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ECONOMIC ANALYSIS ON ENERGY CONSUMPTION IN INDIA

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Abstracts

Electricity is a crucial service in the modern days for enjoying the quality of life, and at the same time it is an important input in economic development. Electricity use is growing worldwide, providing a range of energy services. At this junction the present paper especially focus on the electricity consumption in Tamil Nadu. In India faces multiple problems over access to electricity. Such problem is epitomized by the low availability of electricity; Lack of reliable electricity transmission network, causing loss of electricity due to inadequate infrastructure and make electricity exchanges across regions less efficient; The power theft is also rampant which adds additional burdens on electricity supply. The electricity sector in India supplies the world's 5th largest energy consumer, about 65.34 percent of the electricity consumed in India is generated by various source. The country has also invested heavily in recent years in renewable energy utilization, especially wind energy. Electric power sector in India during the year of 2010-11, the energy requirement registered a growth of 3.7 percent during the year against the projected growth of 5.6 percent and Peak demand registered a growth of 2.6 percent. Over the previous year and the peak met increased by 6.0 percent, the shortage conditions prevailed in the Country both in terms of energy and peaking availability. Renewable energy sources are also being encouraged considering the growing environmental concerns. Hence, the future prospects of nuclear power, hydro power and power from renewable energy sources are also good.

Keywords: energy services, electricity consumption, transmission network, energy consumer, renewable energy, electromagnetic induction

Introduction

Electricity is a crucial service in the modern days for enjoying the quality of life, and at the same time it is an important input in economic development. Electricity use is growing worldwide, providing a range of energy services: lighting, cooking, heating and cooling, specific industrial uses, entertainment, information technologies, and mobility. In India with increasing population, economic expansion, information and communication technology like computers, the internet, mobile phones and many other related

technologies have become standard devices that most people take for granted, so the demand for electricity has been growing rapidly.

Electricity is a general term encompassing a variety of phenomena resulting from the presence and flow of electric charge. These include many easily recognizable phenomena, such as lightning, static electricity, and the flow of electrical current in an electrical wire. In addition, electricity encompasses less familiar concepts such as the electromagnetic field and electromagnetic induction. The word is from the New Latin ēlectricus, "amber-like", coined in the year 1600 from the Greek (electron) meaning amber (hardened plant resin), because electrical effects were produced classically by rubbing amber. In general usage, the word "electricity" adequately refers to a number of physical effects. In a scientific context, however, the term is vague, and these related, but distinct, concepts are better identified by more precise terms.

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India's Electricity

Electricity plays a vital role in socio economic development of a country. Economic growth and improved living standards of people are directly or indirectly related to the increasing utilization of energy. The electricity sector in India supplies the world's 5th largest energy consumer, accounting for 4.0 percent of global energy consumption by more than 17 percent of global population. About 65.34 percent of the electricity consumed in India is generated by thermal power plants, 21.53 percent by hydroelectric power plants, 2.70 percent by nuclear power plants and 10.42 percent by Renewable Energy Sources. The country has also invested heavily in recent years in renewable energy utilization, especially wind energy. In 2010, India's installed wind generated electric capacity was 13,064 MW. Additionally, India has committed massive amount of funds for the construction of various nuclear reactors which would generate at least 30,000 MW.

Electric power sector in India during the year of 2010-11, the energy requirement registered a growth of 3.7 percent during the year against the projected growth of 5.6 percent and Peak demand registered a growth of 2.6 percent. Over the previous year and the peak met increased by 6.0 percent, the shortage conditions prevailed in the Country both in terms of energy and peaking availability. Base load requirement was 861,591 MU against availability of 788,355 MU which is a shortage is 73,236 MU i.e. 8.5 percent deficit. During peak load the demand was for 122,287 MW against availability of 110,256 MW which is a shortage of 12,031 MW i.e 9.8 percent.

Electricity Consumption in India

Electricity is an essential requirement for all facts of our life and it has been recognized as a basic human need. It is the key to accelerating economic growth, generation of employment elimination of poverty and human development. In the Electricity Services render to Domestic Sector, Commercial Sector, Irrigation, Industrial Sector and traction and railways and others for the consumption purpose.

Table 1 Consumption of Electricity by sectors in India

(Giga Watt hour)

Year	Industry	Agricultural	Domestic	Commercial	Traction & Railway	Others	Total Electricity Consumed
1970-71	29579	4470	3840	2573	1364	1898	43724
1975-76	37568	8721	5821	3507	1855	2774	60246
1980-81	48069	14489	9246	4682	2266	3615	82367
1985-86	66980	23422	17258	7290	3182	4967	123099
1990-91	84209	50321	31982	11181	4112	8552	190357
1995-96	104693	85732	51733	16996	6223	11652	277029
2000-01	107622	84729	75629	22545	8213	17862	316600
2005-06	151557	90292	100090	35965	9944	24039	411887
2006-07	171293	99023	111002	40220	10800	23411	455749
2007-08	189424	104182	120918	46685	11108	29660	501977
2008-09	209474	109610	131720	54189	11425	37577	553995
2009-10	236752	120209	146080	60600	12408	36595	612645
Growth rate of 2009-10 over 2008-09 percent	13.02	9.67	10.90	11.83	8.61	-2.61	10.59

Central Electricity Authority, Energy Statistics 2011, Central Statistical Office, Ministry of Statistical and Programme Implementation, Government of India, New Delhi

The table 1 clearly expresses that year by year the power consumption was increased rapidly by its users such as domestic, agriculture, industry, commercial and railway. It is evident from table 1 that the consumption of electricity growth was met double digit growth by domestic, industries and railways against agriculture. The report represents the cumulative average growth rate for 1970-71 to 2009-10; the consumption of electricity was 13.02 per cent of Industrial Sector, 9.71 per cent formed agricultural sector, 10.90 per cent formed Domestic sector, 11.83 per cent of commercial sector, 8.61 per cent by railways. All consumption growth has positive trend than other. It reflects that the domestic, industries, railways, and commercial growth highly increased to double digit when compared to others. These sectors have not any negative growth in 1970-71 and 2009-10.

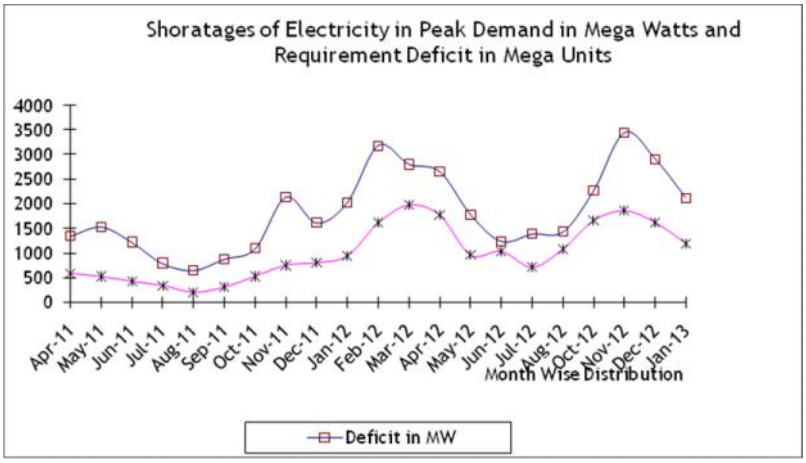
It is evident from table 2 that the electricity requirement and availability of electricity in mega units and peak demand and peak availability of electricity in mega

watts. The table 2 shows that the requirement for electricity and the peak demand for electricity were high in 2012 than compared to the year 2011. The requirement for above mentioned periods had minimum value and maximum value of 6093 MU and 8233 MU respectively. The total sum of requirement was 154255 MU with 7345.48 of its mean value. The standard deviation for the above requirement of electricity was 515.25 MU.

Table 2 India's Electricity Board

Month	Requirement MU	Availability MU	Peak Demand MW	Peak Availability Mw
April 2011	7076	6491	11911	10566
May 2011	7088	6566	11832	10298
June 2011	7108	6686	11713	10491
July 2011	7576	7237	11068	10275
August 2011	7454	7252	10855	10203
September 2011	6961	6654	11118	10237
October 2011	7563	7037	11187	10094
November 2011	6093	5342	11148	9006
December 2011	6732	5929	10962	9347
January 2012	6882	5940	11110	9075
February 2012	7200	5591	12166	8980
March 2012	7952	5980	12813	10006
April 2012	7583	5817	12499	9841
May 2012	6796	5840	11967	10182
June 2012	7868	6834	12296	11053
July 2012	8043	7333	12269	10877
August 2012	7840	6763	12004	10566
October 2012	8233	6574	12544	10269
November 2012	7110	5254	11755	8306
December 2012	7450	5831	12323	9409
January 2013	7647	6456	11819	9698
Source: Central Electricity Board				

For the availability of electricity, the standard deviation was 627.12 MU and the total sum of availability was 133407 MU with its means of 6352.11 MU. It has the 5254 MU and 7333 MU as a minimum and maximum value of its availability of electricity respectively. While concerning peak demand and peak availability of electricity, the total sum was 247359 MW and 208779 MW respectively. The peak demand and peak availability of electricity was deviated to 587.30 MW and 696.81 MW. The mean value of 11779 MW and 9941.86 MW are peak demand and peak availability of electricity respectively.



It is clearly shows that there is a deficit in both requirement and peak demand there is a fluctuation of deficit up and down in India electricity. It is also describe in the below diagram.

Electricity Service in Tami Nadu

The Tamil Nadu Electricity Board is a statutory body of the government which was established in the year 1957 under the Electricity Supply Act of 1948. This body was established to achieve the proper generation and distribution of electric power in the state and aspires to effectually render its services to the citizens of the state.

The Tamil Nadu Electricity Board has established three thermal power stations at Tuticorin, Mettur and North Chennai. The board aspires to establish several other substations to augment the existing thermal stations to generate the ever increasing electricity requirement of the state. The board has an installed capacity of 7905 mega watts with an added support of 832 mega watts generated by the wind mills. The Electricity Board had installed 1,39,933 transformers for the distribution of power to more than 149.91 lakh consumer in Tamil Nadu. The statutory body utilizes the energy forms like the wind, solar, biogas and the biomass which are renewable along with the thermal and nuclear forms of generating electricity. The electricity generated is distributed among the industrial, agricultural and the domestic sectors.

The Government has supported the programs of the Tamil Nadu Electricity Board and has undertaken several programs to augment the generation of power. The Accelerated Power Development and Reforms Program was started to improve the distribution and to modernize the existing power stations. Another program, Prime Ministers Grama Yojana Scheme aims at the generation of power in the tribal and dalit areas in the Nilgiris, Velore and Kodaikanal in the Dindigul District. The NABARD provides loans for the development of the rural infrastructure. The Tamil Nadu Electricity Board aims to empower all the regions of the state with electric power and aspires to maintain the quality of electricity as well.

The electricity generation in the country during the month of July'11 has been 74,104 MU with a remarkable month's double digit growth rate of 12.49 percent corresponding to generation of 65,874 MU during the same month last year. The growth rate during July'10 was 4.09 percent; The cumulative electricity generation in the country during April'11– July'11 has been 291,139 MU with a growth rate of 9.29 percent corresponding to growth rate of 5.28 percent achieved during the same period last year; The actual electricity generation during the month from nuclear plants was 22.33 percent more than the program for the month. The nuclear generation has achieved a remarkable growth rate of 62.70 per cent in comparison to 16.10 per cent achieved during the corresponding month last year due to improved availability of nuclear fuel and commissioning of new unit at Kaiga; the cumulative electricity generation from nuclear plants during April'11– July'11 continued to achieve a remarkable growth rate of over 50 percent. The growth rate during April'11-July'11 in respect of generation from nuclear plants was 53.27 percent in comparison to 22.87 percent achieved during the same period last year.

The electricity generation in the country from the coal based plants during July'11 has exceeded its program by 299 MU due to 100 per cent availability of coal requirement for the month. Coal based plants have achieved an impressive growth rate of 10.68 percent during July'11 over same period last year. Cumulative generation of coal based plants during April-July'11 has also achieved a remarkable growth rate of 9.49 percent over same period last year. Since the demand of power was primarily met by the increased generation from hydro, nuclear and coal based stations, the energy demand from gas, liquid fuel and diesel based stations have reduced. As a result, these power plants have a negative growth rate.

Summaries and Suggestions

An incident which occurred on Edison's death was on October 18. 1931.lt was proposed by President Herbert Hoover that all electrical current in the United States be turned off for one minute in tribute to the great inventor the proposal was declined when its paralyzing effect was realized. I think the fact that the current could not be shut down was a much greater tribute to Edison than the one minute of darkness. So. I would like to propose today in his centenary year, that we too should hopefully expect that the Electricity Authorities will keep the power flowing all the time without interruption.

India has stepped its development agenda and power is an inevitable element of economic growth and development. Growth in the power sector is related to India's GDP growth rate and hence, in order to sustain the growth of 8-9% in GDP, India needs to continuously add power generation capacity to commensurate with this pace.

Although, the Indian power sector is one of the fastest growing sectors in the world and energy availability has increased by around 36% in the past 5 years, the demand for power outstrips its supply. Nearly 60 crore Indians do not have access to electricity. The energy and peaking deficits have been hovering around double digits for the past two years and the condition might worsen in the coming years considering the huge demand of power from India's rising population and rapid industrialization and urbanization. Hence, there is no slowing down of demand for the Power Sector, thus offering ample scope for rapid capacity expansion.

The Government is investing in this industry through various development schemes like Rajeev Gandhi Rural Electrification Program, 'Power for all by 2012′ and Accelerated Power Development and Reform Programme (ARDRP), Ultra Mega Power Projects etc. It has also been is encouraging participation of private players in this Sector.

Renewable energy sources are also being encouraged considering the growing environmental concerns. Hence, the future prospects of nuclear power, hydro power and power from renewable energy sources are also good.

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