

# Challenges of Indian Power Sector-Road Map for Sustainable Development

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## ABSTRACT

Energy is said to be the prime factor for driving the economy towards the path of economic growth. Electricity among all the forms of energy plays a vital role in the process of development as to attain growth. Deficit in the supply of power is no doubt having a direct influence on the growth of the economy as it supports all the sectors of the economy. In spite of increasing the installed capacity manifold i.e. from 42584.72 MW in 1985 to 250000 MW in 2014-15 (Arslan & Karasan, 2013), the demand for power could not be met out fully and the power deficit remains to be more than 5 per cent. Ministry of power have been allocating huge funds to strengthen power sector but the problem of power deficit persists yet. Present article gives an overview of Indian power sector since 1996-97 to 2014-15. An attempt has been made to highlight the current challenges of Indian Power sector and some policy suggestions are discussed along.

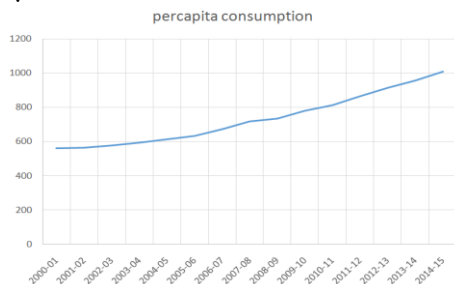
**KEY WORDS:** Energy, Economic Growth, Economic Development, Power Deficit.

## 1. INTRODUCTION

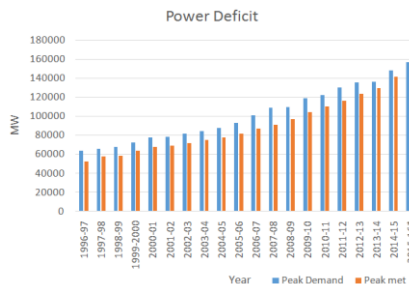
Energy plays a vital role our life. It is recognized as an essential requirement for the day to day functioning of all socio economic activities. Among all the forms of energy available, electricity is an important component of economic development. In the present era electricity has become a necessity and is called as the lifeline of all the economic and social activities. In the past two decades increasing impact of changing lifestyles on the household consumption of electricity has been found in India. The availability of modern energy i.e. electricity has facilitated the people to lead a comfortable life and improve their standard of living. At present electricity has become indispensable to the life of human beings to the extent that they cannot carry their household activities without the use of electricity. Households prefer to use an increased number of electrical appliances so as to have more time to spend with their family. This has a direct impact on the consumption of electricity. Changes in the consumption pattern of electricity always go hand in hand with the changes in the economic structure, i.e. a change in the structure of the economy would result in the changes in the consumption pattern of electricity and vice-versa. These changes in the structure of the economy have resulted in ever increasing demand for power. The consumption of electricity is considered as an effective indicator to determine the standard of living of people in developed as well as developing economies and the availability of adequate electricity has become a precondition for economic development. India is emerging as one of the fastest developing economies in the world. Our country ranks third in electricity production surpassing Japan and Russia but still struggling to bring the benefits of electrification to its entire population (Sepulveda, 2010).

**Power Scenario of India:** Indian economy has witnessed rapid economic development in the past 100 years. Our economy has moved from carts driven by animals to space flights. All these developments have been made possible by the use of energy. Energy is considered as the life blood for modern economy and building block of economic development, therefore the availability of adequate and reliable power is critical for the development of the nation. The demand for primary commercial energy has increased at a rate of 6 per cent during the period 1981-2001 (Bose and Shukla, 1999). It is also estimated that in order to achieve rapid economic growth rate the energy supply should increase more than the increase in demand. However, in spite of the continuous increase in the installed capacity since 1950, the Indian power sector has not been able to bring a balance between demand for and supply of power. It has been characterized by capacity shortfalls, frequent black outs, poor reliability and poor quality. The present section presents an overview of the Indian power scenario.

**Power Deficit in India:** It is seen that in the past twelve years the per capita consumption of power has increased by almost 100 per cent i.e., from 559 KWh in 2000-01 to 1010 KWh in 2014-15. The increase in the per capita consumption is considered to be an important indicator of growth and development but led to serious issues like power deficit and global warming.

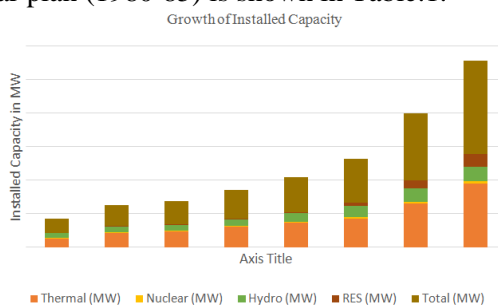


**Figure.1. Growth of per capita consumption of power in KWh from 2000 to 2015**



**Figure.2. Growing Power Deficit in India from 1996-97 to 2015-16**

**Source wise installed capacity in India:** In order to meet out the growing demand for electricity the installed capacity of the nation has been continuously upgraded during the planning period. The growth in installed capacity (source wise) since the sixth five year plan (1980-85) is shown in Table.1.



**Figure.3. Growth of Installed Capacity in India since VI plan**

It can be rightly concluded from the figure 1.3 that the increase in capacity to meet out the growing power demand in India is dominated by thermal generation which accounts for almost 70 per cent of total generation. This excessive dependence on thermal power especially coal has adversely affected the environment and cannot be sustained in the long run. This highlights the significance of research in managing and controlling conspicuous demand for power.

**Plan outlay in power sector of India during various plans:** To enhance the capacity in order to meet out the growing power demand in India around 15 to 25 per cent of the total plan outlay has been allocated to this critical infrastructure. It is seen that the allocation of funds towards the electricity sector increased during the planning period as supply of adequate power was considered to be critical to drive the economy towards rapid growth and development.

**Table.1. Plan Outlay in power sector during Planning Period in India**

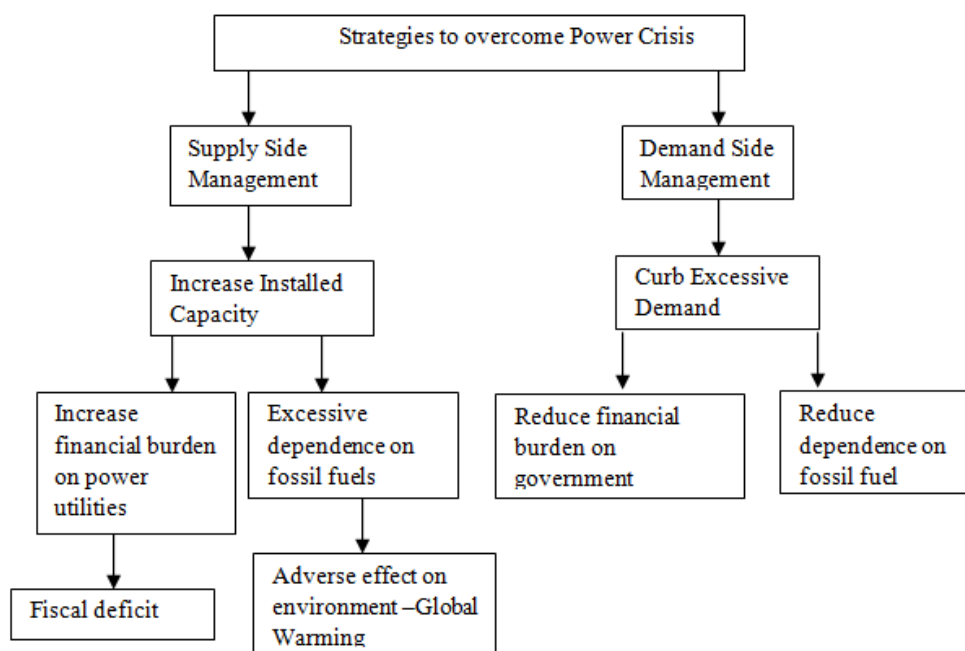
Plan Period	Plan Outlay (Power Sector Rs.Cr)	Total Plan Outlay (Rs.Cr)	Plan outlay in Power Sector (%)
I Plan	260	1960	13.26
II Plan	452	4672	9.7
III Plan	1252.3	85576.5	14.6
Annual Plans	1212.5	6625.4	18.3
IV Plan	2931.7	15778.8	18.6
V Plan	7399.5	39426.2	18.8
Annual Plan	2240.5	12176.5	18.4
VI Plan	30751	109292	28.1
VII Plan	61789	218729.6	28.2
Annual Plan(90-91)	11387.8	58369.3	19.5
Annual Plan(91-92)	14517.9	64751.2	22.4
VIII Plan	115561	434100	26.6
IX Plan	215545	859200	25.08
X Plan	403927	1525639	26.47
XI Plan	854123	3644718	23.43
XII Plan	1438466	7669807	18.75

Source: Electric Power Survey 17<sup>th</sup> and 18<sup>th</sup>.

It can be clearly seen in table.1, that in each subsequent plan almost the outlay for power has increased. However, despite increased budget outlay the problem of power deficiency continues in the nation which has

adversely affected the industrialization and economic development of the nation. Besides, heavy dependence on power has led to environmental degradation and impoverished the power utilities. It is now widely recognized that increase in capacity (supply side) is an expensive and ineffective solution to the problem of power crisis in the long run. An efficient and effective option to tackle power deficit in the short run is to enact and enforce appropriate demand side management (DSM) policies and measures (Figure.4).

**Strategies to Overcome Power Crisis:** Since independence GoI and Power Ministry have focused on increasing the supply of power so as to bring a balance between growing demand and supply of power but from the above sections it is clear that inspite of allocating more funds and increase the installed capacity manifold the problem of power deficit persists and these initiatives have further led to serious issues like mounting debts and environmental problems as more than 70% of energy demand is met from non- renewable sources (Purohit, 2009).



**Figure.4. Strategies to Overcome Power Crisis**

## 2. CONCLUSIONS AND SUGGESTIONS FOR POLICY MAKING

Figure.4, clearly show that DSM approach would help to (i) reduce our dependence on non-conventional energy sources and protect our environment from carbon emissions. (ii) Reduce financial stress on the government (iii) overcome the problem of power crisis. DSM strategies should primarily focus on;

- Improving the efficiency of electrical appliances and replacing the energy inefficient appliances with the efficient ones in both domestic as well as commercial sectors. Data regarding stock of electrical appliance in all the sectors has to be compiled so as to enable the removal of inefficient ones as have been done in many countries.
- Sellers/Retailers should be given incentives to maximize the sales of energy efficient appliances as they are the link between the manufacturers and consumers.
- Adequate credit at 0% interest rates could be provided to the people with low income for purchasing energy efficient /green labelled appliances.
- Encouraging people to renovate the older buildings with the newer green buildings. Some standard norms regarding the number and size of windows, ventilators and doors should be made compulsory in all the new buildings. Banks providing home loans can also contribute by providing some concession to those who purchase energy efficient flats and villas.
- Increase in the number of subsidized cylinders and easy availability would reduce the use of induction cook wares resulting in reduced demand for power in residential sector
- Compulsory and regular energy audits in domestic and industrial buildings.
- Tax benefits could be given to hospitals, schools, colleges and other commercial building for conserving power by efficient technologies.
- Awards to be announced for people adopting energy conservation techniques in both commercial and residential sector.

The above mentioned are some of the suggestions to curb the excessive demand for power as well as bring a balance between the growing demand and supply of power in India as well as developing nations. Switching over

to renewable energy sources could also be a better option as India has good potential of wind and solar power but it would involve huge investments which our economy lacks at present and can be a suitable option in the long run.

#### REFERENCES

Arslan O & Karasan O.E, Cost and emission impacts of virtual power plant formation in plug-in hybrid electric vehicle penetrated networks, *Energy*, 60, 2013, 116-124.

Bose R.K & Shukla M, Elasticities of electricity demand in India, *Energy Policy*, 27 (3), 1999, 137-146.

Pimentel D, Lach L, Zuniga R & Morrison D, Environmental and economic costs of nonindigenous species in the United States, *Bio Science*, 50 (1), 2000, 53-65.

Purohit P, CO<sub>2</sub> emissions mitigation potential of solar home systems under clean development mechanism in India, *Energy*, 34 (8), 2009, 1014-1023.

Sarfi R.J, Salama M.M.A & Chikhani A.Y, A survey of the state of the art in distribution system reconfiguration for system loss reduction, *Electric Power Systems Research*, 31 (1), 1994, 61-70.

Sepulveda A, Schlupe M, Renaud F.G, Streicher M, Kuehr R, Hagelucken C & Gerecke A.C, A review of the environmental fate and effects of hazardous substances released from electrical and electronic equipments during recycling: Examples from China and India, *Environmental impact assessment review*, 30 (1), 2010, 28-41.

Suganthi L & Samuel A.A, Energy models for demand forecasting—A review, *Renewable and sustainable energy reviews*, 16 (2), 2012, 1223-1240.