

NOTE ON  
POWER GENERATION CAPACITY  
ADDITION  
IN ANDHRA PRADESH – INDIA

M. Thimma Reddy  
People's Monitoring Group on Electricity Regulation

Submitted to World Resources Institute (WRI)  
December 2012

## CONTENTS

1. INTRODUCTION	3
2. PROVISIONS FOR CAPACITY ADDITION	5
3. PROPOSED CAPACITY ADDITION	8
4. ALTERNATIVES	15
5. DANGER SIGNALS	22
6. GOVERNANCE ISSUES	27
7. PATH AHEAD	32
REFERENCES	33
ANNEXURE	34

## Chapter 1

# INTRODUCTION

Electricity has become one of the essential parts of modern life. We cannot visualize modern living without electricity. It has become as important as water and air for living. Even to have access to water electricity has become a necessary requirement. Either to draw water from underground or pump it several floors above electricity is needed. At the all India level as for as access to electricity is concerned six decades of independence and two decades of reforms did not mean much to nearly half of rural households in India. India also has the dubious distinction of having largest number of people without access to electricity in the world. Recent population census showed that out of 246.7 million households in the country only 67.2% have access to electricity. While 92.7% of the urban households have access to electricity only 55.3% of the rural households have access to this facility. In this respect situation in Andhra Pradesh is better. Out of 21 million households in the state more than 19 million households have access to electricity. That is, 92% of the households in the state have access to electricity. While 97% of the urban households have access to electricity 90% of the rural households have access to electricity in the state. In the case of per capita consumption of electricity also India lags behind. Per capita annual consumption of electricity in India stands at 813 units. Compared to this China reached 2,000 units per capita electricity consumption nearly a decade back. In most of the developed countries per capita electricity consumption crossed 5,000 units mark. In USA it was nearly 12,000 units. Compared to all India situation the position of AP is better. Per capita electricity consumption in AP is 1050 units per year. But this is also quite low compared to developed countries. Besides this there are rural-urban and inter class disparities in electricity consumption.

Low per capita electricity consumption at the country level as well as state level indicates the need for additional power generation. But this also brings in environmental dilemma. In this context one fact that needs to be kept in mind is that power sector is the biggest contributor to greenhouse gas emissions. It contributes more than 30 percent of global GHG emissions. Even though more than 30% percent of the households in the country do not have access to electricity India already ranks third in the world in carbon emissions, just behind USA and China. Even in India AP is the third biggest carbon dioxide emitter next only to Uttar Pradesh and Maharashtra.

India's per capita CO<sub>2</sub> emissions are only 1.3 tons, compared to global average of 4.4 tons. Though India accounts for a fifth of world population its share in global carbon emissions is expected to increase to only 7 percent by the year 2020. The energy intensity of households in India is just one-third of American households in the same expenditure class. Even then, given the absolute quantity of greenhouse gas emissions from the country, India as well as AP as a part of the country needs to factor in environmental impacts while attempting to address low electricity consumption as well as low access to electricity.

The situation at the country as well as state level brings us face to face with the dilemma is - how to increase access without impacting climate change? Impending adverse environmental changes leading to global warming makes it imperative for the developing countries like India also to explore avenues to achieve economic growth with lower carbon emissions. This may be achieved by a combination of measures to reduce electricity consumption through energy conservation and reduce carbon emissions during power generation through improving efficiency and resort to renewable sources of energy. In other words low carbon polices in power sector are the need of the hour.

In the context of the need for low carbon policies in power sector here an attempt is made to examine power generation capacity addition in AP.

In different parts of AP local communities have come out openly and with full force against location of coal based thermal power plants in their vicinity because of the adverse impact of these plants on local environment. Three people died in police firing in Sompeta in Srikakulam district on 14 July, 2010. On that day thousands of people from surrounding villages protested against initiation of work on 2640 MW coal based thermal power plant in that area by Nagarjuna Construction Company (NCC). In a similar situation two persons died in police firing on 28 February, 2011 in Kakarapally again in Srikakulam district when local communities spread over several villages opposed location of coal based power plant in their locality. In both the places the plants sought to be located in ecologically sensitive wetlands along the sea cost. At the same time there were also widespread protests against power cuts in the state. While there is need to meet the legitimate electricity needs of people in the state we cannot close our eyes to the environmental impacts of these power plants. This calls for people centred, low carbon policies to meet electricity needs of people in the state.

## Chapter 2

# PROVISIONS FOR CAPACITY ADDITION

Preamble to the Electricity Act, 2003 claims that the Act is meant to promote efficient and environmentally benign policies in the power sector. At the same time Section 7 of the Act makes it clear that generating companies do not need license to establish, operate and maintain power generating stations. This raises the question of who and how will regulate the sector to see that the sector functions in environmentally benign manner. Only in the case of hydro electric plants the developer is expected to submit a plan to the CEA for its concurrence (Section 8). Along with this captive power generation is freed from controls and the Act also made it mandatory on the utilities to provide open access to captive plants to carry electricity from its captive plant to the destination of use. The Act also laid down that promotion of electricity generation from renewable energy sources should guide the Commission in specifying the terms and conditions for determination of tariff (Section 61(h)). According to this Act one of the important functions of the Commission is to promote generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources a percentage of the total consumption of electricity in the areas of a distribution licensee (Section 86(1) (e)). According to this Act the Central Electricity Authority (CEA) is expected to prepare electricity plans periodically. These plans shall also include issues related to power generation also. But there is no specific mention that these plans need to promote low carbon methods.

**The National Electricity Policy** announced on 12<sup>th</sup> February, 2005 called for creating adequate reserve capacity margin to ensure grid security and quality and reliability of power supply. This Policy aimed at providing 1000 units per capita by 2012 and adding capacity of 1,00,000 MW during this period. It laid down that in creating new generation capacities appropriate technology need to be considered keeping in view the likely widening of the difference between peak demand and base load. It considered hydel power projects as an important renewable energy and wanted the state governments to review procedures for land acquisition and other approvals for speedy implementation of these projects. In the case of coal based thermal power projects it preferred coastal, imported coal based thermal stations as they emit low ash. This policy wanted to increase share of nuclear power. It also referred to promotion of non-conventional energy, renovation & modernisation, and captive power. But overall stress seems to be away from low carbon policies.

**The National Tariff Policy** announced on 6<sup>th</sup> January 2006 mostly dealt with methods or modes of procuring and pricing power. It talked about ensuring that new capacity addition should deliver electricity at most efficient rates to protect interests of consumers. It also pointed out that future power procurement should be through transparent competitive bidding. In the case of determining the proportion of renewable energy to be procured by DISCOMs it stated that this proportion should be based on the availability of renewable energy resources and its impact on tariffs.

The Planning Commission of GoI brought out **the Integrated Energy Policy (IEP)** by in 2006. This attempts to estimate electricity needs for the coming 25 years i.e., up to 2031-32. The Planning Commission while estimating electricity consumption in the coming 25 years assumed that the economy would grow at the rate of 8 percent. Based on this it estimated that per capita electricity consumption would increase from 553 units in 2003-04 to 2,471 units in 2031-32. This would require electricity generation capacity of 7,75,860 MW by 2031-32.

Table: 1 Estimates

Fuel	Power generation capacity 2010		Power generation capacity 2031-32	
	MW	%	MW	%
Coal	86,003	52.97	4,00,000	51.56
Hydel	39,953	22.76	1,50,000	19.33
Nuclear	4,560	02.81	63,060	08.13
Natural Gas	17,221	10.61	69,800	9.00
Solar energy	16,429	10.12	33,000	4.25
Biomass	--	--	50,000	6.44
Total	1.62,366		7,75,860	

Source: IEP – 2006, Planning Commission

According to the estimates of the Planning Commission power generation capacity in India has to increase by five times in the coming 25 years. The basis for this is estimate is the assumption that electricity consumption will increase at 8 percent, same as that of national economy's growth rate. The important question at this point is – Is it necessary for the power sector to grow by five times in the coming 25 years, at the same rate as economy grows. In the national economy there are sectors that do not depend much on electricity. If this aspect is taken in to account then IEP's estimate of power consumption need to be brought down. India's past experience also shows that growth rate in power generation is less than the economy's growth rate. During the 12<sup>th</sup> five year plan while gross domestic product increased by 8 percent demand for electricity increased by 5.2 percent only. According to an estimate of United Nation's Industrial Development Organisation (UNIDO) during the last ten years while industrial production increased by 7 percent per annum electricity consumption in industrial sector increase by only 3.6 percent. This shows that though electricity is important in increasing national income its growth need not be at the same level as that of growth in national income. It could grow at lower rate.

The Integrated Energy Policy has taken shape in the background of the Electricity Act, 2003. In a way IEP can be considered as a road map to implement the Act. The IEP document was released within a short time from the date the Act became effective. Important objective of the Electricity Act is to replace all government agencies with private corporate entities in all activities in the power sector – generation, transmission and distribution of electricity. As the publicly owned electricity boards are in mounting

debts and would not be in a position to mobilize investments to set up nearly 8 lakh MW of power generation capacity the IEP underlined the need to promote private participation in the power sector. But it is doubtful whether IEP would be able to meet these objectives. Let us take the example of AP here. At the time of formulating power sector restructuring programme in AP with the support of the World Bank in 1998 it was estimated that 8,500 MW additional power generation capacity would be needed by the end of 9<sup>th</sup> five year plan i.e., by 2001-02. It was also estimated that to generate this power and take it to consumers in the state Rs. 50,000 crore investments would be needed. As both the state government and APSEB were mired in debt and would not be in a position to raise that much capital it was suggested there was no alternative to turning to private sector. The shape and structure of the power sector in AP was altered accordingly. But they failed in adding power generation capacity as planned. They added only 1,786.3 MW as opposed to the target of 8,500 MW. Though they failed in achieving the target capacity addition they have succeeded in changing the structure of the sector in the state. IEP can also be considered as an important stage in altering the structure of the power sector in the country.

According to estimates of the Planning Commission's IEP document coal based thermal power plants will contribute 51.56 percent of the proposed capacity addition. Gas based plant will contribute 9 percent, nuclear power plants will contribute 8.13 percent, hydel 19.33 percent and renewable sources 12 percent. Given the limitations in fuels availability these targets appear to be a tall order.

Though the **Government of AP** did not come out with specific plan or programme about capacity addition it took steps in favour of merchant power plants. In the year 2008 it announced that no more long term PPAs will be entered in to for power procurement. It gave the specious reason that all the PPAs that were entered in to until now have turned out to be controversial and wanted to avoid those controversies by moving towards merchant power plants. It also pointed out that large power consumers could procure power needed by them through open access. It was proactive in giving clearances needed by these merchant power plants. It even sent a ministers' delegation to Delhi in August 2010 to lobby with the central government to obtain necessary clearances from the central government for these merchant power plants. At that time the state government gave green signal for 24 firms to set up merchant power plants with a combined capacity of 40,000 MW.

### Chapter 3

## PROPOSED ELECTRICITY GENERATION PLANTS

According to the information available in coming years 118 power generation plants are going to come up in AP. Their total generation capacity is 77,842.4 MW. In Nellore district alone 24 coal based thermal power plants are going to be established with a total power generation capacity of 24,654 MW. These plants in Nellore district account for 30.39% of the total proposed capacity in the state. All these plants are coming up within a radius of 20 kms. 21 power plants with a total power generation capacity of 10,009 MW are going to come up in East Godavari district. These plants account for 12.86% of the total capacity proposed in the state. Out of these plants 17 will be natural gas based. One will be coal based and the remaining three will be renewable energy (Bagasse and Municipal Solid Waste) units. In Srikakulam district 7 power generation plants with a combined capacity of 11,310 MW, contributing 14.53% of the proposed new capacity addition in AP. Out of these 7 units 6 will be coal based thermal power units and the remaining one will be a nuclear plant. In Prakasam district two coal based power plants with a combined capacity of 8,000 MW will come up. In Visakhapatnam district three coal based thermal power plants with total capacity of 5,150 MW are planned. These five districts together will contribute 75% of the proposed capacity addition in power sector in AP.

According to the information submitted to Srikrishna Commission by the state government and state utilities by the end of 12<sup>th</sup> plan i.e., 2016-17 about 19,406 MW additional power generation capacity is going to be added in the state.

Out of the total proposed power plants in the state 63 will be coal based thermal power plants with combined capacity of 55,925.2 MW. These coal based plants account for 71.84% of the proposed capacity addition. Nearly 50% of this capacity will come up in Nellore district only. Next place in terms of capacity addition belongs to gas based power plants. 33 gas based power plants with a total capacity of 16,734 MW are planned in the state. These plants account for 21.5% of the proposed capacity addition. But renewable energy based power generation plants will not be contributing even one percent to the new capacity addition in the state.

### **Present situation in the state:**

Before we discuss future electricity needs of AP state let us have a look at the existing situation in power sector in the state. Existing power generation capacity in the state stands at 15,756 MW. Out of this state government owned APGENCO contributed 8,421.86 MW. Central government's generation stations contributed 3,397.45 MW. Both state and central government owned power plants contributed 78% of the existing power generation capacity in the state. Power generation capacity installed by private sector's Independent Power Producers (IPP) stands at 2,294.62 MW. AP gas Power Corporation Ltd, a joint venture between state government and some private firms contributed 272

Table: 2 DISTRICTWISE PROPOSED POWER PLANTS IN ANDHRA PRADESH

District	Fuel	No. of Units	Capacity (MW)	District Total Capacity (MW)
Srikakulam	Coal	6	9,310.0	11,310.0
	Nuclear	1	2,000.0	
Vizianagaram	Coal	5	3,083.0	3,083.0
Visakhapatnam	Coal	3	5,150.0	5,172.0
	RE/Cogen	1	22.0	
East Godavari	Gas	17	8,652.0	10,009.0
	Coal	1	1,320.0	
	RE/Cogen	2	24.0	
	RE/MSW	1	13.0	
West Godavari	Gas	4	1,560.0	1,687.5
	Coal	1	120.0	
	RE/Biomass	1	7.5	
Krishna	Gas	6	2,607.0	2,789.0
	Coal	1	182.0	
Prakasam	Coal	2	8,000.0	8,000.0
Nellore	Coal	24	23,654.0	23,654.0
Kadapa	Coal	2	670.0	3,176.0
	Nuclear	1	2,000.0	
	RE/Wind	1	500.0	
	RE/Biomass	1	6.0	
Anantapur	RE/Wind	1	80.0	80.0
Khammam	Coal	4	1,212.0	1,636.0
	Gas	1	24.0	
	RE/Mini Hydel	1	400.0	
Nalgonda	Coal	5	501.0	1,624.2
	Gas	3	920.0	
	Hydel	2	170.0	
	RE/MSW	2	25.2	
	RE/Biomass	1	8.0	
Karimnagar	Coal	2	303.2	2,413.2
	Gas	1	2,000.0	
	RE/MSW	1	10.0	
Adilabad	Coal	3	465.0	465.0
Warangal	Coal	2	625.0	625.0
Medak	Gas	1	495.0	495.0
Ranga Reddy	HSD	1	12.0	18.0
	RE/Biomass	1	6.0	
Mahaboobnagar	Coal	2	1,330.0	1,605.5
	Hydel	1	240.0	
	RE/Bagasse	1	28.0	
	RE/Biomass	1	7.5	
Total		117		77,842.4

Source: Annexe 1

MW generation capacity. Renewable energy based units contributed 670.65 MW to the power generation capacity in the state.

Table: 3 Fuel wise Proposed Capacity Addition

<b>Fuel</b>	<b>No. of Units</b>	<b>Capacity (MW)</b>
Coal	63	55,925.2(71.84)
Gas	33	16,734.0 (21.50)
Nuclear	2	4000.0 (05.14)
Hydel	3	410.0 (00.53)
Renewable Energy	16	761.2 (00.98)
HSD	1	12.0
<b>Total</b>	<b>118</b>	<b>77,842.4</b>

Source: Annexe 1

Table: 4 Agency wise installed power generation capacity – 2010-11

<b>Agency</b>	<b>Fuel</b>	<b>Capacity (MW)</b>
APGENCO	Thermal	5,092.50
	Hydel	3,829.36
	<b>Total</b>	<b>8,921.86</b>
Central Generating Stations	Thermal	3,047.70
	Nuclear	349.75
	<b>Total</b>	<b>3,397.45</b>
Independent Power Producers	Gas	2,494.62
APGPCL	Gas	272.00
Renewable Energy		670.65
<b>Total</b>		<b>15,756.58</b>

Source: Aggregate Revenue Requirement of APCPDCL 2011-12

Table: 5 Fuel wise installed power generation capacity – 2010-11

<b>Fuel</b>	<b>Capacity (MW)</b>
Coal	8,140.20 (51.66)
Gas	2,766.62 (17.56)
Nuclear	349.75 (02.22)
Hydel	3,829.36 (24.30)
Renewable Energy	670.65 (04.26)
<b>Total</b>	<b>15,756.58</b>

Source: Annual Revenue Requirement of APCPDCL 2011-12

In AP out of the total power generation capacity available to the state 51.66% i.e., 8,140.2 MW comes from coal based thermal power plants. Gas based power plants contributed 17.56% of the power generation capacity. Nuclear power plants contributed 349.75 MW generation capacity accounting for 2.22% of the generation capacity. Hydel power generation units contributed 3,829.36 MW. Renewable power generation units accounted for 4.26% of the existing power generation capacity in the state.

Table: 6 Electricity supply during 2009-10 (MU)

Fuel	Quantity (MU)
Coal	48,024.17 (66.25)
Gas	16,626.77 (22.94)
Nuclear	1,124.47 (01.55)
Hydel	5,498.68 (07.59)
Renewable Energy	1,219.47 (01.68)
Total	72,493.56

Source: Annual Revenue Requirement of 4 DISCOMS 2011-12

During the year 2009-10 in AP 72,493.56 MU of electricity was purchased by DISCOMS. While 66.25 percent of this power was generated in coal based thermal power plants, 22.94 percent was produced in gas based power plants. Power generated in nuclear, hydel and renewable energy power plants was lower when compared with their installed generation capacity. While nuclear power plants account for 2.22 percent of the generation capacity available to the state it produced only 1.55 percent of power supplied in the state. In the case of hydel power though its installed capacity forms 24.3 percent of the installed capacity in the state it contributed only 7.59 percent of the power supplied in the state. Similarly, the renewable sources of energy contributed only 1.68 percent of the power procured in the state though its contribution to installed capacity was 4.26 percent. When compared to coal and gas based thermal power plants their plant load factor (PLF) was low.

Table: 7 Electricity consumption during 2009-10 (MU)

Consumer Category	Power Consumption (MU)
Domestic	13,115.58 (18.09)
Commercial	3,386.16 (04.67)
Industry	19,621.11 (27.07)
Agriculture	18,237.71 (25.16)
Railway Traction	1,526.13 (02.11)
Others	3,172.65 (04.38)
Total Consumption	59,059.34
Surplus	1,798.58 (02.48)
T&D Losses	11,635.64 (16.05)
Total Purchases	72,493.56

Source: Annual Revenue Requirement of 4 DISCOMS 2011-12

During the year 2009-10 domestic consumers in the state consumed 18.09 percent of power supplied in the state. Industrial consumers accounted for 27.07 percent. Agriculture sector according to the DISCOMs consumed 18,237 MU, i.e., 25.16 percent of power procured for the state. Transmission and distribution losses constituted 16.05 percent, i.e., 11,365 MU of power supplied in the state.

However, estimation of power consumption in agriculture sector and transmission & distribution (T&D) losses continues to be suspect. As most of the agriculture services are not metered its electricity consumption is arrived through an estimation method prescribed the APERC. But even this method is not being followed properly. In order to show that DISCOMs are working efficiently T&D losses are shown to be low and declining and agriculture consumption high. Let us examine the information related to the year 2009-10. In the above table we have seen the information provided as a part of ARR for the year 2011-12. According to the information submitted while filing the ARR for the year 2009-10 the agriculture consumption was estimated to be 16,614.84 MU, constituting 23.04 percent of the power procured in the state. Similarly, T&D losses were estimated to be 13,209.75 MU, accounting for 18.32 percent of power supplied in the state. While agriculture consumers were shown to have consumed 1,600 MU more than initially estimated T&D losses were shown to have declined by the same extent. DISCOMs benefit from this lopsided estimation of power consumption. Cost towards supply of electricity is recovered through subsidy provided by the state government and cross subsidy from industrial and commercial consumers. Lower T&D losses show that DISCOMs are working efficiently. By overestimating agriculture consumption DISCOMs receive more income through subsidies. One thing we need to note is that T&D losses are higher than shown by the DISCOMs. By reducing the losses the need to add additional power generation capacity can be reduced.

### **Future needs:**

As mentioned above 77,842 MW of additional power generation capacity is going to be installed in the state. An important question that needs answer is: do we need all these power plants and this much of additional power generation capacity?

The Central Electricity Authority (CEA) is statutorily, under the Electricity Act- 2003, entrusted with the responsibility of preparing plans for the country as a whole. Let us look at its estimation of electricity use in AP. According to CEA estimates peak electrical load at the end of 11<sup>th</sup> five year plan i.e., 2011-12 would be 14,721.21 MW. If we take in to account the fact the PLF of some of the plants would be low and that the plants need undergo overhauling and repairs during the year we may need some reserve margin to account for these eventualities. We may assume a reserve margin of 15 percent. Then the installed capacity needed at the end of 11<sup>th</sup> plan would be 17,000 MW. During the same time installed capacity in the state is about 16,000 MW. This shows that the deficit is about 6 percent. According to CEA estimates power consumption in the state in 2011-12 would be about 98,032.49 MU. According to the information placed by DISCOMs before

the APERC during the same year electricity procured was 87,375.91 MU, signifying a deficit of only 1.9 percent in electricity availability.

Table: 8 Long term forecast of electricity requirement

	Energy Requirement (MU)			Peak Electrical Load (MW)		
	2011-12	2016-17	2021-22	2011-12	2016-17	2021-22
ANDHRA PRADESH	89032.490	132118.210	175590.124	14721.210	21845.290	28215.843
ALL INDIA	968658.543	1392066.048	1914508.233	152746.097	218208.593	298253.241

Source: 17<sup>th</sup> Electrical Power Survey of CEA

According to the Power Grid Corporation of India during April 2010 – February 2011 peak electricity demand was 12,018 MW and peak availability of capacity was 11,232 showing a deficit of 6.5 percent. During the same period while 70,860 MU of electricity was needed 68,577 MU was available indicating a deficit in availability of 3.2 percent only. Peak demand will not be the same throughout the year. Let us take February 2011. In this month while 6,665 MU of electricity was needed 6,595 MU was available. During this month deficit in electricity availability was only 1.1 percent. In the case of peak capacity demand deficit was even less, 0.2 percent.

Table:9 Power Deficit in Andhra Pradesh

	Electricity Demand (MU)	Electricity Availability (MU)	Deficit MU (%)	Peak Demand (MW)	Peak Availability (MW)	Deficit MW (%)
April 2010 – February 2011	70,860	68,577	-2,283 (-3.2)	12,018	11,232	-786 (6.5)
February 2011	6,665	6595	-70 (-1.1)	11,250	11,232	-18 (0.2)

Source: Andhra Jyothi Daily Newspaper dated 17-03-2011

Let us come back to CEA's estimates. Peak demand at the end of 12<sup>th</sup> five year plan i.e., 2016-17 is estimated to be 21,845.29 MW. If we consider reserve margin to be 15% generation capacity needs to be 24,122 MW. Similarly, peak demand at the end of 13<sup>th</sup> five year plan is estimated to be 28,215.84 MW. Again taking in to account the reserve margin the installed capacity needed would be about 32,450 MW.

At present 15,756.58 MW generation capacity is available to AP. If CEA estimated capacity is to be reached in 2011-12 additional capacity of about 1,250 MW would be needed. Additional capacity to be created in the state by 2016-17 would be 8,370 MW and about 16,700 MW only by 2021-22.

But as mentioned above plans are afoot to create additional power generation capacity of 77,824 MW in the state. This is nine times of the additional capacity to be created by the end of 12<sup>th</sup> plan and about five times of the additional capacity to be created by the end of 13<sup>th</sup> plan. According to the information placed before the Sri Krishna Commission by the GoAP public and private companies were going to set up power plants with a combined

capacity of 19,406 MW. This is more than double to that of the additional capacity need to be created by the end of 12<sup>th</sup> plan.

One may point out that while giving approval to set up new power plants besides state's needs country's needs were also taken in to account. But not only AP many other states also have given approval to set up many new power plants. In Chhattisgarh alone approval was given to set up new power plants with a combined capacity of about 50,000 MW. The total capacity of new power plants going to come up in Maharashtra is 35,000 MW. It is 27,000 MW each in Madhya Pradesh and Gujarat, 32,000 MW in Odisha, 19,000 MW in Karnataka and 17,000 MW in Tamil Nadu. From this it is clear that problems arising out of setting up such massive capacities will not be confined to AP only but will encompass the whole country.

AP contributes about 10 percent to the power generation capacity in the country. In the year 2010 while installed capacity at the country level was 1.62 lakh MW it was 15.75 thousand MW in AP. By 2031-32 IEP proposed an installed capacity of 7.3 lakh MW and the newly proposed capacity addition in AP stands at 77.8 thousand MW. This is a bit more than 10 percent of the proposed capacity at the country level. When observed from the perspective of IEP the proposed capacity addition in AP appears justified. The doubts and reservations expressed about IEP will also apply to proposed capacity in AP as well.

During the ten year period of 2002-12, i.e., the period corresponding to 10<sup>th</sup> and 11<sup>th</sup> five year plans, the Planning Commission estimated a capacity addition of 1 lakh MW at the country level. The target for the 10<sup>th</sup> plan was 62 thousand MW. The capacity added was only 55 thousand MW. Similarly, during the 11<sup>th</sup> plan while target was 41,110 MW actual capacity addition was only 29,950 MW. During this decade only 75% of the target was achieved. While the target for the decade of 2002-12 was one lakh MW the same for the two and half decades ending with 2031-32 is six times higher. The past experiences will give rise to doubts about reaching this target. But in the case of AP situation is different. Already 118 plants with a combined capacity of 77 thousand MW are in different stages of obtaining clearances. Many of them have already obtained various approvals. Only some of them have to obtain environmental clearances. In the present conditions it may not be difficult to obtain these clearances. The problem will be only when all these plants start generating power.

## Chapter 4

# ALTERNATIVES

There appears to be no concerted attempt to explore alternatives to new power generation capacity addition in the state. These alternatives include electricity conservation, bringing down T&D losses and promotion of renewable energy sources. By using the already available power plants efficiently and by improving energy efficiency in electricity consumption the need for additional power generation could be brought down.

### **Increasing electricity consumption:**

Related to this let us examine domestic electricity consumption. In urban areas nearly all the households have access to electricity. Though it is reported that 100 percent of the villages are electrified some of the households in rural areas are yet get electricity connection. About 30 percent of the rural households may not have access to electricity. Such households may number about 40 lakhs. About 1400 MU of electricity may be needed to supply electricity to meet necessary needs, say about 30 units per month. 250 MW generation capacity may be needed to generate this power. Many villages in the state are facing power cuts throughout the year. To remove these power cuts an additional generation capacity of about 300 MW may be needed. This implies that 550 MW additional generation capacity is enough to meet electricity needs of domestic consumers.

Table: 10 Power situation in Hyderabad Metro Zone

<b>YEAR</b>	<b>No. OF CONNECTIONS</b>	<b>PEAK DEMAND (MW)</b>
<b>2005</b>	11.54	669.0
<b>2006</b>	12.20	788.3
<b>2007</b>	12.85	878.6
<b>2008</b>	13.48	963.8
<b>2009</b>	13.82	1020.8
<b>2010</b>	14.53	1065.0

Source: The Hindu Date: 08-02-2011

In this context we need to note that in India during the last decade while electricity generation increased by 65 percent the number of households with access to electricity increased by 10 percent only. This implies that the households who are already connected to the grid are consuming more and more electricity. Hyderabad city can also be taken as an example for this. In 2005 while number of electricity connections were 11.54 lakh peak demand was 669 MW. In the year 2010 while number of connections increased to 14.53 lakh peak demand increased to 1065 MW. During these five years while the number of consumers increased by 27% between 2005 and 2010 the electricity

consumption increased by 59%, i.e., increase in peak demand is double to that of increase in number of connections.

We shall explore the issue of electricity consumption in domestic sector further. A.P. Central Power Distribution Company Limited (APCPDCL) in its filing on Aggregate Revenue Requirement (ARR) for the year 2012-13 before the A.P. electricity Regulatory Commission (APERC) also provided information on electricity consumption among households.

Demand for electricity in the state is increasing because of high electricity consumption among rich households. Electricity consumption among households consuming more than 300 units of electricity per month is increasing. Under the jurisdiction of APCPDCL the households consuming more than 300 units per month constituted only 4.73 percent of total households they consume 25.28 percent of the power consumed by all the households. At the same time households consuming less than 100 units per month though constitute 65.75 percent of the households consume only 24.43 percent of the power consumed in the domestic sector. Similarly, the households consuming less than 50 units in a month constitute 44.2 percent of domestic consumers they consume only 7.8 percent of the electricity consumed by households. Households consuming more than 300 units in a month constitute less than 5 percent of the domestic consumers they consume more electricity than 65 percent of the households who consume less than 100 units per month. Similarly, though households consuming more than 500 units of electricity in a month constitute less than one percent they consume more power than households who consume less than 50 units in a month who constitute 44.2 percent of domestic electricity consumers.

Table: 11 Domestic Electricity Consumption

<b>Domestic Slab (Units)</b>	<b>No. of consumers</b>	<b>% of total consumers</b>	<b>Energy sales to slab wise consumers (MU)</b>	<b>% of consumption in each slab</b>
0-50	2547946	<b>44.29</b>	483.28	<b>7.88</b>
51-100	1234475	21.46	1014.64	16.55
101-200	1279758	22.25	1984.34	32.36
201-300	419312	<b>7.29</b>	1099.50	<b>17.93</b>
301-500	223461	<b>3.88</b>	950.38	<b>15.50</b>
> 500	47526	<b>0.83</b>	599.15	<b>9.77</b>
<b>Total</b>	<b>5752478</b>	<b>100</b>	<b>6131.29</b>	<b>100</b>

Source: CPDCL ARR Filing, 2012-13

Table: 12 Change in domestic consumption of electricity

Domestic Slab (Units)	Electricity Consumption (2008-09)	Electricity Consumption (2011-12)	% Increase/Reduction
0-50	555.74	483.28	- 13.04
51-100	923.21	1014.65	9.90
101-200	1457.69	1984.35	36.13
201-300	678.12	1099.16	62.09
> 300	858.24	1549.60	80.56
Total	4473.00	6131.00	37.07

Source: CPDCL ARR Filing, 2012-13

Between 2008 and 2012 while electricity consumption by households using less than 50 units in a month declined by 13.04 percent consumption by households consuming more than 300 units per month increased by 80.56 percent. Additional power is being purchased to meet increasing demand for power by rich households. Even among middle class also power consumption is increasing as appliances like air conditioners have come within their reach. Because of this conspicuous consumption demand for electricity is galloping. The issue is how to bring down this consumption.

### **Scope for electricity conservation:**

Electricity consumption in domestic sector can be brought down by following energy conservation measures and by using energy efficient appliances. For example, by replacing incandescent bulbs with CFL or LED lights electricity consumption can be reduced.

In Nasik city of Maharashtra three lakh CFLs were supplied to households. Because of this 10 MW of power could be saved. In Visakhapatnam of AP also through similar intervention 7 MW of power could be saved. Akshaya Praksh Yojana programme was taken up in 4,611 villages in Maharashtra in 2006-07. Under this programme appliances that consume large quantity of electricity like electric stoves should be avoided. During peak period, both in morning and evening, electricity consumption should be reduced. Under this initiative 960 MW of power could be saved. Electricity consumption during morning time can be reduced by using solar water heaters. It was estimated that 270 MW could be saved if 2,50,000 households install 100 litre capacity solar water heaters. In Karnataka state already incentives are being provided to households using solar water heaters. Extensive and successful implementation of such energy conservation measures will help to bring down the quantity of electricity needed to be produced.

According to DISCOMs during the year 2009-10 25.16% of the electricity supplied in the state was consumed in the agriculture sector. But these consumption figures are not reliable. As the agriculture pump-sets are not metered its consumption is arrived through

an estimation process. The DISCOMs in order to show lower transmission and distribution losses are inflating agriculture consumption figures. Even then there is scope to reduce electricity consumption in agriculture sector through demand side management (DSM) measures. According to the state government policy on free power to agriculture the farmers to be eligible for free power have to adopt four DSM measures. These are installation of capacitors, use of HDPE pipes and friction less foot valves and ISI standard motors. Through implementation of these measures electricity consumption in agriculture sector can be brought down considerably. Through installation of capacitors alone transmission losses could be reduced by 15 to 25 percent. DISCOMs are claiming that 90 percent of the pump-sets under their jurisdiction were provided with capacitors. But field verification shows that not even 10 percent of the pump-sets are provided with capacitors. In reality the DISCOMs do not have correct information on number of pump-sets in their areas. More than 50 percent of the technical posts like linemen are vacant in rural areas. Installation of capacitors for all pump-sets may cost only Rs. 60 crore but the state government is not ready to implement its own policy. At the same time in the name of reducing T&D losses in agriculture sector HVDS transformer programme is being taken up. Already Rs. 2,450 crores was spent on this. But it is doubtful whether this programme has yielded any results.

Industrial and commercial sectors together are consuming more than 30% of the electricity supplied in the state. In the coming days these two sectors are going to clock higher rate of growth in electricity consumption than other sectors. During 2010-11 the commercial sectors was expected to register 13.5 percent growth in electricity consumption. Similarly, electricity consumption was expected to grow up to 12.6 percent in industrial sector. Keeping aside the issue of brining down electricity consumption un these sectors through DSM measures in the background of debate on global warming the need is to focus on development trajectory that will not environmentally harm the coming generations.

### **Acts not implemented:**

It is more than decade since the Electricity Conservation Act, 2001 had come in to operation. Let alone ordinary consumers even people in industrial and commercial sector are not aware that such an Act exists. The central and state governments did not show much interest they have shown in implementing the Electricity Conservation Act, 2001 as in implementing the Electricity Act, 2003 though it had come in to force two years later. There are some loose ends in the design of the Act itself. The provisions of this Act need to be implemented voluntarily. There are no mandatory provisions that will take the Act forward. Bureau of Energy Efficiency (BEE) was created as a part of this Act. But it was not invested with enough powers and funds to implement the Act. The responsibility of implementing this Act at the state level is placed on energy development agencies – the New and Renewable Energy Development Corporation of AP (NREDCAP) in AP. These agencies are again paying more attention to promotion of renewable energy resources than to energy conservation.

According to the Energy Conservation Act energy audit shall be taken up in government buildings. Even a decade of the existence of this Act the number of government buildings that underwent energy audit is too few to merit attention.

According to news item published in The Hindu (Hyderabad City Edition) on March 18, 2011 NREDCAP asked the electricity utilities in the state to provide it a list of government and private buildings consuming large volumes of electricity. In response NREDCAP seems to have received some little bits of information. But who knows when would NREDCAP receive full information and complete energy audit of these buildings?

The way the Act is being implemented in AP invariably leads to this sort of doubt. The energy department of GoAP issued a government order G.O.Rt.No.256 Energy (Re) Dept on 28<sup>th</sup> September 2006 stipulating that in all government buildings CFL bulbs and T5 tube lights should be used. But it did not prescribe any limit for implementation of this GO. The municipal administration department of GoAP issued a government order G.O.Ms.No.302 M.A.and U.D. Dept on 3<sup>rd</sup> August, 2004 made installation of solar water heaters compulsory for newly constructed houses. But no attention was paid to its implementation. Through another GO issued on 23<sup>rd</sup> May, 2008 the municipal administration department made the installation of solar water heaters optional. The general administration department of GoAP issued the government order G.O.Ms. No.1 GAD Dept on 2<sup>nd</sup> January 2007 stipulating that energy saving measures should be followed in all government departments. Like all other GOs the state government did not pay any attention to its implementation. If the energy saving measures are effectively implemented in all government departments the need to additional power generation capacity can be brought down.

Above we have seen that though the state government clearly laid down a policy regarding DSM in agriculture its implementation was neglected. In industrial and commercial sectors also no one is showing interest to take up such DSM measures. If the consumers, electricity utilities and the state government together initiate energy saving measures electricity consumption could be reduced considerably. And to that extent the need for additional power generation capacity can be avoided.

### **Transmission and distribution losses:**

According to the Aggregate Revenue Requirement for the financial year 2011-12 filed by APDISCOMs before APERC 15.73 percent of power procured in the state is going waste due to transmission and distribution (T&D) losses. If take in to account the fact that consumption figures for the agriculture sector are being inflated the actual T&D losses would have been much higher. In efficiently run electrical systems these losses would be 5 – 6 percent. By reducing these losses the need for additional power generation can be reduced.

Table: 13 Transmission and distribution losses during 2011-12

	CPDCL	EPDCL	NPDCL	SPDCL	TOTAL
<b>Power Purchases (MU)</b>	39,736.70	14,305.68	13,242.74	20,090.79	87,375.91
<b>Domestic Consumption (MU)</b>	6,289.37	3,370.25	2,328.36	4,468.26	16,456.24
<b>% of Domestic Consumption</b>	15.82	23.56	17.58	22.24	18.83
<b>T&amp;D Losses (MU)</b>	6,583.83	1,859.61	2,179.16	3,119.20	13,741.80
<b>% of T&amp;D Losses</b>	16.57	13.00	16.46	15.53	15.73

Source: Annual Revenue Requirement of 4 DISCOMS 2011-12

The above table shows that there is scope to reduce such T&D losses in AP also. The T&D losses are 13 percent in EPDCL. In the other three DISCOMs it is in the range of 15.53 percent to 16.57 percent. By reducing T&D losses in other DISCOMs to the level of EPDCL through this 2,278 MU of power can be saved in an year. This is more than the electricity needed to electrify 40lakh households that do not have access to electricity. By reducing these T&D losses to the level of EPDCL we can set aside the need to add 350 MW additional power generation capacity.

In the rural areas technical personnel of utilities like linemen are not available. More than 50 percent of the posts like junior linemen and assistance linemen are vacant. The number of these posts is more than 6,000 in the state. In the absence of proper monitoring at the ground level electricity is being misused. Annually about Rs. 80 crore are enough to fill these vacancies. But the benefits from this will be several times to this cost. From this also the need for additional capacity addition can be reduced.

### **Attention on alternatives:**

In the background of local communities stiff opposition to NCC power plant at Sompeta in Srikakulam district the following question was posed: 'People want the light to glow and the pump-set to pump out water at the pressing of switch but they do not want the power plant in their backyard. How is it possible?' Certainly it should be possible! Both light during night times and water for drinking and for crop are essential and minimum needs that should be met or should be given priority. We shall focus rather on unnecessary and extravagant use of electricity. We can take a news item that appeared on 26<sup>th</sup> November, 2011 in Andhra Jyothi (Telugu Daily Newspaper). According to it Mukhesh Ambani's family (richest person in the country) in their 27 floor house consumed 6,37,240 units in a month. If we compare this per capita monthly consumption of power in the country it was sufficient to meet electricity needs of more than 25,000 families in the country. Is it correct for five people to consume this much of electricity? Instead of one individual let us look at the Mumbai city as such. Total electricity demand in this city was about 3200 MW and 40 percent of this goes to meet electricity demand from air conditioners. Similar situation prevails in cities in AP also. But this is not as important as providing water for drinking and irrigating crops. If this extravagant consumption is reviewed the need to set up additional power generation capacity can also be brought down.

Let us look at the issues related to agriculture pump-sets. As there was there was no support for dry land agriculture farmers in the dry land areas turned to well irrigation to overcome uncertainties in dry land agriculture. By providing proper support to dry land agriculture dependence on well irrigation can be brought down. Indiscriminate sinking of bore wells has led to serious decline in ground waters table there by leading higher consumption of electricity to pump out water from greater depths. By regulating water use through farmers' participation and by taking up soil and water conservation methods like water sheds power consumption in agriculture can be brought down. But the way the watershed programmes are being implemented in the state show that though hundreds of crores of rupees were spent on these programmes there is no visible impact on the ground.

There are various ways to bring down electricity consumption in the coming days. By following these electricity saving measures the need to add new power generation capacities can be reduced. There are opportunities for DSM measures in industrial, commercial and domestic sectors. By implementing these measures the need for additional power generation can be avoided in future. These will also help to stop uprooting of families from rural and tribal areas in the state. Pollution could also be brought down. By reducing high T&D losses total power generation could be reduced. In AP peak demand in morning is higher than evening peak demand. By extensive use of solar water heaters morning peak demand could be reduced. By implementing the Energy Conservation Act effectively the need for additional power generation could be reduced.

## Chapter 5

# DANGER SIGNALS

Two instances of police firing on people protesting against setting up of coal based thermal power plants in their area and death of a few protesters brought to the fore the issues related to power generation capacity addition in the state.

Two persons died several people were injured in the police firing on February 28, 2011 in Vaddithandra village of Srikakulam district in Andhra Pradesh (AP). Villagers were agitating against East Coast Energy Private Limited (ECEPL) is setting up a 2,640 MW coal based thermal power plant at Kakarapalli in Santhabommali mandal of Srikakulam district. State government also allotted 2,450 acres of land for this power plant. The land allocated by the state government to EPECL power plant is a part of Bhavanapadu – Naupada wetlands. These wetlands are environmentally very sensitive and valuable. Besides this, people from 30 surrounding villages depend on these wetlands for their livelihoods. Fishing communities, farmers and others depend on these wetlands. Their livelihoods will be severely affected by this power plant. They were also not provided with any alternative livelihoods. A few of these villagers may get some insignificant jobs like sweepers and security personnel in this plant. In the background of increasing automation of the operation and maintenance of power plants there is very little scope for employment for the local people. Added to this people of this area have to face environmental pollution from this power plant. As the plant is located close to the sea coast effluents let out by this plant in to the sea water will adversely affect fisheries. The proposed plant will also adversely impact the Telineelapuram bird sanctuary meant for protection of migratory birds which is also a part of Bhavanapadu wetlands. Already vast tracts of arable land was submerged due to water diversion structures constructed by the plant authorities. This spurred the local communities to rise up against the power plant. The Expert Appraisal Committee appointed by the central government suggested shifting the location of the plant to the north of the wetlands. But disregarding this the state government went ahead and issued a No Objection Certificate to the setting up the power plant at the present location in February 2009.

A few days before these developments at Vaddithandra and surrounding villages in the month of July 2010 even more severe repression was faced by people of Sompeta in the same district.

Nagarjuna Construction Company (NCC) proposed to set up a 2,640 MW coal based thermal plant in Sompeta mandal. The state government allocated 972.69 acres of land in the local wetland area which is called Beela. This Beela (wetland) spread over 4000 acres. The length of this Beela land is about 20 kilometers. This Beela looks like a small lake. Two lakh people living in 30 villages spread over the mandals of Sompeta, Kaviti and Kanchili mandals depend on the Beela lands for their livelihoods. It provides one or the other source of income through the year.

Land around Beela is fertile and two crops of paddy is grown on nearly 5000 acres. This area is also known for good quality vegetables and vegetables grown here are transported up to Kolkata. Two lift irrigation schemes located in Beela help to irrigate 750 acres. Fishing communities find fish throughout the year. As Beela is spread along the sea coast fishermen also venture in to the sea for fishing. Beela land also works as grazing ground for cattle. Grass grown in Beela is used for thatched roofs and for making mats.

Besides all these, drinking water pumps located at Manikyapuram and Borivanka villages within the Beela help to supply drinking water to 62 villages in this region.

Suppressing all these important facts the state government of AP gave all necessary approvals to NCC to set up the coal based thermal plant at Sompeta. Thousands of people who attended the public hearing on environmental impacts of this power plant held on 18 August 2009 opposed it. In spite of this the state government gave it the green signal.

If this NCC plant really comes up it will blacken the lives of people of this area. Agriculture and fishing in these lands will almost be destroyed completely and people living these will lose important source of their living. Electricity produced in this plant may help to illuminate houses in different parts of the state but the lives of people depending on this Beela land will be engulfed in darkness. Fly ash from this plant will be stored on this Beela only rendering the drinking water pumping from this Beela useless. This plant not only takes food away from people but availability of drinking water will also become very difficult. More than all this health of people of this area will be a major casualty.

Having grasped the destructive nature of this power plant people of these villages, setting aside all differences of cast and creed, decided to give voice to their concerns. All the efforts of the state government as well as the company management to water down the people's opposition did not bear fruit. When NCC company management tried to start plant erection work on July 14, 2010 villagers in large numbers arrived on the scene and resisted the company's work. At this point the police as well as goons hired by the company attacked the villagers mercilessly. In the police firing that took place that day three persons died.

In other parts of the state also local people began to raise their voice against the proposed power plants in their area. In Prakasam district people are opposing the 4,000 MW power proposed to be set up public sector APGENCO. In east Godavari district people stood against the GMR Group's proposed 6500 MW power plant. In Nalgonda district the state as well as central government temporarily halted to works to set up uranium processing plant.

These people's protests against power plants in the state brought to the fore adverse implications of power plants.

## **Tentacles of Pollution:**

During electricity generation besides fly ash many other harmful chemicals will be let in to atmosphere endangering human lives. Harmful chemicals like mercury, sulphur dioxide, arsenic, and lead will enter human bodies through air, drinking water and food.

72 percent of the proposed capacity addition will be from coal based thermal power plants and 22 percent of the addition will be from gas based power plants. Nuclear power plants will contribute 5 percent of the proposed addition. The areas where these plants are going to be located will see loss of livelihoods for local people and environmental degradation. A look at Singrauli in Madhya Pradesh and Korba in Chhattisgarh will show the kind of situation that will emerge in these areas. Coal based thermal plants with a total capacity of 4,980 MW are operating in Korba. In Singrauli the total capacity of these coal based thermal plants is 3,260 MW. These two places are already recognized as one of the most polluted places in the country. Power plants in Singrauli are letting out 720 kilograms of mercury every year. 6 million tones of fly ash is being generated. Because of the spread of this fly ash agriculture in the neighbouring lands is badly affected. Large tracts of land have become uncultivable. According to a report of United Nations Environment Programme mercury in the blood of the local people was found to be above permissible limits. Industrial Toxicology Research Centre located in Lucknow in its health survey of the people around Singrauli found that mercury in their blood and hair was several times above the permissible limits. Because of this local people, especially children facing diseases related to lungs, stomach and kidneys. Instances of stunted mental growth were also found among children. Fly ash in the atmosphere is leading to diseases related to lungs. Similar situation is prevailing in Korba of Madhya Pradesh as its air, water and land are polluted by the power plants.

Visakhapatnam in AP with various industrial units including coal based thermal power plants is one of the highly polluted centres in the country. According to the new proposals new thermal power plants with a combined capacity of 5,150 MW are going to come up in Visakhapatnam district. In Nellore district alone power plants with a total capacity of 23,650 MW are going to come up within a 20 kilo meter range. Experience of Singrauli and Korba shows how polluted different parts of AP will be in coming few years if all these plants become operative, and its adverse impact on the livelihoods of people of these areas.

Coal used in thermal power plants is an important source of pollution. Pollution takes place from the point of mining to storing of fly ash from the plant. A large proportion of coal is coming from open cast mines rather than underground mines. Because of this method besides uprooting of people living here a large number of trees and other forest resources will disappear severely impacting local ecology. Water sources of that area also will get polluted. During transportation of coal also pollution will take place. During generation of electricity burning of coal leads to air pollution. This is leading to lung related diseases. Fly ash stocks not only occupy large tracts of land it also leads to pollution of ground water. Fly ash in the air settles on plant leaves and leads to lower crop yields.

In AP in all the places where coal based thermal plants are in operation – Kothagudem, Ramagundam, Vijayawada, Muddanur and Visakhapatnam – people are facing problems from the fly ash spewing out of these plants. Some time back when retaining bunds of the fly ash pond breached fly ash entered irrigation canals. In some villages water from these canals is also used for drinking purpose. Similar incidents are also taking place at other plants also. To overcome such accidents the Ministry of Environment and Forests of GoI had come out with many directives. In November 2009 the Ministry came out with a directive stipulating that coal based thermal plants within four years of its operation has to see that 100 percent of the fly ash coming out of these plants shall be used in activities like manufacturing of cement and brick making. But it is doubtful as to how far such directives will be implemented. When fly ash coming out of the present coal based thermal units with a total capacity of 8,140 MW is not being managed properly one can imagine what will be the situation if all the proposed new thermal power plants with total capacity of about 60 thousand MW become operational.

Sulphur dioxide is an important pollutant from coal based thermal power plants. It is poisonous. It impacts lungs and may also lead to death. To remove it from atmosphere Flu Gas Desulphurization (FGD) is used. But the Pollution Control Boards (PCB) that issue environmental clearances are not making use of FGDs compulsory. In some cases they are only directing to allot some land for such machinery but not stipulating that the machinery shall be installed. In the case of UMPP being set up by Reliance Power at Krishnapatnam in Nellore district it was found that the coal to be used at that plant has sulphur content of 0.8 percent. Here PCB has directed the company to set aside some land for the FGD machinery. In other two coal based thermal plants coming up in Nellore district it was found that coal to be used in these plants contain 1.3 percent sulphur. Here PCB directed use of Circulating Fluidised Bed Combustion (CFBC) method to bring down sulphur dioxide.

Mercury is another important harmful chemical let out by thermal power plants. Coal mined in India contains mercury. During burning of coal it takes shape of gas and enters atmosphere. At the fly ash storage sites it enters groundwater. Through this it enters food cycle. Mercury adversely impacts functioning of brain, heart, kidneys and lungs. This severely debilitates immune system in human body. Though mercury pollution poses grave danger to human health no action is initiated to control it. Even simple directions on precautions to be taken are not issued.

Nuclear plants also figure in the list of newly proposed power plants in AP. In the case of nuclear power plant at Kovvada in Srikakulam district land was identified and its acquisition is to be initiated. Nuclear power plants are also proposed in Kadapa and Prakasam districts. These nuclear power plants are not only costly but also environmentally very dangerous. The recent Fukushima nuclear plant incident in Japan has again brought to the fore dangers involved in nuclear power plants. Nuclear power is not going to meet even two percent of our electricity needs. Through promoting renewable energy sources and bringing down transmission and distribution losses we can secure even more electricity.

When a large number of power plants are going to be located at a single location environmental pollution at that location will be very severe. At such places instead of examining environmental impact of each power plant separately environmental impact of all the proposed power plants at that location shall be examined together. If power plants with thousands of MW capacity come up at a single location livelihoods as well as environment and health of people will be hit. It is the responsibility of democratic governments to see that people do not have to face such man made calamities. But the governments have thrown the welfare of the people to the winds and are jealously guarding the interests of investors only. When private investors are not able to buy the consent of the local communities thugs were let loose to terrorise them and police were deployed in support of the thugs but not to protect voiceless masses. The Sompeta and Kakarapally incidents are a proof of this.

### **Adverse impact on livelihoods:**

According to the estimates of the Central Electricity Authority (CEA) in setting up coal based thermal power plants 0.6 acres to 1.1 acres of land per one MW of installed capacity will be needed. On this basis nearly 80 thousand acres of land will be needed to set up the proposed power plants. Already majority of the power plants have acquired the land needed by them. While the state government acquired land to some extent for these plants the private companies purchased lands from farmers in many cases not informing the real purpose of the land acquisition. For example, in Sompeta land was initially purchased by middle men from farmers in the name of developing fish ponds. Later this land was transferred to the NCC for setting up the power plant. In some cases land belonging to APGENCO, the state government owned power generation company, was transferred to private companies for setting up power plants. Thermal Power Tech Limited and Reliance Power were given lands belonging to APGENCO.

Whatever may be the method because of this transfer of land farmers who lost ownership of the land and other rural households who were dependent on these lands directly and indirectly are losing livelihoods. Households who live in fishing villages along the coast are also facing threat to their livelihoods as most of the power plants are coming up along the coast – from Nellore to Srikakulam. Near Krishnapatnam in Nellore district where a sea port has come up to meet coal import needs of the proposed power plants many fishing villages were already cut off from sea which used to provide sustenance to them. Similarly, because of the hot water and other effluents let out by the NTPC Simhadri thermal power plant near Visakhapatnam in to the sea fishing and other marine resources have drastically declined and lives of fishing households dependent on fishing in these waters had turned miserable. Fly ash spewed out by the coal based thermal power plant near Vijayawada in Krishna district has covered the surrounding agriculture fields and the crop yields have declined drastically. One can imagine the predicament of local people if all the proposed power plants come up.

## Chapter 6

# GOVERNANCE ISSUES

## **Administration**

The Department of Energy of GoAP does not figure in the scheme of things as it has no licensing power. No permission is needed from it for setting up power plants in the state. Given the open ended scope for setting up of power plants provided under the Electricity Act, 2003 the Department of Energy virtually do not have any role. Once it was decided by the GoAP that no more long-term PPAs will be entered and the required power would be procured from the open market it implies that the Department's role in setting up of power plants is brought down to zero. Following this the DISCOMs obtained permission from APERC to procure 4000 MW from open market through Case I bidding process. While 2000 MW is for a short term of four years another 2000 MW is for a long term of 25 years. Once APERC gives permission the DISCOMs will handle the issue. Under the Case I bidding the developers are responsible for acquiring necessary clearances, including land, water and environment clearances.

At the same time there were also cases where private merchant power plants were allotted government lands without any corresponding obligations on these power plants to address power requirements of the state. The Thermal Power Tech Corporation in Nellore district was allotted land earlier belonging to the state owned power generation organization APGENCO. This private power plant is allowed to operate as a merchant plant. Even in the case where government land is allotted the process starts at the Office of the District Collector, giving an impression that the state government has no role in this process.

### Lack of coordination among government departments:

Though license is not needed for setting up power plants still developers need to obtain some clearances or allocations from some departments of state government. These departments include revenue, irrigation and environment. If the objective of the Act as well as the state government is promotion of efficient and environmentally friendly power plants in a transparent manner there should be coordination among all the departments that deal with setting up of power plants. But each department deals as if other departments do not exist. The issues raised by the people who participated in the movements against coal based thermal power plants in Sompeta and Kakarapalli in Srikakulam district are related to this. Land, water and environmental clearances to these plants were given to these plants without regard to people's welfare and their impact on local and global environment. These very movements showed that environmental clearances were issued disregarding basic norms. Even when people opposed these plants at the public hearings they were given go ahead signal.

For coal based thermal power plants along with coal water is an important and critical input. According to CEA's estimates for a 100 MW power plant will need 3.92 million cubic meters of water in a year. The proposed power plants in AP may need about 3000 million cubic meters of water. This will be sufficient to provide irrigation to nearly 6 lakh hectares of agriculture land. This water can be used to quench thirst of crores of people in the state. At a time when the state is facing severe constraints in meeting water requirements of households as well as agriculture allocation of such large quantities of water to the proposed power plants is unthinkable. This will also lead to conflicts over water. A river basin as whole may have surplus water. But at a particular location in the river basin where power plant is expected or has already come up there may be severe stress on water availability. Let us take NTPC's coal based thermal power plant at Ramagundam in Karimnagar district. This is located in Godavari river basin. Water for this plant is allocated from Sriramsagar project and Manair reservoir. Because of this the ayacut under Sriramsagar project is not receiving sufficient water. Manair reservoir has almost stopped supplying water for agriculture lands. Even from newly constructed Yellampally Sriapadasagar reservoir water is allocated to this power plant. These allocations were made against the wishes of the farming community. There are surplus waters in Godavari river basin but at Ramagundam there is stress in water availability. In the same way, for Rayalaseema Thermal Power Plant in Kadapa district water is allocated from Sri Pothuluri Veerabrahmaswamy reservoir which was primarily meant for irrigation. This allocation also faced resistance from local farmers.

Some of the newly proposed power plants are also already facing resistance from local communities. Alfa Infraprop Limited is setting up a 2,640 MW coal based thermal power plant at Komarada in Vizianagaram district. Water for this is allotted from Thotipally reservoir which is being used to irrigate about 60,000 acres. Local communities are resisting this allocation. Even a cabinet minister in state cabinet Mr. B. Satyanarayana opposed this water allocation. Similarly, in Mahabubnagar district water allocation to Seshadri Power Plant from Krishna river got adverse response from the public. Even an all party meeting passed a unanimous resolution opposing water allocation. In Prakasam district APGENCO is planning to set up a coal based thermal power plant at Vodarevu. This plant not only will receive water from Gundlakamma reservoir but also encroaches upon a part of the command area of the reservoir. Local farmers are opposing it. They obtained a stay from High Court on further land acquisition for this power plant.

Many of the proposed projects in the state will come up in Penna, Krishna, Godavari and Brahmani river basins. Because of pollution from these plants for millions of people who depend on these rivers for drinking water as well as for irrigation of crops life will become unbearable.

### Lack of Transparency:

Transparency is the last word that we find in examining the new power plants coming up in the state. GOs issued by the state government departments giving clearances to different power projects are not easily available. These GOs are expected to be available

on the GoAP's website. But only a few GOs are available on this website. One has to take recourse to RTI to get access to these GOs. The present researcher's experience showed that even RTI is not of much help in accessing relevant GOs.

### Absence of stakeholders' participation:

All stakeholders' involvement in formulating power generation capacity addition and implementation is to a large extent does not exist. Public hearings on environmental clearances are the only occasion where there is some scope for local communities' and general public's participation. These public hearings have become a farce. Information related to these projects is not made available proactively to the public. Many obstacles were placed in the participation of people in these proceedings. Water from irrigation canals was also allocated to the power plants without the knowledge of the local farmers who depend on water from these canals.

The State Pollution Control Board (SPCB) in association with the local revenue authorities holds public hearings on EIA. Local communities' inputs are not factored in while examining pros and cons of particular power plant. Even when local communities as in the case of Nagarjuna Construction Company's (NCC) thermal power plant at Sompeta in Srikakulam district opposed the power plant location in that area the SPCB went ahead gave it green signal. In the case of East Coast Energy's power plant at Kakarapally in the same district the land was leveled and soil from other area was transported to cover the wetlands, before the visit of the expert committee. The local communities became aware of the impact of this power plant only after first rains following the leveling of the land. Most of the agriculture land and other community lands meant for pastures were submerged. When people protested they were answered with bullets. In the case of Alfa Infra Company's coal based thermal power plant at Komarada in the neighboring district of Vizianagaram it is going to impact a minor irrigation project meant for tribal communities. Local communities and political parties opposed this plant. Even then there is no sign of rethinking on location of this plant at this place. The state government's APGENCO also did not consult the local communities while deciding to set up a thermal power plant at Vodarevu in Prakasam district. If it comes up it will adversely impact the newly constructed irrigation project at Gundlakamma. Local farmers approached the High Court and obtained a stay on land acquisition for this project.

Some of the private companies which have obtained water and coal allocations and secured necessary land may not even lay the foundation stone. As they have laid their hands on critical resources like land, fuel and water they would try to profit by trading these resources. In reality it is a real estate business for them and setting up a power plant is just a pretext to corner valuable resources.

### **Finance**

As the state government nearly abdicated responsibility towards new power generation capacity addition the question of finances for its administration may not arise. Under the proposed capacity addition state governments agency APGENCO is also planning to set up new power plants. Under the existing CEA norms 30 percent of the funds needed for setting up new plants have to come from equity and the remaining 70 percent from debt funds obtained from financial institutions. In the case of GENCO the GoAP is expected to infuse funds towards equity. But for the last few years the GoAP was not allocating any funds to GENCO. Following this it is taking up new projects completely based on debt. Power Finance Corporation is an important source of funding for GENCO. Recently the GoAP announced that it would provide about Rs. 4,000 crore to GENCO for setting up new power plants. But there are doubts about this fund allocation taking place.

The private developers are also setting up power plants with debt based funding from financial institutions. Already these financial agencies have huge exposure to the power generation sector. These financial agencies will be in trouble if these developers fail to repay following inability of distribution companies to pay for the power purchased from private power producers. Already companies like Lanco have substantial receivables pending from distribution companies in other states like Tamil Nadu, if not from AP.

## **Monitoring**

The State Pollution Control Board (SPCB) is responsible to see that the power plants follow environmental norms scrupulously. But its record in monitoring the industrial units including power plants is not inspiring. In the case of thermal power plant proposed to be located at Sompeta in an environmentally sensitive wetland the green tribunal has entered the scene and stayed the environmental clearance issued and ordered a fresh public hearing. Only when there were incidents like Sompeta and Kakarapally there were some attempts to reexamine the permissions issued earlier. There is no pro-active effort on the part of SPCB to examine environmental threat posed by the proposed power plants in the state. In Nellore district 24 coal based power plants with aggregate capacity of 23,654 MW are going to come up within a radius of about 25 kilo meters. Environmental impact of each plant is being assessed separately. There was no attempt to examine cumulative impact of all these power plants put together. This itself shows inadequacy of SPCB in exploring environmental threats posed by these coal based thermal power plants. Even when there are complaints on violation of pollution norms there was little that the SPCB did. It does not have personnel or financial muscle to take pro-active action.

APERC as regulator of the power sector has to monitor procurement of power. But recent experiences with its regulation of power procurement raise doubts about its capacity, consistency and reliability. Draft PPAs related to new units of APGENCO are pending before the Commission for the last three years. Already six of these units started power generation. According to the existing regulations first the Commission has to approve PPA of a power plant. Based on this approval financial closure will be achieved and erection of the plant starts followed by declaration of commercial operation and date and actual supply of power. In the case of new units of GENCO through these plants

started power generation the Commission is yet to examine these PPAs. On the other hand there is also an instance where it went out of its way to approve power purchases. The Commission issued an order on 31 March, 2009 determining the price for purchase of wind energy. It decided the rate as Rs. 3.50 per unit. The Wind Energy Association filed a review petition on 31 January, 2012 requesting the Commission to review the above order and increase wind energy purchase price. According to the Commission's Regulations on Conduct of Business a review petition has to be filed within 90 days of issue of the concerned order. But in the present case review petition was filed well beyond this time period. The Commission not only admitted the petition but also approved to increase the wind energy price to Rs. 4.70 per unit. Such of these instances raise doubts about reliability of APERC to regulate power sector in an efficient, economical and transparent manner.

The way the power plants are mushrooming in different parts of AP gives an impression that transparent, accountable and participatory governance is the last thing on the minds of the people invested with powers to look after health of the sector and the state. The developers in rush to make as much money as soon as possible, disregarding environmental implications of their drive. The nightmarish conditions in and around places like Korba, Singrauli and Angul have not woken up policy makers and political leaders to environmental conditions that will envelop places like Nellore.

## Chapter 7

# PATH AHEAD

We cannot imagine modern human society without electricity. But, how much electricity consumption will make us part of modern social life? How much electricity needs to be consumed to meet our minimum needs and to lead dignified life in modern society? It may not be possible to arrive at an answer agreeable to all. In the background of changes taking place in atmosphere worldwide and the debates that are taking place on global warming we need to arrive at an answer to the question: how much electricity do we need? at the earliest.

Besides the household needs like lighting every one depends on other sectors like agriculture, commerce and industry to meet his or her needs. Electricity is also consumed in these sectors. While bringing electricity within reach of every household plans and programmes shall be prepared such that every one consumes as less electricity as possible, and such that higher human development is achieved with lower level of electricity consumption at the economy level.

There are three ways to meet our electricity needs: centralised, large scale power plants based on coal and other fuels; decentralized, renewable energy sources based power plants; and energy conservation and improving efficiency in electricity consumption. Renewable energy sources and energy efficiency programmes alone cannot meet our electricity needs. We need to depend on centralized and large scale power plants to some extent. By promoting renewable energy sources and energy conservation our dependence on centralized, large scale power plants can be brought down. We shall try to meet our electricity needs by using available resources through integrated resource planning. While setting up new power plants care shall be taken to see that its adverse social and environmental impacts are minimized.

The plans and programmes to meet future electricity requirements need to be given shape in transparent, participatory and accountable manner. Also these plans and programmes need to be sustainable and environment friendly in the long run. The above examination of the proposed power generation capacity addition in AP shows that all these attributes are lacking in setting up new power plants.

Mouthing of platitudes for low carbon policies by the policy makers and administrators appears to be a mere lip service to this cause. There is no real action on the ground. Even the references to low carbon policies are mostly limited to renewable energy units. Different segments of renewable energy like biomass, mini hydel, wind and solar energy appears to be in the grip of politicians. Overall developments in the power sector are going against low carbon policies. There is need for determined and effective intervention by the civil society to infuse urgency towards low carbon policies in the power sector as a whole.

## REFERENCES

Joy, K J; Suhas Paranjpe and Anant Phadke (2009) “An Alternative Energy Plan for the Konkan”, *Economic and Political Weekly* Vol. 44, No.19

Kasturi, Kannan (2011) “New Thermal Power Clusters”, *Economic and Political Weekly* Vol. 46, No.40

Prayas Energy Group (2011) *Thermal Power Plants on the Anvil: Implications and need for rationalization* Discussion Paper, Pune.

Sarma, E A S (2010) “The Saga of Sompeta: Public Deception, Private Gains”, *Economic and Political Weekly* Vol. 45, No.33

Sarma, E A S (2011) “Kakarapalli: Another Blot on India’s Democratic Systems”, *Economic and Political Weekly* Vol. 46, No.11

Sharma, Sankar (2012) *Integrated Power Policy: A framework for people-centric, environment-friendly and sustainable power policy* India

## Annexure - 1

### List of Power Generating Stations Proposed in AP

Sl. No.	Name of the Developer	Fuel	Capacity (MW)	Location
1	East Coast Energy Pvt Ltd	Coal	2640	Kakrapalli village, Santhabommali mandal, Srikakulam district
2	NCC Power Projects Ltd	Coal	2640	Sompeta mandal, Srikakulam district
3	Meghavaram	Coal	500	Srikakulam district
4	Nuclear Power Corporation of India Ltd	Uranium	2000	Kovvada, Srikakulam district
5	GENCO/Srikakulam TPS (JV)	Coal	(4X600MW) 2400	Srikakulam
6	Suryachakra Thermal Energy (Andhra) Pvt Ltd	Coal	80	Jharupudi Village, Kanchili mandal, Srikakulam District
7	Suryachakra Thermal Energy (Andhra) Pvt Ltd	Coal	1050	Jharupudi Village, Kanchili mandal, Srikakulam District
8	Alfa Infracorp Pvt Ltd	Coal	2640	Komarada village, Parvathipuram mandal, Vizianagaram district
9	NCS Sugars	Coal	240	Lachchayapeta (V), Sitanagaram (M), Vizianagaram Dist
10	Sri Maa Mahamaya Power Limited	Coal	98	Srirampuram (V), L. Kota (M), Vizianagaram District
11	Steel Exchange India Limited	Coal	60	Malliveedu & Sreerampuram (Villages), L.Kota (M), Vizianagaram District
12	Facor alloys Ltd.	Coal	45 Captive	Chinthapallipeta, Shreeramnagar, Garividi mandal, Vizianagaram District
13	Namratha Bijli Power Pvt. Ltd	Coal	150	Munipadu village, Visakhapatnam district
14	NTPC	Coal	4000 (AP's share 2000 MW)	Pudimadaka village, Achyuthapuram mandal, Visakhapatnam district
15	Hinduja Power Project	Coal	1000	Visakhapatnam

16	The Chodavaram Co-Op Sugars Ltd	Co-gen.	22	Govada (V), Chodavaram (M), Visakhapatnam District
17	Reliance Infra.	Gas	1200	East Godavari
18	GMR Energy Ltd	Coal	1320	Kakinada. East Godavary district
19	GMR Barge mounted power plant	Natural gas	220	Kakinada, East Godavary district
20	Konaseema gas power – Stage II	Natural gas	820	Ravulapalem, East Godavary district
21	GMR Energy Ltd	Natural gas	800	Vemagiri, East Godavary district
22	Spectrum Power Generation Ltd	Natural gas	1200	Uppada, East Godavary district
23	Gautami Power Pvt Ltd	Natural gas	800	Peddapuram, East Godavary district
24	KVK (RJY) Pvt Ltd	Natural gas	120	Rajahmundry, East Godavary
25	Vasavi Power Services Pvt. Ltd	Natural gas	420	Kondaguntur village, Jegurupadu mandal, East Godavary district
26	Vijayaditya Power Projects	Natural gas	27	Ramachandrapuram, East Godavary district
27	RVK Energy	Gas	486	East Godavary district
28	Greenco Godavary Power Projects	Gas	240	East Godavary district
29	Nagarjuna Fertilizers and Chemicals Ltd.	Natural Gas	55	Kakinada, East Godavari District
30	Venkatarama Power Pvt. Ltd.	Gas	4	Kesavadasupalem (V), Sakinetipalli (M), East Godavari District
31	Panduranga Energy Systems Pvt.Ltd.	Gas	470	Chintavari Palem, Bikkavolu, East Godavari District
32	Silk Road Power Projects	Gas	30	Kakinada, East Godavary district
33	Bright Light Energy Ventures (P) Ltd.	Gas	440	Balabhadrapuram (V), Bikkavolu (M), East Godavari District
34	Sirius Overseas Pvt. Ltd.	Co-Generation	9	Peddapuram (V), East Godavari District
35	Parry Infrastructure Co. Pvt. Ltd.	Co-gen	15	Vakalapudi (V), Kakinada Rural Mandal, East Godavari District
36	Yuvaraj Power Projects Ltd.	MSW	13	Vemagiri village, East Godavary district
37	Srinivasam Energy	Coal	1320	Pentakota village, Tuni

	Limited			mandal, East Godavary district
38	RVR Power Projects	Natural gas	20	Palakollu, West Godavary district
39	APGPCL	Natural gas	700	Vijjeswaram, West Godavary district
40	Devee Power Corporation Ltd.	Gas	440	Chikkala (V), Chagallu (M), West Godavari District
41	Pedavegi Power Pvt.Ltd.	Gas	400	Pedda Vegi (V & M), West Godavari District
42	The Andhra Sugars Ltd.	Coal	120	Saggonda (V), Gopalapuram (M), West Godavari District
43	Lalitha Aditya Power projects Pvt. Ltd.	Biomass	7.5	Musullakunta (V), Nallajerla (M), West Godavari District
44	GENCO/IGCC plant at Dr. Narla Tata Rao TPS(JV)	Coal	182	Krishna district
45	Lanco	Gas	366	Krishna district
46	Encore Power Projects Pvt Ltd	Gas	500	Krishna district
47	MRK Constructions Ltd	Gas	410	Krishna district
48	Keerthi Industries	Gas	820	Krishna district
49	Sriba Industries Ltd.	Gas	31	Chigurukota (V), Mudinepalli (M), Krishna dist.
50	Sravanthi Industries Pvt.Ltd.	Gas	480	Agiripalli (V), Agiripalli (Mandal), Krishna District
51	UMPP at Kothapeta	Coal	4000	Kothapeta, Prakasam district
52	APGENCO	Coal	4000	Vodarevu, Prakasam district
53	Simhapuri Energy Pvt Ltd	Coal	540	Chillakur mandal, Nellore district
54	Meenakshi Energy Pvt Ltd	Coal	600	Krishnapatnam, Nellore district
55	Krishnapatnam Power Corporation Ltd	Coal	1320	Krishnapatnam, Nellore district
56	Kineta Power Pvt Ltd	Coal	1980	Krishnapatnam, Nellore district
57	Thermal Powertech Pvt Ltd	Coal	1980	Krishnapatnam, Nellore district
58	UMPP, Krishnapatnam	Coal	4000	Krishnapatnam, Nellore district
59	APGENCO	Coal	1600	Krishnapatnam, Nellore district
60	SBQ Steels Ltd.	Coal	300	Chillakur mandal, Nellore district
61	VSF Projects	Coal	350	Ankulapathur village,

				Chillakur mandal, Nellore district
62	Vikas Power	Coal	540	Krishnapatnam, Nellore district
63	Meenakshi Energy Pvt Ltd, Phase II	Coal	300	Thamminapatnam village, Chillakur mandal, Nellore district
64	Nelcast Energy Corporation Ltd	Coal	1320	Muthukur mandal, Nellore district
65	Navayuga Krishnapatnam Power Corporation	Coal	1320	Chillakur mandal, Nellore district
66	Lanco	Coal	1000	Momidi village, Chillakur mandal, Nellore district
67	Leather Park	Coal	500	Krishnapatnam, Nellore district
68	Mahaveer	Coal	454	Chillakur mandal, Nellore district
69	Dr. Ramakrishna Rao	Coal	100	Chillakur mandal, Nellore district
70	Sivaswamy Construction Pvt Ltd	Coal	1200	Chillakur mandal, Nellore district
71	Mahaveer Energy Pvt Ltd	Coal	500	Chillakur mandal, Nellore district
72	Pradesa Power Pvt Ltd	Coal	2640	Chillakur mandal, Nellore district
73	Ramakrishna Prasad Power Ltd	Coal	420	Chillakur mandal, Nellore district
74	Sowmya Energy Pvt Ltd	Coal	100	Chillakur mandal, Nellore district
75	VSR Power Tech	Coal	530	Chillakur mandal, Nellore district
76	Nekkanti Power Pvt. Ltd.	Coal	60	Krishnapatnam Special Economic Zone, SPS Nellore District
77	Kadapa Nuclear Power Plant (JV)	Nuclear	(2X1000MW) 2000	Kadapa
78	APGENCO	Coal	600	RTPP, Muddanur, Kadapa district
79	Raghuram Cements Ltd.	Coal	70 Captive	Nallalingayapalle (V), Kamalapuram (M), Kadapa District
80	Suzlon Infrastructure Services Ltd.	Wind	500	Vajrakoduru, Kadapa district
81	Pinakini Power Projects Pvt. Ltd.	Biomass	6	Dommaranda Nandyala (V), Tadipatri Road, Mylavaram (M), Kadapa

				District
82	Enercon India Ltd.	Wind	80	Kondameedapally, Anantapur district
83	Lakshmi Tulasi Agro Pvt. Ltd	Coal	12	Aswaraopeta, Khammam district
84	Navabharat Energy India Ltd	Coal	300	Palvancha, Khammam district
85	Navabharat Energy India Ltd	Coal	300	Palvancha, Khammam district
86	APGENCO	Coal	600	Sattupalli, Khammam district
87	SLS Power Corporation	Mini Hydel	24	Dummugudem, Khammam district
88	Kakatiyacrystals Energy Ventures Pvt.Ltd.	Gas	400	Appalanarasimhapuram (V), Nelakondapally (M), Khammam District
89	Hema Sri Power Projects	MSW	12.6	Suryapet, Nalgonda district
90	Hema Sri Power Projects Ltd.	MSW	12.6	Vibhalapuram (V), Mothey (M), Nalgonda District
91	MY HOME Industries Ltd.	Coal	9 Captive	Mellacheruvu (V), Nalgonda District
92	Penna Cement Industries Ltd.	Coal	77 Captive	Ganeshpahad (V), Damaracharla (M), Nalgonda District
93	Theja Energy Ltd.	Coal	60	Mellachervu (V) and (M), Nalgonda District
94	The India Cements Ltd.	Coal	55 Captive	Wadapalli (V), Damaracherla (M), Nalgonda District
95	MECWEL Power Pvt. Ltd.	Coal	300	Vellaturu (V), Mellacheruvu (M), Nalgonda District
96	Srinivasam Energy Limited	Natural gas	300	Anantharam village, Bhongiri mandal, Nalgonda district
97	Kakatiyacrystals Power (India) Pvt. Ltd.	Gas	400	Nallabandagudem (V), Kodad (M), Nalgonda District
98	Kamineni Steel & Power India Pvt. Ltd.	Gas	220	Yellareddyguda (V) and Cheruvugattu (V) Narketpally (M), Nalgonda District
99	APGENCO	Hydel	120	Pulichintala, Nalgonda District
100	APGENCO	Hydel	50	Nagarjunasagar Tail Pond , Nalgonda District
101	Mata Energy Ltd.	Bio mass	8	Revuru (V), Mellacheruvu (M), Nalgonda District

102	APGENCO	Natural gas	2100	Karimnagar district
103	Shalivahana Projects Ltd.	MSW	10	Rebladevpalli (V), Sultanabad (M), Karimnagar District
104	The Singareni Collieries Company Ltd.	Coal	270	Jallipalle (V), Kamanpur (M), Karimnagar District
105	Kesoram Industries Ltd.	Coal	33.2 Captive	Basantnagar (V), Ramagundam (M), Karimnagar Dist
106	Shalivahana Power Corporation Ltd.	Coal	300	Achalapur (V), Tandoor (M), Adilabad District
107	VBC Ferro Alloys Ltd.	Coal	135	Bodepalli (V), Sirpur (M), Adilabad
108	Gomathi Energy (P) Ltd.	Coal	30	Madavelli (V), Dhaigam (M), Adilabad District
109	GENCO/Kakatiya Stage II	Coal	600	Bhupalapalli, Warangal
110	Suryavanshi Spinning Mills Ltd.	Coal	25	Kallam (V), Lingala Ghanpur (M), Warangal District
111	Lakshmi Balaji Power Pvt.Ltd.	Gas	495	Cherial (V), Sangareddy (M), Medak District
112	Shravana Power Projects Pvt. Ltd.	Biomass	6.0	Thakkalapally (V), Yacharam (M), Ranga Reddy District
113	XL Telecom & Energy Ltd.	HSD	12 captive	Fab City, SEZ, Ravirala (V), Maheshwaram (M), Ranga Reddy District
114	Krishnaveni Sugars	Bagasse	28	Kothakota, Mahabubnagar district
115	PSR Green Power Projects (Pvt), Ltd.	Biomass	7.5	Marikal (V), Danwada (M), Mahaboobnagar District
116	APGENCO	Hydel	240	Jurala, Mahaboobnagar District
117	Seshadri Power and Infrastructure Ltd.,	Coal	1320	Mhaboobnagar District
118	Bilasraika Sponge Iron India Pvt Ltd.	Coal	10 Captive	Gundlapotlapalli (V), Balanagar (M), Mahaboobnagar District