

ENERGY

India must take leap in generation

[This has a reference to the Eleventh Five Year Report Volume III Chapter 10 on Energy]

Present Scenario :

1. When Pt. Jawahar Lal Nehru layed the foundation of modern India, he had vusalized the need of energy. So he planned to establish various energy generating projects during the first and second Five Year plan to meet the need of fast growth rate of industries and urbanization. It was visualized as under :

1.1 India processed huge potentiality for development of hydel and thermal generating plants and exploration of petroleum products.

1.2 The establishment of such projects were subject to the following factors.

Project	Period of Commission	Cost	Maintenance	Generation Cost Per KW	Pollution	Life
Thermal	2-3 Years	1 Units*	High	Rs. 1.5 Per KW	Yes	20 Year
Hydel	5-7 Years	2 Units	Low	Rs. 0.75 Per KW	None	50 Year
Nuclear	5-7 Years	3 Units	Average	Rs. 1.00 Per KW	None	50 Year
NPG (Gas)	3-4 Years	1 Unit	Average	Rs. 1.5 Per KW	None	30 Year
Non. Convent. (Wind, Sea)	2-3 Years	2 Units	Low	Rs. 3.00 Per KW	None	50 Year
*It is based on the Rs. 15 crore per 1000 KW as 1 Unit						

1.3 Total exploration for generation of electricity from the following sources were not undertaken :

1.3.1 Like U.K. river flow based generators of 500 KW were not established with full effect till today when the maintenance cost is low.

1.3.2 Sea wave energy generation were not tried.

- 1.3.3 Waterfall – generation system too not fully tapped in the entire Himalayan and N.E. region when on each waterfall a min. 500KW capacity could be generated. This would have meet the need of rural areas.
- 1.3.4 Gas based generation plants have been established, but exploration of NPG has been considerably delayed inspite of detection of the Krishna – Godawri basin. Undoubtedly the exploration of petroleum-crude and gas exploration takes 3-4 years, but establishment of plants too takes 4-5 years due to many factors and handicaps.
- 1.3.5 Light and heat generating through “Gobar Gas Plants” were not undertaken with full force to provide energy to about 5 lakh villages.

2. **Some facts :**

- 2.1 The energy need during the Tenth Five Year plan could not match the growth rate of 8.5% achieved against the envisage GDP growth rate of 6.75%.
- 2.2 Envisaged growth rate of economy during Eleventh Plan is 9%. Naturally the energy too must grow to meet the demand of growth. This is the biggest challenge before the planners.
 - 2.2.1 Half of the Indian population does not have access to electricity. Due to shortage of electricity or no access – majority of the population living in non urban or forest areas are firewood. (Endangering forest wealth) during dung cakes, or crop residue. All creating pollution.
 - 2.2.2 This slowly increasing non-forest areas and deploidiation of forest. We have to save forests from this onslaught.
 - 2.2.3 Since independence, India has made significant expansion in total energy use in the country from non-commercial to commercial sources.
 - 2.2.4 India is both a major energy producer and consumer. Energy consumption rose from 59.790% in 1980-81 to 72.6% in 2006-07. India consumed 455KG of oil (Kgoe) per person of primary energy in 2006 which works to about 26% of world average of 1750 Kgoe in that year.
 - 2.2.5 Main challenge before energy sector for fuelling the proposed growth rate in Eleventh Plan is to enhance energy supply in cost effective ways. Persistent shortage of

electricity during normal power and peak power indicate the magnitude of the problem. Average peak shortage is about 12% in 2006-07 the load factor on grids was very high thus entire system is operating under strain. At the same time for want of natural gas, some gas based power plants are kept idle. Nuclear plants are also operating at lower load factor for want of nuclear fuel.

2.2.6 Some states like UP, MP are facing power shortage for last 20 years. Power cut (duration 4-8 hours) tactics are being applied in all the major cities. Even Delhi also becomes victim during summer and winter season.

2.2.7 The transmission and Distribution Losses (TDL) are quite high. As per data it was 40-60% during the Tenth Plan Period. State Utility Services (State Electricity Board or State Distribution Corporation) failed to reduce it and bring it to international level of 15-25%.

3. **Some Observations : Energy Resources :**

3.1 Hydro Generation : 70% of the resources are in Northern and NE area while South has 30% of the resources.

3.2 Hydro Carbon : Major coal fields are in east and rest in MP. Limited lignite is in north while major part of mines are in South. East account for 70% the total reserves.

3.3 Coal – Lignite : Coal constitute the major source of energy. As on January 2007, coal reserves were 253.3 billion ton out of which only 92.72 billion ton is in the proved category. This is likely to last for 100 years at the rate of present consumption.

3.4 Petroleum and Natural Gas : Recoverable oil reserves as on 1st April, 2006 is about 1633 mt. Which can last for 35 years at the current level of consumption. This caters for 26% of national demand while balance is met by import of crude oil.

Gas current level of natural gas production is not adequate to meet industrial demand, specially for power and fertilizer industries. The shortage is matched by the import of LNG since 2004-05.

Situation will improved once production commences from Krishna-Godawri basin soon, the production was scheduled for June, 2008 but has been delayed due to delay in setting of infrastructure by Reliance Industries Ltd. Oil and Gas flow at rate of 1000 bopd and 30 million cu. Ft. of gas.

- 3.5 Coal Base Methane (CBM) : India has significant CBM and Underground Coal Gasification (UCG) resources. Eleventh Plan target to produce 3.78 bcm and 2.99 bcm from 4CG.
- 3.6 Nuclear as Energy : Present installed capacity of nuclear energy is 3900 MW forming 3.190 of total installed power generation capacity with Plant Load Factor (PLF) of 57%
- India has vast resources of thorium. Research is under fast development to convert it into uranium useful for our power plants.
 - We have good reserve of low grade uranium. This potential can be increased to produced 3,00,000MW in second stage through fast breeder reactors.
- 3.7 Renewable Source of Energy : To achieve goal of development, India would have to rely on imports of oil, gas and coal. In this context the role of new and renewable energy assumes added significance. This account to 5-6% of the commercial mix.

4. Task Ahead :

- 4.1 The demand for energy specially of commercial energy is growing rapidly. The trend of demand and supply of primary energy estimated as under :

		in mtoe
	2006-07	2011-12
Domestic production	259.56	435
Net Import	131.97	111
Total Comm. Energy	391.53	546
Non-Comm. Energy	147.56	169
Total Primary demand	539.09	715

- 4.2 Energy requirement : Growth recorded between 1990-91 and 2006-07 Primary energy requirement – 3.67% growth rate, Primate Commercial requirement – 4.93% growth rate.

Sourcewise Demand :

Year	All in (mtoe)						
	Coal	Lignite	Oil	Nt. Gas	Hydro	Nuclear	Wind
2000-01	131.52	6.43	106.97	25.07	6.40	4.41	0.13
2006-07	200.02	8.72	132.75	34.60	9.75	4.86	0.83
2011-12	270	13	186	48	12	17	<1

Percentage demand met from Domestic Source

(in %)

Year	2000-01	2006-07	2011-12
Coal	96.1	90.33	93.02
Lignite	100	100	100
Oil	30.3	26.6	27.59
Nat. Gas	100	82.08	69.30
Hydro	99.96	99.74	95.94

(for 2011-12 @ 9% growth)

4.3 Projected Requirement of Commercial Energy

Coal	Lignite	Oil	Nat. Gas	Hydro Power	Nuclear	Wind
731mt	55.59mt	145mt	106bcm	165BKWh	44.64 BKWh	7BKWh

4.4 Experience of the development during 10th Plan

4.4.1 Utilisation and targets

(in crores)

Sector	10 th Plan Outlay	Expenditure	Percent Utilisation
State + UTs	93225.71	88076.39	92.12
Central	177050.64	90677.85	51.222
All	270276.35	179354.24	66.36

4.4.2 Recovery of Revenue V/S Production of Energy

Cost of Energy	2003-04	2004-05	2005-06
Cost of energy sold	110553	118975	128853
Revenue from Sale	85942	91738	100000
Energy sold	67.47%	68.75%	63.58%
Loss on Sale	24611	27237	28853
Average Cost of Supply	353.80	357.35	366.96
(Paisa/KW)	(-5.54%)	(-4.60%)	(-2.03%)

4.4.3 Reported AT&C losses are to the tune of 28853 crores for 20 major states is an under estimate. SEB (State Electricity Board) account conceal more than what they reveal. They do not produce commercial type balance sheet with audit report and Assets & liabilities and Audit Comments are avoided. UP-SB did not submit correct report AT&C losses are estimated to accede.

Rs. 40,000 crores (Para 10.50 Chapter 10)

4.4.4 APDRP is also in wrong shape :

- Accountability missing
- Project report ill prepared
- Base line data missing
- Unrealistic target were setup (Para 10.52)

4.4.5 Short falls experience during Tenth Plan :

- (i) Inordinate delay was caused in according investment approval for various projects (17 numbers)
- (ii) In State Utility Service and SEB : Accountability and good governance missing. Quality Control on purchase of material specially transformers of 11KVA, 33KVA not exercise strictly – rather safety testing norms were relaxed for undue latent benefits. Result more than 50% transformers could not withstand the fluctuated over load factor in supply.
- (iii) Cost escalation factor in supply contract was not adhered too resulting into the delay in supplies or supplies backup out facing legal battles.
- (iv) No sincere efforts made to reduce transmission losses from 40-60% to 25-30% (on average standards)
- (v) Dung Gas Plants : In spite of the fact that “Gobar Gas Plant” was introduced by Khadi and Village Industries Board in the year 1974, this project failed to cover about 200 districts, 1600 tehsils and 3 lacs villages to meet the need of light and cooking gas as well as of manure. China adopted this technique and by year 1984 covered most of the village. With such a huge cattle wealth in plain areas, if this project was implemented in toto, the village economy would have improved due to availability of natural organic manure. Estimate is that now a suitable gas plant cost about Rs. 1 lac each and can cater for 3-4 houses. On the other hand this would have reduce dependence of villagers of wood fuel saving forests.

5 Action plain :

- 5.1 In order to meet the shortage of energy, we feel that we should harness all the energy producing natural resources at war footing so that burden on the import of crude oil, gas and coke is reduced.
- 5.2 We should tap and establish hydro generating plants at all the water falls in the Himaliyan and N.E regions of capacity 250 to 500 KW each to meet the area demand. Undoubtedly the generation is optimum for 6 months only and no generation during 3 month of winter.

Estimate generating points 2000 of 500 KW each
Total generation: 10,000,000 KW
Total cost Rs 5000
corors*

5.3 River Flow generating plants :

On the pattern of European countries all the river sources may be exploited. In U.P Martin Burn & Co. in past exploited Ganga Waterflow at Haridwar and generated electricity and supplied it in Northern India upto Mathura for 40 years.

We feel that about 100 plants of 500 KW each can be setup on all the rivers of India. Thus generating $500 \times 1000 = 5,00,000$ KW energy

Total cost Rs. 5,000
crores*

5.4 Seawater harnessing :

India have a good capacity to harness sea water energy. In the Bay of Bengal on entire cost of A.P. and T.N. generates high waves from 10 to 15 feet while the Arabian sea all along the western cost generates such waves at some selected places.

Advantage : You generate electricity both ways i.e. incoming and outgoing waves.

Estimated generation capacity is at 1000 points of 500 KW each =
Total 5,00,000 KW*

Total cost Rs. 5,000 Crores*

Note : * This cost is based on the estimate that 1000 KW plant establishment will cost Rs. 1 Crore at the generating site at the existing price level.

5.5 Thus we will have during Eleventh Plan additional energy from the above indicated system as under :

	Energy KW	Rs. Cost in Crores
(a) Water Fall	10,00,000KW	5,000
(b) River Flow	5,00,000KW	5,000
(c) Sea Water	5,00,000KW	5,000
Total	20,00,000KW	15,000

5.6 India will save good amount of Rs..... on the on the import of crude oil, gas and coke by the end of Eleventh Plan Period. No Pollution will be created. North Eastern region and village lying in the entire belt of Himalaya will prosper. The same will be the fate of villagers living along the sea coast of India.

Warning : This additional generation should be utilized only for the welfare of rural masses and not for industries who may be asked to put power captive plants without any electricity duty benefit.

5.7 Gobar Gas Plants : This should be harness on war footing in all the villages during the Eleventh Plan Period. Setting of one plant in a village will cost Rs. 1 lac so as per survey necessary funds may be provided to the Khadi and Village Industries Commission. They may be asked to meet the targets by the end of Eleventh Plan. Estimated total energy generation will be around 5 lac KW.

Note : For consideration of Dr. P.C. Lunia

Dr. L.B. Lal as per your desired has completed the project on ENERGY and it shall be to all concern after meeting of your approval.