



सत्यमेव जयते

POSITION PAPER ON
THE POWER SECTOR
IN INDIA

December 2009

Department of Economic Affairs
Ministry of Finance
Government of India

EXISTING SCENARIO

Generation

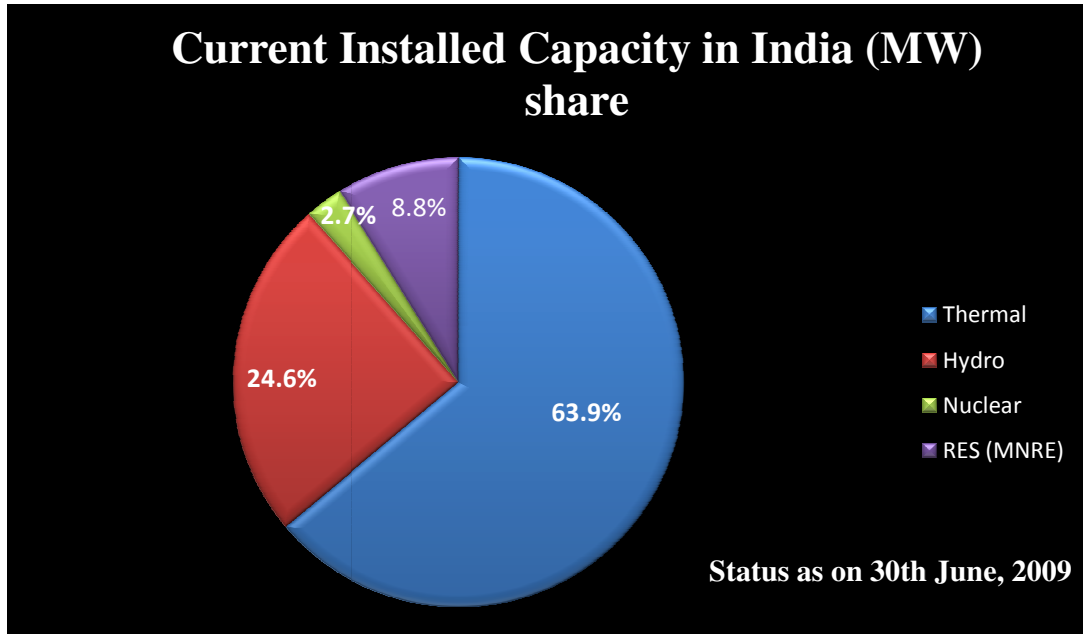
1. India is the fifth largest producer of electricity in the world and according to the Planning Commission, while the State Governments account for 51.5% of the total generation capacity, the central sector and the private sector account for 33.1% and 15.4% of the generation capacity respectively. In line with the respective power generation share, while the government sector (both central and state) have contributed 85.5% of the total capacity addition of 45,295 MW during 1999-00 and 2008-09, the private sector has contributed the balance 14.5%, almost at par with its share in the total installed capacity in the country. Transmission of power is entirely looked after by government utility companies and distribution too barring a few states are in the hands of the government entities.
2. India's current installed power generation capacity as on 30th June, 2009 is at 1,50,324 MW as against 89,103 MW during 1997-98 and 1,32,329 MW at the end of March, 2007. In addition to this, the captive power capacity has been pegged at over 24,000 MW at present. The break up with respect to the fuel mix accounts for as per the following (refer **Table 1** and **Graph 1** below)

Table 1
Current Installed Capacity in India: As on 30th June, 2009

Categories	MW	%
Coal	78,459	52.2
Gas	16,386	10.9
Diesel	1,200	0.8
Total Thermal	96,045	63.9
Hydro	36,917	24.6
Nuclear	4,120	2.7
RES (MNRE)	13,242	8.8
Total	1,50,324	100

Source: CEA

Chart 1

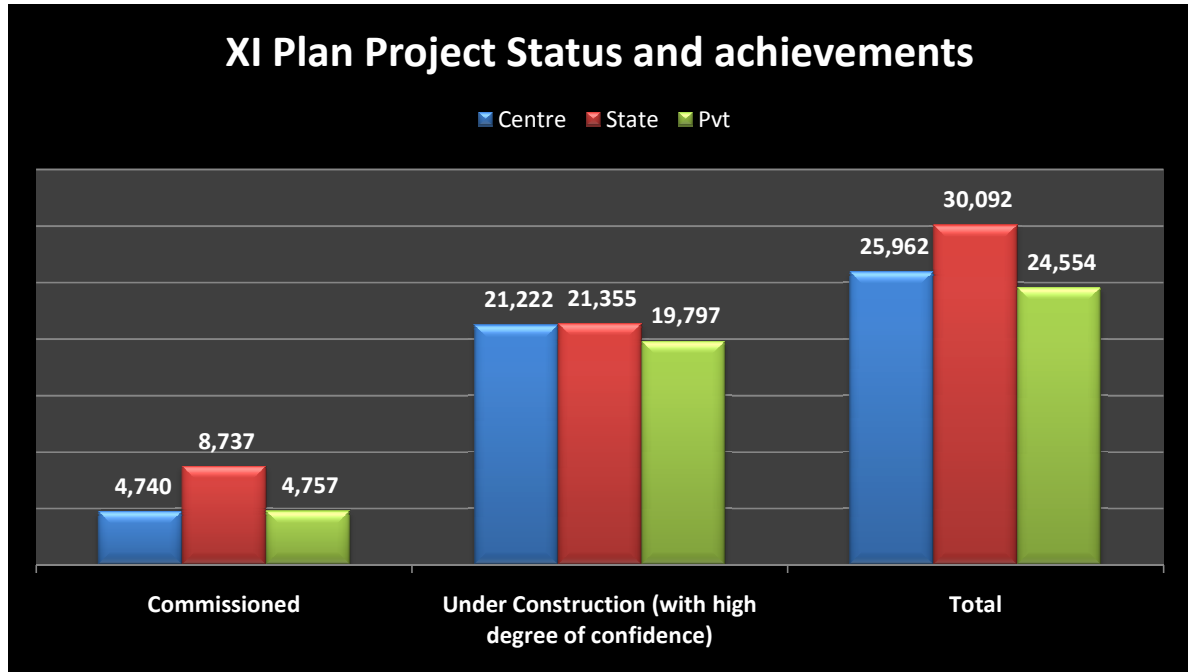


Source: CEA

- The category wise share of the current installed capacity of 150,324 MW as depicted in Table I and Chart 1 respectively translates to shares of Central Sector – 33.1%, States – 51.5% and Private Sector – 15.4%

However, during the 11th Plan the structure is sought to be changed with respect to capacity additions. The Central sector is expected to lead the charge in capacity additions with accounting for as much as 49% of the new capacity additions, while the private sector is expected to add 22% to the overall kitty, leaving the balance 29% to the state sector under the reduced target of 68,504 MW, down from the already revised 90,000 MW as against the original target of over 78,000 MW. However as per the actual physical progress on the ground till the end of the financial 2008-09, while the private and the state sectors have achieved its targeted capacity addition figures, there is considerable slippage with respect to Central sector figures. In the first two years of the current plan period, additional capacity of 13,017 MW has already been realised with an additional 2,733 MW of captive capacity and another 44,670 MW is under construction.

Chart 2



Source: Power Ministry

4. As per the latest assessment, total capacity of 62,374 MW is likely to be commissioned with a high degree of confidence and additional 12,590 MW capacities is being targeted on best efforts basis for commissioning during the XIth Plan. **The private sector participation has been more than the target for the XIth Plan both in absolute and percentage terms.** In addition, 12,000 MW Captive Power Plants are under execution against which about 5,000 MW has been commissioned till August 31, 2009. Against the target of 14,000 MW for renewals, 7154 MW has been commissioned as on July 31, 2009.
5. Detailed status for requirement of capacity addition for the XIIth Plan are under finalisation in Central Electricity Authority (CEA) and as per the preliminary studies, the requirement of capacity addition works out to about 1,00,000 MW. **There appears to be a need to set higher target for private sector participation for the XIIth Plan in view of its performance during the XIth Plan.**
6. During the Xth Plan, total investment in the power sector was US\$ 60 billion out of which the private sector contribution was US\$ 13 billion. The projected investment during the XIth Plan period is US\$ 133 billion out of which, the private sector contribution is expected to be around US\$ 37 billion or 21%. In physical terms, a target

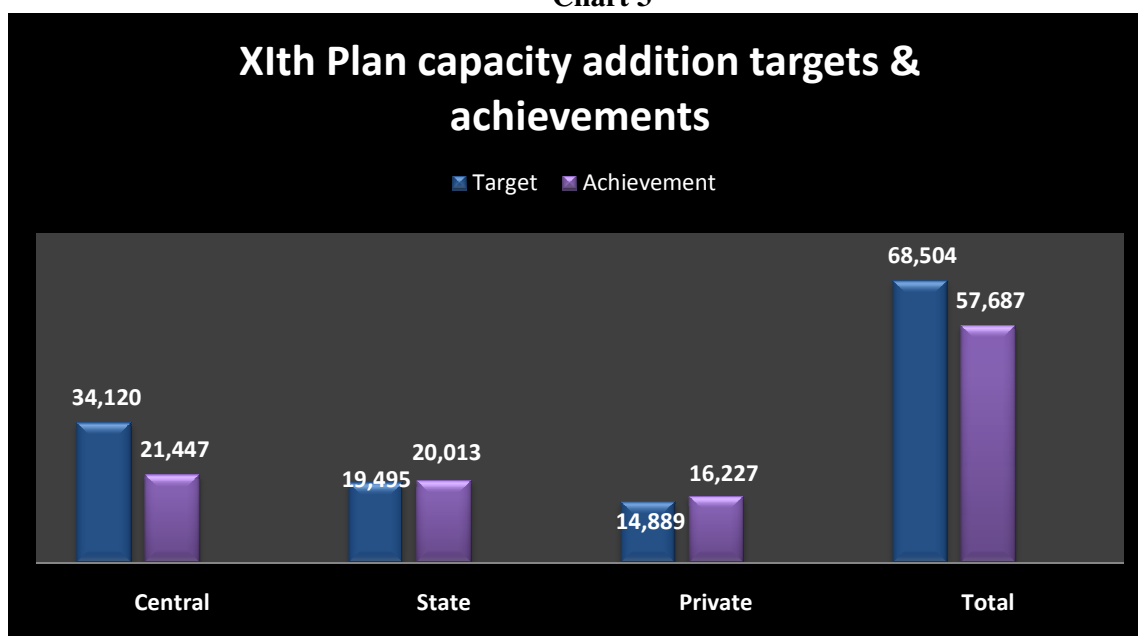
of 78,700 MW has been fixed during this plan period, which has now been finally revised to 68,504 MW.

Table 2
Capacity Addition Break Up: (XIth Plan)

Sector	Hydro	Thermal	Nuclear	Total
State Sector	3,957	15,538		19,495
Central Sector	11,080	19,880	3,160	34,120
Private Sector	3,744	11,145		14,889
Total	18,781	46,563	3,160	68,504

Source: Ministry of Power

Chart 3

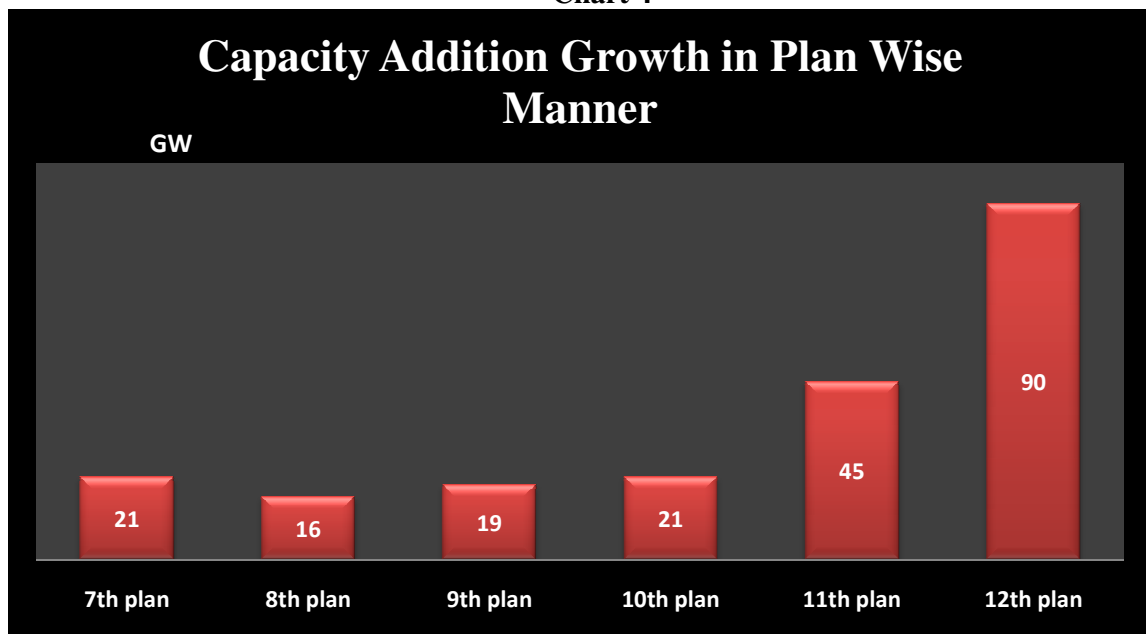


Source: Planning Commission

The achievements in the above chart include projects that are under construction in addition to the ones that have been already commissioned in the first two year of the current plan. In the central sector a total of 3,990 MW have been commissioned and another 17,457 MW are under construction. Similarly, in the state sector 7,094 MW have been commissioned as

against 12,919 MW being under implementation. Finally, in the private sector, a total of 1,933 MW have been commissioned and 14,294 MW are under implementation. In terms of analysis, it is clear that the state sector is definitely on course with respect to its targeted capacity addition and while the private sector does seem to be in sight of its target, it will depend on its ability to implement the under construction projects on time. In retrospect, it appears that one could have kept a higher target for private sector for the XIth Five Year Plan. In Generation, private sector certainly seems to be more promising than what has been anticipated. The cause for concern however, is the central sector in which as much as 37% of the targeted projects are yet to reach the implementation phase thereby leading to the conclusion that the central sector may not be able to meet the target.

Chart 4



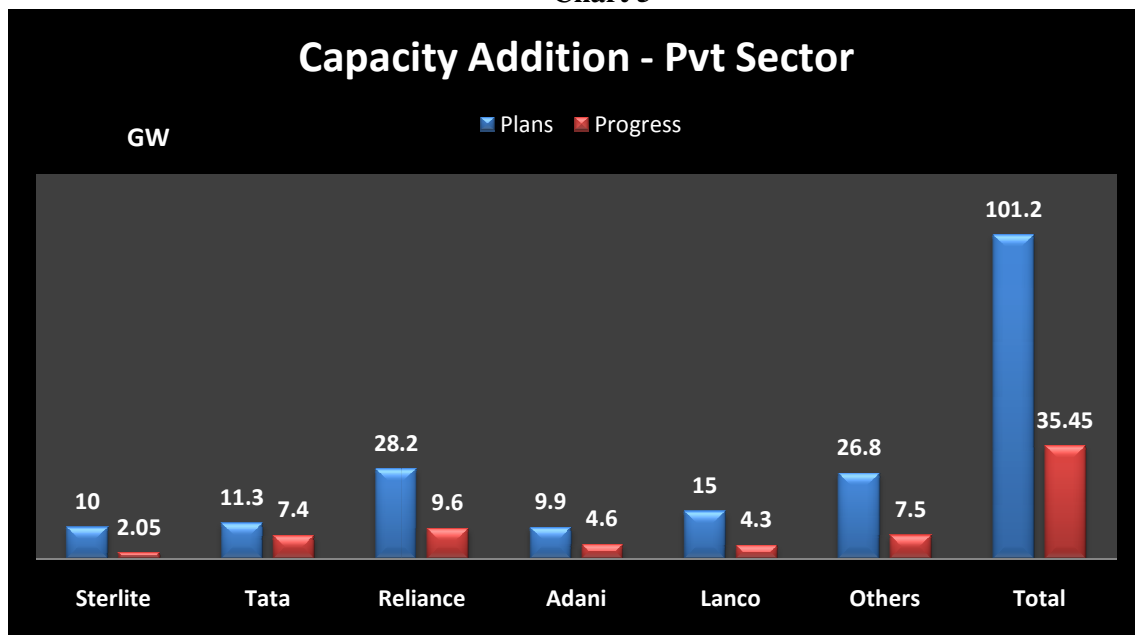
Source: CEA and CLSA Asia-Pacific Markets

7. While most of the growth in capacity addition during the 11th Plan will be fuelled by Government utility companies, the growth in the 12th Plan is expected to be driven by the

private sector players¹. **In fact, private companies have already announced capacity addition of nearly 100 GW in the next 6 to 7 years compared to a total private capacity of around 20 GW at present.** Even if a third of such projects see the light of the day, private sector’s contribution to the national capacity addition in the power sector shall be around 35% compared to 17 to 20% at present.

Since, 2003, 30 private power projects with a total capacity addition of 22,038 MW have achieved financial closure. In 2008-09, the private sector has contributed 883 MW of the total capacity addition of 3,454 MW². In terms of their efficiency improvements, private thermal power plants have realised improvements in their Plant Load Factor (PLF) from 68.9% in 1999-00 to 95.1% in 2008-09, which compares favourably against the PLF of 71.2% and 84.3% achieved by the States’ and Central power plants respectively.

Chart 5



Source: Coal Ministry, CEA and CLSA Asia-Pacific Markets

- With respect to nuclear power, the installed capacity at present is 4,120 MW or 2.9% of the total installed capacity in the country. The option of PPPs in nuclear power generation is being explored to support the target of generating 20,000 MW of nuclear power by Year 2020.

¹ Indicative list of big size private power projects expected in **Eleventh** and **Twelfth** Plan is provided in **Annexure A**

² Expected capacity addition in 2009-10 is 7,208 MW and is reflected in **Annexure B**

9. The **financial closure scenario** for private capacity additions for Eleventh Plan as per government estimates is given below in **Table 3**

Financial Closure Scenario for private capacity as per 11th Plan

Table 3

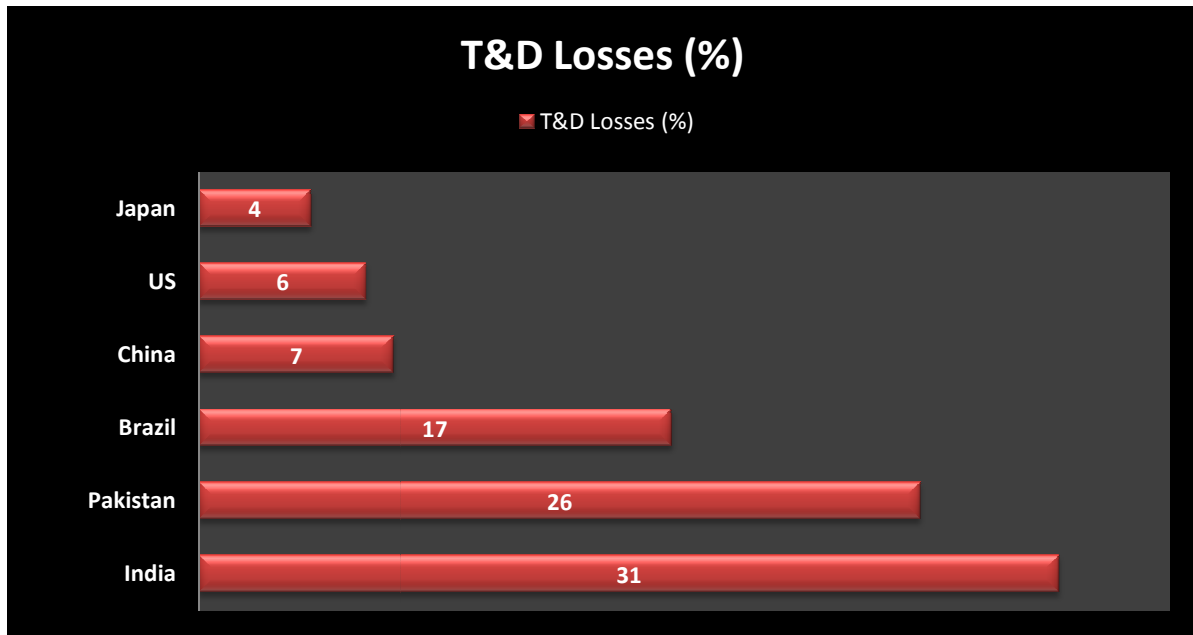
Fuel Wise	Thermal	Hydel	Nuclear	Total
Capacity (MW)	11,552	3,491		15,043
Total Capex (Rs billion)	480-490	270-280		750-770
Total debt funding needed (Rs billion)	335-345	185-195		520-540
FC achieved (Rs billion)	220-230	125-135		345-365
FC yet to be achieved (Rs billion)	110-115	60-65		170-180

Source: Crisil Research

10. Despite the expected strong growth in capacity addition, India’s power shortage is likely to remain very high and may in fact draw to a reasonable level during the 12th Plan. On the T&D side, government has come out with a revised APDRP (Accelerated Power Development and Reform Program) which will provide support and financial incentives for reduction in T&D losses³. This is crucial for a sustainable development of power sector, as India has amongst the highest T&D losses in the world. 11th Plan investments under this scheme are targeted to US\$10 billion. Another US\$10 billion is likely to be spent on rural electrification to achieve the government’s target of “Power for All” by 2012. Private investment in transmission sector is also set to pick up.

Chart 6

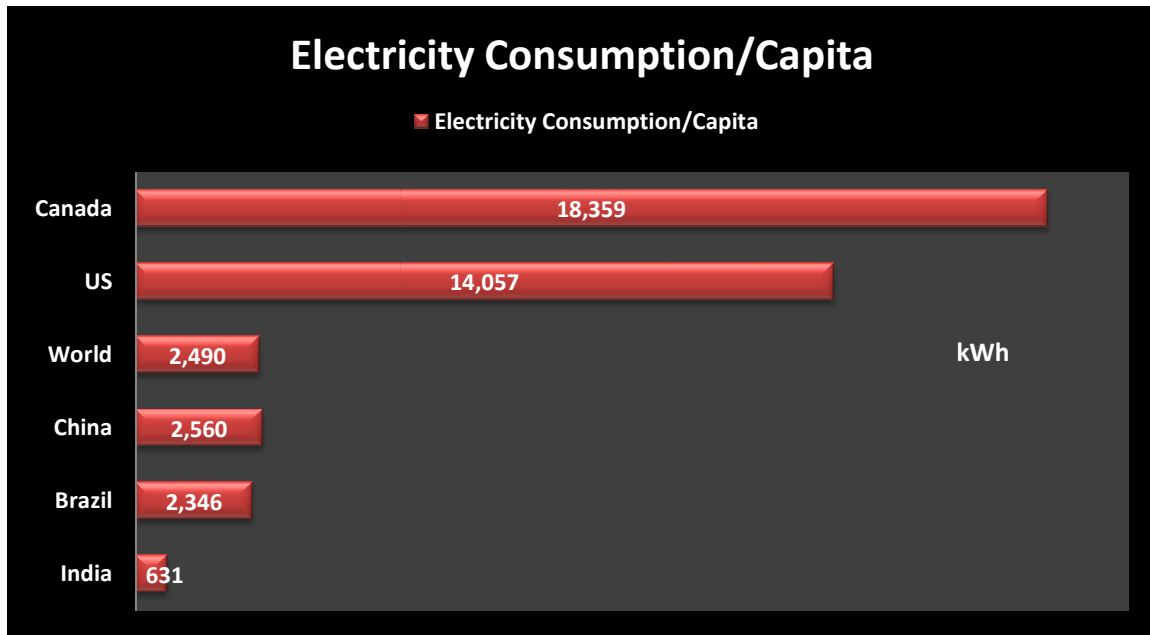
³ Refer **Annexure D** for Revised APDRP features



Source: CLSA Asia Pacific Markets

11. India ranks fifth in the world in terms of total installed power generation capacity but it ranks as one of the lowest in terms of per capita consumption of power. At the end of December, 2008, the base load deficit stood at 11.7% while the peak load deficit stood at 13.9%. More than 18% of villages and 45% of total households in India still do not have access to power. The peak power shortage, which was around 11 – 12% levels during the 9th Plan period and the first few years of the 10th Plan, is on an increasing trend and has already crossed 14% in the current year.

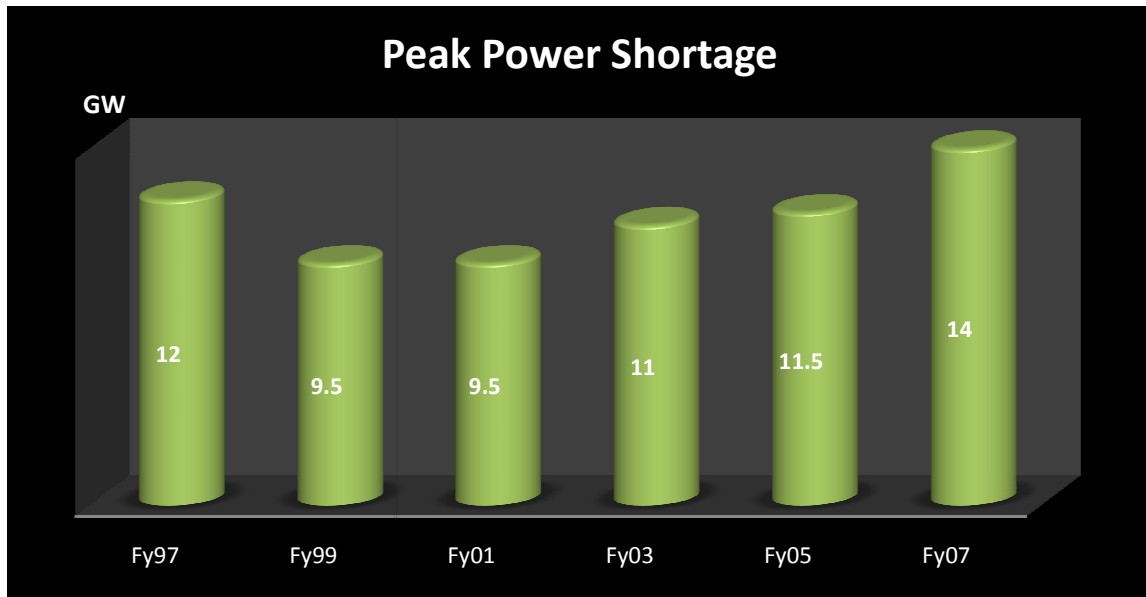
Chart 7



Source: CLSA Asia-Pacific Markets

12. During 2007-08, energy demand reached 737 billion kWh (increasing at CAGR of 5.5% from 507 billion kWh in 2000-01). The supply during 2007-08 however reached 664.6 billion kWh (increasing at a CAGR of 5.1% from 467.4 billion kWh in 2000-01), which only reinforces the glaring demand supply gap.

Chart 8



Source: Ministry of Power

Top states base load and peak load deficit

Table 4

State	Base load deficit		Peak load deficit	
	April-December 2008 (per cent)	April-December 2007 (per cent)	April-December 2008 (per cent)	April-December 2007 (per cent)
Maharashtra	21	16.4	25.9	26.4
Gujarat	11.9	14.3	25.5	26.2
Tamil Nadu	7.8	2.5	5.5	15.9
Andhra Pradesh	6.8	3.7	9.8	10.9
Uttar Pradesh	20.5	16.1	22.3	22.8

Source: CEA

13. The 17th Electric Power Survey (EPS) which is conducted by Central Electricity Authority (CEA) has forecasted that the peak demand will be growing at a CAGR of 7.8% in the 11th Plan and the supply is expected to notch up around 6.8 to 7% during this period thereby continuing with the upward trend of power deficit.
14. With respect to Transmission and Distribution, which are equally critically for the overall success of the Power story in India, huge investments are required in these two segments. Globally every dollar invested in generation has an equal amount invested in T&D. However, in India, traditionally every dollar invested in generation has a corresponding half a dollar invested in T&D. Importantly, as compared to the global average of 50 to 60%, transmission lines in India are loaded to 90% capacity.
15. The planned implementation of Hydro Projects in the 11th Plan and their current status is provided in the Table below:

Table 5

Sl#	Type of CCEA Approved Hydro Projects (11th Plan)	Present Status
A	NHPC Projects 13 NHPC projects approved by CCEA out of which 12 projects with an aggregate capacity of 5,322 MW are targeted for completion during 11 th Five Year Plan	Out of 12 projects for 11 th Five Year Plan <ul style="list-style-type: none"> - Two projects (Omkareshwar & Teesta V) with capacity of 1,030 MW already commissioned in 2007-08 - Sewa II for 120 MW likely to be commissioned by December 2009. - Six projects are likely to be

		<p>completed in 2010-11</p> <ul style="list-style-type: none"> - One project to be completed by 2011-12 - Two projects with a capacity of 2,800 MW are likely to slip to 12th Five Year Plan <p>The 13th project ie Kishanganga project of capacity of 330 MW likely to be completed by January 2016.</p>
B	<p><i>Tehri Hydro Development Corporation Project</i> Three ongoing projects of the THDC</p>	<p>The status is as follows</p> <ul style="list-style-type: none"> - Koteshwar 400 MW is likely to be completed in March 2011 - Tehri PSP project (1000 MW) originally scheduled for 11th Plan will slip to 12th Plan - Pipalkoti HEP (444 MW) originally scheduled in June 2013 will likely commence in July 2014
C	<p><i>NEEPCO projects</i> 4 projects</p>	<p>Status</p> <ul style="list-style-type: none"> - Kameng (600MW) – slip to 12th Plan - Pare (110MW) – slip to 12th Plan - Turial (60 MW) – slip to 12th Plan - Monarchak Gas (100 MW) – to be completed in Jan 2012
D	<p><i>NTPC on-going projects</i> Target of 17,760 MW in 11th Plan involving 20 projects</p>	<p>Achieved</p> <ul style="list-style-type: none"> - 5 projects of 3,240 MW - 2007/08 & 2008/09 – 2740 MW from five projects - 2009/10 – 500 MW capacity added <p>Slippages (11th Plan)</p> <ul style="list-style-type: none"> - Two projects aggregating to 2,580 MW <p>To make up this slippage additional capacity of 2,790 MW have been added in 11th Plan. Therefore, 11th Plan capacity is 17,970 MW against 17,760 MW</p>
E	<p><i>Satluj Jal Vidyut Nigam</i> One project Rampur Hydro Electric Project for 412 MW is under construction</p>	<p>Completion Status</p> <p>The project is scheduled to be commissioned by January 2012.</p>

(Source: Ministry of Power)

16. With a surge in generation capacity addition, India needs big growth in expenditure on T&D networks to evacuate, transmit and distribute the power produced. Most of India's coal resources are concentrated in Eastern and Central India, while most hydro

resources are in North East. Demand shortages are highest in Northern and Western India. Huge investments are required to expand inter-regional grid capacity. Significant investments are also required to upgrade the distribution infrastructure (to reduce T&D losses) and for rural electrification. Government expects US\$68bn investments in T&D in the 11th plan. Actual investment is however expected to be around US\$43bn, which is around 135% growth over the 10th plan.

Transmission:

17. The XIth plan envisages an addition of over 60,000 MW of transmission network by 2012, designed to carry 60% of the power generated. The existing inter-regional power transfer capacity is 17,000 MW which is to be further enhanced to 37,000 MW by 2012 through the creation of “Transmission Super Highways”. The guidelines for private sector participation in transmission sector issued in January 2000 envisage two routes for private sector participation:

- Through the Joint Venture route wherein the CTU/STU shall own at least 26% equity and the balance to be contributed by the JV partner and
- Independent Private Transmission Company (IPTC) route wherein 100% equity shall be owned by the private entity

INVESTMENTS

18. With the objective of meeting the rising demand of our growing economy and to provide electricity to all by 2012, an ambitious target of 78,700 MW has been set for the 11th Five Year Plan. Its sector-wise and source-wise break up in MW is as follows:

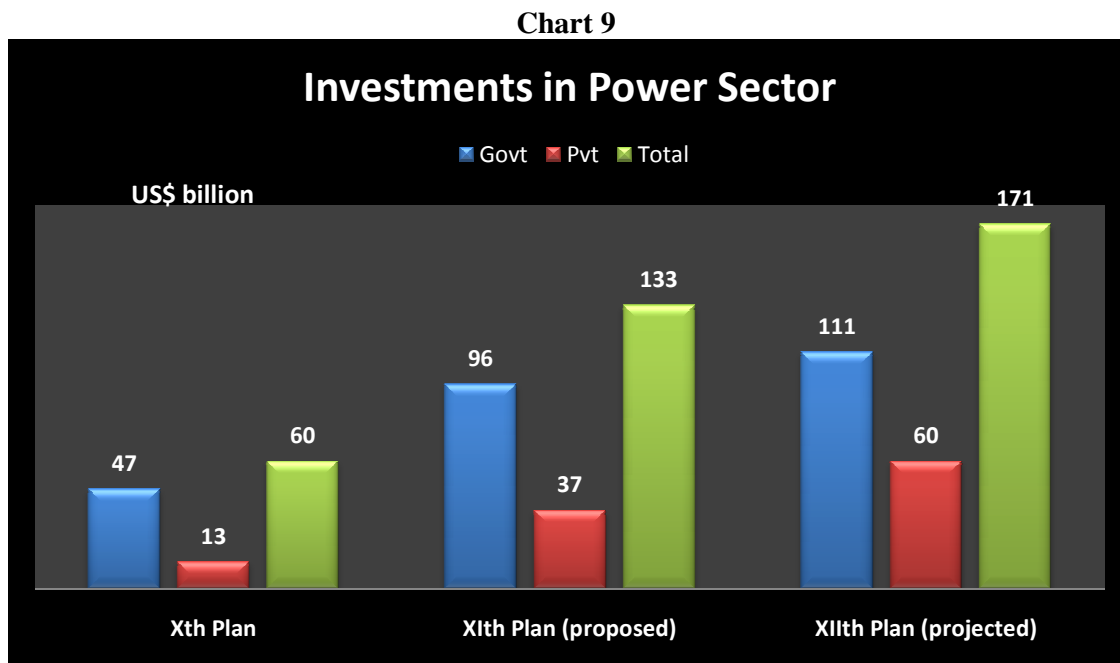
Table 6

<i>(in MW)</i>					
Source / Sector	Hydro	Thermal	Nuclear	Total	% age
Central	8,654	24,840	3,380	36,874	47%
State	3,482	23,301		26,783	34%
Private	3,491	11,552		15,043	19%

Total	15,627	56,693	3,380	78,700	100 %
% age	20%	76%	4%	100%	

(Source: Ministry of Power)

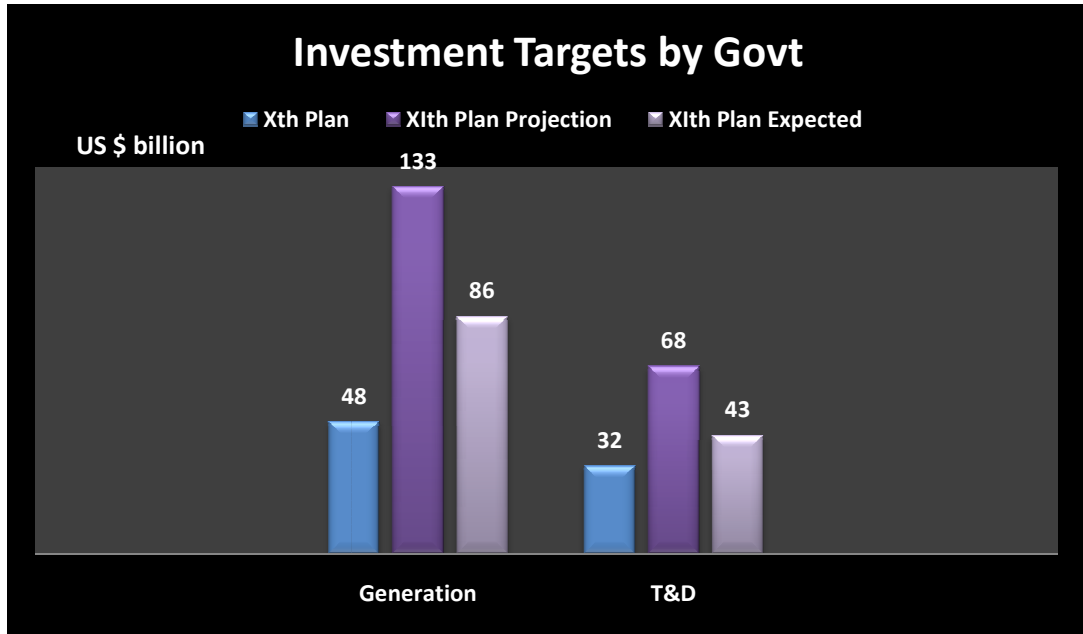
The investments in the Power Sector over the 10th Plan (actual), 11th Plan (proposed and 12th Plan (projected) is depicted in Chart 9 below:



Source: Planning Commission

19. In INR total investment in power sector in Xth plan was Rs 291,850 Cr or US\$60 billion. For the XIth plan, the INR figure is Rs 666,525 Cr out of which Rs 185,512 Cr is private sector share.

Chart 10



Source: Planning Commission

20. Though the investment targets by the Government has been kept at around US\$ 133 billion, the actual investment is however, expected to be around US\$ 86 billion primarily on account of slippage in the target achievement by the central sector. A power project implementation period is around 36 to 48 months from the date of award of the mandate and hence only those projects which have been cleared up to March 2008 would be in a position to meet the target date. One can keep the un-awarded central projects out of the purview of the target achievement figures and on that account alone, a total of over US\$ 15 billion will remain unrealised. Similarly there could be slippages in the already awarded projects and therefore a shortage of around US\$ 20 to 25 billion is expected during the XIth plan period.

POLICY AND REGULATORY FRAMEWORKS:

21. Given the state of power infrastructure in the country and the overall requirement in the next five year plans, the Government has taken some key initiatives. These are:
- 100% FDI permitted in generation, transmission and distribution
 - APDRP (Accelerated Power Development and Reform Programme) – Investment of US\$ 12 billion to reduce AT&C losses to 15% from the existing level of around 31%

- Rajiv Gandhi Grameen Vidyutikaran Yojana – Investment of about US\$ 6.5 billion for rural electrification
- New Electricity Act, 2003
- Securitisation of State Electricity Board dues
- Setting up of State Regulatory Commissions
- Distribution reforms – breaking SEBs into Generation, Transmission and Distribution units

Policy Initiatives to encourage private participation:

22. To attract large scale private investment, the Central Government has taken a number of steps including the private sector to set up coal, gas or liquid based thermal, hydel, wind or solar projects with foreign equity participation up to 100% under the automatic route. The bulwarks of the new policy framework are the Electricity Act, 2003, National Electricity Policy 2006, Tariff Policy 2006, Rural Electrification Policy 2006, New Hydro policy 2008 and Mega Power Projects 2008. In addition, the Central Government has notified the National Load Dispatch Centre Rules, 2004. Further, the Central Electricity Regulatory Commission (CERC) has notified several important regulations including the regulations on tariff, open access in transmission and licensing of transmission service providers and traders and the Indian Electricity Grid Code, 2006. The Appellate Tribunal for Electricity was set up in 2004 to hear appeals from Central and State Electricity Regulatory Commissions.

Key CERC norms on tariff regulations (2009-2014)

- **Return on equity to be higher**
The return on equity for existing plants would increase from 14.0 per cent to 15.5 per cent from 2009-10. In case of projects commissioned on or after April 1, 2009, an additional return of 0.5 per cent will be allowed, provided the projects are completed within the specified period. This is a positive for players in the central sector as from 2009-10 the players would start earning a higher return on equity at 15.5 per cent post tax (from the previous 14.0 per cent) on existing capacities.
- **Depreciation rate increased to 5.28 per cent; AAD removed**
The Central Electricity Regulatory Commission (CERC) has done away with the advance against depreciation (AAD) norm stated in the CERC Regulation Policy 2004-09, and in order to compensate for the same, has increased the depreciation rate to 5.28 per cent for a period of 12 years from the earlier 3.6 per cent. The balance depreciation will be spread equally over the life of the asset.
- **One-third benefit on refinancing of long term loans to be kept by companies**

The generation company or the transmission licensee, upon refinancing, would be allowed to retain one-third of the net savings. In the past, net savings from any restructuring activity had to be entirely passed on to the beneficiaries.

Source: Crisil Research

CERC notifies new inter-state trading regulation 2009

The important features of Trading Regulations 2009 are:

- Definition of inter-state trading has been revised to include electricity imported for resale. As per the previous trading regulation, the definition of inter-state trading pertained to the transfer of electricity from the territory of one state to the territory of another state by an electricity trader. This has now been expanded to include the transfer of electricity from the territory of one state for resale to the territory of another state, ***and includes electricity imported from any other country for resale to any state in India.***
- The categories of licensees has been reduced from six to three and the net worth requirement has been increased to Rs 50-500 million, keeping the prevailing prices of traded power in view.

Source: Crisil Research

19 Government has taken a number of steps, beginning with the Electricity Act (2003) and Securitisation of SEB dues to reform the power sector and to attract private investments. In addition, distribution reforms were brought under focus besides making theft of power a punishable offence. Further APDRP was launched to improve the T&D infrastructure in the country and electricity regulatory commissions have been set up at the state level to delineate tariff setting from extraneous influences. State utilities in most states have already been unbundled into generation, transmission and distribution entities to bring in accountability in the sector.

In addition, Government has taken a number of measures to encourage new capacity addition by the private sector. Some of the changes initiated by the government to make power sector investment attractive to private players are:

- **Introduction of Open Access:** Non-discriminatory access to transmission lines and distribution systems by the licensees or consumers or generators
- **Introduction of Competition / UMPPs:** According to new guidelines private players have to set up new capacities on the basis of competitive bidding. For the recently awarded UMPP projects, the government took the responsibility of getting all the necessary clearances (environment, land acquisition, water supply etc) making the environment more conducive for private sector participation in the power sector.

- **Merchant Power Plants:** Electricity Act 2003 allows developers to set up merchant power plants which have no power purchase agreements. The tariff of these plants will be market driven and not determined by the regulator but the entire risk will be borne by the developer.
- Allocation of captive coal blocks to public sector and private players

Super Critical Technology in Power Generation

The Ministry of Power has launched supercritical power programme on the lines of the US, Japan, Germany, Korea and Russia. Currently in India 69% of the gross generation of electricity is coal based and only 1.2% is based on renewable energy sources. The Central Electricity Authority (CEA) has estimated that meeting electricity demand over the next ten years will require more than doubling the existing capacity, from about 132 GW in 2007 to about 280 GW by 2017, of which at least 80 GW of new capacity is expected to be based on coal. Moreover, the maximum contribution of renewable energy would be around 5.6% of India's total energy by 2031-32.

Even though a large part of the power generation will be coal dependent, it is important that India moves away from sub-critical pulverised coal or 'dirty' coal. There are no clear technology choices but their analysis suggests that commercial supercritical combustion technology is the best option for India in the short-to-medium term.

The supercritical coal based units have faster starting time and load changes and are more suitable for daily start up/shut down operation and have better efficiency at part load operation.

The task of induction of supercritical technology through bulk ordering of generating units for PSUs is under active consideration of the Government.

Discussions are on for the procurement of 7 units of 600 MW and 6 units of 800 MW through bulk tendering, through International Competitive Bidding (ICB). The selected bidders will have to set up manufacturing facilities in India with a Phased Manufacturing Program.

Source: Ministry of Power

Mega Power Policy

The Mega Power Policy was announced with the intention of developing large size power projects in the country in November 1995 and revised in years 1998 and 2006. There has been a need to review the policy in view of the relevant energy shortages in the country and requirement of increasing the per capita availability of electricity to over 1,000 units by 2012; need for installation of fresh capacity of 78,577 MW in XI Plan; and the requirement of encouraging brown-field expansion projects. This is under consideration of the Government.

Salient Features of existing Mega Power Policy

- i. Conditions to be satisfied for grant of Mega Project status: Inter-State Thermal/Hydel capacity of 1,000 MW /500 MW respectively, with relaxations for States of North East Region (NER) and J&K.
- ii. Pre-conditions for availing benefits include constitution of Regulatory Commissions and undertaking to privatize the distribution in all large cities, by the Power purchasing states. In order to ensure that domestic bidders are not adversely affected, price preference of 15% to be given to projects under public sector.
- iii. Fiscal conditions / benefits available in the policy are: Zero Customs Duty on import of capital equipment, deemed export benefits to domestic bidders under Foreign Trade Policy (FTP), and income tax regime as per Section 80-IA, of the Indian Income Tax Act, 1961.

Source: Ministry of Power

PPP FRAMEWORKS AND INITIATIVES

20 The earliest effort on PPP in the Power Sector can be traced down to Dabhol Power Project in Maharashtra. The project did not succeed. The Dabhol power plant was initiated in 1992 and took nine years to commence operation. The total project cost is \$2.9 billion for 2,184 MW of power. Enron owned along with other American corporations owned 85% and the Maharashtra State Electricity Board (MSEB) owned remaining 15%. The plant closed in June 2001, due to a payment and contract dispute between the Maharashtra state government and the plant owners. The reasons were

- **Viability of the project** – as per World Bank letter to MoF, GoI “proposed plant would produce too much power at too high a price for the State”⁴. Further, fuel supply was liquid natural gas which was much costlier than coal.
- **Fuel supply drain on exchequer** – As per GoI, the plant’s annual import of 3 million tons of gas would drain the at least US\$ 250 million from India’s foreign exchange reserves.
- **Currency risk on MSEB for fuel supply import**
- **Environmental concerns of the Dabhol project**

The key overall issue was that PPP project risks were not properly assessed, and equitably allocated between MSEB and Dabhol. Further project feasibility was not done to verify whether the project would independently run without the necessary Central and State guarantees.

20 Also to encourage power projects through the PPP mode, standardised bidding processes and model documents which include the Request For Qualification (RFQ), Request For Proposal (RFP) and RFP for technical consultants in Transmission Systems have been developed. The Model Transmission Agreement is expected to be finalised soon by the Ministry of Power.

Stimulating Public-Private-Partnerships in Power

21 The recent surge in adding new capacity in the power sector has been primarily driven by rising power shortages (demand), electricity reforms initiated in 2003, de-regulation of the electricity sector and potential for higher returns, gradual improvement in financial situation of some state utilities, allocation of captive coal

⁴ Fact Sheet: Background on Enron’s Dabhol Power Project

blocks to private and government companies and initiatives like UMPP (Ultra Mega Power Project) at central and state levels.

Launched in 2005, nine Ultra Mega Power Projects (UMPPs) each with an initial capacity of 4,000 MW are expected to result in around US\$ 35 to US\$ 40 billion of private investment. Four UMPPs have already been awarded. The current status of the UMPPs is given below in Table 4

Table 4

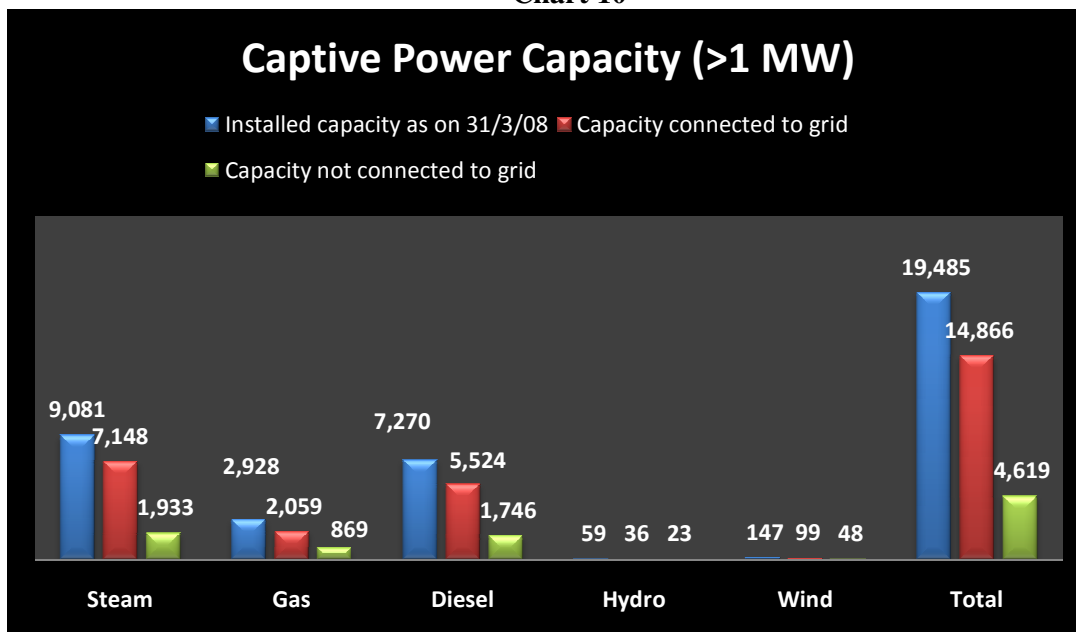
SL No	UMPP	Company	Bid tariff (Rs/kwh)	Expected commissioning year
01	Mundra, Gujarat	Tata Power	2.26	2012
02	Sasan, Madhya Pradesh	Reliance Power	1.20	First two units in April, 2012
03	Krishnapatnam, AP	Reliance Power	2.33	September, 2013 to October, 2015
04	Tilaiya, Jharkhand	Reliance Power	1.77	2015
05	Sundargarh, Orissa	Bidding yet to commence		
06	Cheyur, TamilNadu	Bidding yet to commence		
07	Girye, Maharashtra	Under Bidding		
08	Tadri, Karnataka	Under Bidding		
09	Akaltara, Chattisgarh	Bidding yet to commence		

Source: Planning Commission

- 22 There has also been a sharp increase in the number of captive plants with installed capacity of 1 MW or more. It is estimated that 45,000 MW or 25% of the total installed capacity is generated by this sector. Captive generators are also being encouraged to supply their surplus power to the grid and by March, 2008, 14,900 MW of captive generating capacity was connected to the grid. The Central govt has earmarked coal blocks with reserves of 3.2 billion tonnes of coal for allotment to

merchant and captive plants. About 10,000 MW is expected to be developed through merchant power plants in the XIth Plan period.

Chart 10



Source: CEA and CLSA Asia-Pacific Markets

Financial Incentives for Power PPPs by GoI

23 NBFCs such as Power Finance Corporation (PFC) and Rural Electrification Corporation (REC) were set up to provide finance mainly to provide finance mainly to central and state power projects. To aid private project financing via the PPP route the government set up IIFCL as a dedicated institution for financing and development of infrastructure projects in the country. Currently, IIFCL renders financial assistance through

- Direct lending to eligible projects
- Refinance to banks and financial institutions for loans with tenor of 5 years or more
- Any other method approved by Government of India (GoI)

IIFC Plc, the UK subsidiary of IIFCL, has already lent to several projects, including two ultra mega power projects (UMPPs) – Tata Power’s Mundra and Reliance

Power's Sasan. Further, IIFCL has also received permission from government to raise Rs 400 billion through tax-free bonds.

Utilization of foreign exchange reserves

The Committee on Infrastructure Financing ('Committee') has recommended the use of foreign exchange reserves via an externally focused investment arm i.e. a company set up in a foreign country by the Government of India. This company could borrow a small fraction of India's reserves at the benchmark lending rate and invest it into infrastructure development that would be beneficial for the country.

The government has already implemented this recommendation and set up a company, IIFC Plc, the UK subsidiary of IIFCL. The RBI has released the first tranche of \$250 million to this company out of the total of \$5 billion of foreign exchange reserves planned to be used.

Source: Crisil Research

CONSTRAINTS

24 Stimulation of PPP in the power sector will require a pro-active approach from the project sponsors, particularly the State and the central Government. Some of the key constraints from the recent attempts in developing power projects on PPP mode include:

- Lack of understanding on PPP structure
- Land acquisition issues
- Lack of standardized documents leading to diverse interpretation of issues at the states (lack of knowledge of available standardized documents)
- Tighter access to liquidity
- Arbitrary norms of pre-qualification primarily adopted by state entities
- Inability to stick to set deadlines by the state entities conducting project development activities
- Faster pace of development on evacuation of power to attract private investment in generation
- Lack of trained manpower – Human Resources issues
- Others

25 Constraints to Private Financing / PPP Initiative:⁵

- **Land acquisition** for new project is more contentious and poses a big threat to private sector participation in PPP initiatives in the power sector. Issues like resettlement and rehabilitation (R&R) have resulted in several projects being stalled (like UMPPs in Maharashtra and Karnataka)
- **Lack of political will** on going for big ticket land acquisition for larger power projects in the backdrop of Nandigram in west Bengal and ongoing Posco agitation in Orissa
- **Lack of proper dispute resolution mechanism.** Dispute resolution mechanism in most cases are not at international level thereby leading to lengthy litigation and substantial project delays
- **Fuel Supply** - The fuel supply scenario though looks promising with regards to Coal India Ltd's achievement rates. However, the growing demand, slow rate of captive coal production and transportation remain key issues affecting fuel availability for the power sector.
- **Lack of skilled manpower** – The Working Group on Power has estimated the need for 0.34 million additional manpower (0.26 million technical and 0.08 million non-technical) during the XIIth plan.
- **Liquidity problem** in the market owing to global meltdown makes it difficult for developers to raise equity. Crisil Research states "Our interactions with various lenders led us to conclude that in the current scenario equity has become a key issue as private projects are held up at the financial closure stage for the requirement of equity. Lenders find reassurance in the promoter's equity being brought in through cash flows or owners funds compared to the equity brought in through the foreign direct investment (FDI) route."
- **Unavailability of long tenure debt to private sector** – High cost of guarantees
- **Equipment Supply** - On the whole, boiler turbine generator (BTG) orders of around 70.0 GW have been placed for the Eleventh Plan period. Out of this, around 60 per cent has been placed with BHEL (42.5 GW). Despite BHEL

⁵ Refer "Recommendations of the Committee on Infrastructure Financing / Power Ministry on financing power projects that require consideration" – Annexure C

best intentions of increasing capacity the completion of orders (42.5 GW) in **Eleventh Plan will be stretched**. The balance orders have been placed with Chinese and other international players. Chinese players have received orders close to 15.0 GW for the Eleventh Plan period whereas international players have received orders of around 15.5 GW.

- **Environment, water and forest clearances** - The clearances on this front are typically time-consuming as it involves approvals from state governments as well as the central government. *On an average it takes 18-24 months to receive all the clearances.*

CONCLUSION AND WAY FORWARD:

26 The gap between demand and supply in the Power Sector is still huge. Many of the “B” and “C” category towns have daily power cuts of 5-6 hours even in the non-peak months. The small and medium industries have to rely on their own generators to continue production but that comes at higher recurring costs and more capital investments. Thus, products of many of these industries become uncompetitive as compared to cheaper imports from other countries. There is a need to involve private sector more intensively in Power Sector to bridge the gap between demand and supply.

27 Most large manufacturing companies in India have set up their captive power plants (implying higher project investments) to ensure regular and economic power supply. All major non-ferrous industries have setup their captive power plants and their reliance on grid power is limited to less than 10% only.

Power intensive industries set up their own captive units because:

- Grid power is usually unreliable and the production losses are huge due to frequent power cuts and repeated starting and shutting down of machinery. The fluctuation in voltage in grid power also damages the critical electronic components for which the owners won't like to take a risk.
- Due to the cross subsidy of power in India the tariff for industrial consumers is very high and the cost arbitrage of setting up of a captive power unit is huge

Captive power seems the way ahead for power intensive / power dependant mission critical industries.

- 28 Study of 2001 Census data shows that there is a high correlation between the GDP per capita of the states and the status of rural electrification. Bihar, Jharkhand, Orissa, Assam and Uttar Pradesh (these 5 states constitute 35% of the total population) which have the lowest levels of GDP per capita also have a poor record in rural electrification. Similarly states like Himachal Pradesh, Punjab, Haryana and Tamil Nadu which have higher rates of rural electrification also have higher per capita GDP.

Five states of Bihar, Assam, Uttar Pradesh, Kerala and West Bengal, which together constitute 38% of India's population, have an average per capita consumption of 272kWh/annum (57% lower than the national average). The high variation in per capita consumption of power within India is also an indicator of existing gap in power generation in the lower consuming states. The addition in generation capacities in these states should have a significant impact on overall per- capita consumption figure for India.

- 29 As per the 2001 Census, only 44% of the total rural households in India are electrified, as compared to the 88% of the urban households. With 72% of India's population living in villages this means that almost 40% of country's population does not have access to electricity. According to Central Electricity Authority (CEA), even today more than 100,000 villages (18% of total number villages in India) have no access to power at all. National Council of Applied Economic Research (NCAER) did a study to find out the factors that contribute to the big difference in the penetration of consumer durable goods in the rural and urban areas. The interesting take away from this study was that while factors like income and lifestyle differences do contribute to the penetration of consumer durables, the most dominant factor was lack of regular electricity supply in the rural areas⁶. This supports the view that there is a lot of latent demand for power in the country which is not captured in the official figures.

⁶ Government has been pushing for electrification of villages. Refer "Rajiv Gandhi Grameen Vidyuthikaran Yojana (RGGVY)" scheme in Annexure D

30 However, an interesting aspect of more supply of electricity resulting in higher demand elasticity will prompt the need for greater generation of power. In this aspect, the example of China is an interesting case. China's elasticity of power demand with GDP was 1.1 in 2001. With increase in power generation the elasticity also went up from 1.1 to 1.6 - as the power was made available people consumed it. With 45% of the Indian household still un-electrified there is a huge amount of latent demand for power. India's average GDP growth rate in last five years has been 7.6% while the growth in power demand over the same period is only 5.8%. Lower elasticity of power demand with the GDP growth in India has been due to higher contribution of services to the GDP, several manufacturing units setting up their captive units and limited growth in generation itself. However, with the capacity additions currently going on and those planned for the 12th plan, the elasticity of power demand should go up as is evident from the Chinese experience.

There is a strong link between poverty alleviation with power availability.

31 On the issue of losses, despite several measures the pace of reduction in losses of state utilities is low. Overall losses of power sector at the country level have come down only marginally. However, some states have seen significant improvements. Andhra Pradesh, West Bengal, Gujarat, Kerala, Goa, Himachal Pradesh turned cash positive in FY06. Even if financials of some of the larger states improve, it offers a big opportunity for private players to supply power to those states. Power Trading Corporation is also playing an important role in developing a power market in the country by bringing buyers and sellers together.

The effort therefore will have to be multi-pronged to ensure electricity for all and thereby boosting the overall GDP growth of the country so that the economic targets set across sectors are met⁷. Some of these efforts need to be pointed towards:

- Encourage Private sector investment
- Address the contentious issues like land acquisition, litigation, multiple clearances adequately
- Greater joint sector investment
- Easier access to finances

⁷ One clear initiative is the enactment of The Electricity Act, 2003. Refer **Annexure D** on salient features of the same.

- Smooth bid process management
- Tapping of alternate sources of energy
- Development capacity with respect to human resources
- Others

Annexure A

INDICATIVE LIST OF BIG SIZE PRIVATE POWER PROJECTS EXPECTED IN ELEVENTH AND TWELFTH PLAN

Project	Company	MW	Fuel	Commissioning	Equipment Supply	Fuel Supply	Clearances	Financial Closure
Sugen Plant U1	Torrent Power	376	Thermal	2008-09	✓	✓	✓	✓
Jharsuguda U1	Sterlite Energy Ltd	600	Thermal	2009-10	✓	✓	✓	✓
Sugen Plant U2	Torrent Power	376	Thermal	2009-10	✓	✓	✓	✓
Sugen Plant U3	Torrent Power	376	Thermal	2010-11	✓	✓	✓	✓
Anpara – C U1	Lanco	600	Thermal	2011-12	✓	✓	✓	✓
Jharsuguda U1	Sterlite Energy Ltd	600	Thermal	2010-11	✓	✓	✓	✓
Jharsuguda U1	Sterlite Energy Ltd	600	Thermal	2010-11	✓	✓	✓	✓
Jharsuguda U1	Sterlite Energy Ltd	600	Thermal	2011-12	✓	✓	✓	✓
Angul	Jindal Power	1,200	Thermal	12 th Plan	✓	✗	✓	✓
Anpara – C U1	Lanco	600	Thermal	12 th Plan	✓	✓	✓	✓
Mundra UMPP	Tata Power	4,000	Thermal	12 th Plan	✓	✓	✓	✓
Raigad Power Project U1	Athena Power Projects Pvt Ltd	600	Thermal	12 th Plan	✓	✓	✓	✓

Project	Company	MW	Fuel	Commissioning	Equipment Supply	Fuel Supply	Clearances	Financial Closure
Sasan UMPP	Reliance Power Ltd	3,960	Thermal	12 th Plan	✓	✓	✓	✗
Bhavanabadu TPP Stage 1 U1	East Coast Company / NCC	660	Thermal	12 th Plan	✓	✓	✗	✗
Dabandh, Dhenkanal, Phase 1	Lanco	660	Thermal	12 th Plan	✓	✓	✗	✗
Gondia Phase I U1	Sterlite Energy Ltd	660	Thermal	12 th Plan	✓	✓	✓	✓

Source: Crisil Research

Annexure B

EXPECTED CAPACITY ADDITIONS IN 2009-10

Sector	Project	Company	Energy Type	State	Capacity (MW)
Central	Barsingsar U1	NLC	Thermal	Rajasthan	125
	Bhilai TPP – Extn (JV) U2	NTPC	Thermal	Chhattisgarh	250
	Chandrapura TPS Extn	DVC	Thermal	West Bengal	250
	Neyveli TPS II Expansion U1	NLC	Thermal	Tamil Nadu	250
	Teesta Low Dam Stae III U1	NHPC	Hydel	West Bengal	33
	Teesta Low Dam Stae III U2	NHPC	Hydel	West Bengal	33
	Uri –II U 1	NHPC	Hydel	J&K	60
	Kaiga Stage II U-4	NPCIL	Nuclear	Karnataka	220
	RAPP U5	NPCIL	Nuclear	Rajasthan	220
	RAPP U5	NPCIL	Nuclear	Rajasthan	220
State	Bakreshwar US	WBPDC	Thermal	West Bengal	210
	Bhopalapally	APGENCO	Thermal	Andhra Pradesh	250
	Chabra (Baran Dist) U1	RRVUNL	Thermal	Rajasthan	250
	LAKWA WH	ASGENCO	Thermal	Assam	37
	New Parli U2	MAHAGENCO	Thermal	Maharashtra	250
	Paras TPS U2	MAHAGENCO	Thermal	Maharashtra	250
	Paricchha TPS Extn – Stg2 U5	UPRUVNL	Thermal	Uttar Pradesh	250

EXPECTED CAPACITY ADDITIONS IN 2009-10

Sector	Project	Company	Energy Type	State	Capacity (MW)
State	Santhaldih TPP Unit -6	WBPDC	Thermal	West Bengal	250
	Surat Lignite	GIPCL	Thermal	Gujarat	125
	Surat Lignite	GIPCL	Thermal	Gujarat	125
	Suratgarh Ext U6	RRVUNL	Thermal	Rajasthan	250
	Utran	GSECL	Thermal	Gujarat	374
	Vijaywada TPP Stage IV	APGENCO	Thermal	Andhra Pradesh	500
	Kutyadi Extn U1	KSEB	Hydel	Kerala	50
	Kutyadi Extn U2	KSEB	Hydel	Kerala	50
	Priyadarshini Jurata U3	APGENCO	Hydel	Andhra Pradesh	39
	Priyadarshini Jurata U4	APGENCO	Hydel	Andhra Pradesh	39
	Priyadarshini Jurata U5	APGENCO	Hydel	Andhra Pradesh	39
	Priyadarshini Jurata U6	APGENCO	Hydel	Andhra Pradesh	39
	Varahi Ext Stage II U2	KPCL	Hydel	Karnataka	115
Private	Gautami CCPP U3	Gautami Power Ltd	Thermal	Andhra Pradesh	174
	Jharsuguda U1	Sterlite Energy Ltd	Thermal	Orissa	600
	Konseema CCPP U2	Konseema Power EPS/Oakwell	Thermal	Andhra Pradesh	140

EXPECTED CAPACITY ADDITIONS IN 2009-10

Sector	Project	Company	Energy Type	State	Capacity (MW)
	Konseema CCPP U3	Konseema Power	EPS/Oakwell Thermal	Andhra Pradesh	165
	Pathadi TPP (Lanco Amarkantak) U1	Lanco	Thermal	Chattisgarh	300
	Sugen Plant U2	Torrent Power	Thermal	Gujarat	376
	Torangallu Extn U1	JSW Energy	Thermal	Karnataka	300
TOTAL (MW)					7,208

Source: Crisil Research

Annexure C – Recommendations of the Committee on Infrastructure Financing / Power Ministry on financing power projects that require consideration

1. The Committee recommended that the funds raised by banks for a long tenor (at least 10 years) through bonds or term deposits for investment in infrastructure assets should have no statutory liquidity ratio (SLR) requirements. **Current Status** – *no change on long term funds for infrastructure although overall SLR requirement has come down to 24 percent from 25 percent.*
2. Currently, take out financing is subject to 100 per cent risk weight for provisioning of capital with the take out financier using a credit conversion factor of 50 per cent till the take out takes effect. This result in the maintenance of excess capital, thereby restricting the take out financier’s lending ability and increases lending costs. Hence, the Committee recommended that the credit conversion factor be reduced to 0 per cent till the take out is accessed. **Current Status** – *credit conversion factor for take-out financing stands at 50%*
3. The banking sector regularly faces issues related to ALM when it comes to infrastructure financing as their deposits are not long term in nature whereas the investment period for infrastructure projects is typically more than 10-15 years. Due to the long tenure of investments, insurance companies are ideally suited to finance infrastructure projects. Hence, the committee recommended tapping the insurance sector for financing infrastructure projects such as power, roads and airports. For this purpose, the committee recommended a change in the definition of infrastructure to widen its scope, liberalizing minimum credit rating and investment guidelines for debt and equity instruments, respectively.
4. For power sector NBFCs, the capital-to-risk weighted asset ratio (CRAR) of 12 percent might be reduced to 9 percent by the RBI. The power ministry has also suggested increasing the exposure limits of banks for lending to single borrowers and group borrowers to 30 percent and 70 percent respectively, from the current 20 percent and 50 percent.
5. Currently, the NBFC exposure norms stand at 20 per cent for a single borrower and 35 per cent for group borrower of only Tier I capital. The Committee on Infrastructure Financing (‘Committee’) recommendation was to increase the single borrower limit to 25 per cent and raise the group’s borrower limit from 35 per cent for both Tier I and Tier II capital.

These recommendations require quick implementation.

Annexure D

Rajiv Gandhi Grameen Vidyuthikaran Yojana (RGGVY)

Government of India launched Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) in March 2005 with the objective to electrify over one lakh un-electrified villages and to provide free electricity connections to 2.34 Crore rural BPL households. This scheme has been continued in the 11th Plan. The scheme provides 90% capital subsidy for the projects. Habitations above 100 populations are eligible to be covered under the scheme. States have to ensure minimum 6-8 hours power supply to the villages electrified and to establish franchisee for distribution management.

During the 10th Plan, 235 projects were sanctioned for implementation. Additional 327 projects have been sanctioned under Phase I of the scheme during 11th Plan. The details of sanctions and achievements so far are given below:

Proposals	Projects	Project Outlay (Rs Cr)	Un-electrified Villages	Electrified Villages	BPL Households (lakhs)
Sanctions in 10 th Plan	235	9,732.9	68,763	111,936	83.1
Sanctions in 11 th Plan	332	16,506.04	49,736	241,492	162.96
Total Sanctions	567	26,238.94	118,499	353,428	246.06
Total Achievements (as on 15/7/2009)		16,030.55	65,797 (55.5%)	85,934 (23.4%)	78.41 (31.9%)

Targets and achievements during 2007-08 and quarterly targets during 2009-10 are as follows:

Year	Un-electrified Villages (No)			BPL Households (lakh)		
	Target	Achievement	%	Target	Achievement	%
2007-08	10,500	9,301	88.6%	40	16.21	40.5%

2008-09	19,000	12,056	63.5%	50	30.85	61.7%
Cumulative (so far)	79,500	59,832	75.3%	133	53.79	40.4%
2009-10 (as on 15.7.09)	17,500	3,158	18%	47	9.8	20.8%
Qtr. I	3,000	2,638	88%	11	8.74	79.5%
Qtr. II (15.7.09)	3,000	520	17.3%	8	1.06	13.2%
Qtr. III	5,000					
Qtr. IV	6,500					

Restructured Accelerated Power Development and Reform Program (R-APDRP)

CCEA approved the “Restructured APDRP” for the 11th Plan on July 31, 2008. The objective of the programme is reduction of AT&C loss to 15% in project areas through adoption of information technology for energy accounting/ auditing and strengthening / upgradation of distribution network. Projects under the schemes are to be taken up in urban areas – towns and cities with population of more than 30,000 (10,000 in case of special category States)

Projects under the scheme are to be taken up in two parts

Part A – is the projects for establishment of baseline data and IT applications for energy accounting / auditing & IT based consumer service centres and

Part B – is towards regular distribution strengthening projects.

The R-APDRP program size is Rs 51,577 crores. The expected investment in Part-A (Baseline System) would be Rs 10,000 crore and that in Part-B would be Rs 40,000 crore. PFC is the nodal agency for operational zing the programme. Part ‘A’ & Part ‘B’ projects can be implemented simultaneously with a gap of 3-6 months which is needed to establish the baseline figure of AT&C loss of the project area through ring fencing by installation of boundary (import/ export energy meters). Seventeen States have so far obtained the approval for entire eligible towns under Part ‘A’. Under Part ‘A’ of R-APDRP, 1,130 projects with a total cost of 4,183.93 crore has been sanctioned so far. Base line AT&C loss (figure) of the project area is yet to be established.

Financial Year 2008-09

(in Rs crores)

		4 th Quarter	Total
Sanctioned Project Cost	Target	1,100.00	1,100.00
	Achievement	1,947.70	1,947.70
Disbursement of Funds	Target	350.00	350.00
	Achievement	350.00	350.00

Financial Year 2008-09

(in Rs crores)

		1 st & 2 nd quarter	3 rd quarter	4 th quarter	Total
Sanctioned Project Cost	Target	925.00	1,750.00	2,325.00	5,000.00
	Achievement	1,614.23			
Disbursement of Funds	Target	600.00	600.00	530.00	1,730.00
	Achievement	259.31			259.31

In the current year 2009-10, the balance projects of Part-A and some limited projects of Part-B are targeted to be sanctioned and amount disbursed for implementation of projects

The Electricity Act 2003

Salient Features

- Based on the recommendations of the Standing Committee on Energy, the Government of India moved certain amendments. The Electricity Bill, 2001 along with these amendments, was passed by Lok Sabha on 9th April, 2003.
- The provisions of the Electricity Act except section 121 were brought into force with effect from to 10th June 2003.

What the Electricity Act 2003 intends to achieve

- The 'Central Government to prepare a National Electricity Policy in consultation with State Governments. (Section 3)
- Thrust to complete the rural electrification and provide for management of rural

- distribution by Panchayats, Cooperative Societies, non-Government organizations, franchisees etc. (Sections 4, 5 & 6)
- Provision for license free generation and distribution in the rural areas. (Section 14)
 - Generation being de-licensed and captive generation being freely permitted. Hydro projects would, however, need clearance from the Central Electricity Authority. (Sections 7, 8 & 9)
 - Transmission Utility at the Central as well as State level, to be a Government company - with responsibility for planned and coordinated development of transmission network. (Sections 38 & 39)
 - Provision for private licensees in transmission and entry in distribution through an independent network, (Section 14)
 - Open access in transmission from the outset. (Sections 38-40)
 - Open access in distribution to be introduced in phases with surcharge for current level of cross subsidy to be gradually phased out along with cross subsidies and obligation to supply. SERCs to frame regulations within one year regarding phasing of open access. (Section 42)
 - Distribution licensees would be free to undertake generation and generating companies would be free to take up distribution businesses. (Sections 7, 12)
 - The State Electricity Regulatory Commission is a mandatory requirement. (Section 82)
 - Provision for payment of subsidy through budget. (Section 65)
 - Trading, a distinct activity is being recognized with the safeguard of the Regulatory Commissions being authorized to fix ceilings on trading margins, if necessary. (Sections 12, 79 & 86)
 - Provision for reorganization or continuance of SEBs. (Sections 131 & 172)
 - Metering of all electricity supplied made mandatory. (Section 55)

Open Access

The Electricity Act mandates that non-discriminatory open access for inter-state as well as intra-state transmission is to be provided by the Central Transmission Utility, State Transmission Utilities as well as all transmission licensees. Open access on distribution was to be introduced through regulation by SERCs such that by January, 2009 open access would be available to all consumers who require a supply of electricity where peak power at any

time exceeds 1 MW. Open access is expected to enable consumers to get power from any source of their choice and induce improved service from existing utilities.

Open access in inter-state transmission has been effective but open access in intra-state transmission and distribution has been largely restricted to captive consumers.

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