

## **ELECTRICITY FOR RAILWAYS – CAN THE NATION AFFORD IT ?**

India, the largest democracy with an estimated population of about 1.04 billion, is on a road to rapid growth in economy. During the period 1981-2000, it has witnessed an impressive GDP growth rate of around 6%/yr. Now the growth rate has touched a figure of 8%. Forecasts by several agencies point towards continued growth of Indian economy. Dominic Wilson and Roopa Purushothaman of Goldman Sachs in their paper write, “India has the potential to show the fastest growth over the next 30 to 50 years. Growth could be higher than over the next 30 years and close to 5% as late as 2050 if development proceeds successfully.” To ensure that the development proceeds successfully, Government of India has been very proactive and several steps have been taken in the recent past. These include policy initiatives as well as planning and launching of projects aimed at improving energy, transport and communication infrastructure in the country. The Electricity Act – 2003, notified in June 2003, is one such important initiative. All these are the steps towards achieving an average annual growth of 8% in GDP during the ongoing 10<sup>th</sup> five year plan (April 2002 to March 2007).

As elsewhere in the world, the energy and electricity growth in India is closely linked to growth in economy. One may notice this by comparing per capita electricity consumption and GDP in PPP US \$ (purchasing power parity US \$) of various countries in the neighbourhood as well as in other regions of the world. Key World Energy Statistics published by the International Energy Agency gives detailed information about electricity consumption in various countries and GDP in 1995 PPP US \$. India’s electricity consumption based on data from utilities is given as 408 kWh per year per capita for the year 2001, while GDP per capita in PPP US \$ is given as 2138. Corresponding figures for Indonesia are 423 and 2684, for Thailand 1563 and 5833, for Malaysia 2824 and 7645, and for Singapore 7677 and 20426. For OECD countries these numbers are 7879 and 21785. Here one may note a correlation between per capita GDP and per capita electricity consumption.

At the time of independence in the year 1947, total installed electricity generation capacity was 1,363 MWe. It rose to 30,214 MWe in the year 1980-81, to 66,086 MWe in the year 1990-91 and to 138,730 MWe on 31<sup>st</sup> March 2003, the corresponding growth rates being 9.54%/yr, 8.14%/yr and 6.26%/yr. The average growth rate over the entire period, thus, has been 8.6%/yr. In spite of this impressive growth, per capita electricity consumption is very low. The electricity sector has experienced severe shortages during the above period despite an impressive growth. During the year 2004-05, there was an average electricity shortage of 7.3% and a peak power demand shortage of 11.7%.

Every region of our country shows a power deficit. The southern states have the least shortage (3.1%) and the western states the most (22.4%). About 60% of Indian manufacturing entities need to have captive power. The equivalent number in China is 16%; in Brazil 17%; and in Pakistan 42%.

The table given below shows the power position in our country during the last few years:

(Energy in million Units)				
Year	Requirement	Availability	Shortage	% Shortfall
1999-00	480,430	450,494	29,836	6.2
2000-01	507,216	467,400	39,816	7.8
2001-02	522,357	483,350	39,187	7.5
2002-03	533,537	485,452	48,085	9.2
2003-04	559,264	519,398	39,551	7.1

( Source: 16<sup>th</sup> Electric Power Survey Report)

The future demand projections during the closing years of the 10<sup>th</sup>, 11<sup>th</sup> and 12 plans i.e. 2006-2007, 20011-12 and 2016-2017 as per the 16<sup>th</sup> electric power survey report are 719,097, 975,222 and 1,318,644 million units respectively. If the additional demand on account of ruler electrification is considered, there is an addition requirement of 25,000 million units of power.

The Government shall do all that is necessary to reduce this shortage by augmenting the generation capacity and revisiting the energy policy to decide the form of energy allocated to each sector. One area where there is feasibility for saving electricity is Railway Traction.

After phasing out steam traction, which was highly inefficient and put constraint on the operation of the Railways, two choices for providing traction energy to the Railways are available – Diesel & Electricity. Both these modes of traction are widely employed around the world and the performance is generally comparable upto the speeds of 200 kmph, beyond which electric traction becomes a technological necessity. Indian Railways have gone in for massive electrification, regardless of the fact diesel traction is equally efficient and does not require massive capital expenditure on the overhead electrical equipment. The major freight railways of the world-the US, Canadian and the Australian railways are on diesel only.

If we take the figure of the consumption of electricity of Indian Railways for electric traction in the year 2003-04 into account, then it is very much clear from the table shown below that the avoidable shortage inflicted by the Railways happens to be 20% of the total shortfall. It means that a major chunk of the total available energy is consumed by the Indian Railways that can be avoided by choosing the alternative traction and can be diverted to our energy deficient industries.

(All figures are in million units- year 2003-04)	
Total demand of the country	559,264
Actual availability	519,398
Shortfall	39,551
Consumption of Railways in 2003-04	7803
(Source: Annual Statistical Statement 2003-04)	
Avoidable shortage inflicted by the Railways	20%

Again, increase in % shortfall of power supply for the fiscal year 2004-05 (7.3%) from the year 1990-00 (6.2%), despite a steady increase in availability, depicts that there is a fast increasing and sustained demand of electricity in our country. This figure also entails that the capacity of our power production industry is becoming vulnerable to cope up the ever-increasing demand of power. We are very well known to the fact that the power is the backbone / lifeline for our manufacturing industries. Due to the shortages of power, our industrial sector as well as agriculture sector does not perform well. Since, the contribution in India's GDP growth rate to the potential available in the economy is not being achieved.

The power crisis has become a fat in India. The shortfall in 2004-05 is 10%. The consequences are legion: farmers starting irrigation pumps at the dead of the night, patients dying on the operation table, factories running much below capacity or not running at all and so on. The World Bank study says that the shortage has reduced the annual economic growth rate by one to three percent throughout the years.

This shortage is partially made good by diesel generators running at a very low efficiency in domestic circuit and in light industrial establishments. The shortfall results in irreversible loss of production. Besides the quality of power supply suffers due to excess demand on the system. It is clear that the increasing requirement of electrical power for Railway traction may worsen the situation.

This issue has come into sharp focus now because the railways are at the threshold of building dedicated freight corridors on Delhi-Mumbai and Delhi-Kolkata sectors. For freight traffic, which runs at speeds well below what is called the high speed (200 kmph or more), there is no justification for electrification – the maximum speed of trains on the freight corridors would be 60 to 80 kmph only. The electricity should instead be provided to the domestic and industrial sectors. The time to decide is NOW.