competitive power market is too complex and delicate to be dominated by heavy political compromises that are intended to shield stakeholders from the consequences of the reform.
- Most developing countries should start with limited forms of competition that can evolve to full wholesale competition through spot markets once the sector can manage full competition without uncontrollable market power. The creation of bid-based spot markets should generally not be their top priority.

## **CHAPTER 6: Selection and Implementation of a Strategy**

### **6.1 Immediate Privatization?**

Before trying to define a strategy for the privatization of the sector, one should start by answering the following question:

Is EDL actually ready for an advanced form of private ownership?

To answer this question, let us analyze and assess the pre-requisites for the different forms of private involvement as exposed in paragraph 5.2:

<b>Pre-Requisite</b>	<b>Assessment</b>
<b>Political Commitment</b>	Although, virtually all the political class agrees on the necessity of privatization in general; the privatization of power supply and its implementation has failed to achieve a true political consensus and is still being debated. Moreover, the workforce has shown its apprehension of any change in the current situation.
<b>Good Information about the System</b>	One of the major issues facing EDL. Information regarding the distribution of costs, assessment of current assets, distribution of losses and assessment of future needs and demand is poor.
<b>Developed Regulatory Framework</b>	The regulatory framework is still at its earliest stages. None of the regulatory institutions that will oversee the sector has yet been created.
<b>Cost Recovering Tariffs</b>	Most of the studies made on the current tariffs show that the current levels are roughly enough to recoup marginal costs but uneconomical if interest on debt and principal repayment are to be included.
<b>Good Country Rating</b>	Both foreign currency public debt and domestic debt have been downgraded two notches from B+ to B-.

Clearly, EDL does not currently satisfy the basic requirements for an advanced form of private participation (Franchise, BOOT or full divestiture).

If we add to this picture the consequences of the Sep. 11 and Post-Sep. 11 events on the willingness of foreign capital to invest in the region, without a substantial premium, this will lead us to conclude that the immediate sale of public assets will be seriously undermined.

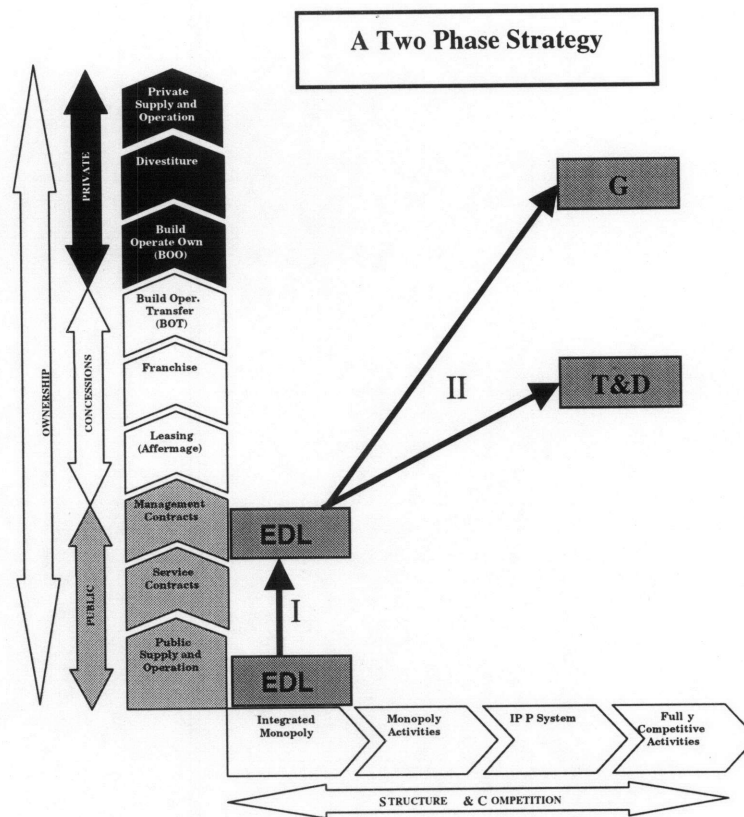
Given the fact that, without any doubt, the main goal of the government's privatization plan is to maximize the sale value in order to reduce the public debt, we feel that the timing is just inappropriate for an immediate privatization and that instead, the sector should go through a transitional phase before any form of private involvement in the ownership of power assets.

In planning its broad privatization program, the government should actually prioritize the concerned sectors starting with the most feasible and less risky ones, namely the national airline, the public media, and both the wireless and the fixed lines telecommunications sector. By following this principle, the government will:

- Respond to its short-term financial needs without undermining, to a certain extent, the assets' sale value.
- It will build both the investor's and the public's confidence in the process.
- It will also build enough knowledge and experience in issues surrounding private participation in public infrastructure to handle more difficult sectors such as the water and the power systems.

For these reasons we propose the following two fold strategy:

1. A two years transitional phase with a private management contract.
2. A partial competition at the wholesale level in the subsequent phase.



- T&D** Transmission and Distribution
- G** Generation

## 6.2 Phase I: Restructuring and Corporatization

### 6.2.1 Objectives and Duration

This phase will have three objectives:

1. Resolve some of the issues surrounding the sector and the company. Issues, which are actually undermining the sale value.
2. Prove to the investors' community the state's commitment to privatization.
3. Put in place the legal framework and create the regulatory body that will oversee the privatization and then the regulation of the sector. A step of

paramount importance if the following phase is to be successfully implemented.

Below is an action plan, which should be completed within 2-3 years.

## **6.2.2 Company Level Measures**

### **A. Corporatization**

Defined as the *“conversion of public enterprises under public laws into companies under private law”*<sup>50</sup>, corporatization has proven its benefits, notably in New Zealand, *where it increased the accountability of state owned enterprises, allowed better measures of their performance, forced significant improvements in productivity and prepared and furthered the cause of privatization*<sup>51</sup>.

This measure should actually be viewed as the first step on the path of privatization. Its main purpose will be to purge EDL from political involvement, merge the company’s higher management and hold it accountable for its actions. The leadership of the company will be unified under one board of directors headed by a chairman and reporting directly to the prime minister. The board of directors will be appointed for a fixed period of 2-3 years without the possibility of being removed, and granted substantial autonomy. Its mission will be clearly and publicly defined as preparing the transition towards privatization and steering the company towards financial independence.

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<sup>50</sup> Pierre Guislain. “The Privatization Challenge. A strategic, Legal, and Institutional Analysis of International Experience”. The World Bank.

<sup>51</sup> Pierre Guislain. “The Privatization Challenge. A strategic, Legal, and Institutional Analysis of International Experience”. The World Bank.

## **B. Management Contract**

The corporatized company will enter into a management contract with a private operator. The latter will be paid a performance-based fee correlated with the improvement in the company's overall results or with the improvement of the company's billing and collection ratios.

For this phase to be successful, the private operator will be granted extensive power (such as cutting the lines of delinquent payers or illegal connections). The government will pledge its support and specifically its security forces to back the operator's mission.

One of the main purposes of this contract will be to put in order accounting, consumer records, and information on the physical facilities.

## **C. Clear Pending Litigations**

As we mentioned in paragraph 4.1.1 several litigations are still pending with some of the previous private concessionaires over the compensation amounts. Future private owner are likely to factor these pseudo-liabilities when bidding for the company. Therefore EDL's management, capitalizing on the public authority's de facto influence, ought to resolve these disputes prior to any privatization.

## **D. Financial Statements and Debt**

The company will have to put its financial statements in order. More specifically its relation with the central government ought to be cleared. Two steps will be undertaken:

1. The accrued receivables due to the company from several public entities will be deducted from the company's debt to the government.

2. This debt will be restructured and possibly transformed to and equity participation in the company's capital.

### **E. Restructure the Company**

EDL will be restructured into three different business units or cost centers equivalent to the sector's vertical sub-divisions: Generation, Transmission, and Distribution. These units will be managed, to the most possible extent, as independent units. The goal is obviously to identify the costs of each of these divisions (a knowledge that would eventually be used in the design of the post-privatization regulated tariffs), and to introduce to the workforce's, medium management's and top management's culture this concept of vertical unbundling.

### **F. Resolve Workforce Issues**

The freeze on recruitment should be maintained in order to avoid the pressures of political staffing during this transitional period.

The management should also address the workforce's apprehension of privatization by establishing a transparent dialogue and possibly a limited stock ownership of the corporatized company. The Chilean experience with a 5-10% workforce ownership of privatized company's has proven to be fruitful in terms of winning the employee's support.

Finally, disciplinary and possibly judicial measures ought to be taken against any employee guilty of 'unlawful behavior'.

## **G. Tackle the Payment Discipline Issue**

The company could introduce some incentives for bill payments such as discounts or exemption of accrued bills.

### **6.2.3 Sectoral Measures**

On the broader sector level, the public authority's main task will be to build the necessary legal infrastructure to support the subsequent privatization plan and to implement a series of measures that would ease up the transmission of ownership to the private sector. The following steps ought to be undertaken:

#### **A. Marketing the Plan**

The privatization plan should be 'marketed' to both the public and the political class where it should achieve a broader approval.

The social effects and benefits of private sector participation in power supply, as proven by previous experiences, should be used as a selling point. Winning the approval of the general public might be facilitated by its deep resentment of the current situation as a consequence of the frequent blackouts, and by the benefits of giving up the use of polluting and costly private generators.

#### **B. Review and Increase Tariff Levels**

As discussed in paragraph 4.2.7 the current tariff structure is facing two major problems:

1. The 7.65c/Kwh average level is barely enough to recoup the estimated marginal costs.

2. With no indexation to the main input prices, namely the price of oil, EDL has been exposed to the volatility of crude oil prices.

Previous experiences have proven that the question of tariffs has to be tackled prior to any divestiture of assets if the sale price is to be maximized.

However, as we mentioned in paragraph 4.2.7, raising tariffs to the theoretical economically viable level of 12.6c/Wwh is not affordable in social terms. Furthermore, if collection is improved (which is likely to happen if a management contract is signed), the economically viable level will likely decrease below this 12.6c/Kwh threshold. Such decrease will be further enhanced by the restructuring (or conversion to equity) of the debt due to the government.

Therefore, during this transition phase, tariffs should be increased to an optimal level that would permit financial viability in the post-privatization phase.

As for the indexation to input prices, we feel that such indexation should be partial (Tariffs variations ought to be smoother than crude oil volatility). This, on one hand will partially hedge the investors' risk, and on the other hand will provide them with an incentive to pursue less costly and volatile forms of fuel.

### **C. Building the Legal and Regulatory Framework<sup>52</sup>**

Given the high sunk costs that investors will bear when privatization will occur, it is very important to define and put in place, prior to privatization, the regulatory institutions as a means of insuring investments in an area in which it is easy to expropriate firms.

The first step would be to issue the sector's restructuring and privatization law.

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<sup>52</sup> This point will be further elaborated in 6.4.3

This law will:

1. Spell out clearly the steps to be undertaken on the road to privatization (corporatization, restructuring...).
2. Define the privatization strategy that will be put in place in the subsequent phase.
3. Create a 'sector regulatory body' that will be put in charge of the privatization process in the first phase and will oversee regulation in the subsequent phase.
4. Define the prerogatives of the regulatory entity.

In the absence of a credible local regulatory framework that will protect investors from political taking, we feel that the latter should be granted an undisputed right to arbitration in case conflicts arise.

Given the market power problems that may occur after the privatization, the legal framework should be backed by an anti-trust legislation and by the creation or designation of a judicial authority that would handle monopoly litigations.

### **6.3 The Award Process**

Let us consider the following points:

- One of the main characteristics of most 'infrastructure sectors' is their status of 'natural monopoly'. This means that activities can be delivered at a lower cost and more efficiently if aggregated under one entity. Thus true competition is difficult to achieve when these assets are transferred to the private sector.

- Privatization itself is a long-term project that outlives governments' mandates. Thus, for a privatization deal to be sustainable on the long run, the award process has to be clear and transparent: 'In the absence of a true competition in the market there should be a true competition for the market'<sup>53</sup>.

For this reason, we feel that the award process should be directly overseen by the parliament.

The award criteria have to be clearly defined in the request for proposals and the information about the company should be evenly shared between all of the competitors: this point will have to be further stressed if the private operator in charge of managing EDL during the transition phase is actually taking part in the bidding process.

When defining its selection criteria, the government will have to keep in mind that objectives such as maximizing the sale value and improving services are often conflicting. A choice, depending on priorities, will have to be made.

## **6.4 Phase II: Privatization**

### **6.4.1 Structure and Competition**

#### **A. Market Characteristics**

The evolution of technology, coupled with a revolution in market regulations, has clearly abated the effects and benefits of economies of scale and scope in the power sector. As a consequence, virtually all of the privatization and restructuring programs that were undertaken during the last decade were built around the

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<sup>53</sup> J. Gomez-Ibanez. Commitment and Flexibility: Strategies for Regulating Privatized Infrastructure. October 1998

principle of vertical and horizontal unbundling. These recent experiences however, have also proven that not all three power supply activities (generation, transmission and distribution) could be open to competition and that the optimal structure depended first and foremost on the country's and sector's characteristics.

In this regard, three main 'local characteristics' can be deduced from chapters two and four:

1. Given the market size (~3.5M. people) and the concentration of the population in the area surrounding Beirut, there's practically no room for competition at the distribution level.
2. The main reason behind the sector's past failures have been illegal connections and payment discipline. These risks will be transmitted to the subsequent private distribution companies.
3. Most of the last decade's capital investments were allocated to generation. Substantial investments still need to be made at the distribution and transmission levels.

## **B. Distribution**

Therefore, given the concentration of risks and pending investments at the distribution level, we think that investors in distribution ought to be provided with a more stable and attractive environment. This, combined with the recent failures and lessons learned from the Californian crisis, drives us to advocate against retail competition. Instead we would opt for granting, in distribution, geographical exclusivity rights.

### **C. Generation and Transmission**

As for generation, previous experiences in comparable markets in terms of size (notably the Chilean experience) have proven that competition could be sustainable under certain conditions. Therefore we recommend a regulated<sup>54</sup> form of wholesale competition.

Chile and Argentina attempted to introduce a limited form of retail competition targeting large customers. Because of network access issues these experiences have both been inconclusive<sup>55</sup>. For this reason and again because of our concerns regarding the attractiveness of distribution we do not recommend such a strategy. The distribution companies will exclusively supply these customers.

Finally, transmission is still widely viewed as a natural monopoly. Thus it should be maintained as a horizontally integrated activity.

### **D. Power Pools' Boundaries**

Having adopted the above structure, the following step will be determining the number of power pools and their boundaries. Two factors limit the available options:

1. The small size of the market confines the possible number to two or three as a maximum.
2. The attractiveness of the 'Greater Beirut and Mount Lebanon' region both in terms of size of population and payment discipline compels us to design pools that would balance attractive and unattractive areas. In short, any viable solution will require the division and sharing of the above region.

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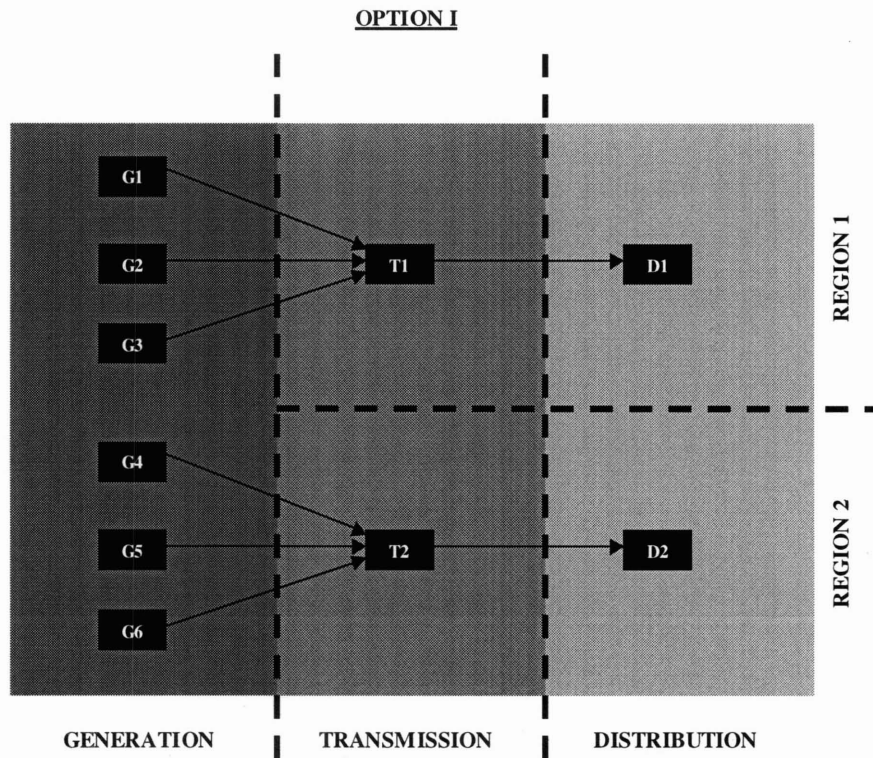
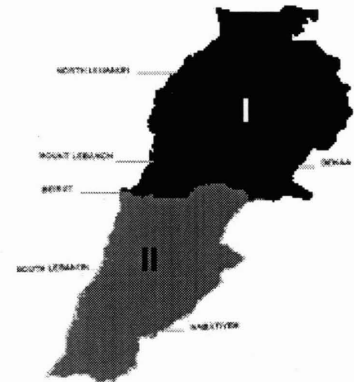
<sup>54</sup> will be clarified in 6.4.4

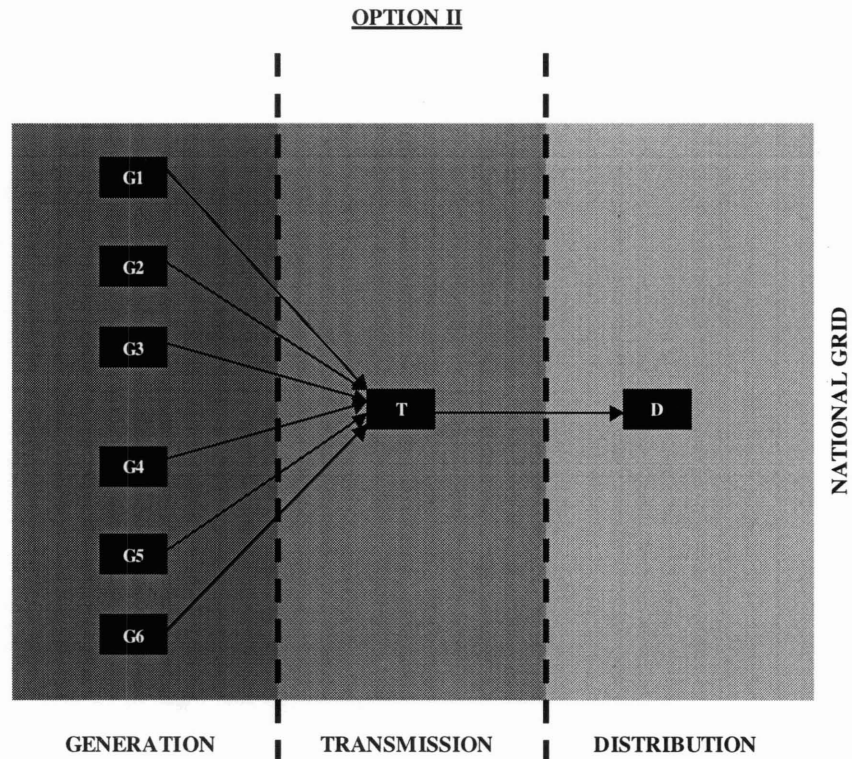
<sup>55</sup> R.Fisher and P.Serra. 'Regulating the Electricity Sector in Latin America'. ECONOMIA Fall 2000.

We suggest the following two options:

**Option I:** Establishment of two power pools defined by an East/West boundary separating the Greater Beirut and Mount Lebanon region in two.

**Option II:** Adoption of a national power pool covering the entire country.





### 6.4.2 Ownership

Having gone through a private management contract during the transitional phase, and given the serious financial constraints facing the government's budget, we feel that the public authority should seek a more advanced form of private involvement during this phase.

Thus, from the different types of ownership structures defined in paragraph 5.2.1 two forms can be used in transferring the existing assets to the private sector: Divestitures and Franchises (Leasing maintains the responsibility for capital investments in the public sector and BOT/BOOT structures are essentially designed for Greenfield projects).

Compared to franchises, divestitures have the benefit of maximizing the sale value, which in turn can be used to lower the public debt: one of the main concerns of the government. However, given their permanent nature (a divested asset is permanently transferred to the private sector, whereas a franchise is limited in time), divestitures limit the public authority's flexibility in coping with unforeseeable conditions.

In our case, the most substantial uncertainties lay in the riskiest areas of the sector: distribution. It is very difficult for instance, to predict how much improvement, if any, privatization will bring to the collection of bills and the issue of illegal connections. Furthermore, coupling divestiture with exclusivity rights may result in an overwhelming market power that would be too burdensome to regulate.

Limited wholesale competition, however, is likely to alleviate this risk on the generation level.

Thus we suggest the following ownership structure:

1. Full divestiture of generation assets. New facilities will have to go through a competitive licensing process whereby projects are ranked according to costs.
2. Similarly to Argentina, distribution rights will be granted under 95 years concessions with cyclical re-bids (every 15 years). This periodical 'competition for the market', in the absence of a 'competition in the market', guarantees enough flexibility to cope with unforeseeable market conditions.

3. Regarding transmission and pool operation, two approaches seem to be possible: maintain the public sector's ownership, or transfer the assets to the private sector and closely regulate the private operator. Given the proven weaknesses of the public sector and the urgent need for capital investment in transmission (see paragraph 4.3.3) we will recommend the second option. Ownership will be similar to the ownership structure used in distribution.
4. One of the main weaknesses of the Chilean model has been the imbalance due to vertical integration. For this reason, cross ownership of assets should be proscribed. Companies operating in one of the three activities, (generation, transmission or distribution) or affiliates of these companies will not be permitted to operate in any other activity.

#### **6.4.3 Type of Regulation**

The Lebanese case is the perfect example where regulation has to obey to the principles of 'Commitment' towards the investor's community' and 'flexibility in face of uncertainty and unforeseeable events'.

Indeed, on the one hand, substantial political risks and a weak legal environment render any traditional discretionary regulation unviable from the investor's perspective.

On the other hand, the uncertainties surrounding the economic prospects (which in turn correlate with the uncertainties surrounding the regional geopolitical situation), suggest that any classical contract regulation is not workable: The

recent failure of the wireless telecommunications BOT's can largely be blamed on the lack of flexibility associated with this type of regulation.

For these reasons we would opt for a hybrid strategy, as defined in paragraph 5.2.3, combining the flexibility of discretionary regulation and the commitment of contractual regulation.

The regulatory system will be built around one central regulatory agency.

As a means of isolating this entity from the interferences and often conflicting interests of a fragmented political class, we suggest reducing the composition of the agency's board to five members appointed by the cabinet for staggered five-year terms and sworn in by the parliament. The privatization law will clearly spell the exceptional causes for which any member can be dismissed.

In fact, a similar structure has already been adopted and put in place decades ago for the 'banking control commission' in charge of overseeing the banking sector. As proven by the 'financial health' of this sector despite seventeen years of civil war, the experience seems to be a convincing success.

The privatization law will also have to spell out the guiding principles, not the fully detailed processes, underlying the agency's regulatory decisions such as setting tariffs and awarding new concessions.

The agency's main functions will be:

- Set distribution and transmission tariffs.
- Estimate gencos' marginal costs and build the subsequent merit order curve.
- Grant the distribution concessions and manage the cyclical re- bids.
- Manage the licensing process at the generation level.

- Closely monitor the operation of the private entity handling the transmission network and pool operation, making sure that the principles of non-discrimination between generation companies and open access to the network are respected.
- Approve investments related to the expansion of the transmission capacities.
- Insure that the distribution companies are offering an equal and exhaustive access to their networks, to all the population living within the boundaries of their service area. This may require expanding the distribution networks in the underlying areas at the expense of more attractive urban regions, maintaining implicit cross subsidies.

#### **6.4.4 Price System**

##### **A. Generation**

Having adopted the principle of wholesale competition, two possible pricing mechanisms can be applied:

##### **1. A simulated spot market approach<sup>56</sup>**

Applied in Chile notably, this system, which is little different from the centrally dispatched power pools like PJM that existed in the US for decades, is much more a simulated form of competition than a real unregulated competition. Indeed, the system uses a merit -order dispatch curve, in which the regulator (or the power pool operator) ranks plants on the basis of short-term marginal operating costs and dispatches those with lower costs first. The spot price of

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<sup>56</sup> R.Fisher and P.Serra. 'Regulating the Electricity Sector in Latin America'. ECONOMIA Fall 2000

energy is thus the offer price of the last dispatched, and most expensive plant in operation. Demand is satisfied by those plants that bid a price equal or less than the spot price.

A plant's offer price (i.e its marginal costs) is determined by the regulator. This means that the pool is not really a market, since gencos are not free to set their offer price.

The main advantage of using short-term marginal costs to determine dispatch is that it reduces the possibility of short-term strategic behavior on the part of gencos, which is a real concern for bid-based spot markets with few participants.

On the downside, the system requires the regulator to play a prominent role in determining marginal costs. In markets depending heavily on hydroelectric power such as most Latin American countries, this calculation has proven to be very complicated and has often led to disputes between the gencos and the regulator or between the gencos themselves.

## **2. A bid based spot market approach:**

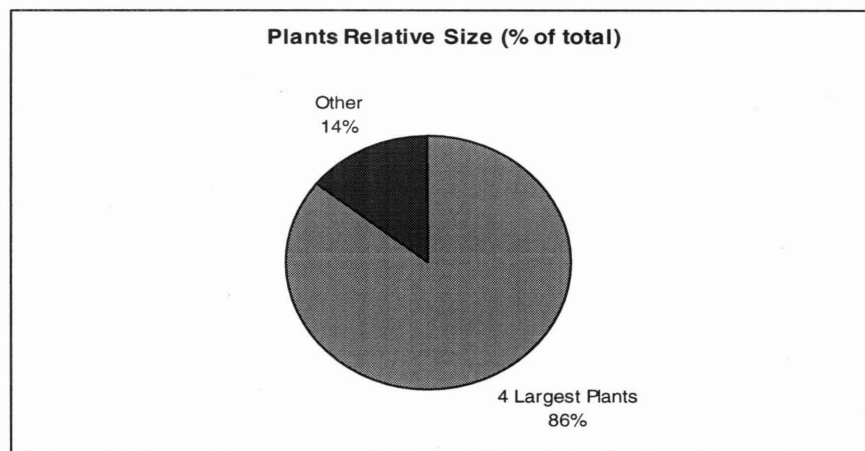
Undoubtedly the most liberal form of competition, the bid based spot market approach has been mostly applied in developed markets such as California and the UK. Under this system, the market simply sets its own rules: generation companies are allowed to freely bid on both price and available capacity.

This pricing mechanism which requires the least intervention from the regulator presents however the following difficulties:

- As proven by the Californian crisis, the system may face serious challenges resulting from horizontal market power in case a minimum number of market players at the generation level is not achieved.
- Substantial mechanisms for congestion management have to be deployed.

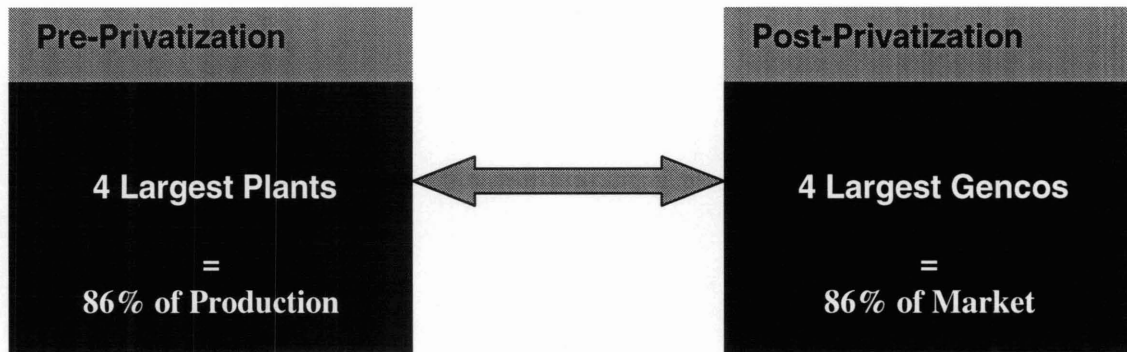
**Let us try to assess the risk of wholesale market power in the post-privatization phase:**

By looking at the size of the existing power plants relative to the size of the whole market, one can roughly forecast the number of players and their market power after privatization.



Source: EDL

Thus, after privatization, and only in the best case whereby the four largest generation plants are won by four different bidders, these four gencos will control 86% of the market.



Therefore, there's a very high risk of wholesale market power in the post privatization phase. For this reason we do not recommend the adoption of a bid based spot market pricing system.

Instead, the public authority should choose the simulated competition approach based on a marginal costs dispatch mechanism or a hybrid system that would impose for example a cap on gencos bid prices (limited competition).

A capacity payment will be added to the spot price to constitute the wholesale price. This generation price will be passed through to the end users.

## **B. Distribution**

The tariffs' second component will be the Value Added for Distribution (VAD), which remunerates the services offered by the distribution companies.

As a mean of stimulating efficiency and costs reductions, and in the absence of any form of competition at the distribution level, the VAD will be subject to a CPI-X pricing regulation as defined in paragraph 5.2.4.

Two elements will have to be clearly spelled out in the privatization law: the timing of the tariffs' reviews and the price setting process (i.e the calculation of the X factor).

For the purpose of maintaining enough flexibility with the regulator without undermining the investors' confidence, these two elements will have to be balanced. This means that the frequency of the reviews will have to be balanced by a reduction of the regulator's discretionary power.

We suggest the following mechanism:

1. Tariffs reviews at year 5 after privatization and every 3 years then on.
2. The regulator, based on a study by an independent consultant, will determine the X factor. This decision can be challenged by the distributor and settled in a fast track arbitration under a pre-agreed upon procedure.
3. The VAD for the first five-year period will be determined prior to privatization and will be spelled out in the request for proposals.

### **C. Transmission**

The privatization of transmission is actually not as popular as the privatization of generation and distribution. For different reasons ranging from the difficulty of regulating such a natural monopoly to the unattractiveness of this activity to the private sector, most of the privatization programs worldwide chose to maintain the transmission network under the public sector's umbrella.

However, given the proven inefficiencies of the Lebanese public sector and the urgent needs for capital investments in the high voltage network, we have opted for privatization.

Transmission pricing will be divided in two parts:

1. Expansion and rehabilitation costs, which will be born by the generation and distribution companies without being passed through to the final consumer.
2. Operation and maintenance costs, a fixed fee that will be passed through to the final consumer.

## CHAPTER 7: Sequel

While this paper was being edited, during the week beginning on November 19<sup>th</sup>, the country was plunged into prolonged periods of blackouts: EDL had run out of fuel. The company's general director and the ministry of Energy exchanged blames for these power cuts.

In a statement published on November 26<sup>th</sup>, EDL claimed that the ministry had refused to supply it with fuel oil for its plants.

Mr. Beydoun, minister of Energy replied<sup>57</sup> that the company didn't even ask for this fuel until its reservoirs became empty. He accused the general director (who was appointed by the previous government) *of conspiracy and acts of sabotage against the current government*. In describing the issues undermining the sector, the minister said that *"a number of large industries had struck a deal with employees at EDL to have their meters adjusted to incorrectly register power consumption and maintained that his allegations were unrelated to the list released in the summer which included names of influential politicians who were allegedly refusing to pay their electricity bills"*.

Backing these remarks by tangible actions, Mr. Beydoun submitted an urgent letter to the prime minister demanding that EDL's general director be dismissed and proposing to merge the positions of director general and chairman of the board. The judiciary also launched a round of investigations into fraud and mismanagement at EDL.

The cabinet, which convened on the 29th of November, denied the minister's request refusing to place all the blame on one person. The government insisted

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<sup>57</sup> The Daily Star. November 27<sup>th</sup>, 2001.

that such dismissal should be part of a promised wider reshuffle of the whole public sector administration and agreed to appoint a consultative firm, other than the already chosen investment bank, to “ *assess EDL’s problems, find adequate solutions, and stop the ongoing waste of resources*”<sup>58</sup>.

A former minister commented saying that the goal behind the latest crisis was to make people feel that “ it was necessary to privatize the company and, possibly, to give it away at the lowest price possible...”

Meanwhile, a prominent member of the parliament expressed very well the population’s resentment in the following terms: “ *It is no longer permissible to keep quiet, neither the citizen will accept to be a victim nor do we agree to things continuing as they are...*”<sup>59</sup>

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<sup>58</sup> Cabinet Declaration. November 29<sup>th</sup>, 2001.

<sup>59</sup> The Daily Star. November 26<sup>th</sup>, 2001.

## **CHAPTER 8: Research Findings and Conclusion**

Through this paper, we tried to propose a plan defining the timing, the nature and the extent of the private sector's involvement in the Lebanese power sector.

An overview of the country's characteristics and of the sector's past performance has led us to argue against any form of immediate private participation in the ownership of EDL, including the government's current plan which calls for the divestiture of a minority stake in the company. Our point of view is articulated around three main points:

1. Several issues hampering the sector's performance have to be resolved prior to privatization. If kept unresolved, these issues will undoubtedly undermine the sale value.
2. The public authority has to define and put in place a regulatory and legal framework prior to the divestiture of its assets. A step of utmost importance for a sustainable privatization deal.
3. Following the Sep. 11 events and the uncertainties surrounding the region's near and long term future, private investors are likely to require a higher premium for their venture.

We therefore, recommended a two-phase strategy that will start with a two-year transitional period where EDL will be corporatized, a management contract will be signed with a private operator, and the regulatory framework will be put in

place. The goal of this transitional phase will be to tackle some of the issues that are likely to undermine the sale value. Hopefully, some of the questions and uncertainties regarding the region's future will be resolved during this two-year buffer period, leading to lower premiums.

For the second phase of our plan, which will include a more advanced form of private participation, we tried to adapt a generic strategy to the market's and country' characteristics. Thus we opted for a limited form of wholesale competition exposed in chapter 6.

One of the main lessons learned from past privatization experience is that this field is much more an art than a science: thus no unique solution exists. The choice and design of the privatization plan is actually secondary to its implementation. Therefore, whatever the plan the public authority opts for, success is bound by its long-term commitment to it: no technical solution can alone resolve a socio-political problem...and power in Lebanon is first and foremost, a political issue.

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