CHAPTER - I
INTRODUCTION
1.1 INTRODUCTION

The Power Sector is a strategic infrastructure of any national economy. Without this vital infrastructure, it is impossible for any country to make any headway on the path of development. The Indian Power sector has witnessed many interesting and rapid changes over a long period of time. At every point of time right since pre-independence to the present period, the power sector has been a testimony to the vibrant changes that have taken place in the national economy.

The pre-independence power sector was quite different from the development that took place after independence. With the adoption of the Five Year Plans, the needs of the nation grew and it became necessary to develop the infrastructure to meet these needs. The Power Sector had to revamp its policies, undergo reforms and adapt to many changes that were vital to its survival and growth.

This study aims to look at the reforms that took place in the Power sector with special reference to Gujarat and the impact that it had on the selected companies that this researcher intends to study.
1.2 NEED FOR THE STUDY

The basic requirement, for growth of any economy—is infrastructure. The infrastructural sectors—transport, power and telecommunications—have a direct bearing on the improvement of the industrial sector. The relationship between infrastructure growth and industrial performance has important implications for sustaining higher output growth. If we look at the Indian economy, we can see that the decline of infrastructural growth between 1980’s and 1990’s was mainly due to decline in the growth of electricity, coal and petroleum—essentially the energy sub-sectors.

During the fag end of the 1980’s and the beginning of the 1990’s, India’s economic scenario had become very dismal. The economy was taking a downward plunge and the country was staring at the face of bankruptcy. It was then that the Narsimha Rao government, which came to power in the 90’s, took drastic measures to revamp the Indian economy. Under the able guidance of Dr. Manmohan Singh, the then Finance Minister, India ushered in an era of Industrialization and Liberalization. Thus India, during this period witnessed a flurry of activities in its economic policies and its resulting changes on the economic front.

This complete scenario of economic change had attracted the researcher towards the search of more information on reforms and the direction of reforms. The information was very stimulating as there were the winds of
change all over. People who were accustomed to the “stability” factor were perplexed with the unexpected changes but temperamental people formed their way to “dynamic stability”. That is perhaps ideal change management.

Keeping this in view, the researcher has decided to study the “Electrical Power Sector” because of it is indivisible appearance as the most critical resource of infrastructure. Electrical Power sector remains in wider horizons a very essential infrastructure because its use percolates to the lower rungs of the society. Since adequate electricity supply would always assure a balanced growth to Industry and agricultural sector with high efficiency outputs, it was necessary to focus attention on this vital infrastructure.

During the beginning of 1990’s, the power sector was also in doldrums and it was not equipped to cope up with and support the changing economic scenario at the national level. Hence major changes at the national level in the power sector became the need of the hour. Reforms were initiated in the power sector to root out the problems and strengthen it to complement the economic growth of the country.

The researcher through this study intends to analyze the Indian power sector, its maladies, and the reforms initiated in the power sector with special emphasis on Gujarat. For this purpose, the researcher has
identified a few companies of Gujarat in the power sector and has analyzed the impact of reforms in these companies and the strategies that have been adopted by them to cope with the changing scenario.

1.3 MEANING OF REFORMS

As per Webster's dictionary Reform means "Improvement or Amendment of what is wrong, corrupt or unsatisfactory ". It could be

- To change to better state, form
- To abandon wrong or evil ways of conduct
- Amendment of conduct
- Improve by alteration, substitution, abolition

"Change, It has the power to uplift, to heal, to stimulate, surprise, open new doors, bring fresh experience and create excitement in life. Certainly it is worth the risk" - Leo Buscaglia

The reforms initiated in the power sector were also done with the aim of rooting out the tumor rampant in this sector and giving it a fresh lease of life by ushering in strategic policies and initiatives for its development.

1.4 POWER SECTOR REFORMS

With the Industrialization Policy of 1991, adopted by the Government and the subsequent initiatives taken by the government at the national level to open up the Indian economy, it became mandatory for the government
to provide the requisite infrastructure to tread on the path of growth and development. This situation mounted further pressure on the SEBs to improve their operations and provide economical and reliable power to industries. Hence some corrective measures were necessary to revive the Power Sector. Massive investment was necessary for new capacity addition to reduce the demand-supply gap. Similarly, it became vital for the SEBs to undergo a vital transformation in their set-up and operate to be more effective in their functioning. The government at this juncture realized that to develop the economy of the country, it was necessary to develop one of the most vital resources of the economy, that was POWER. Hence steps were initiated to reform the power sector by adopting regulations that could revamp the existing framework and bring about changes conducive to the growth of this sector.

1.4.1 LIFE CYCLE OF REFORMS

If we look at the chronology of reforms in the Power sector, we can briefly divide it into the following four phases.

1. Inception Phase - 1991
2. Infant stage - Start up - Post 91 to 96
3. Transition Phase/ (Stability Phase) - 1996 - 2003
4. Growth Phase

The reforms in the Power sector were initiated in 1991, propelled by the New Economic Policy of the Government. Till 1996, the reforms were still
in the nascent stage which saw a transition period till 2003. This period from 1996 to 2003 saw various polices, regulations etc. being formulated in the power sector which led to major conducive changes to the sector. The result of these major initiatives is being witnessed, by the sector in the positive growth seen in this current phase - The Growth Phase.

1.4.2 HIGHLIGHTS OF REFORMS IN THE POWER SECTOR

- Setting up of an independent SERC in each state which will be the ultimate deciding authority in tariff fixation, eliminating political interference in tariff fixation.
- Unbundling of the SEB into generation, transmission and distribution entities
- Corporatization of each of these entities
- Privatization of each of these activities
- Making these entities leaner and more efficient, pruning down workforce, training of personnel to make them more consumer oriented.
- Rationalization of tariffs, which includes raising agricultural tariffs to reasonable levels.
- Metering of all connections to ensure that all consumption is billed
- Toning up the collection mechanism to ensure that all bills are collected
- Reduction of system losses through systematic investments in good quality T&D equipment
> Investments in R&M and life extension of power plant equipments so as to improve operational efficiencies
> Improvement of metering technology to include time-of-day metering, remote meter reading, theft proof meters etc
> To enforce grid disciplines among various SEBs; ABT is implemented at the national level
> Third party sale is also allowed
> Special sops were allowed for renewable energy
> Encouraging private participants for generation to fill up the gap of deficit
2.1 A BRIEF HISTORY

The history of Indian Electricity Industry dates back to almost a century. It is governed by the Ministry of Power, and the responsibility for electric power is vested in both the Central and the state government. In the last 60 years after independence, this industry has witnessed a rapid growth. The history of the Indian Electricity Industry can be traced as below:

2.1.2 PRE-INDEPENDENCE ERA

Before independence, the power sector in India largely constituted of private companies with licenses or local authorities which supplied 80% of the electricity required by the country. The electricity generation during this period was mainly from stand alone generation sets, hydroelectric and thermal power projects.

The advent of electricity in India was in the form of galvanic electricity (Both Electro-chemical and Electro-magnetic) through telegraphy. The electric telegraph was introduced almost simultaneously in India as well as in Europe and America.

The first experimental line was set-up in Calcutta in 1839 at the Botanic Gardens along the river Hoogly and the first line between Calcutta and
Diamond Harbor link was thrown open to public on December 5, 1851 after discontinuing the existing sophomore. Between 1853 and 1856, the network was completed between Calcutta and Peshawar via Agra, Agra to Bombay and Bombay to Madras. Electricity for lighting arrived 35 years later. The former princely state of Bikaner holds the record of ushering in electricity in the sub-continent. In 1886, a dynamo driven plant was installed at the residence of Jamshedji Tata which was subsequently extended to the Gymkhana club ten years later. Those were all private installations.

The Taj Mahal Hotel built by Jamshedji Tata in 1903, was equipped with a modern power generator for all the electrical needs of the establishment. Even when commercial generation started in Calcutta, various private suppliers like Electric Supply Association supplied Electricity for street lighting.

2.1.3 IMPORTANT LEGISLATIONS

Anticipating the growing needs of electricity as a public utility, in 1896 the Government of India invited Crompton to assist in the preparation of an “Electric Lighting Act” on the lines of the English Act.

The Calcutta Electric Lighting Act 1895 was the first piece of legislation governing the supply of electricity to Calcutta. Later on followed the Howrah Bridge Electric Lighting Act, 1902. This Act authorized the local
government to grant licenses to new companies to supply electricity and with it a new chapter of developmental history of the country began. Initially several firms applied for licenses to supply electricity. But it was Kilburn & Co. agent to Crompton & Co., Chelmsford which secured the Calcutta lighting licenses. Subsequently, Indian Electric Company Ltd. was registered in London in January 1897 which was renamed as Calcutta Electric Supply Corporation (CESC) a month later.

2.1.4 THE GROWTH

On November 10, 1897 Honorable CC Stevens, Lieutenant Governor of Bengal inaugurated India’s first hydroelectric power station (130 kW) designed and installed by Crompton & Company, UK at Sidrapong, Darjeeling. The first major hydroelectric project (4.5 MW) in India was on-Cavery River at Sivasmudram, commissioned by the Maharaja of Mysore in 1899. The capacity was increased to 42 MW in stages by 1927. The Tata Hydroelectric Power Supply Company was registered on November 7, 1910 and the license obtained by the syndicate for power generation was transferred to the Company. In 1905 the Company commissioned its new thermal power plant at Kalyan near Bombay. In 1903, Crompton & Co. installed a power plant for the Madras Electricity Supply Corporation of India Ltd. The Company set up power plants in different cities including Karachi, Kanpur, Allahabad, Nagpur, Rangoon and Tibet.
Electric generation facilities were installed after the First World War (1914-18) in major industrial locations. During 1920-30, power generation plants came up in Mussoorie, at Wellington Barracks (Nilgiri) Munnar, Gokak, Bhatgar (19.6 MW) in Bombay Presidency, 30 MW Mettur dam 50 MW Pykara in Madras, and on Uhl River in Punjab. In the late 1930s the Mayurbhanj Electrification Scheme was completed for the supply of power to Bripada town and to Tata Iron & Steel's iron-ore mines at Gurumaishini hill.

In the initial years, no overseas company thought of setting up manufacturing facility in India. Many of them were merchandising and contracting through their local agents in India like Kilburn & Co., Martin & Co., Kilick Nixon, F & C Osler and Co., Balmer Lawrie, Jessop & Co, John Fleming etc. Understanding the growing demands of electricity particularly in textile mills, Greaves Cotton, the biggest group of spinning mills, setup it's Electrical Engineering Department in 1904. The holding agency for Crompton F & A Parkinson and Verity & Co. and took up contract jobs for electrification of textile mills. Martin & Co. agents to Crompton & Co. undertook jute mills electrification in a big way.

GEC (India) Ltd was the first distribution company to be set up in India and later, there were others who joined the race like Siemens in 1922. This was followed by Indian Cable Company which setup a manufacturing plant in Jamshedpur in 1923; AEI (India) Ltd in 1924.; Westinghouse
Brakes & Signals in Calcutta in the late 1920s; Crompton Parkinson in
Bombay in 1937; Philips Electrical Co. (India) Limited in Calcutta in 1931;
Union Carbide (India) Ltd for batteries; National Carbon Products in 1934
and AEI Manufacturing Co. Ltd. in Calcutta in 1939.

2.1.5 POST INDEPENDENCE ERA

By the time India became independent in 1947, the total installed
capacity in the country was 1,392 MW (884 MW Thermal and 508 Hydro).
The growth of the installed capacity in the next fifty years has been
phenomenal reaching at 83,288 MW in 1996. Yet, the country remains
power-starved because of the significantly growing demand. In the earlier
years, electricity was not very easy to sell. The power generation
companies had to strive hard against consumer apathy who were content
with oil, gas and kerosene lamps. The age-old superstition, shock, scares
etc. refrained many from accepting a new technology. As the electrical
appliances started coming in, even though the consumers were skeptical
to start with, they slowly shrugged off inhibition and accepted the
newcomer.

Twentieth Century has proved to be an age of electricity. A country's
level of development largely depends on the quantum of power
generation and utilization. No development has since had more pervasive
effect on the quality of life than the public distribution of electricity.
One way or the other, electricity is destined to play a pivotal role in the development of human society well into the future. In spite of all the disadvantages against electricity, it is responsible to provide all comfort, convenience and a better quality of life at the flick of the switch.

Since independence, development of the electricity sector was primarily the responsibility of the government, with a relatively small contribution from private enterprises, in the form of licensees like Bombay suburban electricity supply company (BSES), Tata Electric Company (TEC), Calcutta Electric Supply Company (CESC) and Ahmedabad Electric Company (AEC), etc. The Post Independence era saw a flurry of activities in the Industrial scenario in the country with the adoption of the Five Year Plans. This resulted in a growing demand on the power sector which could not be met by the existing private companies in the power sector. Therefore the task of developing the power sector fell on the government. It was then that the Electricity statues were constituted to develop the power sector.

2.1.6 IMPORTANT LEGISLATIONS IN THE POST INDEPENDENCE ERA

The Central Electricity statues - The Indian Electricity Act, 1910 and The Electricity (Supply) Act, 1948 govern the structure of the ESI. The existing structure of power industry is a combination of public and private sector enterprise working in accordance with National Power Policy.
2.2 ORGANISATIONAL SET-UP
The Central Electricity Authority is the statutory organization constituted under the Electricity (Supply) Act 1948 to develop the national power policy and to prepare power plans.

2.3 VARIOUS ENTITIES IN THE POWER SECTOR
With traditional government controlled vertically integrated monopoly giving way for new multi-player, market-driven scenario, the opportunity in power sector attracted entrepreneurs into the sector. The ever-growing demand gap asked for addition of 10000 MW generation capacity per year.
These forces coupled to give rise to different strategies that were new to the sector. One of the fast growing strategies that attracted a lot of players was—Small Power Plants or ‘Midgets’. State treasuries were empty and debt was already throttling loss making state run power units. The lack of internally generated funds and the inability of treasuries to provide funds have resulted in severe shortages of capital for expanding generating capacity. Governments (central and state) and utilities hoped to solve these capital scarcity problems with an influx of private capital. It was also believed that the indigenous private sector might not have the necessary capital, as the foreign exchange component of funds required by the power sector could be large.

The Central government had established central sector entities in the areas of generation and the transmission. The various central generating companies involved in bulk power generation are National Thermal Power Corporation (NTPC), National Hydro electric Power Corporation (NHPC), Northeastern Electric Power Corporation (NEEPCO), Neyveli Lignite Corporation (NLC) and Nuclear Power Corporation (NPC).

The only entity in the central sector which is entrusted with the exclusive responsibility for bulk transmission, is Power Grid Corporation, established by the Government of India in 1989 to ensure integrated power grid operation; Operation & Maintenance of transmission lines and
delivery of bulk power from central generation stations to the respective beneficiary state as well as exchanges within and between regions.

2.4. MAJOR PLAYERS

2.4.1 STATE ELECTRICITY BOARDS

All the SEBs are vertically integrated, dealing with all the functions of generation, transmission and distribution and the sale of electricity to retail consumers. The bulk of generating capacity in the country is owned and operated by the SEBs, who rely for power supply not only on their own generation but also on bulk supply purchases from other sources, which includes state generating private companies, allocations from central sector generating companies and shares from inter-state and multi-purpose projects.

The country's electricity needs were enormous. Government's perspective plan for the power sector indicated that there would an incremental capacity requirement of 142000 MW during the period 1992-2007 to meet the demand over this period. That would imply creation of an incremental capacity of nearly 10000 to 12000 MW per year. This mammoth task and the decreasing health of the State finances forced government to invite private participation in the power sector. The private participation was invited in all the three parts of the sector - generation, transmission and distribution. A number of policy initiatives have been taken since 1991 for encouraging private investment in power.
sector with a view to streamline the procedure and delegation of power for early implementation of projects.

2.4.2 ELECTRICITY GENERATION - PLAYERS

In India major portion of power is generated by the following players Central Utilities such as NTPC, NHPC, Nuclear Power Corporation, Damodar Valley Corporation and NEEPCO.

2.4.3 ELECTRICITY TRANSMISSION - PLAYERS

In the Transmission sector, a few states have unbundled their transmission and corporatized their SEB. In all other states, transmission is still in the control of SEBs except the 5 cities where licensees control the transmission of power.

2.4.4 ELECTRICITY DISTRIBUTION - PLAYERS

Orissa is the only state where power distribution has been entrusted to the private sector. Orissa has been divided into 4 zones - Wesco, Nesco, Southco and Cesco. BSES has a 51% stake in the first 3 and AES has a 51% stake in the last. The remaining stake is held by Gridco. In all other states, distribution is in the control of SEBs except the 5 cities where licensees control the distribution of power.
2.4.5 CENTRAL UTILITIES

Central Power Utilities are government controlled power generating companies. The CPUs operating in India are

Table 1: Central Utilities in the power sector in India

<table>
<thead>
<tr>
<th>Central Power Utilities</th>
<th>Capacity (FY02-03) (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Thermal Power Corporation</td>
<td>19466</td>
</tr>
<tr>
<td>National Hydro Power Corporation</td>
<td>2135</td>
</tr>
<tr>
<td>Nuclear Power Corporation</td>
<td>4110</td>
</tr>
<tr>
<td>Neyveli Lignite Corporation</td>
<td>NA</td>
</tr>
<tr>
<td>Damodar Valley Corporation</td>
<td>2760</td>
</tr>
<tr>
<td>North-Eastern Electric Power Corporation</td>
<td>625</td>
</tr>
<tr>
<td>Bhakra Beas Management Board</td>
<td>NA</td>
</tr>
</tbody>
</table>

CPUs have dominated the Indian power generation sector, accounting for 38% of total power generated. Even after the new power policy of 1991, their share in power generated as well as new capacity added has not diminished significantly, largely due to failure of IPPs to take off.

2.4.6 POWER GRID CORPORATION OF INDIA

Power grid was formed in 1989 with the main objective of efficient operation and maintenance of transmission systems all across the country.
and strengthening of Regional Power Grids and establishing inter-regional links, leading to the formation of National Power Grid.

2.4.7 POWER FINANCE CORPORATION OF INDIA

PFC was established in July 1986 as a Development Financial Institution (DFI) dedicated to the Power Sector. It provides financial assistance for power projects and state power sector reforms.

2.4.8 RURAL ELECTRIFICATION CORPORATION

It was formed for providing financial assistance for rural electrification projects.

2.4.9 POWER TRADING CORPORATION OF INDIA

It was formed with the objective of facilitating trading of power between surplus and deficit states. Under the mega power policy, power sales from the mega power generating station will be routed through PTC.

2.5 INDIAN POWER SECTOR - FACTS AND FIGURES

India has an installed capacity of 112 GW and a Transmission and Distribution infrastructure of over 5.7 million circuit kilometers. In 2002, India ranked sixth in world electricity generation and third in Asia-Pacific, next only to China and Japan. India’s share in world electricity generation has steadily increased from 2.4 per cent in 1994 to 3.6 per cent in 2002.
India has been divided into five geographical regions for administrative purposes, management of transmission lines; load dispatch centers and inter state transfer of power. All the regions are further connected by High voltage AC and DC transmission lines.

Government of India along with all state governments has taken and is going to take leaps towards the reforms of the power sector. The power sector was among the first sectors to be opened up for private sector investment during the early 1990s. Though the initial impetus was on investment for power generation projects, the government subsequently allowed private investment in distribution and transmission projects also.

India had around 1,24,287 MW of installed power generating capacity in the year 2006. Thermal power plants comprise almost 70 per cent of this capacity, hydroelectric plants about 16 per cent, while the remaining is from nuclear plants. A relatively smaller percentage is contributed by the non-conventional energy sources.

Considering the economic growth targets, significant power generation capacities need to be added. The Planning Commission has estimated that around 47,000 MW of new power generation facilities will have to be set up over the next 5 years. This would require an investment of around US$ 73 billion.
The following table depicts the per capita energy consumption worldwide and the position of India. Statistics on World Wide Per Capita Energy Consumption

Table 2: World Wide Per Capita Energy Consumption

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Country</th>
<th>Per Capita Consumption (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Argentina</td>
<td>2185</td>
</tr>
<tr>
<td>2</td>
<td>Brazil</td>
<td>1883</td>
</tr>
<tr>
<td>3</td>
<td>PRC</td>
<td>1379</td>
</tr>
<tr>
<td>4</td>
<td>India (2004-05)</td>
<td>613</td>
</tr>
<tr>
<td>5</td>
<td>Japan</td>
<td>7818</td>
</tr>
<tr>
<td>6</td>
<td>Mexico</td>
<td>1801</td>
</tr>
<tr>
<td>7</td>
<td>Thailand</td>
<td>1752</td>
</tr>
<tr>
<td>8</td>
<td>USA</td>
<td>13078</td>
</tr>
<tr>
<td>9</td>
<td>World</td>
<td>2456</td>
</tr>
</tbody>
</table>

2.6 CAPACITY, GENERATION AND CONSUMPTION PATTERNS

2.6.1 CAPACITY

India's power generation capacity stood at around 96600MW in 2000. The major portion of the capacity has been set up by SEBs (58%). This was followed by centrally controlled plants which contributed 34%. IPPs have started contributing to installed capacity only as recently as 1996 when
the first IPP, GVK's 216MW power plant at Jegurupadu in Andhra Pradesh was commissioned. The installed capacity is distributed as follows

Table 3 : Sector wise Installed Capacity of Power 5

<table>
<thead>
<tr>
<th>Ownership</th>
<th>Hydro</th>
<th>Steam</th>
<th>Gas</th>
<th>Diesel</th>
<th>Nuclear</th>
<th>Renewable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>25248</td>
<td>38305</td>
<td>3500</td>
<td>605</td>
<td>0</td>
<td>68</td>
<td>67725</td>
</tr>
<tr>
<td>Central</td>
<td>6172</td>
<td>25973</td>
<td>4419</td>
<td>0</td>
<td>3360</td>
<td>0</td>
<td>39924</td>
</tr>
<tr>
<td>Private</td>
<td>906</td>
<td>4241</td>
<td>4771</td>
<td>597</td>
<td>0</td>
<td>6123</td>
<td>16639</td>
</tr>
<tr>
<td>Total</td>
<td>32326</td>
<td>68519</td>
<td>12690</td>
<td>1202</td>
<td>3360</td>
<td>6191</td>
<td>124287</td>
</tr>
</tbody>
</table>

Note: Additional Captive Generating Capacity = 19485 MW

Although the CEA had initially projected a shortfall of 150000 MW in 15 years and therefore a capacity addition target of 10000 MW every year, the actual capacity addition has been far short of targets.

Revised Capacity Addition Targets

The CEA has recently revised the capacity addition target to 100000 MW in the next 15 years from the earlier 150000 MW. This implies an annual addition of 8500 MW. This revision is under the assumption that a National Grid would be in place, T&D losses would be minimized and R&M of plants would be carried out at a vigorous pace, which would together take care of 25000MW of capacity. But at the present, rate of capacity addition, even 8500MW looks like a tall target.
### 2.6.2 Privately Owned Generation Capacity and Its Share

#### Table 4: Privately Owned Generation Capacity and Its Share

<table>
<thead>
<tr>
<th>Regions</th>
<th>Total Capacity (MW)</th>
<th>Private Capacity (MW)</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern</td>
<td>33782</td>
<td>571</td>
<td>1.69</td>
</tr>
<tr>
<td>Western</td>
<td>34868</td>
<td>5793</td>
<td>16.61</td>
</tr>
<tr>
<td>Southern</td>
<td>35819</td>
<td>5212</td>
<td>14.55</td>
</tr>
<tr>
<td>Eastern</td>
<td>16681</td>
<td>1565</td>
<td>9.38</td>
</tr>
<tr>
<td>North-Eastern</td>
<td>2443</td>
<td>26</td>
<td>1.07</td>
</tr>
<tr>
<td>All India</td>
<td>123668</td>
<td>13187</td>
<td>10.66</td>
</tr>
</tbody>
</table>

(As of 31 Dec. 2005)

### 2.6.3 Plant Load Factor

The average PLF in India was 56.4% in 2000. Low PLFs are partly due to inadequate investment in R&M of power plants.

### 2.6.4 Consumption

The All-India Energy consumption in 2002 was 313bn KWH. The electricity consumption over the past five years has grown at a CAGR of 7.2%. The elasticity of electricity consumption to GDP growth has been estimated at 1.1X. The consumption in the past five years has been as follows
### Table 5: Yearly Consumption Patterns (as per 2004-05 data)

<table>
<thead>
<tr>
<th>Year</th>
<th>Electricity Consumption (Million KWH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>3,16,600</td>
</tr>
<tr>
<td>2001-02</td>
<td>3,32,460</td>
</tr>
<tr>
<td>2002-03</td>
<td>3,39,599</td>
</tr>
<tr>
<td>2003-04</td>
<td>3,60,937</td>
</tr>
<tr>
<td>2004-05</td>
<td>3,86,133</td>
</tr>
</tbody>
</table>

### Table 6: Sector Wise Consumption In Percentage

<table>
<thead>
<tr>
<th>Sector</th>
<th>Consumption (million Kwh)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>95,659</td>
<td>34.4</td>
</tr>
<tr>
<td>Agriculture</td>
<td>88,555</td>
<td>31.9</td>
</tr>
<tr>
<td>Commercial</td>
<td>31,381</td>
<td>11.3</td>
</tr>
<tr>
<td>Industry</td>
<td>43,668</td>
<td>15.7</td>
</tr>
<tr>
<td>Railway</td>
<td>9,495</td>
<td>3.4</td>
</tr>
<tr>
<td>Others</td>
<td>8,867</td>
<td>3.1</td>
</tr>
<tr>
<td>Total</td>
<td>2,77,625</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Domestic segment remains the biggest consumer of electricity and its share in the overall electricity consumption was 34.4% in 2004-05. It is closely followed by agriculture and then Industry consumption.
2.6.5 MAJOR AREAS OF POWER CONSUMPTION

In the last three decades, maximum growth in consumption was registered under the domestic and agricultural consumer segments. Increased use of electronic equipment by India's huge middle class population, improving reach of power distribution in rural areas and increased use of irrigation have led to higher growth in these areas. Domestic consumption is certain to remain a high growth area in future, while growth in agricultural consumption is expected to taper and reduce in percentage terms.

2.7 SOURCES OF ENERGY

Coal, oil, gas and hydroelectric potential constitute the conventional sources for electricity generation in the country. Coal-based thermal power plants and hydro-power plants have been the mainstay of electricity generation, counting for more than 80% for thermal and 14% for hydro power plants. Oil, natural gas and nuclear power account for a smaller proportion.

The all India installed generating capacity of hydro-thermal (including nuclear, gas, oil and wind) mix stands at 14:82.
2.7.1 THERMAL POTENTIAL

The total coal reserves are assessed at 186bn ton which is suitable for power generation. The country also has some 5bn ton of lignite deposits suitable for power generation. Electricity extracted from these fuels can meet the growing needs in the next 100 years and beyond.

2.7.2 RENEWABLE SOURCES:

As regards hydel generation, it is assessed that exploitable potential at 60% load factor is 84,000mw which could yield 442bn units of 'firm' generation annually and a further 150 bn units of 'infirm' seasonal electricity. Most of the hydel potential (about 75%) remains to be exploited.

The country also possesses renewable energy sources in abundance. Potential generation capacity according to official estimates is 126,000mw. The largest source (79,000mw) however, is of ocean, thermal, tidal and wave power, technologies for which are yet to be established through pilot schemes. Solar energy also available in abundance needs to be tapped.

Indian coal reserves are predominantly inferior in quality with relatively low gross calorific value. There are also adverse environmental consequences of increased use of these reserves for power generation.
These considerations call for an integrated medium and long-term fuel policy for the power sector.

India has shortage of oil and gas. While several schemes are being talked about to import liquefied natural gas (LNG), the lead time, costs and other implications are major variables which will determine its viability.

2.8 FUEL PATTERNS - DEPENDENCE ON THERMAL POWER

India has estimated coal reserves of 186bn ton, enough to meet the nation's requirement for 100 years at current extraction and consumption rates. Abundant availability of coal, coupled with low gestation period of 3-4 years with thermal power plants (compared to 15-20 years for hydroelectric power plants), has encouraged a build-up of thermal capacity. Thermal power makes up about 8% of India's total power supply.

2.9 THE LACUNA PREVAILING IN THE POWER SECTOR

The power sector in India was at a crossroads during the period before the 1990’s. It was riddled with multifarious problems right from demand supply management to a whole lot of political problems. At this juncture, when India had thrown out its inhibitions and was whole heartedly embracing liberalization through the New Economic Policy of 1991, the power sector was not in a position to complement the growth of the national economy with its serious maladies some of which are as stated below:-
2.9.1 CAPACITY-SUPPLY GAP

With India’s installed capacity at 1,01,660 MW, the controlled demand should have been higher than 65000 MW. However, the per capita consumption was approximately 360 kWh against the World Average of approximately 2,200 kWh. There existed a huge distance between the installed generating capacity and the supply. The Plant Load Factor (PLF) shows that the country’s power generation capacities had grossly been under utilized. It was a matter of concern that only about 52000 MW was available to the consumer as against an installed capacity of 1,01,660 MW with a transmission and distribution loss of 21.5%. The shortage was significant which got compounded by the peak demand.

2.9.2 NEW CAPACITY ADDITION

To keep pace with the growth of the Indian economy, it had become necessary for the country to improve its power supply. As the capacities took considerable time to yield benefits, advance planning became essential to meet the future demand. Though fullest utilization of the existing capacity was of utmost importance it could not be a substitute for the new capacity addition.

2.9.3 AVAILABILITY OF FUEL

With the share of hydel power being only around 20% out of the total capacity of the country, the balance power generation comes from thermal, nuclear and gas/liquid power plants. Looking to the scenario of
the western region, hydel power is only 14% of the total capacity of the western region. Mix of thermal and hydro should be 50:50, however development towards the hydel resource is not optimistic due to one or the other reason. Nuclear power plants have long suffered from political and technical limitations in India.

Therefore, Indian power sector heavily depended on thermal power plants - which use fossil fuel. Though 90% village had been electrified, only less than 40% of rural houses are connected. At present 10,000 - 15,000 MW annual growth is still needed. Therefore it became the need of the day to tap other sources of renewable power generating sources.

2.9.4 T&D LOSSES

Transmission and Distribution (T&D) losses arise on 2 counts:

When electricity is transmitted over long distances, some amount of electricity is lost. Installation of HVDC equipment can solve the problem to some extent. However, even the best designed system has T&D losses of 5-6%.

In the Indian context, a significant portion of losses arise due to thefts and pilferages. These can be eliminated through better vigilance and installation of theft-proof meters.

The T&D losses in India have been as follows:
Table 7: Transmission & Distribution Losses in India

<table>
<thead>
<tr>
<th>Year</th>
<th>T&amp;D losses (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998-99</td>
<td>22.2</td>
</tr>
<tr>
<td>1999-00</td>
<td>23.0</td>
</tr>
<tr>
<td>2000-01</td>
<td>21.8</td>
</tr>
<tr>
<td>2001-02</td>
<td>20.8</td>
</tr>
<tr>
<td>2002-03</td>
<td>25</td>
</tr>
<tr>
<td>2003-04</td>
<td>30</td>
</tr>
<tr>
<td>2004-05</td>
<td>33</td>
</tr>
</tbody>
</table>

The high incidence of T&D losses is partly responsible for huge power shortages and distorted tariffs.

2.9.5 SHORTAGES

While the energy shortfall has reduced over the last few years, peak shortfall continues to rise. However, the reduction in energy shortfall has been at a time when industry is going through recessionary conditions. It is expected that with a pick up in industrial activity, the energy shortages are likely to rise in the next few years.

There are however pockets of deficit and surplus in India, which implies that a well established National Grid for the transportation of electricity would reduce the shortfall to some extent.
2.9.6 POLITICAL ISSUES

Power sector had been grossly neglected by the government when it came to reforms because of largely selfish political motives. The major policies were not framed on purely economic grounds but with an objective to achieve selfish motives. The successive government was reluctant to implement any measure to improve the power sector due to the fear of loosing political battles as it called for some tough steps.

Among the important sectors—transport, power and telecommunication—power sector has shown significant and sustained gaps for long. The poor performance of SEBs, with increasing financial strain emanating from low average tariffs and high cross subsidies to agriculture and household sectors have stifled the growth of this sector. According to Tenth Plan approach paper, “The energy infrastructure will be a major constraint to any effort to achieve a significant acceleration on the growth of GDP in Tenth Plan period. This will place heavy demands on the generation and distribution of electric power. Furthermore, in globally competitive environment, the quality of these services in terms of both price and reliability are as important as availability and it is well-known that we face serious problems on both counts.” But fundamental issues—such as frequent power cuts, both scheduled and unscheduled, erratic voltage and low or high supply frequency have added to ‘power woes’ of the consumers. The Indian Power industry has since independence faced the demand and supply gap.
2.9.7 PROJECT RISKS

With the large capital outlay and long gestation period, the risk levels in power projects are quite high. Various risk involved are

- Project implementation risks- including fuel supply risk
- Operational risks-including fuel supply risk
- Commercial risks
- Political risks
- Exchange rate risks

The Indian Power sector faced these glaring disparities which needed some urgent action.

Some other notable problems being faced by the power sector were:-

- Lack of focus and absence of a clear-cut policy (e.g. Government of India’s initial attempt at promoting projects based on liquid fuel like naphtha which turned nonviable, mega projects which could not take shape ).

- Lack of exposure of Indian entrepreneurs to the Indian power sector, which limited their perspective on developing and operating power projects.
• Inexperience of SEBs in operating in the changed market environment and their poor financial health, which limited their escrow capacity.
• Unavailability of fuel and unwillingness of fuel suppliers to enter into bankable contracts.
• Lack of necessary infrastructure to transport and store fuel and high cost risk involved in transporting fuel.
• Limited financial capability of the promoters to bring equity.
• Weak financial condition of SEBs was the biggest roadblock for sector's development.

2.10 THE NEED FOR REFORMS

In 1991, India faced a macroeconomic crisis involving an adverse balance of payment situation, a mounting debt burden, a serious budgetary deficit and unsustainable levels of losses, a persistent shortage of power - all this coupled with the political instability to present a very dismal picture of the Indian economy.

This led to World Bank pressurizing the government to adopt the policies of liberalization, privatization and globalization to which the Government of India yielded. Dr. Manmohan Singh, who was the finance minister in the Narasimha Rao cabinet was entrusted with the responsibility of initiating the reforms along with Mr. Montek Singh Ahluwalia. This team decided to introduce the national economic reforms policies. As a Part of this they
introduced "Structural adjustments mechanism" and "NEP Vis-à-vis NIP" i.e. New Economic policy and New Industrial policy.

In 1991, it was envisioned that although India is having full potential to become a developed nation, its inadequate infrastructure may lead to a trailing position in the competition of economic growth at world level. Therefore, structural adjustments were decided to be converted into aggressive economic reform policies where its sub-domains were liberalization, privatization and globalization.

“Structural Adjustments” made by GOI in the new economic policy and new industrial policy was an indication for many who witnessed this as the first phase of “Liberalization”. There was a “New World Order” globally under the intangible influence of the great USA on one side and on the other side there was an unexpected fall of the communist super power - USSR (United Stated of Soviet Russia), which was a strong and powerful ally of India.

At this stage, India had no choice but to fall prey to the loan conditions inflicted by IMF and World Bank (The Bretton-Wood institutions). This had led Indian economy in doldrums initially but Indian family owned businesses responded well to the change in the policies. There was a lot of hue and cry for a “level playing field” from domestic players compared
to the MNCs with their Foreign Direct Investments or Joint Ventures. But over a period of time, everything seemed to settle on its own.

Electricity consumption in India has more than doubled in the last decade, outpacing economic growth. The primary energy supply in the country is coal-dominant with the power sector accounting for about 40% of primary energy and 70% of coal consumption. It is also the single largest consumer of capital, drawing over one-sixth of all the Indian investments over the past decade. Fuelled by high coal and investment consumption, India’s power sector has grown 80-fold since independence to over 107,000 MW but the per capita power consumption is very low, approximately 350 kWh/year.

The existence of huge demand supply gap clearly indicates the inefficiency of the mammoth organizational setup of the Indian Power Sector. On critical analysis of the setup, it was found that the inefficiency is caused as most of them have overlapping functions. The involvement of State Government in this sector has further complicated the issue, each state has developed its own electricity policy and pricing based on its own interest rather than thinking of the country as a whole. The different pricing regimes and distribution policies of state governments further aggravated the power situation.
The failure of the huge federal structure and the changing global scenarios has forced Government to think of ways to revive this fundamental infrastructure sector.

The hardship of the state controlled power units, due to lack of fresh capital, environmental concerns and inability of these units to meet the socialist agenda, was further aggravated because of their declining technical performance. All this and the growing trend of liberalization in the country caused a shift in the stand of the government.
3.1 GUJARAT POWER SECTOR - A BRIEF PROFILE

The Gujarat Electricity Board was formed on 1st May 1960 as an SEB for generation, transmission and distribution of power to the state of Gujarat. It began with an installed power capacity of 315 MW. During the Ninth Plan, 2108 MW power generation capacity was added in the system and the installed capacity reached 8576 MW. Efforts were made to add more than 4,000 MW generation capacity during the Tenth Plan.

3.2 Among the major power plants in Gujarat are:

- Ukai (850 MW)
- Utran (39 MW)
- Gandhinagar (660 MW)
- Panandhro (140 MW)
- Kadana (120 MW).
- Wanakbori (1260 MW)
- Ahmedabad Electricity Company (510 MW)
- Dhuvaran (588 MW)
- Sikka (240 MW)

As on 31.03.2003, the total installed capacity in the State was 8576 MW. It may be added here that in addition to this, there is a capacity of 1306 MW (of which the state procures 507 MW) from captive generating sets
put up by different Companies within State. The State's per capita annual electricity consumption is 944 kWh compared to national average of 510 kWh.

During the 9th Plan, 2108 MW power generation capacity was added in the system and the installed capacity has now reached to 8576 MW at the end of 2002-03. During the 10th five-year Plan, the state had planned to add more than 4,000 MW generation capacity. However the capacity addition in the last three years was hardly 100 MW. Special efforts were also made to increase the Plant Load Factor (PLF) of the existing power station by way of taking measures on renovation and modernization as well as following good maintenance practices for increase in generation and efficiency. GEB attained PLF 69.69% at the end of the year 2002-03 that is the highest ever.

3.3 CONSTITUTION OF WESTERN REGION ELECTRICITY BOARD

The Western regional electricity board (WREB) was formally set up in 1964 in pursuance of Government of India resolution with representation from the state of Gujarat, Madhya Pradesh and Maharashtra and the central electricity authority in order to promote integrated operation of the power system in the region and to ensure optimum utilization of the power resources in the region. Goa, Union territories of Daman, Diu and Dadra and Nagar Haveli, Nuclear Power Corporation of India Ltd, National Thermal Power Corporation Ltd, Power Grid Corporation of India Ltd and
Power trading Corporation of India Ltd and Chhattisgarh State Electricity Board were also nominated subsequently as member of WREB in accordance with various resolutions of the government of India issued from time to time.

The constitution of WREB is as follows:

- Chairman, Gujarat State Electricity Board
- Chairman, Maharashtra State Electricity Board
- Chairman, Madhya Pradesh State Electricity Board
- Chairman, Chhattisgarh State Electricity Board
- Member (Grid and operation), Central Electricity authority
- Principal secretary to government of Gujarat, energy and petrochemical department
- Principal secretary (energy) to government of Madhya Pradesh
- Energy secretary to the government of Maharashtra, department of energy and environment
- Secretary (energy/power) to the government of Chhattisgarh
- Chief engineer (elect.) to government of Maharashtra, hydro Projects
- Chief electrical engineer, electricity department, government of Goa
- Collector and special secretary (power), union territory of Dadra and Nagar Haveli
- Secretary (power) union territory of Daman and Diu
3.3.1 FUNCTIONS OF THE WREB

- Planning and ensuring integrated operation of the constituent power system in the western region in such a manner that maximum possible benefits are realized by the region from the total amount of power generated and transmitted at any time.
- Reviewing the progress of the power projects in the region.
- Preparation of a well-coordinated maintenance and overhaul programme for the generating units in the region.
- Planning and coordinating shutdowns of 400 kV and major 220 kV transmission elements for maintenance etc.
- Planning the generation schedule to be followed by the constituent power systems.
- Energy accounting on daily basis and monthly basis for billing purposes.
- Facilitation of commercial arrangements for inter-utility trading of power.
- Coordination and revision of protection aspects of regional grid.
- Coordination and conducting of various system studies for assessment of capacitor requirement, transmission capability etc.

- Coordinating mutual exchanges of power and energy between the constituent states and with neighboring regions.

- Determining a suitable tariff structure to govern inter-state/inter-regional exchanges of power.

- Consideration of any other relevant matter for economic and smooth operation of the western regional grid.
SECTION 4
POWER REFORMS IN GUJARAT

4.1 NEED FOR REFORMS IN GUJARAT

Till the nineties, the State Electricity Boards were besotted with multifarious problems which were throttling its efficiency. Some of the problems are stated below:

- Electricity Boards were large, monolithic, unwieldy bodies. It was a highly centralized set up with no proper demarcation in its functioning.
- Boards were chiefly concerned with fire fighting, there was lack of long term vision in successfully running the organization.
- Finance was a major constraint as far as the electricity boards were concerned. Electricity sector was largely dependent on State Governments and the State resources were getting scarce.
- Lack of motivation in the employees and the need for a culture change.
- Boards had become virtually sick undertakings.
- Environment not conducive for initiative and accountability.

As per the statistics available in 2004, the cost of supply was Rs. 3.50/kWh and the realization only Rs. 2.40/kWh. i.e. much of the electricity generated was sold below cost. Some of the major problems faced by the
SEBs were in terms of the highly centralized set-up, lack of necessary infrastructure, lack of financial resources.

Commercial losses of all SEBs put together stood at Rs. 6,332 crore in March '95. The net Rate of Return (ROR) that states had earned in 1994-95 was (-13.5%) as against statutory 3%. The average cost of generation in 1994-95 was Rs. 1,599 per KWH while average price to the customer was Rs. 1,329 kWh.

Large scale power theft (approximately 15-18% of power generated) leading to very high transmission and distribution losses was another major problem faced by the SEBs. This alone amounted to a loss of around Rs. 30,000 crores annually. Incomplete billing and very poor revenue collection by Electricity boards were some other drawbacks of SEBs. Subsidies on agriculture accounted for approximately 30% of the losses. This vast consumption sector gave only less than 5% revenues thus bleeding the power sector. The losses excluding subsidy were estimated to be approximately Rs. 180 Billion annually. Unviable tariff structure, dismal financial condition of the electricity boards etc. were some other ailments of the SEBs. There was a huge disparity in the investment between Generation and Transmission/ Distribution due to which the transmission and distribution system remained weak and inadequate. The result was that even if power was available, there were long power outages. Subsidies to the domestic consumers were some of the other
problems faced by the SEBs. Almost all the state governments had implemented social subsidy policy through the SEBs thereby compromising the financial viability of the SEBs. All of them subsidized the agricultural consumers who were not even charged the marginal cost of production. In practice, all the SEBs had found vital commercial subjects such as tariffs, new connections and disconnections beyond their purview. This had kept them operating on fully commercial basis.

The SEBs were unable to mobilize these resources due to lack of Financial and managerial autonomy.

Due to all these reasons the need was felt by the State government for initiating major reforms in the power sector.

4.2 OBJECTIVES OF POWER REFORMS:

"To set up an Electricity Industry which is commercially viable, efficient, self sustained, economical, professional, quality conscious and consumer friendly"

The power policy of Gujarat has taken into consideration the objectives set in the industrial policy and other sectoral policies. The following are the objectives of the power policy of the State:
1. To plan and build up adequate capacities in generation, transmission and distribution of power through efficient and cost effective means.

2. To achieve optimum utilization of existing equipments and assets through renovation and modernization.

3. To rationalize the tariff structure to ensure reasonable rate of return to power utilities and generate surplus needed for future investment.

4. To improve delivery of services and achieve cost effectiveness through technical, managerial and administrative restructuring of the utilities.

5. To achieve conservation of energy through efficient utilization and demand side management, and minimizing waste.

6. To encourage generation of power through non-conventional sources of energy.

4.3 BASIC CONCEPT OF REFORMS

The reforms were initiated by the Gujarat government with a view:

- To segregate the Regulatory and Utility functions.
- To unbundled the State Electricity board and decentralize the organization for better administrative purposes.
- To corporatize the electricity utilities.
- To function effectively to provide better services to the consumer.
➢ To work out a middle path in the best interests of the electricity utilities and the consumers.

4.4 IMPORTANT FEATURES OF REFORMS

When the processes of reforms were initiated, the basic features of the reforms were highlighted as follows:

➢ The existing independent regulatory commission to continue as a statutory body under the new act.
➢ Vesting all regulatory functions in the commission
➢ The state government to work on its role to set Broad Policy Directives
➢ Unbundling of the board on functional basis -Generation, Transmission, Distribution etc.
➢ Incorporate companies to assume the unbundled functions
➢ Initiate a transparent decision making process

4.5 NEED FOR STATE REFORM ACT

After the Industrialization Policy of 1990's when major changes were being initiated in the power industry sector at the national level, Gujarat government also did its part in revamping the power sector through its Power Policy. The need for implementing the State Reform Act was felt due to the following reasons:-
• Central Acts did not have provisions enabling the reorganization of the Gujarat Electricity Board. Transfer of assets, functions, liabilities and more importantly personnel were difficult in the absence of statutory transfer scheme binding on all.

• Constitution of the commission under the Central Act optional

• State Legislature should own the Reform - It should be result of legislative action and not merely executive

• Differences in State’s need and outlook - Special features could not be captured in the Central Act.

4.6 REFORMS INITIATED IN DIFFERENT AREAS

i. In the Generation Sector:

The reforms in the generation of power were initiated to achieve the following:-

❖ To open up the generation of power to private players in the state thereby encouraging a healthy and competitive level playing field by both State sector enterprises and private companies

❖ To help the State to select Independent Power Producers (IPPs) on a competitive and transparent basis and provide attractive returns to IPPs. The Power produced by IPPs would be purchased at levelized tariff at the bus-bar.

❖ Early Completion, Commissioning and Stabilization of new units.
In order to provide quick capacity addition to meet the minimum needs of the State Grid, it is proposed to build a number of small generating power plants at sub-station levels based on liquid fuels.

Gujarat offers site advantage for port-based liquid fuel power plants both large and small. Liquid fuel is more eco-friendly compared to lignite and coal. This strategy could be extended to put up small plants at sub station level also. Besides, there would be other multiple advantages such as low capital cost, reasonable operating cost, short gestation period, reduction in T & D loss and generation of employment in rural areas.

Renovation, Modernization and Management of Existing Power Plants:- An important area which had not received sufficient attention was the upkeep of existing plants. Some of the power stations in Gujarat had outlived their original life span; in the absence of surplus generation capacities, due attention had not been paid to scheduled maintenance, renovation and modernization of the existing plants. This had resulted in unplanned outages and frequent breakdowns. As a result, availability factor and the Plant Load Factor of a number of plants were below satisfactory level. It was proposed to increase the operating efficiency of the existing plants through introduction of professional management and renovation and modernization programmes. The process of renovation and modernization involved substantial investment. The State proposed to throw open the renovation and modernization of the existing
plants to private sector (joint sector) participation which could help in bringing in more efficient management practices leading to greater availability of power.

❖ Private Sector to be allowed to operate/manage the plants wherever necessary. Such participation by the private sector may follow the following routes:- Lease, Rehabilitate, Operate and Transfer (LROT); Joint Asset Management with State Electricity Boards and Sale of existing plants to private sector or to any joint sector venture.

❖ Captive Generation: In the context of continuing gap between projected generation and demand for power in the State, it recognized the need for captive generation of power by Industries. This was to be encouraged by the State as a means to augment the power supply. Captive generation would ease the burden on distribution system and also make surplus power available for the State Grid. Private industries including EOU's would be permitted to go for captive generation up to 60 MW without any restriction. For higher captive capacity decision, would be taken by the State Government on a case to case basis.

❖ Co-Generation: The co-generation combines the process of recovering steam and power from the same single fuel source. After the power is generated, the waste heat from the exhaust is collected to generate steam. The State would encourage the industries to generate steam through co-generation. This would help waste heat recovery and lead to energy efficiency.
Gujarat Electricity Board would consider purchase of surplus power from captive units on mutually agreed terms covering price, timing, quantum and the period of purchase of power.

The State's small endeavor was to get the maximum benefit out of the non-conventional and renewable sources of energy which are clean and eco-friendly. The state intended to rationalize the incentive scheme for wind farms to attract more private investors and also simplifying procedure for allotting government waste land for above purpose.

It was proposed to encourage setting up of suitable solar power stations in North Gujarat and Kutch/ Saurashtra by tapping solar energy both for generation of power and green house. The State has 19 sugar mills which could generate 200 MW of power from the bagasse. Even other sources like paddy husk and other biomass, agricultural waste etc. that are available in the State were being thought of as alternate sources to tap eco-friendly fuel.

ii. In the Transmission Sector:
In order to provide efficiency in transmission, there was a need to upgrade the transmission system. In the area of Power transmission, the state had come up with the following initiatives for reforms.

The State Power Grid would be maintained by the Gujarat Electricity Board. In addition to its own generation, GEB would transmit power of
different generating companies for distribution, to its own substation in Gujarat or to the substations of private distribution companies. The necessary wheeling charges would be paid by the distribution companies.

Higher investments in the transmission sector; a time bound programme to minimize the transmission losses; private sector participation in setting up transmission lines and equipment for or on behalf of Gujarat Electricity Board, etc. were some other strategies that were planned by the government as part of its reform policy. Also to reduce the transmission losses the government had come out with plans of:

- Increasing the voltage level wherever feasible.
- Replacing existing conductors by higher capacity conductors.
- Reducing the impedance in transmission lines by continued installation of Static Capacitors to an optimum level.
- Decentralizing generation at peak period by installation of small power plants.
- Better vigilance.

iii. In the Distribution Sector:

Till the power reforms, distribution of power had been the monopoly of Gujarat Electricity Board. The new power policy proposed to throw open distribution of power to private sector and joint sectors also. The following were the reforms introduced in the power sector in Gujarat.
Each distribution centre would be identified as a Profit Centre. The executive of the profit center would be held accountable for loss, theft as well as be given monetary incentives for better productivity and better management.

For both HT and LT power consumers including single-phase services the use of electronic meters would be resorted to. Use of low cost unmanned substation would be progressively increased with the ‘State-of-the-Art’ SCADA systems.

In order to accurately account for the distribution losses, there was a need to enforce the accountability of every unit of power that was generated. For this all distributing companies had to provide timely release of all connections to various classes of consumers so that the consumers and the industry did not suffer for want of electricity.

iv. Tariff Structure:

The State recognized the fact that there had to be a tariff rationalization if private and foreign investments were to be forthcoming in the Power Sector. Tariff and duty rationalization was also necessary if one had to improve the operational efficiency of GEB. On the other hand, grant of unrestrained freedom to fix the tariff by power utilities would lead to consumer interest being adversely affected. Looking to this, the Government proposed to:
• Set up an Independent Statutory Power tariff and Regulatory Commission. The Commission would call for relevant data from power utility companies to fix the tariff. Care would be taken to see that the cost of inefficiency of the public/electricity utilities would not be passed on to the consumers.

• Revenue so generated for the utilities should be adequate to sustain the operations and also to generate adequate surpluses for proper maintenance of plant and machinery. Utilities should run on commercial principle and earn adequate rate of return on capital investment.

• Tariff should be so rationalized to take advantage of higher tariff for peak hour power consumption.

• Government was committed for continuance of subsidized tariff for agricultural and socially obligatory activities like drinking water and street lighting and lighting for urban and rural poor.

These subsidies would have to be explicit, quantified, reasonable, and targeted. The Independent Statutory Power Tariff Commission envisaged above, shall take such subsidies into consideration while determining the tariffs.
SUMMARY

For any nations, indicator for wealth is the economic growth. We need to align our economy with global trends. We need to adopt flexibility and liberalized attitude in economic policies. This urges reformation process and the Reforms.

How Indian economic has transformed itself from the mixed economic regime to liberalized economy and aimed to be free market economy is the genesis of this chapter. This is referred in the context of the power sector. The focus of the microeconomic policies is changed because of the change in the model from socialistic democracy to the capitalistic democracy which in the main reason for change.

We have aimed to examine the objectives like nature and scope of the change in the power sector policies. Impacts and implication of the reforms on the power companies. The urge of the strategic leadership to the power sector and the future scenario were the subsequent objectives in the light of reforms. On investigating we found that under protected regime of central and state monopoly in power sector, there were innumerable lacunae in the functioning of the power sector transforming industrial growth and increasing the demand supply gap in the power. This was needed to be improved resulting in reforms in the power sector. It was relevant to study changes in the power sector organization in the light of reforms hence the study of this kind is justified.
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