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Power for All by 2012: Bottlenecks and Strategies for Mission

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Abstract

Power is a key factor that contributes to the industrialization and the economic growth of a country. It is one of the most important infrastructures on which the development of various economic sectors of a country depend. Availability of reliable and quality power at affordable rates is very crucial. It helps to make the domestic market competitive globally and thus enhance the quality of life for people. The nuclear, hydro, and thermal energy are the prominent sources of electricity generation in India. In India, the power industry is huge. The Central Ministry of Power is the main authority responsible for the overall development of electrical energy. The ministry is in charge of planning, formulating policies, monitoring and implementing power projects, processing of projects for investment decision, and enacting legislation with regards to power generation, distribution, and transmission. In order to attract foreign investments into the power industry of India, the government has announced several policies and has taken initiatives from time to time. The most important amongst all the policies announced by the government is the enactment of the Electricity Act. The act was enacted in 2003. The act mainly aims to solidify the existing laws relating to the generation, distribution, transmission, and trading of electricity, promote healthy competition among companies in the power sector; and ensure that there is a supply of electricity to every nook and corner of the country. The Electricity Act also aims to rationalize electricity charges, promote efficient and environmentally favorable policies. Moreover, the Central Ministry of Power has set an ambitious plan of "power for all by 2012". While the power sector in India has witnessed a few success stories in the last 4-5 years, the road that lies ahead of us is dotted with innumerable challenges that result from the gaps that exist between what's planned versus what the power sector has been able to deliver. This document highlights and quantifies some of these gaps and attempts to analyze the problem.

1. INTRODUCTION

The Indian Ministry of Power has set a goal, "Mission 2012: Power for all" and released a comprehensive sector development blueprint. The main objectives, in addition to providing 100% access to power, are to provide sufficient power to achieve targeted GDP growth rate of 8%, provide reliable and good quality power and to enhance commercial viability. A huge capital investment of about US$ 200 billion is required to meet Mission 2012 targets. This has welcomed numerous global companies to establish their operations in India under the famous PPP (public-private partnership) programs. Additional massive capital investment is further required over the subsequent years with the country's power requisite expected to touch 800,000 MW by 2031-32. The

latest figures released by the Central Electricity Authority (CEA) indicate a 5.5% growth in electricity generation in India during the financial year 2010-11. Power generation recorded a CAGR of 5.17% during the period 2001-02 to 2010-11.

2. HIGBLIGHTS OF POWER SECTOR

Highlights of power sector developments in 2010-11

a) The total thermal generation has achieved a growth rate of 3.81%. Coal-based generation recorded a growth rate of 3.99%.Growth of thermal generation was mainly restricted due to coal shortages, receipt of poor quality/ wet coal, delay in commissioning of power plants.

b) The average PLF of thermal power projects (coal/lignite) achieved during the year was 75.10%, as compared to 77.68% in the previous year.

c) As on March 31, 2011, 29 power stations had critical coal stock position (of less than 14 days) and 13 power stations with super critical stock meaning stock for less than 4 days.

d) Gas-based power generation witnessed a setback due to lower fuel availability from the Reliance Industries owned KG-D6 basin.

e) Revival of good monsoon after two successive years of deficient/scanty rain fall resulted in a 10% growth in hydro power generation.

f) The nuclear generation achieved a remarkable growth rate of 41.04% due to improved availability of nuclear fuel to the nuclear plants, and additional generation from the newly commissioned nuclear unit at Kaiga in January'11 & re-commissioning of some of the units after repairs & maintenance works.

g) The contribution of the private sector to India's electricity output has grown from 11.6 per cent in 2006 and further to 30 per cent as of date and is likely to go up by about 60 per cent in the 12th plan (2012-2017).

h) 16 ultra-mega power projects and 14inter-state transmission schemes have been identified for development by the private sector on the basis of competitive bidding.

3. OBJECTIVES FOR THE STUDY

There is a large demand –supply gap in Indian Power sector. Power sector reform is the biggest problem the Indian economy faces. The objectives of the study are to identify the problems that Indian power sector experience and suggest some solutions to achieve the target. Hence the primary objectives are:

a) To identify the bottlenecks in ensuring Reliable Power
b) Suggestions and Strategies for reforms in power sector
c) To identify the possibilities of positive changes that can lead to Recovery.

4. RESEARCH METHODOLOGY

Keeping in view the Objective of the study, only secondary data have been studied and this paper has been developed based on the information available from books, magazines, journals, newspaper, and websites.

5. BOTTLENECKS IN ENSURING RELIABLE POWER

The document builds on the risks prevalent in the industry, some prominent hurdles that the power sector has already crossed and more importantly that various players have to overcome. Understanding these core issues and risks of the power sector ,the mission of power for all can be achieved.

a) Deteriorating financial condition of State Electricity Boards (SEBs): SEBs recorded sharp erosion in their net worth over the past several years caused by high operational losses. SEBs across India are saddled with losses due to power theft and technical losses to the tune of 28.44% during transmission and distribution (T&D), billing inefficiencies, and, more importantly, because they have to buy expensive power to tide over short-term deficits.

b) Deterioration in SEB finances impact power demand; blackouts, low PLFs co-exist:

i) SEBs' commercial losses reached an all-time high of Rs526b in FY09. Costs increased due to "mandated" power procurement, high staff costs

(Sixth Pay Commission) and tariff increases were marginal.

ii) More important, commercial cash losses rose as the system took time to transition to the new reality. State governments' subsidy payments were lower than provided for, resulting in higher cash losses on revenue realized basis.

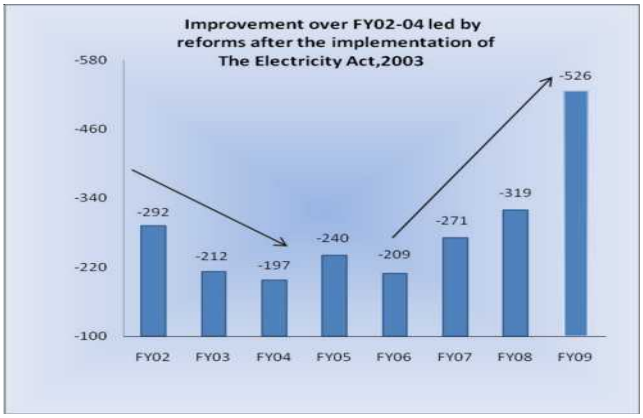
iii) The deterioration in SEB finances impacted buying ability and in turn, power demand. Blackouts and lower PLFs now co-exist.

iv) Base deficit declined to 8.5% in FY11 from 11% in FY09 due to lower demand (impact of SEB finances) and increased supply (better monsoons).

Table 1
SEB Finances Deteriorate (Rs Bn)

YEARS	AMOUNT
FY02	-292
FY03	-212
FY04	-197
FY05	-240
FY06	-209
FY07	-271
FY08	-219
FY09	-526

Source: Motilal Oswal report on power sector



c) Inadequate resource availability in generation, transmission and distribution: In order to provide availability of over 1000 units of per capita electricity by year 2012, it has been estimated that need-based capacity addition of more than 100,000 MW would be required. While some progress has been made at reducing the Transmission and Distribution (T&D) losses, these still remain substantially higher than the global benchmarks, at approximately 33 percent. The current installed transmission capacity is only 13 percent of the total installed generation capacity. State utilities have already accumulated huge losses and even private firms have defaulted on payments to power producers as tariffs are low – a situation that is discouraging fresh investment in the power sector and making new capacity of 35,000 mw unviable.

Table 2
Cash losses (on subsidy received basis) at unsustainable Levels (Rs bn)

YEARS	AMOUNT
FY02	-107.5
FY03	14.5
FY04	21.5
FY05	32.3
FY06	22.5
FY07	-18.6
FY08	-27.8
FY09	-212.6

Source: Motilal Oswal report on power sector

d) Demand ahead of supply leads to record high base deficits:

i) The average capacity addition from the Seventh Plan (1985-89) until the Tenth Plan (2003-07) was largely similar at 16-21GW every five years; resulting in underinvestment. The actual achievement was 48-54% of the plans, impacting power availability.

ii) The gap between power availability and requirement widened meaningfully after 2005 and over FY05-10, power requirement CAGR of 5.6% was higher than generation growth (availability) of 4.5%, widening the demand-supply gap.

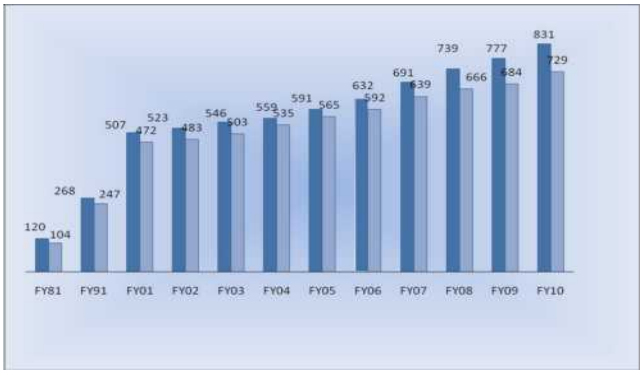
iii) Low supply (drought in FY09 impacted hydro generation) and high demand (General Elections in 2009), accentuated power shortages.

iv) The base deficit increased to 12% in FY08 since 1989 and sustained at higher levels.

Table 3
Demand Supply Gap

Years	Requirement (BU)	Availability (BU)
FY 81	120	104
FY 91	268	247
FY 01	507	472
FY 02	523	483
FY 03	546	503
FY 04	559	535
FY 05	591	565
FY 06	632	592
FY 07	691	639
FY 08	739	666
FY 09	777	684
FY 10	831	729

Source: Motilal Oswal report on power sector



e) Physical constraints: (See Table 4)

i) Projects were delayed due to issues such as local protests, the lack of environment and forest clearances as large capacity addition strained the system/resources.

ii) Equipment supply issues, clearances and issues related to Chinese visas impacted many projects, in terms of time and costs. This is a function of excessive strain on limited resources and the delays impacted project cash flows.

iii) Fuel supply emerged as a challenging issue, as evacuation bottlenecks led to increased inventory for Coal India (up 3x in the past four years). Environmental issues impacted production growth (FY11 production flat). These factors led to several newly commissioned projects operating at sub-optimal PLFs.

f) Fuel SupplyCritical:

i) Domestic coal production has been impacted by issues related to the environment, law and order and land acquisition.

ii) Given the accelerated pace of capacity addition over FY12-15, coal demand is expected at 10% CAGR. Low domestic production and increased demand impacts project economics.

iii) PLFs of coal based projects declined 300bp in FY11. Coal India's actual supply against linkages towards power plants was 302mt v/s requirement of 355mt.

iv) Coal supply has been a bigger issue for projects commissioned after FY09, impacting operating rates. Linkages continue to be on best-efforts basis, impacting the chain.

v) Several projects commissioned in FY10 and FY11 are operating at sub-80% PLF. FSAs for many of the capacities are not yet signed due to fuel scarcity.

vi) Massive investments required in mining, railways, ports for transportation of fuel. Supply of natural gas, even from existing gas based stations very short of requirements and resulted in under-utilization of these stations.

vii) The country had been facing coal shortage due to fall in domestic production. Imports too have gone down dramatically due to a sharp rise in the cost as countries such as Indonesia and Australia have imposed additional duties, taking the price from $30 to $150 a tone. Sudden changes in the Australian and Indonesian coal block policies had impacted the ultra mega power projects and other plants to the extent of 15,000 MW. The changes made the power purchase agreements (PPAs)

Table 4
Project progress impacted/delayed due to adherence to Environment Norms

Company	Project Impacted	Remarks
Adani Power	1980MW Tiroda, Maharashtra	withdrawal of TOR for mining in Lohara block, due to proximity to tiger reserve
Uttarkhand JalVidyut nigam	480MW, Pala Maneri	Scrapped by environment Ministry, due to religious sentiment
Uttarkhand Jal Vidyut nigam	381MW, Bhaironghati	Scrapped by environment Ministry, due to religious sentiment
Essar Power	1200MW, Mahan 1, Madhya Pradesh	To source coal from Mahan coal block in Madhya Pradesh, now declared 'No Go' area
AES	1200MW, Chhattisgarh	Sanyang coal block allotted, could not obtain forest clearance
IFFCO	1320MW, Chhattisgarh	Put on hold by MoEF, due to non availability of coal linkage

unworkable for the power producers who had signed agreements with the State governments

Table 5
Coal requirement for power sector increases

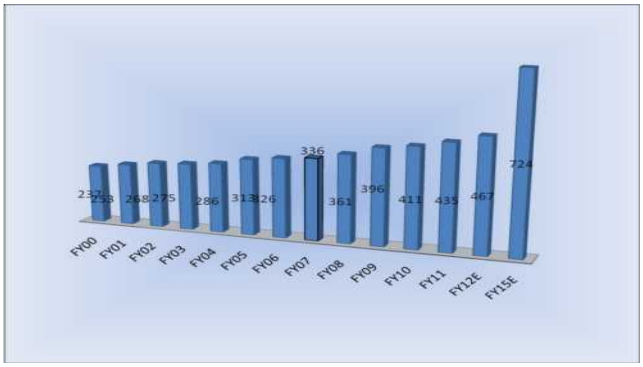
Years	Requirement (M tons)
FY 00	237
FY 01	253
FY 02	268
FY 03	275
FY 04	286
FY 05	313
FY 06	326
FY 07	336
FY 08	361
FY 09	396
FY 10	411
FY 11	435
FY 12E	467
FY 15E	724

Source: Money control.com

6. SUGGESTIONS AND STRATEGIES FOR REFORMS IN POWER SECTOR

Based on the analysis of current power sector, following are the suggestions that can be followed to achieve the targets set

a) Project execution need to be expedited: Reasons identified for slippage range from inadequate preparedness of projects, shortage of equipment to the delay in financial closure.



i) Fuel Availability- Purchase and development of coal mines abroad. To ensure this

- Risk management through effective contracting, supply diversification, etc.
- Control over supply infrastructure

ii) Plant Equipment Shortage-

- Procurement from abroad
- Setting up of new supply units
- Robust procurement management, vendor monitoring
- Project scheduling

iii) Land Acquisition and Environment Clearance-Inadequate communication with stakeholders resulting in mismatch of expectations from project affected persons. So for speeding up processes, it is essential to proactively manage the environment and stakeholder' expectations.

iv) Financial - Rapid buildup of the generation capacity is being aided by setting up of Ultra Mega Power Projects (UMPPs) each of which is 4000 MW. However, the execution of the Ultra Mega

Power Projects (UMPP) is a significant challenge as India has not witnessed an execution of such a large scale power project before. So to execute such large projects, resources should ensure technical and financial capability, and also stress on project execution and costs/ cash flow management. Continued investment is required in ongoing projects so that investments already made is not lost, for this these projects should be reviewed, and investment should be prioritized before taking up new projects.

b) Reforms in Financial condition of State Electricity Board: SEBs were required to accept reform-based performance milestones such as setting up of SERCs (State Electricity Regulatory Commission), metering of distribution feeders and improvement in revenue realization. The states were offered incentives for complying with the scheme. Some of other suggestions are-

i) increase competition in power distribution through adoption of franchisee route
ii) revision of power tariffs to reflect higher international coal prices, as a large number of power projects, including ultra mega power projects under implementation, have run into serious 'viability problems'
iii) The Shunglu panel, set up by the Planning Commission for state electricity board (SEB) reforms, has suggested a seemingly radical idea: create a special purpose vehicle (SPV)—majority owned by the Reserve Bank of India (the rest split up equally between Power Finance Corp. Ltd and Rural Electrification Corp. Ltd)—to which shaky loans of SEBs will be transferred. The argument goes that this move will take the risk off the books of power lenders and lessen any impact on the financial system at large.
iv) open access to consumers to choose their electricity supplier and restructuring of power utilities of seven major States — including Uttar Pradesh and Tamil Nadu
v) State power utilities should provide power to open access consumers at negotiated rates and not regulated rates

c) Reduction in T & D Loss: One-third of investment in power may evaporate if T &D losses not checked. Of the total investment of Rs 810,000 crore in the power sector during 11th Plan, over Rs 270,000 crore may well evaporate into an unknown space if war-footing steps are not taken to control mammoth transmission and distribution losses.

i) 'Energy audits' for identifying elements causing excessive losses
ii) The central or the state governments should draw plans to provide financial support to the utilities for installations of meters on at least all the distribution transformers in a phased manner.
iii) It should be made obligatory for all the big industries as well as the utilities to carry out energy audit of their system to identify high loss areas and take remedial measures to reduce the same.
iv) Schemes for incentive awards to utilities who are able to reduce T&D losses beyond a certain pre-fixed limit.
v) The financial institutions should be encouraged to provide easy loans to utilities for taking remedial measures to reduce the T&D losses.
vi) Publicity campaigns should be carried out to make the consumer aware of the high penalties on the unauthorized use of electricity.
vii) Utilities should prepare realistic power Master Plans for their systems to develop a strategy to meet the growing electricity demands of the different sectors of the state's economy over the next 15 years.

d) Power Sector must be given incentives, direct benefits: "Power sector being one of the key sectors of the economy should be focused through a combination of incentives and direct benefits. India is in dire need for strengthening the power transmission and distribution sectors. More so, the distribution sector which needs to be strengthened in two ways: a) upgrading existing ailing infrastructure & building new infrastructure for expansion in both rural and urban sectors; and b) strengthening the distribution by introducing technology into the network. This should be an ongoing exercise not just limited to a specific 5 year plan. 4 levels of benefits /incentives to boost the sector, as explained below:

i) Special Tax benefits must be provided for companies engaged in R&D producing high-end

technology and offering power technology/ solutions, since this ultimately results in increase in revenues for the government.

ii) Tax incentives must be extended not only to companies owning the power assets but for companies who are directly engaged in creating and deploying those assets. Only then the entire value chain will be sustainably developed. This is essential because infrastructure is a low margin business and huge turnaround time coupled with long sales to cash cycles. This phenomenon pushes companies to carry huge debts which hamper growth. Tax breaks for companies engaged in these operations will help grow faster with healthy operations.

iii) Similarly, this growth drive will give rise to inorganic opportunities like mergers and acquisitions and therefore the government should consider benefits for companies/ promoter's who sell off or merge into other entities which will help consolidation and boost the sector.

iv) Due to the visible gap in target Vs. actual capacity additions in all 3 sectors of power industry and resultant investment requirement for the next 7- 10 years, power sector also needs to be incentivized by giving tax benefits for 10 years be it in generation, transmission or in distribution much similar to that of IT industry which enjoyed 10 yr. tax exemptions. This not only creates visibility to existing players but brings in new players while opportunity for investors to deploy more capital will be enormous

e) Demand Side management:

i) Shifting of system load from peak to off peak hours

- staggering of weekly holidays of commercial and industrial establishments
- staggering of agricultural loads
- incentives in terms of concessional tariffs for rescheduling by Time of Day Metering

ii) Efficient raising of bills and bill collections at distribution level

iii) Energy Conservation Bill drafted - to be approved

f) Optimal power generation mix: The government should come up with some Strategy for meeting the upcoming Power needs. They need to segregate the Source of Generation (Thermal, Nuclear, Renewable, Hydro etc.) and Identify which way to be most Important and reliable for meeting growing Power requirements. In order to achieve target set, they should focus on growth of the Individual sector.

g) Focus on Peaking Power Plants: While the 11th Five Year Plan has brought a good addition of base load capacity, it is high time peaking power plants are given sharp focus and a special place in the 12th Five Year plan. Addition of approximately 28,000 MWs of gas-based peaking plants distributed in the load centers can offer the following benefits at the country level:

i) Higher efficiency leading to savings of over 6 per cent of primary energy in the power sector.

ii) Carbon emission reduction by 101 MTPA, which could be in the order of around 10 per cent of overall emissions from the power sector.

iii) Reduction in water consumption by over 410 million cubic meters per annum - enough to meet the water needs of a city like Mumbai.

iv) Reduction in land requirement by over 14,200 acres, meaning saving in deforestation and displacement of people of a mid-sized town.

v) Reduction in investment of transmission networks to the tune of Rs 15,900 crore in the 12th Plan period.

vi) In overall terms, a potential revenue savings of the order of Rs 14,850 crore per year and capital investment saving of up to Rs 47,330 crore in the 12th Plan period.

7. POSITIVE CHANGES THAT CAN LEAD TO RECOVERY

Even though problems and risks associated exist, many have been tried to overcome and gradual but fundamental changes should be focused, because of which we believe that the next five years beginning 2012 will be a redefining period for the sector.

a) Several new Independent Power Producers (IPPs) have entered the power generation sector

and many of their projects are slated for commissioning from FY15. Many of these companies are new entrants and are building expertise. There are possibilities for M&A opportunities as several projects with new IPPs face funding and fuel scarcity risks. Companies with robust operating cash flows can take advantage of the emerging scenario and build project pipelines.

b) In the same way regarding fuel scarcity, there are possibilities of 60% increase in power generation despite fuel availability constraints. The key players are Adani Power, Tata Power and Reliance Power. Several private developers have acquired mines overseas to ensure fuel supply for existing and expansion projects. For example, Jindal Steel and Power Company acquired coal mine in Mozambique in 2008 and Reliance Power acquired PT Srivijaya in Indonesia.

c) Several positive developments went unnoticed:
   (i) The Delhi High Court in 2011 fined the Delhi state government for interfering in tariff fixing of the Delhi Electricity Regulatory Commission and stated that SERC can suo moto propose tariff hikes without waiting for SEBs to come up with proposals;
   (ii) In the past 12 months,14 out of 21 SEBs raised tariffs. More SEBs might raise tariffs going forward with less state government interference and Appellate Tribunal for electricity.

d) Availability of easy funding scenario has made the power sector the biggest contributor to growth in infrastructure lending. Infrastructure lending posted CAGR of more than 35% over the past five years and accounts for 13% of overall bank credit v/s 1% in FY98..

8. CONCLUSION

Infrastructure includes segments such as power, telecom, road, ports and airports. The power sector has been the biggest contributor to growth in infrastructure development and the share of telecom sector has progressively declined. In last, as liberalization and competition increases in infrastructural sector especially in power sector, efficiency and profitability will become the only true differentiator because it will ultimately feature in GDP of the country. We must realize this principles and Government should give more attention on this sector as they shown in the tenth and eleventh five year plan. Now we head into the new millennium and technology will be the backbone of many aspects of our lives, so research in this sector should go on with the objective to make India as a developed and shining country in Infrastructure sector especially power sector.

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