

POWER SECTOR DEVELOPMENT IN HARYANA

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ABSTRACT

This paper revolves around the different aspects of the power sector. Importance of the strengthened power sector has been showcased. Power sector is facing various challenges on account of power losses. The major portion of losses is covered by transmission and distribution losses. These losses accompany both technical and commercial losses occurring in the power distribution sector. The foremost causes behind these losses have been focused in this paper. Various parameters have been acknowledged for analyzing technical and financial performance of the power companies. The case of power sector has been particularly emphasized for the state of Haryana. The necessity of various reforms has been stressed for industrialized growth of the nation and to cater the needs of common people judiciously. Division of Haryana State Electricity Board has been justified with individual functions of all subsidiaries. The objectives of Haryana Electricity Regulatory Commission have been illustrated.

Keywords: *Electricity, T&D, SEBs, Power losses*

I. INTRODUCTION

India is a developing country and the economy is considered as the world's fastest growing economy, where energy plays an important role in its sustainable development. Electricity is one of the most widely used forms of energy, affecting the socio-economic development of a country critically. In early 1990s, Indian Government introduced various power sector reforms in the country. In 1994, the National Development Council (NDC), in alliance with multilateral funding agencies e.g. World Bank and Asian Development Bank, formulated an agenda for power sector reforms in India. Its recommendations prescribed unbundling of state electricity boards (SEBs) into separate entities i.e., generation, transmission and distribution. The subsequent reforms brought the privatization of electricity sector and formation of independent regulatory boards at central and regional levels. Prior to mid-seventies, the State Electricity Boards (SEBs) were primarily liable for electricity generation, its transmission and distribution and consequently for the growth of power sector in India with small participation from private enterprises. These SEBs are government enterprises with massive political impact, resulting into their poor performance and huge losses.

Haryana is one of the more affluent states of India. Its per capita income is second highest in the country at INR 138, 859 in the year 2011–12 and INR 128,341 in the year 2012–13. Haryana is also one of the most economically well built regions in South Asia and its agricultural and manufacturing industry experienced unremitting growth since 1970s. Haryana is the India's largest manufacturer of passenger cars, two-wheelers, and tractors. Since 2000, the state has also emerged as the largest recipient of investment per capita in India. The

city of Gurgaon has rapidly emerged as a major focal point for the information technology and automobile industries on national level. Gurgaon is the home of Maruti Suzuki, India's largest automobile manufacturer.

II. STATEMENT OF PROBLEM

Electricity is the main source of energy in today's environment. Since, electricity is considered to be the most convenient form of energy, it is one of the most widely used forms of energy, and the socio-economic development of a country depends critically on its infrastructure. The functional domain of power sector comprises of three areas Generation, Transmission, and Distribution. Among these areas, transmission and distribution account for major part of losses. There is considerable wastage of electricity in India due to inefficient transmission and distribution (T&D) system, uneconomic unit size and obsolete technology, which can be reduced with deliberate energy planning. The power sector has witnessed radical changes in its structure, ownership, regulatory set up and patterns. One of the pattern changes was the low tariffs for agricultural sector which were sought to be covered through higher tariffs on industrial and commercial consumers. But such cross subsidization resulted in enhanced cases of theft and leakages, loss of revenue and misreporting. Losses faced by SEBs made them highly dependent on budgetary allocations from their respective governments, reducing their ability to build on the generation capacity, and most importantly to carry out the periodic maintenance and upkeep of their distribution assets.

Every sector has its own issues. But, in the proposed study, our main focus is on distribution sector. The distribution sector revolves around the power distribution companies, their employees, distribution network and consumers. The power companies are having the managerial issues, impacting the efficiency of a company adversely. Whereas, distribution network particularly is having the commercial and other losses.

III. OVERVIEW OF THE POWER SECTOR

Power is life-and-death for all spheres of our life. It has been regarded as the fundamental human need. It is one of the most significant pillars on which the social and economic progress of the country depends. Power supply at reasonable rates to the rural areas is crucial for the comprehensive development of the nation. Availability of reliable and good quality power supply at viable rates to Indian industries is also equally important to make them internationally competitive; further it has to be facilitated to exploit the incredible potential of employment creation. Services sector has made remarkable contribution in the development of national economy. Accessibility of quality power supply is very vital for continued growth of this sector. Power always matters primarily in any economy. Accessibility to power gives energy to an economy and consequently the economic growth becomes sustainable.

The state of Haryana can be rated as one of the wealthy states in availing the facility of electricity. The per capita availability in Haryana is recorded as one of the highest in the country. In Haryana, the power sector reforms have been launched as a part of reform process started in the country under the guidance of World Bank. Haryana got the ranking of the second state in the country in the implementation of the state level restructuring process. However, the major breakthrough in the process of power sector reforms in the country has been enactment of Electricity Act 2003.

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In 1998, HSEB was divided into four successor companies through the statutory transfer schemes.

- Haryana Power Generation Corporation Limited (HPGCL)
- Haryana Vidyut Prasaran Nigam Limited
- Uttar Haryana Bijli Vitran Nigam Limited (UHBVN)
- Dakshin Haryana Bijli Vitran Nigam Limited (DHBVN)

HPGCL is accountable for power generation from the state owned power plants. HVPNL takes care of the power transmission grid. UHBVN and DHBVN have been incorporated to carry out the distribution tasks in northern and southern regions of the state respectively.

IV. SIGNIFICANCE OF POWER IN ECONOMY

In the industrialized world, electricity industry plays an important role. Without power, future generations will not have the power to achieve economic progress and prosperity. Also, on a global scale, there will not be any prosperity, especially from the perspective of economic stability and progress. Now-a-days, energy efficient demand side technologies are in vogue. In earlier spans, power organization and infrastructure has been improved well. However, a lot of improvement is still needed in order to provide more facilities for each and every sector. Rising population presents the need to develop new skills and technologies in the power sector. Thus, a growing population will create significant requirements for expansion of more efficient energy infrastructure.

V. TECHNICAL & FINANCIAL PERFORMANCE

To supply power to each village of the state, Haryana became the first state in the country. The detailed analysis of technical & financial performance of Haryana is carried out on the basis of some selected parameters such as Plant Load Factor, plant outlay, Aggregate Technical and Commercial Losses (AT&C losses), cost recovery, Auxiliary Consumption, etc.

Poor financial performance of the Haryana State Electricity Board (HSEB) is due to the poor collection competence for metering and false billing of the electricity consumed by the consumer. Between 1990-91 and 1997-98, receivables almost doubled in monetary terms, but HSEB hold up payments to its creditors and its payables also doubled between 1990-91 and 1997-98. Even though the state government provided subsidy, but in reality, it was often managed against other due payments to the Government. So there is an urgent requirement of initiating the implementation of power sector reforms by the state government.

VI. TRANSMISSION AND DISTRIBUTION LOSSES (T&D LOSSES)

For better and cheap electricity generation, transmission and distribution losses need to be reduced. The level of Transmission and Distribution losses (T&D) is one of the important indicators for the measurement of the energy efficiency. In the present framework, the energy losses consist of technical losses as well as commercial losses, thus there is an urgent requirement to alleviate them.

The sections of power losses are technical and non-technical losses. Technical losses are naturally occurring losses and they are caused by the actions which are internal to the power system. It consist mainly of power dissipation in electrical system components such as transmission lines, power transformer measurement system, etc. Whereas, non-technical losses are caused by the actions external to the power system, or by loads and various conditions where, technical losses computation fails to take into account such as pilferage, defective meters, error in meter reading and estimation of unmetered supply of energy. Reasons for commercial losses are losses at consumer end meters, tampering/bypass of meters, pilferage of energy, energy accounting system, error in meter reading, false bills and receipt of payment.

VII. IMPORTANCE OF POWER SECTOR IN HARYANA

Haryana State Electricity Board (HSEB) was established on May 3, 1967 under Section 5(1) of the Electricity Supply Act, 1948 and assigned the comprehensive liability for the power sector in the state. This Board is formed for efficient generation, transmission and distribution of power in the entire state. When the Haryana state was formed (November 1, 1966), thermal based generation power capacity of 383 MW is assigned. At that time, for its electricity necessities, Haryana government was relying on the Bhakhra Beas Management Board (BBMB) hydro power project (located in Punjab state). It was initiated as a shared venture of Punjab and Rajasthan. Afterwards, it was constituted under the Punjab re-organization Act, 1966. Later on, Haryana got its share from the Nathpa Jhakri project of the hydroelectricity of 1500MW (located in Himachal Pradesh) and from the generation units of central undertakings of the Government of India. But as we know that power is essential for the development of any state; without advanced infrastructure, development of any type is not possible and electricity is a major part of infrastructure development. After some time, the picture somewhat changed. On November 7, 1975, a gas based plant, namely the National Thermal Power Corporation (NTPC) was built-in (located in Faridabad in Haryana state).

VIII. HARYANA ELECTRICITY REGULATORY COMMISSION (HERC)

HERC was established on August 17, 1998 as a statutory body consequent to Haryana Electricity Reform Act, 1997. It is assigned the power to determine the tariff for generation, transmission and supply of electricity in bulk and in retail.

8.1 Functions of Haryana Electricity Regulatory Commission (HERC)

Main functions of the HERC are as follows:-

- Determine the tariff for generation, supply, transmission and rotation of electricity in wholesale or retail, within the state.
- Regulate the power purchase and procurement process of supply licenses (inclusive of the price at which electricity shall be attained from the generating companies or from other sources with agreements for power purchase for distribution and supply within the State).
- To facilitate intra-state transmission and wheeling of electricity.

- To issue the licenses to persons looking for transmission, distribution or electricity traders' license for operating within the State.
- To encourage the use of renewable sources of energy for generation and co-generation of electricity by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also to motivate for purchase of electricity from such sources.
- To resolve the disputes between the licensees and generation companies and forward to settlement.
- To formulate and impose the standards with respect to quality, continuity and reliability of service by licensees.
- If necessary, fix the trading margin in the intra-state trading of electricity.
- To discharge similar other functions that may be assigned to it under this Act.

IX. LITERATURE REVIEW

Sharma, T. et al. (2016) briefly showcase the commercial losses in the power distribution sector. The prominent portions of the losses that are focused are electricity theft and employee theft, arising due to employees conniving with the consumers. The efficient way to tackle this problem is to utilize the social factors and organizational causes behind employee theft.

Ghosh, D. et al. (2016) In terms of customer satisfaction, most of the studies of electricity pricing behavior have focused on industrial economic approaches (market structure and market power), engineering approach, or institutional aspects (effect of deregulation on price). For the first time in Indian scenario, this paper presents an analysis on the variation pattern of bidding price of power. This report concentrates on five different bid areas of country, with a robust and rigorous technique based on chaos and fractal behavior.

Never, B. et al. (2015) discuss the role of socio-economic factors such as electricity pricing, prevailing social norms and attitudes, trust and awareness which are generally neglected. Two main technical innovations, introduced by Umeme (Uganda distribution company), i.e., bulk metering and prepaid metering have been talked about, with the result of many group discussions and interviews.

Schulze M et al. (2015) analyze that support function in industrial companies has developed considerably within the last few years. In the past years, energy as an input factor within the industrial production process had low or even zero priority for corporate management in industrial companies as energy costs accounted only a small portion of total production costs, as at that point of time, energy prices were low and comparatively stable. This paper provides a methodical review of present journal publications in industry on energy management. Five necessary key elements of the energy management are identified within the body of literature (strategy/planning, implementation/operation, controlling, organization and culture) and the particular findings related to each key element are synthesized.

Ayyoob Sharifi and Ayyoob Sharifi (2015) aim to specify the main components of urban energy resilience and develop a conceptual framework for its assessment. The majority of world population is now living in cities and the share of world urban population is expected to continually increase in the approaching decades. Cities are the major loci of global energy consumption and steady energy supply is essential for their constructive functioning. The expected urban population increase, together with other driving forces such as lifestyle change,

would have significant implications for future energy supply and demand. Drawing on an extensive literature review, this study defines energy resiliency as a range of preparation, absorption, recovery, and adaptation measures that warrant the availability, accessibility, affordability, and acceptability of power supply over time.

Sarat Kumar Sahoo (2015) deals with the specific action points that have been applied as the consequences of the legislation, for settling entry barriers, development of non-conventional schemes, deployment and optimal utilization of energy resources, better management of wastes and land, development methods for technologies and the progress of particular projects, enhancement of tariffs and rates of energy per unit through competitive markets and regulatory rules, incorporation of finances and subsidies towards new technologies and non-conventional sources of energy.

Mwaura, F. et al. (2012) show the importance of prioritizing reduction of non-technical energy losses, i.e. energy theft in the form of illegal connections, fraud or non-payment of bills. These losses constitute the major chunk of commercial losses. The disastrous impact of these losses on the power sub-sector, both on supply and demand side management, has been illustrated. This work has focused on the Electricity Prepayment Billing System (EPBS) as an effective strategy that have been successfully tested in an effort to reduce non-technical losses in Rwanda. EPBS has been proved efficient in identification of suspected frauds, meter tampering and low usage of power that indirectly results into reduction of electricity theft.

Mayor, D. et al. (2012) present the losses in power quality, which affect the income of a company in a very reactive way. Various solutions that are analyzed are: exhibiting to a special contract with the power supplier ensuring high power quality supply, investing in different technical solutions to reduce or prevent the effects of the perturbations or; installing an individual power supply system. To find the optimal solution, it requires a reliable evaluation of the economical losses caused by the various phenomena. The work is directly related with analysis and proposal of a general methodology to solve the described problem. The target audiences of this paper are policy makers and authorities who are in charge of deciding about responsibilities and charges to the companies responsible for the losses.

Ardabili, F. et al. (2012) present the conceptual framework for proposing a model of customer satisfaction in the electricity distribution company. The four hypotheses, which are based on survey, are as follows: announcing, relation, performance has a positive effect on perceived value, and there is direct positive relationship between perceived value and customer satisfaction.

Andaleeb, S. et al. (2012) conclude that social control mechanisms can restore “judicial service” to the legitimate customers and boost their welfare by making the provider more effective as a customer-responsive organization. Siddiqui, M. Z. et al (2012) analyze the recovery of the entire cost of DISTCOs under cost of service regulatory regime. Tariffs in retail markets are fixed on the basis of economic and political considerations of the particular states. Regulators want to fix an optimal tariff to keep their disutility at zero while politicians try to please voters by keeping it at the lowest level.

León, C. et al. (2011) propose novel framework which is an integrated expert system (IES). This analysis is classification of customers under one or more different categories, to help Endean staff identify and categorize NTLs. This system uses real samples obtained from Endears databases. The main contributions of the IES are described as: recognition and classification of the casuistry of utility distribution on customer analysis. The

proposed IES is a practical framework, actually in the test phase, it ends. The suggested IES can be used as a supplementary method to detect NTL, thus increasing the efficiency of the studies.

X. CONCLUSION

Power sector reforms were launched in the state as a part of regulatory reforms. Haryana Electricity Regulatory Commission (HERC) was constituted in 1998, to regulate the state power sector. It has enforced various regulations in order to upgrade the power utilities' technical and financial performance. There is also adequate progress in terms of installed capacity (only in the public sector). The technical as well as financial performance reported by Haryana Power utilities was not satisfactory despite impressive expansion in the physical network. Lack of commercial outlook in operations resulted in poor technical and financial performance of the electricity companies. As a result, it suffered huge commercial losses and recorded negative rate of return on the capital employed in the business. The gap between the revenue realized and cost of supply has increased very rapidly. In order to boost the financial and technical performance, the following propositions are made:

- There is a need for the further improvement in the Plant Load factor. For this purpose regular maintenance of the plants should be undertaken.
- The Distribution companies should provide due attention to reduce the energy losses in the state.
- Power should be purchased on the merit order so that the cost of power purchase is reduced. The distribution company should sign long term contracts to get cheaper power from various sources in the stage.

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