

## Power crisis in Rajasthan: Strategies to attain sustainable development

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### Abstract

In the past hundred years development has been witnessed in the economy. Human beings have moved from carts driven by horses to space flight. All these have become possible only because of energy. And this is the reason why energy has been considered as the life blood of modern economy. No doubt the development of any economy depends on availability of energy, as development is positively correlated with the demand for it. Since industrial revolution, the use of more and more of energy has led to the path of prosperity and human welfare. In the modern era, energy is considered as inevitable and prime indicator of welfare. Energy is available in many forms but among all the sources electricity is considered as one of the important requisites for all economic and social activities. India is one of the fastest growing country in the world. But the development has resulted in many serious problems, and one among this is the growing power crisis. Power sector an important part of country's infrastructure is going through the process of churning. The power sector of our economy is confronted with the major problem of growing demand-supply gap. The per capita consumption of power has been continuously increasing in the past few decades but the increment in the production rate could not keep pace with the growing demand which has ultimately resulted in the widening of demand supply gap of electricity. The policy of the government in order to overcome the power deficit has been oriented towards increasing the supply of electricity, to bring a balance between demand and supply. But this would in fact have an adverse effect on the environment, since a major portion of installed capacity is based on thermal power resulting in climate change. The present paper would focus on the electrical power crisis in India with special reference to Rajasthan, the reasons for power crisis and the strategies to be adopted in order to overcome the crisis.

**Keywords:** Power crisis, demand side management.

### Introduction

Energy plays a vital role and it is one of the requisites for the day to day functioning of economic activities. Energy is derived from various sources such as bio fuels, fossil fuels, renewable etc. The sources of energy can be classified as conventional and non conventional sources. Energy comprises of many like oil, natural gas, electricity, etc. Among this electricity has been given growing importance in the past few decades. India is the world's 6<sup>th</sup> largest energy consumer relying on coal as the primary source for over half of its total energy needs.

The objective of the study is

- To focus on growing power demand and supply gap in India and Rajasthan.
- To highlight the socio-economic aspects responsible for power crisis in Rajasthan.
- Demand side management approach to attain sustainable development

### Power sector of India

The power sector, a crucial component of the country's infrastructure sector and a key element in enabling the Indian economic growth story is going through a crucial process of churning. The per capita consumption rate of electricity has been increasing at a higher rate but the increment in production rate is not remarkable which results in inadequate supply to consumers. The main areas of power sector which are facing the problem of gap in India are basically coal and electricity. Indian power sector has attained insurmountable importance because of huge boom in India's economy. In fact the visionary in

Dr. Manmohan Singh has acknowledged the fact that the electricity is the driving factor for India's economy. He was so forthright that he laid no stone unturned to have India sign the Indo-US nuclear civil agreement. Perhaps among all the forms of energy, Power has become the most important commodity that needs to be taken into account for the estimation of India's GDP.

### Facts & figures of power sector

- In the past 30 years the demand for electricity has grown at an average rate of 3.6%.
- India accounts for 3.4% of global energy consumption.
- In the past few years the demand for electricity is outstripping the supply by 7% to 11%.
- India is facing a serious problem of inadequate power generation. During X plan only 23,000 MW was added to original target of 41,000 MW.

### Power crisis

It is the gap between demand and supply of power and existence of shortages in meeting peak as well as overall demand. Electricity has become an essential requirement in all walks of life and it is also being recognised as a basic human need. It is a critical infrastructure on which the socio-economic development of the country depends. Supply of electricity at a reasonable rate is very essential for the overall development of the country. Not only to increase the supply but also to improve the quality of electricity is very crucial for sustained growth of this sector. Our country had recognised the necessity to increase the supply of electricity in early 18<sup>th</sup> century and



Indian power sector has more than tripled its installed capacity from 30,000 MW in 1981 to 1, 00,000 MW in 2001 and 4, 80,242 MW in 2005-06 (Economic survey report, 2005-06). But despite this growth in supply, the power sector of our country is struggling hard to overcome chronic power shortages and poor power quality. Electricity is the life line of the major economic activities of modern age and it is the commercial form of energy most in demand. The supply has increased manifold, but despite this significant development in this sector, the demand for electricity continues to outstrip the supply. With demand exceeding supply severe peak (around 18%) and energy (around 10%) shortages continue to plague the sector.

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- Inefficiency in power generation.
- Inefficiency in distribution.
- Inefficiency in end use system.

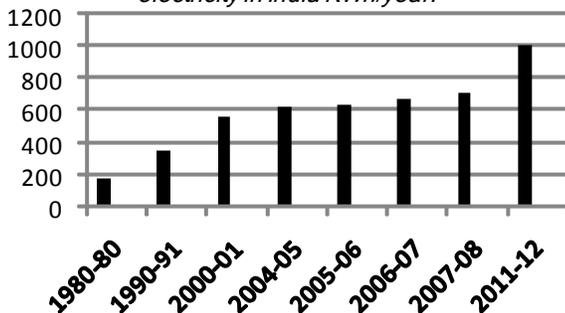
Due to these problems the gap between the demand and supply gap has been widening in the past few years. In spite of various policies taken by the government to overcome the power demand supply gap no effective improvements has been seen over the years. The electricity demand and supply gap of electricity from 2002 to 2010 in Rajasthan has grown to a very great extent .And the government in the year 2009-2010 has adopted forced power cuts in order to attain a balance in demand and supply. But it is also realised that the power cuts also adversely affects the development the state. Electricity is the life line of the major economic activities of modern age and it is the commercial form of energy most in demand. The supply has increased manifold, but despite this significant development in this sector, the demand for electricity continues to outstrip the supply. With demand exceeding supply severe peak (around 18%) and energy (around 10%) shortages continue to plague the sector.

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*Fig. 1. Er capita consumption of electricity in India KWh/year.*



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overcome the power demand supply gap no effective improvements has been seen over the years. The electricity demand and supply gap of electricity from 2002 to 2010 in Rajasthan has been growing rapidly and. the government in the year 2009-2010 has adopted forced power cuts in order to attain a balance in demand and supply. But it is also realised that the power cuts also adversely affects the development of the state. The factor mainly responsible for the increasing power supply gap is the growing per capita consumption for power. The growth in the consumption of power is shown in graph. Since electricity occupies a very important position in life of human beings and development of the economy, the consumption of electricity is also regarded as one of the prime indicator of development. India, which is one of the growing country also experiences rapid change in the consumption of electricity as consumption of electricity and economic development are positively correlated to one another.

**Socio-economic aspects responsible for growing demand for electricity**

The consumption pattern of electricity by an average household is considered as an indicator of well being and if a person is unable to fulfill his basic energy requirement the situation is generalized as ‘Energy poverty’ The lifestyle of people has undergone drastic changes in the past few decades due to the availability of electricity. The per capita consumption of electricity has also shown a rising trend in the past few years and the basic socio economic factors which are responsible for the power crisis in Rajasthan are discussed below

*Population growth:* Average population growth rate at present is 1.3% p.a. Even though there has been a considerable decrease in the growth rate of population from 2.5%, still the growth rate is quite alarming. This increase in the population has definitely resulted in the increase in the demand for electricity.

*Urbanization:* Another major cause responsible for growing power crisis in Rajasthan is the increasing trend of population in urban areas. In 1951only 18.5% of population was living in urban areas according to 2001 census it has increased to 23.38% which is likely to increase in 2011 census. The increasing trend of urban population is given in table 3.1.As more and more people migrate to urban areas the demand for power also increases drastically which further widens the demand supply gap of electricity.

*Increasing per capita income of the people:* It is a well known fact that demand for electricity and income are positively correlated to each other and the increase in the per capita income of the people has again led to the widening of demand supply gap of electricity. Rajasthan, one of the fastest growing state experiences changes not

only in her demography but also in the content of economic development. The cities like Jaipur, Jodhpur and Kota are experiencing rapid industrialization which has led to the increase in the per capita income of the people, who demand more electricity in order to lead a comfortable life resulting in the increasing demand for vital infrastructure like electricity. The living pattern of the people has under gone drastic changes in the past few years. The standard of living of the people and the quality of life of the people have increased to a very great extent which in turn has increased the demand for power.

**Increase in the literacy rate among females and women workers:** According to 2001 census of Rajasthan the literacy rate is 60.4% of which male comprise of 75.70% and females 43.85%. Remarkable strides in the literacy rate has been witnessed in 2001 census as it has recorded the highest increase i.e. 21.86% among all the states as in 1991 the literacy rate was only 38.55%. Female literacy rate has also increased from 20.44% in 1991 to 43.85% in 2001 [Rajasthan census report]. The gender gap in the literacy rate has no doubt decreased at present but has also opened several opportunities for women in the state. This definitely indicates the positive growth in the economy but simultaneously has led to the increase in the per capita consumption of electricity. Women employees due to lack of time has switched over to more comfortable means of living which has led to the increased use of electrical appliances in turn increasing the demand for electricity and widening the demand supply gap.

**Strategies to attain sustainable development**

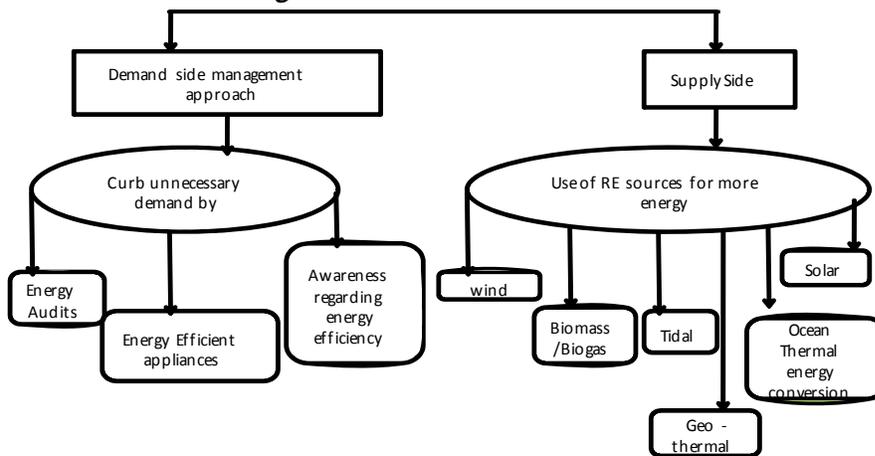
In order to minimize the gap between demand and supply of power any of the two strategies is to be adopted,

- Supply side management i.e. to increase the installed capacity to meet the growing demand there by bringing a balance between demand and supply for electricity.
- Demand side management i.e. to curb the unnecessary consumption of demand in order to narrow down the demand supply gap.

Regarding supply side management i.e. increasing supply to match the demand for electricity is not the ultimate solution as it requires huge capital which our country lacks and this would in turn increase the financial burden of our country and further heavy dependence on coal would also lead to various environmental problems like global warming and depletion of conventional fossil fuel sources. Dependence on Renewable energy sources will

definitely go a long way in mitigating the climate change and also overcome power crisis and attain sustainable development. But it would definitely take a long period to switch over renewable. Government should provide incentives in order to promote the generation of power through renewable sources in the

*Fig. 2. Remedial measures.*



coming years so as to bridge the gap. Demand side management approach would help us to bring a balance between demand and supply of power and reduce the power crisis in the next few years.

**Demand side management approach:** DSM has gained growing importance in the recent years and this approach has great potential in bridging the gap between demand and supply of electricity. As one unit of energy saved is equal to two units of energy generated. As per the latest assessment of power supply position in Rajasthan at the end of 2011-2012\* in the 17 th Economic power survey the peak demand is 8,842 MW and only 6,644 MW could be met. There would be a deficit of -1,839 MW i.e.-21.7% of total requirement of electricity, which would be the highest. In order to overcome the crisis the demand for power has to be decreased by adopting the strategies given below, the problem of Indian power sector could be solved not by increasing the supply but by reducing the demand for electricity. There are various ways to curb the excess demand for electricity, which has been shown below in the chart.

**Regular energy audits:** Energy audits in houses as well as in the commercial buildings would definitely help us to save lot of energy. An Indian (approx) spends nearly 20-30 percent of his income on energy and energy audits will enable us to know the area where the most of the energy is wasted. Proper ventilation, by increasing the number of doors, windows & adequate space could definitely help us to curb the unnecessary wastage of electricity. Even construction of basement could be avoided so as to save energy.

*Use of energy efficient appliances:* This would definitely help us to curb the demand. As development takes place, the standard of living of the people also increases which in turn increases the usage of electrical appliances. Usage of electrical appliances could not be reduced but if energy efficient appliances are used the demand for electricity could be reduced to some extent. Awareness is to be created among the consumers regarding the availability of energy efficient technology and star rating appliances which consumes comparatively less energy. This can help people in leading a comfortable life at a lesser cost. Heating and cooling appliances account for about 45 percent of the total energy use by a household. Use of digital programmable electrical appliances for heating and cooling can also reduce energy to a large extent.

*Use of energy efficient computers:* The importance of computer has increased manifold at present. By turning the computers to efficient mode will help us to reduce the consumption of energy. 70 percent of power used by a computer can be saved by turning it to hibernate mode. The consumption of power can also be reduced by using inkjet printer and a laptop to a large extent. Thus we see energy conservation has become a growing concern for the power sector. The need for energy conservation in India assumes greater significance due to increased power shortages. By adopting the above measures the demand for electricity can be considerably reduced ultimately resulting in reduction in demand supply gap and attain sustainable development. To conclude it would not be incorrect to say that DSM approach would definitely go a long way to mitigate the power crisis in Rajasthan.

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