

A qualitative and quantitative analysis on lignite – A source for power production

A Govindarajan

Faculty of Business administration, Sathyabama University, Chennai.119

Abstract: Lignite a fossil is analysed with respect to its volatility and sulfur content. Lignite is a source for power production. In India more than 68 % of the power produced is by government or public sector under taking Neyveli Lignite Corporation Ltd is public sector from Tamil Nadu, which uses Lignite as raw material to produce electricity is identified for analysis as its contribution can give betterment to the society.

Key words: Coal, Lignite, NLC Ltd, Power production etc.

1. Introduction.

Power is the main source of economic development of every country..In India coal is the major source of power production. The lignite being a fossil fuel a variety of coal considered for analysis. In India more than 68 % of the power produced is by government or public sector under taking Neyveli Lignite Corporation Ltd (NLC Ltd) is public sector from Tamil Nadu, which uses Lignite as raw material to produce electricity is identified for analysis. The people of t Tamil Nadu know NLC Ltd., and the farmers of Tamil Nadu depend on the electricity for pumping of water and for other agricultural activity. The power shortage in Tamil Nadu have brought in the question of existence of life in many as reported by “The Hindu” on 29th sep 2012, The article analysis the application of lignite in solving the problem of power shortage.

2. World Power Production.

The world power production increases consistently with consumption but the rate is at which increase in production with consumption is unmatched¹. The rate of change in power consumption is too high which leads to power shortage in 2013.

Table no. 1 World power production and consumption

Year power	2007	2008	2009	2010	2011	2012	Growth rate
Production	17400	18960	19020	19250	19120	20250	2.4%
Consumption	16330	16880	17480	17930	17780	19090	22%

3. Details of Power Production by India

Power production by India shows an increasing trend. During 2006 it was only 665.3 billion Kilo Watts per Hour(KWH) but in 2013 power production increased to 911.6 billion KWH. The details of power production ² from 2009 to 2013 is given in the Fig1

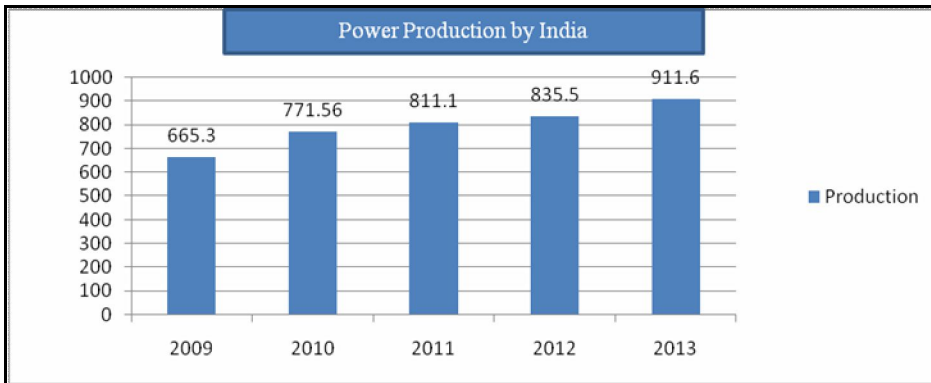


Fig 1

4. Power Supply Position in India

The total requirement, supply and production is represented in Fig 2. It is observed that the requirement is more compared to production. There is a continuous deficit in power supply when compared with requirement.

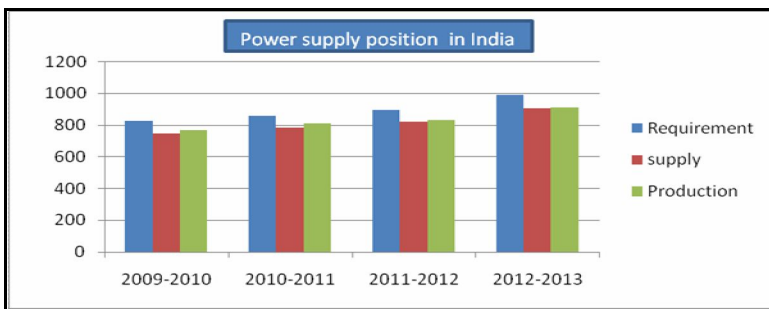


Fig 2.

5. Basis of Power Production by India

The basis of power production of India is through Fossil fuel, Hydro, Nuclear and other renewable sources like solar, wind etc. The Fig 3 gives the details of % of power production through various basis. We find that here is a considerable increase in production of power through Fossil fuel from 40.1% in 1971 to 68.14% in the year 2013. Fossil fuel includes coal, oil and gas ³

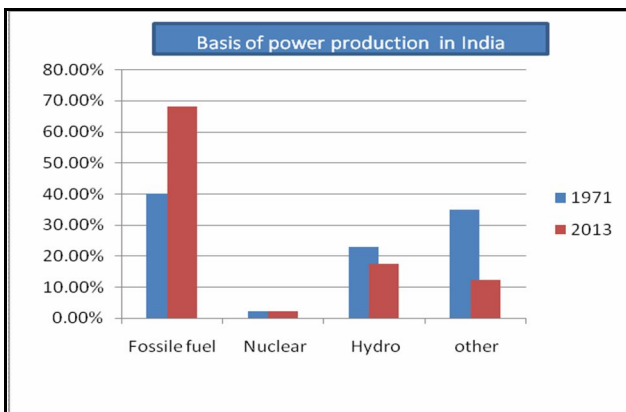


Fig 3.

6. Classification of Coal:

Fossil fuel plays a greater role in power production for India. The Fossil fuel represents Lignite, Flame coal, Gas flame coal, Gas coal, Fat coal, Forge coal, Non-baking coal, Anthracite⁴. The various composition and heat generating capacity is analysed and classified as follows in the Table no 2.

Table no 2. Classification of coals and their specifications.

English Designation	Volatiles %	C Carbon %	H Hydrogen %	O Oxygen %	S Sulfur %	Heat content kJ/kg
Lignite (brown coal)	45-65	60-75	6.0-5.8	34-17	0.5-3	<28,470
Flame coal	40-45	75-82	6.0-5.8	>9.8	~1	<32,870
Gas flame coal	35-40	82-85	5.8-5.6	9.8-7.3	~1	<33,910
Gas coal	28-35	85-87.5	5.6-5.0	7.3-4.5	~1	<34,960
Fat coal	19-28	87.5-89.5	5.0-4.5	4.5-3.2	~1	<35,380
Forge coal	14-19	89.5-90.5	4.5-4.0	3.2-2.8	~1	<35,380
Non baking coal	10-14	90.5-91.5	4.0-3.75	2.8-3.5	~1	35,380
Anthracite	7-12	>91.5	<3.75	<2.5	~1	<35,300

More than 68 % of the power produced is by government or public sector under taking and only 31.5% of the total power production is by private sector. On the above fact analysing a public sector will be good at this time. NEYVELI LIGNITE CORPORATION LIMITED (NLC Ltd.,) is taken for analysis as because it is one among the public sector which uses lignite a variety of coal among the fossil fuels as a major raw material for producing electricity. As per the report of Neyveli Lignite Corporation Limited the availability of lignite in Tamil Nadu is 31327 MT will exist for another 100 years. The world lignite production and India's contribution is represented in the Table no 3. The Lignite production is listed in Table no.4

Table no 3. Lignite production.

	2008	2009	2010	2011	2012
World Lignite production					
(Thousand short tons)	7,470,959	7,601,609	7,999,455	8,443,803	8,694,754
(Metric tons)	8235322.6	8379339.6	8817889.72	9307699.546	9584325.67
Total Lignite production in India					
(Thousand short tons)	570,010	614,918	619,843	633,774	649,644
(Metric tons)	628328.47	677831.07	683259.94	698616.24	716109.92

Table no. 4. Contribution by NLC Ltd

Details	Unit	2011-2012	2010-2011	2009-2010	2008-2009	2007-2008
Lignite	Lakh Tone (LT)	245.90	231.44	223.38	213.07	215.86
Power Generation (Gross)	Million Unit (MU)	18789.44	17881.08	17656.04	15767.98	17456.89

From the above tables it is clear that there is a continuous increase in lignite production and its contribution in power production⁵.

7. Mode of Power Production by NLC Ltd.

NLC Ltd produces power through thermal plants. Thermal power station-1 produces 1600MW and I power station – II produces 1970 MW. Out of total production nearly about 33.5% is provided to Tamil Nadu balance

is shared by neighboring states. Lignite is highly volatile in nature(45%-65%) and very difficult to store therefore it is evacuated and used for power production as an when required.

8. Usage of Lignite.

Electricity is produced from Lignite which is distributed to Sates like Tamil Nadu, Karnataka, Kerala and Andhra Pradesh. Fly ash so produced after burning lignite for power production is used for making Bricks. On evacuation of lignite water from the spring is used for agriculture and vegetation around Neyveli.

9. Strategic Options.

Alternative method of power production need to be analysed as, if on comparison production cost is cheaper than producing electricity through lignite then the government can think of alternative source of power production, in that case the available lignite resources will be unproductive. Lignite is our resources, available in plenty, less harmful compared to other raw material used for producing electricity.

10. Harmful Effect of Power Production Through Lignite.

- Effect on environment because approximately 75 Tg/S per year of sulfur dioxide (SO₂) is released from burning coal. After release, the sulfur dioxide is oxidized to gaseous H₂SO₂ which scatters solar radiation, hence its increase in the atmosphere exerts a cooling effect on climate that masks some of the warming caused by increased greenhouse gases. Release of SO₂ also contributes to the widespread acidification of ecosystems.⁶
- Effect on human being like causing lung cancer because of air pollution by the fumes exhaled from the tunnels of power stations and other side effect of radiation⁷.
- Destruction of houses.

11. Conclusion

Electricity is an inevitable. Without electricity total survivability is difficult. For the betterment of society in field of agriculture, science and technology electricity is very important. Set a siding the harmful effects and as lignite is cheapest source of raw material and available in large quantity a better methodology may be employed to satisfy the human kind especially to the people of Tamil Nadu. People of Tamil Nadu expect a greater contribution from NLC Ltd that is nothing but from the brown gold. Agriculture is a back bone of Indian economy which contributes 53% of employment and contributes 14% of GDP of the nation⁸ which need to be taken into account. In India more than 27,000 villages still need to be electrified. If such type of public sector undertakings contributes more in power production can bring prosperity to villages, which automatically make India as a forerunner in world economy.

References

1. www.oecd-library.com.
2. www.indexmundi.com.
3. Annual report of Ministry of power 2011-2012, 2012-2013
4. Brian h. Bowen, Marty. W. Irwin., Coal characteristics, The Energy center at Discovery park Oct 2008.
5. Annual reports of NLC Ltd from 2008 to 2013.
6. M.Velan., Environmental sustainability and cleaner perspectives- A challenging experience from lignite mining industry in India, International Journal of Engineering and Advanced Technology (IJEAT) , 2013,2, 288 .
7. A. Kucukondar, and H. Lma., Quantitative analysis and qualitative analysis of lignite coal and its ash sample taken from Soma-Darkale region(Turkey), Journal of Qualitative spectroscopy and radiation transfer., 2003,77,329-333.
8. Indian Economic survey 2012-2013.
