International Journal of Engineering Research & Management Technology ISSN: 2348-4039
September-2014 Volume-1, Issue-5
Email: editor@ijermt.org www.ijermt.org

EXAMINATION OF INFRASTRUCTURAL PROGRESS OF POWER SECTOR IN INDIAN ECONOMY

Dr.Sant Ram
Associate Professor
Department of Commerce
Meerut College, Meerut,U.P.

ABSTRACT:
Electricity underpins modern civilization if we consider what would not work and would not happen without electric power. The demand for electricity in the country has been growing at a rapid rate and is expected to grow further in the years to come. The Indian power sector is one of the most diversified in the world, compared to many developing countries where crude oil and natural gas and renewable play a major role. Sources for power generation in India range from conventional sources like coal, lignite, natural gas, oil, hydro and nuclear power to other viable nonconventional sources like wind, solar and agriculture and domestic waste. Because of insufficient fuel supply and power generation and transmission capacity, the country has problems of electricity shortage.
Key words : *Indian Power Sector, transmission capacity*

INTRODUCTION:

India's commercial energy consumption basket comprises of coal, oil, natural gas, nuclear power, hydro electricity and renewables. In terms of million tonne oil equivalent (MTOE) it has gone up from 320.8 in 2003- 04 to 595.0 MTOE in 2012-13. Table -1 below shows over this period growth in the commercial energy basket has registered a CAGR of 6.37%; but highest growth has taken place in renewables followed by coal, hydro-electricity, nuclear, natural gas and oil. Coal retains largest share in the commercial energy consumption basket followed by oil. Coal and Oil taken together forms around 85% and 84% vin 2003 and 2013 respectively, though over this period consumption of natural gas and hydro electricity has gone up substantially.

Transmission Sector:

Development of transmission sector did not get due importance earlier which has led to some imbalances. Investments in the transmission sector have been therefore been inadequate due to the heavy emphasis on generation capacity. In most states, the existing distribution network has been formed by expanding and interconnecting smaller and disjointed networks. Consequently, there are several deficiencies in the transmission system, such as high losses and low reliability. At the end of 31st December, 2014 total transformation capacity measured in MVA were 2,19,579.2 spread over different regions of the country.

Grid Code:

The Indian Electricity Grid Code (IEGC), a regulation made by the Central Commission in exercise of powers conferred under the Electricity Act 2003, lays down the rules, guidelines and standards to be followed by various persons and participants in the system to plan, develop, maintain and operate the power system, in the most secure, reliable, economic and efficient manner, while facilitating healthy competition in the generation and supply of electricity.

Performance of the State Power Utilities:

A cursory look at the Report by erstwhile Planning Commission show that the average tariff over the past few years has undoubtedly increased, but the rise has not been commensurate with the increase in the cost of supply. As a result, the gap between the cost of supply and the average tariff

has been widening over the years. The gap has increased from 56 paise/kWh in 2009-10 to 183 paise/kWh in 2011-12. It is expected to decline to 113 paise/kWh in 2013-14

Commercial losses and Issue of Subsidy:
State governments provide Subsidy on energy sales to the distribution companies, where some of the States direct electricity companies to provide electricity at subsidized rates to agriculture and domestic consumers. The gross subsidy on agriculture, domestic and inter-state is likely to increase from a level of Rs.70,012 crore in 2009-10 to Rs.1,19,621 crore in 2013-14 (AP). Distribution companies also make efforts to recover the shortfall of revenue due to the subsidized power supply, from the industrial and commercial consumers pay a tariff higher than the cost of supply.

Solar and renewable Energy:
India is endowed with a very vast solar energy potential. Most parts of the country have about 300 sunny days. Hence solar energy has high potential, which can be utilized through solar photovoltaic technology which enables direct conversion of sunlight into energy and solar thermal technologies. Over the last three decades several solar energy based systems and devices have been developed and deployed in India which are successfully providing energy solutions for lighting, cooking, water heating, air heating, drawing and electricity generation. The research and development in this sector have also helped in better efficiency, affordability and quality of the products. As a result many solar energy systems and devices are commercially available with affordable cost in the market. Keeping this in view Jawaharlal Nehru National Solar Mission was launched on 11th January, 2010. The Mission target included (i) deployment of 20,000 MW of grid connected solar power by 2022, (ii) 2,000 MW of off-grid solar applications including 20 million solar lights by 2022, (iii) 20 million sq. m. solar thermal collector area, (iv) to create favourable conditions for developing solar manufacturing capability in the country; and (v) support R&D and capacity building activities to achieve grid parity by 2022. The Mission was to be implemented in three phases. For the first phase of the Mission, the target was to achive Grid Solar Power 1100 MW and achievement was 1644.86 MW till March 2013. In addition, a target for Off Grid Solar applications of 200 MW capacity equivalent where achievement were 252.5 MW and 7 million square meter Solar Thermal Collector area; the achievements were 7.01 million sq mtrs.

New Government's proactive stance:
With the new government assumed power in the centre, optimism grew all accorss the sectors of the economy and power sector in particular. The new government's aim is to achieve energy security and generate enough power to keep the country's economic engine chugging and at affordable price that would make the country competitive in manufacturing arena. Current focus of the power ministry is to put national assets to good use to keep energy costs affordable and address peak shortages. The new government has taken a few steps : To bring cohesiveness power, coal and renewable ministry has been brought under one minister to take a comprehensive view about power sectors problem. To reduce aggregate technical and commercial losses established IT-enabled energy accounting /auditing, and improve collective efficiency, a new scheme, which subsumes the R-APDRP and named, as Integrated Power Development Scheme (IPDS). To boost agricultural production and protect the interest of rural masses a new programme has been launched named Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) focuses on separating agricultural and non-agricultural feeders and strengthen rural electrification efforts in the country. Taking advantage of the Supreme Court decision to cancel 214 coalmining licences granted between 1993 and 2010, the new government had introduced a new regime of auctioning of coal mines for power sector. The new government marked a fundamental shift, a leap forward in the energy policy, to promote solar and renewable energy as the prime driver of energy security for the country. The government plans to achieve 1,75,000 MW of power by 2022, from current installed capacity of 31692.14 MW. Solar power will be around 56 % plus 99588 MW in the total. Below presented regional distribution of different renewable energy sources the country wants to achieve.

CAPACITY ADDITION IN THE ENERGY SECTOR:

The all-India installed capacity of electric energy generating stations under utilities was 112 058.42 MW (megawatt) as on 31 March 2014 consisting of 77968.53 MW of thermal, 29 500.23 MW of hydro, 2720 MW of nuclear, and 1869.66 MW of wind energy which as increased to 115 544.81 MW as on 31 January 2013 consisting of 80 201.45 MW of thermal, 30 135.23 MW of hydro, 2720 MW of nuclear, and 2488.13 MW of wind energy. A capacity addition of 41 110 MW has been targeted for the Eleventh Five-year Plan.

The National Electricity Policy (NEP) stipulates energy for all by 2013 and annual per capita consumption of electricity to rise to 1000 units from the present level of 631 units. To fulfill the objectives of the NEP, a capacity addition of 78,577 MW has been proposed for the 12th plan. This capacity addition is expected to provide a growth of 9.5 % to the energy sector. The break up of the capacity addition target is given as under:

Table 1

Capacity Addition Target Source-Wise Break up of Electric Energy

(in MW)

Type/sector	Central	State	Private	Total
Thermal	9685	26800	3380	39865 (50.7%)
Hydro	3605	24347	0	27952 (35.5%)
Nuclear	3263	7497	0	10760 (13.8%)
Total	**16553 (21%)**	**58644 (74.6%)**	**3380 (4.4%)**	**78577 (100%)**

PATTERN OF ENERGY INDUSTRY DEVELOPMENT:

Energy is the most convenient and versatile form of energy and plays a crucial role in the economic development of a country. The history of energy development in India dates back to 1887 when first a hydro station was established at Darjeeeling. In the early years, most of the energy supply facilities were privately and local bodies owned the catered to the needs of big towns and cities. The first thermal energy station in India was established in Calcutta in 1899 with a total installed capacity of 1000 KW. During the first two decades of the twentieth century steam power stations at Kanpur, Madras and Calcutta of 2,170 KW, 9000 and 15000 KW were commissioned. In 1902, hydro-electric plants of 4,500 KW at Sivasamudram in Karnataka, in 1907, 3000 KW at Mahara in Jammu and Kashmir, in 1911, 500 KW at Simla in Himachal Pradesh, in 1914, 1550 KW at Gokak Falls and in 1915, 40,000 KW at Greater Bombay were installed. Between 1921 and 1940 total installed capacity increased by about 10 times, from about 0.13 million kilowatts to 1.3 million KW^2. The industrial boom following world war I, realisation of the use of electricity in industries and the interest shown by some of the provincial Government were responsible for this increase. By the end of 1940 that total installed capacity was 0.6 million comprising steam 0.5 million hydro and 0.1 million diesel. The growth of electricity development between 1941 and 1951 was hardly substantial. Steam generating capacity rose by 60 per cent and slow growth were the stresses and strains of the Second World War and the abnormal post was conditions that followed. The available plants were used up to the maximum capacity and were subject to heavy wear and tear and frequent break-downs. Deterioration of coal supply and shortage of fuel oil also worsened the situation. Thus, at the end of the war, the energy supply industry was in a very precarious position. It was only with the beginning of the first five year plan that energy development received a Phillip.

THE GROWTH IN CAPACITY, PRODUCTION AND CONSUMPTION OF HYDRO, THERMAL AND NUCLEAR ENERGY DURING THE PLANS:

During the first plans (2003-04), construction of a number of major river valley projects like Bhakra-Nangal, Damodar Valley, Hirakund and Chambal Valley was taken up. These projects resulted in the stepping up food production and energy generation. Emphasis in Second Plan was on development of basic and heavy industries and related need to step-up energy generation.

During the Third Plan, emphasis was an extending energy supply to rural areas. The significant development in this phase was the emergence of inter-state grid system. The country was devided into five regions, regions electricity boards was established in each region to promote integrated operation of constituent energy system. In the mid-sixties the country experienced successive droughts which influenced the planners to re-orient the emphasis on rural electrification. Thus the three Annual Plans, that followed the Third Plan aimed at consolidating the programmes. initiated during the Third Plan.
During Fourth Plan envisaged the need for central participation in expansion of electricity generation programmes in strategic locations to supplement the activities in the State sector and revoval of imbalance and to enable equitable distribution. Progress in energy generation programmes during the end of the Fourth Plan was substantial.

Emphasis in Fifth Plan was on speeding up the construction and commissioning and the construction work on others was speeded up. A number of power stations were commissioned and construction work on others was speeded up. Consequent upon these efforts, the total installed generating capacity in the country reached to about 8 million KW at end of Fifth Plan. The installed capacity at the beginning of the current sixth plan period was 26 million K.W.

During the Ninth plan, IREDA sanctioned capacity of 1261.71 MW and 2.84 lakh metric tonnes coal repacment (MTCR/annum). The financial achievements in terms of loan sanction and disbursement were of the order of Rs. 3851.63 crore and Rs. 2027.03 crore respectively.
During the Eleventh plan, capacity addition target of 41,110 MW comprising 14,393 MW hydro, 25,417 MW thermal and 1,300 MW nuclear was fixed for the 11th Plan. The sector wise, type wise summary of this capacity addition target is given in Table below.

Table 2
11TH PLAN CAPACITY ADDITION TARGET-SECTOR WISE

(Figures in MW)

Sector	Hydro	Thermal	Nuclear	Total (%)
CENTRAL	5,742	13,790	1,400	22,832 (55.5%)
STATE	5,481	8,676	0	11,157 (27.2%)
PRIVATE	3,170	6,951	0	7,121 (17.3%)
TOTAL	14,393	27,214	1,400	41,110 (100%)

A moderate target was set for state and private sectors keeping in view the preparedness of various state power utilities and IPPs.

GROWTH IN GENERATION DURING 11TH PLAN;
Electricity is in the concurrent list in the constitution. The National Electricity Policy (NEP), recognizes electricity as a "basic human need" and targets a rise in per capita availability from 631 units to 1,000 units per annum by the end of 2011. To fulfill the objectives of the NEP, a capacity addition of 78,577 MW has been proposed for the eleventh five-year plan. The power sector is expected to grow at 9.5 percent per annum

CONCLUSION:
Ever since Thomas Edison fired up his power station in Lower Manhattan, the world has become progressively more electrified. In the developed part of the world it is taken for granted and yet the world cannot operate without it. For developing countries, shortages of electricity take their toll on people's lives and on economic growth. India one of the world's biggest green house gas emitter after US and China, when emphasizes on solar and wind power is also expected to strengthen the country's standing at global climate change negotiations. Meeting future electricity needs means challenging and sometimes wrenching decisions about the choice of fuel required to keep the lights on and power flowing

REFERENCES:

1. Government of India, Ministry of Commerce — Monthly Statistics of the Foreign Trade of India, Calcutta. (2014)
2. Government of India, Ministry of Commerce — Department of Commercial Intelligence and Statistics, Monthly. (2005)
3. Government of India, Ministry of Finance Deptt. of Economic Affairs — Foreign Trade Statistics, New Delhi, The Author, Annual. (2004)
4. Government of India, Ministry of Energy — External Assistance, Annual 1964-65 to 1998-99, New Delhi, the Author. (2015)
5. Government of India, Ministry of Energy — Report of the Fuel Policy Committee, New Delhi, Manager of Publication. (2010)
6. Government of India, Ministry of Petroleum and Chemicals — Public Electricity Supply : All India Statistical Summary, Annual New Delhi, The Author. (2007)
7. Geological Survey of India. — Annual Report, New Delhi, The Author. Coal Resources in India, Delhi Publications Division. (2004)
8. Reserve Bank of India — Foreign Collaboration in Indian Industries – Second Survey Report (2015)