CLEAN DEVELOPMENT MECHANISM
SIMPLIFIED PROJECT DESIGN DOCUMENT
FOR SMALL-SCALE PROJECT ACTIVITIES (SSC-CDM-PDD)
Version 02

CONTENTS

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.

SECTION A. General description of the small-scale project activity

A.1. Title of the small-scale project activity

"Grid connected electricity generation from renewable sources" at Kadavukalle, Putluru, Anantpur by M/s Wescare (India) Ltd. (WIL).

Version 4 dated 20th June 2007

A.2. Description of the small-scale project activity:

The project activity initiated by the proponent i.e. Wescare (India) Ltd., includes development, design, engineering, procurement, finance, construction, operation and maintenance of wind energy based electric generating stations and supply electricity to the "regional electricity grid". The project activity involves generation, operation and maintenance of grid connected electricity generation facility at Kadavukalle in Andhra Pradesh with a total generation capacity of 13.5 MW.

The main objective of this project is to generate power from non-polluting mechanism thereby displacing the electricity from the grid that is mostly produced by carbon intensive fossil fuels. Ultimately the project activity aims at harnessing the renewable natural resources in the region, and country and thereby displacing non renewable natural resources thereby ultimately leading to sustainable, economic and environmental development.

The electricity generated from this wind farm is supplied to local substation through local transmission lines duly metered at developer's end. The project activity comprises supply, erection, commissioning & operation of 54 numbers wind electric generators each capacity 250 KW out of which 50 numbers are of Das Lagerway make and 4 numbers are of Pioneer Wincon make. The annual output of the wind farm in the year 2004-05 is 22.68 million units. The generated electricity is being supplied to state electricity board of Andhra Pradesh.

The power generated in the wind farm is wheeled through APTRANSCO (Andhra Pradesh Transmission Company) to the grid from where all consumers viz., India Cements Limited, Asian Paints Limited, Dr.Reddy's Lab, Super Spinning Mills etc., draw power. The total power consumed is billed to the client and credit is given for the number of units consumed from the wind farm.

Wescare (India) Ltd. identifies the consumer and enters into an agreement with them for supply of power. The same is intimated to APTRANSCO. As regards additional generation, the same is banked with APTRANSCO. As and when a consumer is identified, credit is given from the banked units.

The details of the project proponents of the project are presented below:

Owner	*Total capacity of wind turbines*	*No. of wind turbines*	*Capacity of each turbine*	*Power generated (MU*)*	*Date of commissioning*
Wescare	2 MW	8	250 kW	18.08	31.3.2000
RCI	11.50MW	46	250 kW	99.87	18.3.2000

* From April 2000 to September 2005.

RCI is a subsidiary of Wescare (India) Ltd. and Wescare (India) Ltd. is the project proponent for the CDM project activity.

The project activity meets several sustainable development objectives including:

- Contribution towards achieving the objective of the policy on wind power generation of Government of India and Government of Andhra Pradesh, which is to promote generation of energy through non-conventional sources to supplement the ever-increasing demand of the state.
- Contribution towards meeting the electricity supply deficit in Andhra Pradesh.
- Reduction in GHG (Green House Gases) emission (CH_4 and CO_2) through development of renewable technology and that of other air pollutants occurring from fossil fuel extraction, processing, transportation and burning.
- Rural and Infrastructure development in the areas around the Project.
- Reducing the average emission intensity (SOx, NOx, PM etc,) average effluent intensity and average solid waste intensity in the system.
- Conserving natural resource including land, forest, water and the ecosystem.
- Reduction in the consumption of fossil fuels in the grid for generating additional electricity equivalent to that generated by the wind turbines.
- Help in economic and social development of remote villages in Andhra Pradesh by making investment in that area.
- Encouragement to other entrepreneurs irrespective of sector to adopt this technology and invest in wind energy.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) Project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Government of India	Wescare (India) Ltd., Chennai	No (Host party)

- Many other entities from Annex I countries may join as project participants. The list of such participants will be provided before the project is submitted for registration.

A.4. Technical description of the small-scale project activity:

- The project activity initiated by the proponent i.e. Wescare (India) Limited includes development, design, engineering, procurement, finance, construction, operation and maintenance of wind energy based electric generating stations (Wind turbines) and supply electricity to the "regional electricity grid". The project activity involves generation, operation and maintenance of grid connected electricity generation facility at Kadavukalle in Andhra Pradesh with a total generation capacity of 13.5 MW.
- The wind turbines were supplied by Das Lagerwey wind turbines Limited (DLWL) (a joint venture between Devices and Systems of India and Lagerwey BV of Holland)
- This project comprises of 50 Nos. DLWL make wind turbines with model LW 30/250, which means 30 M rotor diameter and 250 KW capacity. The wind turbines have 2 nos. blades with rotor diameter of 30 meters and swept area of 707 sq m. The rated wind speed was 15 m/s with cut in and cut off speed ranging from 5 m/s to 25 m/s. The rotor system is connected through an integrated 3-stage (1 planetary and 2 helical) gear-box to the generator of rated output 250 kW. These machines are then connected to a 440/33000 V, 3 phase transformers to the 33KV feeders supplying power to the near by substations.

- The project has 4 nos. Pioneer Wincon make wind turbines with model no. 250/29, which are three- bladed, stall regulated wind turbines of 250 kW capacity. The Turbine has 3 rotor blades of diameter 29 M, having swept area of 684 sqm. The rated wind speed is 15 m/s with cut in and cut off speed ranging from 5 m/s to 25 m/s. The rotor system is connected through an integrated 3-stage (1 planetary and 2 helical) gear-box to the generator of rated output 250 kW.
- All these wind turbines are connected to a 440 / 33000 V, 3-phase transformers to the 33 KV feeders supplying power to the near by substations. The 33 KV feeders are connected to the Komatikuntla substation, which is around 2 kms from the wind farm. In these substations the feeders are connected to 33/132 KV transformer which supplies power to the nearest state grid substation at Tadipatri.
- Of the total 54 wind turbines, 50 nos. are of DLWL make (Das Lagerwey Wind Turbines Limited) and 4 nos. of PWL make (Pioneer Wincon Limited).

A.4.1. Location of the small-scale project activity:

Furnished below

A.4.1.1. Host Party(ies):

Government of India (GOI)

A.4.1.2. Region/State/Province etc.:

Southern region, Andhra Pradesh

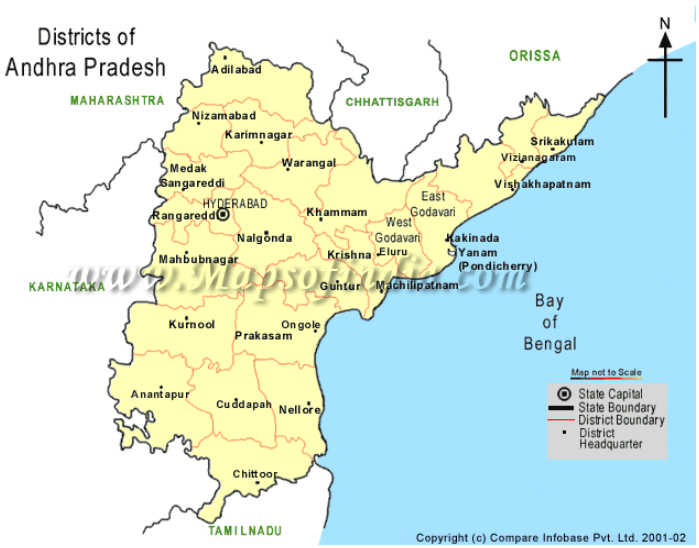
A.4.1.3. City/Town/Community etc:

Kadavukalle Village, Putluru Mandal , Anantpur District

A.4.1.4. Detail of physical location, including information allowing the unique identification of this small-scale project activity(ies):

The project activity is located in the village Kadavukalle, Putluru Mandal, Anantpur district in the state of Andhra Pradesh in India. The Latitude is 14 deg. (North) & Longitude 78 deg. (East) The nearest railway station is Tadipatri. The relevant physical map is furnished below.

Physical map of Location



MAP OF ANANTPUR DISTRICT

A.4.2. Type and category(ies) and technology of the small-scale project activity:

The project comes under Type I – Renewable Energy Project and Category I.D. - Renewable Electricity generation for a grid as per Appendix B of the simplified modalities and procedures for small-scale CDM project activities and guidelines for completing CDM-SSC-PDD and F-CDM-SSC-subm.

A.4.3. Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas (GHG) by sources are to be reduced by the proposed small-scale project activity, including why the emission reductions would not occur in the absence of the proposed small-scale project activity, taking into account national and/or sectoral policies and circumstances:

Andhra Pradesh has an energy demand of 6500 MW. Its Electricity Board's own generation capacity is not adequate to supply the demand. Any additional power requirements are met by either purchasing power or setting up of new electricity generating units. AP is a part of the southern regional grid of the country which is connected to four other states namely Tamil Nadu, Kerala, Karnataka and Pondicherry. As is true for the rest of India, for the southern regional grid too, the electricity sector relies overwhelmingly on thermal-based power generation (coal and gas), and has under-developed renewable energy sources such as wind (constitutes less than 1% of the regional grid power at present). As a result, the region's power grid is a major source of anthropogenic GHGs. In the recent past, the capacity additions in the region have primarily been through the addition of thermal power plants (more than half of which is coal and rest is a combination of gas and diesel).

This CDM project will displace equivalent unit of electricity generated by thermal and other power plants connected to the grid**.** The CDM project activity, wind based project, represents a small capacity addition and hence will have a marginal effect on the operating generating units connected to the selected grid as well as on the capacity addition to the grid. It is demonstrated in Section B.3 that in the absence of the proposed CDM project activity, the electricity authority would have permitted new thermal /or other GHG intensive power generation options or / and continued with the existing ones, which would result in the emission of a greater amount of greenhouse gases (GHG) emissions for generating same quantum of power from the proposed project activity.

The project itself is a zero emission power project as it is based on wind, a renewable natural resource. However, there had been some fugitive emission (in the form of carbon dioxide emissions due to movement of vehicles) during the construction phase of the project, but such emission has been considered negligible when compared with the total savings earned by the project through out its lifetime and based on the scale of construction activities involved.

In absence of the project activity, in view of the substantial energy deficit situation in the state of Andhra Pradesh, the capacity / generation addition would have been the new or existing fossil fuel based generation stations connected to it.

On account of the project activity the power generated by the wind power projects shall result in avoidance of such "Business As Usual scenario" (GHG emission in the grid, which would have otherwise occurred, to generate the same power, in the absence of the project).

The generation of power with wind power is not a requirement as per the Indian regulatory requirement. Though there are several promotional policies for renewable energy generation in India and specifically in the state of Andhra Pradesh, the share of wind energy in the generation capacity in the state of Andhra Pradesh and investment into wind turbines is insignificant component of the investments into power sector.

A.4.3.1 Estimated amount of emission reductions over the chosen crediting period:

The estimated activity is expected to generate an average of 16.75 GWh of electricity during each year of the crediting period. As mentioned in section A.4.3 above, the southern grid has been selected for calculating baseline emissions. The emission rate of the selected baseline grid where the project activity will occur would displace fossil fuel based electricity generation to the extent of the electricity generated by this wind project. The total emitted emission reduction achieved during the 10 year crediting period aggregating to 167550 tons of CO_2.

CER Calculation:

Years	Annual Estimation of emission reduction in tonnes of CO2 e
April 2000 to March 2001	10539
April 2001 to March 2002	20170
April 2002 to March 2003	14611
April 2003 to March 2004	11943
April 2004 to March 2005	18381
April 2005 to March 2006	18381
April 2006 to March 2007	18381
April 2007 to March 2008	18381
April 2008 to March 2009	18381
April 2009 to March 2010	18381
Total Estimated Reduction (tonnes of CO2e)	**167550**
Total number of crediting years	10
Annual average over crediting period of estimated reductions (tonnes of CO2 e)	16755

A.4.4. Public funding of the small-scale project activity:

There is no Official Development Agency funding to be used for the project activity. The funding for the wind farm project has been in the following manner:

Lease Finance/Term loan from:	Number of WEGs	Amount (INR Crores)
Global Trust bank Limited (now taken over by Oriental Bank of Commerce)	20	24.60
Sundaram Finance Limited	12	13.20
Centurion Bank Limited	16	19.2
India Cements Capital Finance Ltd	4	4.80
Lakshmi General Finance Co Ltd	2	2.20
TOTAL	**54**	**64.00**

The Lease finance availed from various companies / banks includes an amount varying from 30% - 40% of the cost of the wind turbines being financed, placed as a deposit with the financing institution which amounts to promoters contribution.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a larger project activity:

As mentioned under *Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM project Activities,* the following results into debundling of large CDM project:

"A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- *With the same project participants;*
- *In the same project category and technology / measure; and*
- *Registered within the previous 2 years; and*
- *Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point"*

For the proposed project activity the project participants have not have gone for additional registration for any similar project within the previous 2 years whose project boundary is within 1 km of the project boundary of the proposed activity. Thus it is confirmed that the small scale project activity is not a debundled component of a larger project activity.

SECTION B. Application of a baseline methodology:

B.1. Title and reference of the approved baseline methodology applied to the small-scale project activity:

The Project has applied approved methodology available for small-scale CDM project at UNFCCC website under Appendix B of the simplified modalities and procedures for small-scale CDM project activities.
Methodology type I.D: Title – "Grid connected renewable electricity generation"

Version 10 dated 23 December 2006

B.2. Project category applicable to the small-scale project activity:

Applicability Criteria	Project Conditions
This category comprises renewable energy generation units, such as photo voltaic hydro, tidal / wave, wind, geothermal and biomass, that supply electricity to an electricity distribution system that is or would have been supplied by at least one fossil fuel or non-renewable biomass fired generating unit	The project is a wind mill project hence applicable for this category
If the unit added has both renewable and non-renewable components (e.g. awind/diesel unit), the eligibility limit of 15 MW for a small scale CDM project activity applies only	There is neither non-renewable component added, nor co-firing is required for the proposed project

to the renewable component. If the unit added co-fires fossile fuel, the capacity of the entire unit shall not exceed the limit of 15MW	activity. The renewable project capacity is 13.5 MW, which is lower than the limit of 15 MW.
Biomass combined heat and power systems that supply electricity to and/or displace electricity from a grid are included in this category. To qualify under this category, the sum of all forms of energy output shall not exceed 45 $MW_{thermal}$ .e.g. for a biomass based co-generating system the rating for all the boilers combined shall not exceed 45$MW_{thermal}$	Not applicable
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct[1] from the existing units.	Not applicable
Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To quality as a small scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	Not applicable

The above comparison confirms that the chosen methodology is applicable for this project activity.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

- In the absence of the project activity, the GHG emissions to generate and supply the same amount of power would be:
- baseline expressed in Tons of CO2 x Quantum of power generated and supplied to the grid by the project activity; and
- whereas, in the case the project activity operates, the GHG emissions to generate the same amount of power will be ZERO.

Additionality Check:

Additionality of the project activity is analyzed in the following section as per barriers outlined in attachment A of Appendix B.

Wescare (India) Ltd. had gained awareness regarding the clean development mechanism in 1999-2000 through various seminars and conferences and published literature. The Wescare (India) Ltd. management had taken a decision to go ahead with the project, after duly considering CDM benefits under the Kyoto Protocol. There is documentary evidence to such decision that could be verified by the validator.

Alternatives to the project activity include the following:

- Same amount of power would be generated through a higher GHG intensive fuel like coal for power generation by the other grid connected power plants, in keeping with the existing /

prevalent trend and prevailing practice in the southern region and especially in the State of Andhra Pradesh.
- Generation of electricity using wind as a renewable source of energy for power generation, without CDM revenue

From the legislations point of view the project highlights include:
- Electricity generation from wind farm is not a legal requirement or a mandatory choice.
- There are, state and sectoral policies, primarily framed to encourage wind based power project to attract more private investment as there are many anticipated risks under the project and requires good amount of investment to be involved.
- The Indian Electricity Act of 2003 does not restrict or empower any authority to restrict the fuel choice for power generation. In addition, it may be noted that the draft National Electricity Policy (revised in August 2004) asserts 'coal would necessarily continue to remain the major fuel'.
- The applicable environmental regulations do not restrict the use of wind energy for power generation. There is no legal requirement on the choice of a particular technology for power generation.

Thus it is clear that none of the alternatives that the project proponent had, in order to meets its power requirements are restricted by the environment regulations, nor do they oppose any legal requirement enforced. Thus the project activity is not the only baseline line scenario existing for the project proponent

The project activity faces the following barriers that would have prevented its implementation, but do not prevent implementation of the identified alternative to the project.

Technological Barriers**:**

With a view to sustain their desire of power generation using renewable resource in order to mitigate the emission while meeting their power requirement, the project proponent had to upgrade the skill set of their existing man power for the maintenance and operation of these wind farms.

The project proponent was well educated of the fact that, occurrence of a fire accident, at the level of the windmills, can result in complete destruction of the control circuit.

The fire may be caused due to occurrence of thunderstorm cum lightening strokes, which is a frequent phenomenon during the rainy season in this region.

Also it is known fact that the lightning arrestors fail during thunderstorm cum lightening due to the fact that sometimes the response time of the arrestor cannot match the speed (time and amplitude) at which lightning strikes. Additionally, accumulation of water particulate on lightning arrestor provides a parallel path in case of lightning through its surface, which may result in the bursting of the arrestor beside breakdown of insulation. Therefore, very purpose of the lightning arrestor is defeated.

In the event of fire, the destruction of the control circuit can lead to stoppage of communication between the control system and the nacelle controller. This will lead to freewheeling / runaway of the turbine and it will be dangerous to stop the turbine which will be rotating at speeds exceeding the speed for which it is designed. This in turn will lead to fatigue and eventually the tower may collapse. Such an event may result in complete loss of investment.

The proponent still decided to go ahead with the investment considering the CDM benefits. This risk which caused concern to the proponent prompted them to take certain additional precautions such as going in for the installation of smoke detectors in the control panel of each WEG as a risk mitigation measure. The smoke detector senses the smoke before the onset of fire and sends communication to the control system to stop the turbine. This will minimize the risk though the risk cannot be eliminated.

Investment Barriers:

The optimum generation of power depends upon the **average available wind** in a year. The occasion of this average wind being available is uncertain. The slightest change in the wind direction, which may lower the availability of the average wind, can change the power output pattern. There is no mechanism, which can guarantee the required average wind, as well as speed that is required for a consistent availability of average wind. Also the extent to which the topology of the region affects the speed of the wind makes any kind of investments in wind farm very vulnerable.

The risks associated with the uncertainty caused by the natural forces on power generation can be minimised only by going for larger wind farms. Larger wind farms would mean subjecting oneself further to increased Power Purchase Agreement (PPA) risks.

There is uncertainty of State Government policies on power purchase, wheeling charges and also delay in realization of revenue.

There was no dedicated substation for wind farms in the region. This wind farm had to be connected to the existing substation through a rural feeder located 14 kms from the site. Frequent grid failures are common in rural feeders increasing the risk of generation and component failures.

Financial Returns:

The financial returns from wind energy are low. Even if one was to factor in the special prices announced by APTRANSCO for wind energy, the returns are low. The IRR calculated for this project was low at 4.9% (pre tax) at a conservative generation of 16 lac units per MW. CDM revenue helped to improve the IRR to 7.1% (pre tax) and was the deciding factor. Wind power projects provide lower IRR as these projects entail high project cost and low PLF. The IRR calculations are enclosed as Annex. 5.

State Governments have different policies for renewable power producers. The fact is that the wind farm developers are dependent on Government policy for tariff and transmission, which **are subject to risk of change of policy**. The perceived risk turned real when in Andhra Pradesh the wind farm owners faced a difficult situation due to change in State Government policy. Many wind farms were put up since year 2000 based on third party sale and power wheeling through electricity grid, which is owned by the Government. The wheeling charge was 2 % of the total power wheeled. In April 2002, the Government abruptly increased the wheeling charges to 28.4 %, which has changed the economics of these projects entirely. The wind farms put up before 2002 have got a stay order against this notice but the risk remains.

Barriers due to prevailing practice:

If we look at the grid penetration of wind power projects in the southern states, it is evident that Tamil Nadu is by far the leader having achieved about 23% penetration (Data Source: Government of

Tamilnadu, Energy Department Policy Note 2006-07). However, penetration level of wind farms in Andhra Pradesh is less than 1% as of 31.3.05, clearly indicating that it is not a common practice.

As of 2006, only 5.73 % of the identified technical potential has been set up as against 135 % in neighbouring Tamilnadu. This is inspite of the fact that Andhra Pradesh has the highest gross potential of 9063 MW which is almost 20 % of the gross potential for India (46,492 MW). Statistics reveal that growth in Wind Power installations in Andhra Pradesh has been way below other states like Tamilnadu, Maharashtra. The additional installations in Andhra pradesh have been about 10 MW in the 4 year period 2000 – 2004 as compared to 328 MW in Maharashtra and 590 MW in Tamilnadu during the same period. (Source: Green Energy – Volume 2, No.4, July-Aug 2006).

From all the above it can be concluded that it is the existence of various barriers that has resulted in Andhra Pradesh lagging way below other states in India

The choice of the location of the wind farms is driven by the meteorological condition. Evacuation of power from the wind farm site to the nearest grid substation also was a major problem for setting up this project. Installation of system for transmitting power from the wind farm site to grid substation required a significant investment, which was not viable for this type of small scale project.

The Project Start date was 3rd January 2000 when the Board of Directors of the Project Proponent duly approved the investment after considering the benefits under CDM. The commissioning of the Wind farms by connecting to the Grid was completed on 31st March 2000.

The proposed activity thus satisfies the additionality conditions and qualifies as a CDM project.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the small-scale project activity:

The project boundary encompasses the physical, geographical site of the windmills at Tadipatri.

B.5. Details of the baseline and its development:

The baseline for this project is the net electricity supplied to the customer by the windmills multiplied by the emission coefficient of the Southern region Electricity grid.

The baseline methodology has followed the one specified under Project category I.D in Appendix B of the simplified M&P for small scale CDM project activities.

As per the latest guidelines in I.D to estimate the baseline emissions, the emission factor is calculated as per the procedures laid in paragraph 9 (a) & (b). As this methodology suggested to adopt the procedures laid in ACM0002, the same has been considered for calculations. The baseline emission and the emission reductions from project activity are estimated based on the quantum of electricity to be exported by the project activity to the grid and the **Baseline Emission Factor (BEF)** of the southern regional grid calculated as a **combined margin (CM)**, consisting of the combination of **operating margin (OM)** and **built margin (BM) factors.** The project proponent wishes to use the BEF calculated Ex-ante, and has fixed the same for the entire crediting period.

Choice of grid:
The southern grid has been selected for the following reasons:

Project boundary is a notional boundary within which the baseline emissions would be estimated based on the impact of the CDM project. Emissions from all the sources of GHG emissions that are significant need to be taken in account while estimating the baseline. In case of a baseline for renewable energy projects generating power and feeding it to the grid, the system boundary could be:

a. the state boundary in which the project is being implemented
b. the regional boundary having common grid to which the project is supplying the power or
c. the combination of regional grids (national boundary).

In case of India, power is a concurrent subject between the state and the central governments. The perspective planning, monitoring of implementation of power projects is the responsibility of Ministry of Power, Government of India. At the state level the state utilities or state electricity boards (SEBs) are responsible for supply, transmission, and distribution of power. Many of the state utilities are engaged in power generation also. In addition to this there are different central / public sector organizations involved in generation like National Thermal Power Corporation (NTPC), National Hydro Power Corporation (NHPC), etc. in transmission e.g. Power Grid Corporation of India Ltd. (PGCIL) and in financing e.g. Power Finance Corporation Ltd. (PFC). There are five regional grids: Northern, Western, Southern, Eastern and North-Eastern.

The management of generation and supply of power within the regional grid is undertaken by the load dispatch centres (LDC). Different states within the regional grids meet the demand from their own generation facilities plus generation by power plants owned by the central sector i.e. NTPC and NHPC etc. Specific quota is allocated to different states from the central sector power plants. Depending on the demand and generation there are exports and imports of power within different states in the regional grid. Thus there is trading of power between states in the grid. Similarly there are imports and export of power between regional grids.
A grid boundary is defined either by any physical restriction in power flow or any administrative authority controlling the imports and exports across the boundary. The project activity is in the state of Andhra Pradesh which is a part of the southern grid of India. There is no physical restriction of Andhra Pradesh grid to be connected to the Southern grid of India. Since the CDM project would be supplying power to the regional grid it is also preferred to take the regional grid as project boundary than the state boundary. It also minimizes the effect of inter state power transactions, which are dynamic and vary widely.

Hence, all the calculation for baseline has been done based on the southern regional grid and in the calculation, wherever estimations / approximations has to be made due to unavailability of data in public domain, conservative approach has been taken.

The most recent available data has been used for the baseline calculation.. The detailed data for baseline calculation has been furnished under Annexe - 3. The Calculation formula are presented in Section E

Southern Grid Power Generation

Source	MoU	OM (2002-03)	OM (2003-04)	OM (2004-05)
Year-wise OM	tCO2/ MWh	0.952	0.979	0.989
OM	tCO2/ MWh	0.973		
BM	tCO2/ MWh	0.647		
Emission Factor-CM	tCO2/ MWh	**0.810**		

Date of completing the final draft of this baseline section *(DD/MM/YYYY)*: 20/10/2005
Name of person/entity determining the baseline: PricewaterhouseCoopers (P) Limited has assisted the project proponent in determining the application of baseline methodology for the identified CDM project.

Organization:	PricewaterhouseCoopers (P) Ltd.
Street/P.O.Box:	252 Veer Savarkar Marg, Shivaji Park,
Building:	3rd Floor, B Wing,
City:	Dadar West,Mumbai
State/Region:	Maharastra
Postcode/ZIP:	400 028
Country:	India
Telephone:	91 22 5669 1200 (Board)
FAX:	91 22 5654 7804/5
E-Mail:	ram.babu@in.pwc.com
URL:	www.pwc.com
Represented by:	
Title:	Dr.
Salutation:	Associate Director
Last Name:	Babu
Middle Name:	Ram
First Name:	P
Department:	Sustainable Business Solutions
Mobile:	98 201 35929
Direct FAX:	
Direct tel:	91 22 5669 1302
Personal E-Mail:	ram.babu@in.pwc.com

SECTION C. Duration of the project activity / Crediting period:

C.1. Duration of the small-scale project activity:

C.1.1. Starting date of the small-scale project activity:

3rd January 2000

C.1.2. Expected operational lifetime of the small-scale project activity:

20 years

C.2. Choice of crediting period and related information:

Fixed 10 years

C.2.1. Renewable crediting period:

Not applicable

C.2.1.1. Starting date of the first crediting period:

Not applicable

C.2.1.2. Length of the first crediting period:

Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

1st April 2000

C.2.2.2. Length:

10 years

SECTION D. Application of a monitoring methodology and plan:

D.1. Name and reference of approved monitoring methodology applied to the small-scale project activity:

Project has applied approved methodologies available for small-scale CDM project at UNFCCC website under Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Methodology type I.D: Title – "Renewable electricity generation for a grid"

Reference: Latest amended version 07 (28th November 2005) of Appendix B to the simplified M&P for small-scale CDM project activities.

D.2. Justification of the choice of the methodology and why it is applicable to the small-scale project activity:

Monitoring methodology is in accordance with the baseline methodology followed for this project activity Applicability of the baseline methodology is described in section B.1.

D.3 Data to be monitored:

Electricity generation from wind turbines is metered and recorded on a continuous basis. The total power (EG_y) supplied to the grid is the summation of the power generated from all the 54 nos. of wind turbines less the internal line losses and auxiliary consumption.

ID number	*Data variable*	*Data unit*	*Measured (m), calculated (c), estimated (e),*	*Recording Frequency*	*Proportion of data to be monitored*	*How long the data to be kept?*	*How will the data be archived? (electronic/ paper)*	*Comment*
1. EG_{GEN} (LCS)	Quantitative Total Electricity Generated (metered in individual wind mills)	MWh /yr	M	Continuously	100%	Crediting period +2 years after	Electronic	Metered at wi The meter is and maintaine Proponent. Tl reading is rec each turbine a Site-in-Charg responsible fo activity.
2. . EG_{GEN} (HTSC)	Quantitative Total Electricity Generated (metered in APTransco HTSC Meter)	MWh /yr	M	Continuously	100%	Crediting period +2 years after	Electronic	Metered at wi The meter is and maintaine APTransco ar monthly.
3. EG loss (Import)	Quantitative Total Electricity Imported	MWh /yr	m	Continuously	100%	Crediting period +2 years after	Electronic	Metered at wi The meter is and maintaine APTransco ar monthly.
	Quantitative	MWh	C	Continuously	100%	Crediting	Electronic	Calculated as

4. EGy	Net Electricity supplied to State grid	/yr				period +2 years after		difference bet parameters 2

D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures are undertaken:

ID Number	Data monitored	Uncertainty level of data (High/ Medium/ Low)	Are QA/QC procedures planned for these data?	Outline explanation why QA/QC procedu are not being planned
1,2,3,4	Electricity generation & supply	Low	Yes	The Monitoring plan is enclosed vide Annex data will be used for the calculation of proje generation.

D.5. Please describe briefly the operational and management structure that the project participant(s) will implement in order to monitor emission reductions and any leakage effects generated by the project activity:

The Project Proponents Wescare (India) limited are a leading wind energy infrastructure development and management company. They also have a MoU for operation and maintenance with their subsidiary RCI Power Limited for operation and maintenance of Wind Turbines of RCI Power.

Wescare has a well-trained, dedicated staff at the site to take care of the on-site operation and maintenance activities that include preventive maintenance, break down maintenance and predictive maintenance. Wescare focuses more on developing the local community in operations and maintenance employment. The performance of the WEGs in terms of power generation is being monitored daily to improve the efficiency of the WEGs and increase the power generation. **There is no expected unintended emission from this Project activity.**

Each Wind Turbine has a local control system (LCS) which records the generation from that Turbine. A number of such Wind Turbines are connected to the common metering point, known as HTSC (High Tension Service Connection), which has a digital meter certified and owned by APTRANSCO. This HTSC meter will record the total generation from all these Wind Turbines, which includes auxiliary consumption. The sum total of the LCS readings of the individual Wind Turbines will not be equal to the HTSC meter readings due to internal line loss in the range of 5 to 7%. Daily readings are recorded from LCS and HTSC by the Site in Charge. The monitoring plan is enclosed vide Annx.4.

The HTSC meter is officially inspected, and the reading is recorded and certified by the APTRANSCO Officials, each month on a prescribed date. Monthly Power generation readings so taken with representatives of APTRANSCO and Wescare (India) Limited is being made available to the Company and formally communicated to them. Thereafter, Wescare makes the billing in line with the units consumed on the basis of generation statement or the generation is banked. Wescare and RCI together monitor the project activity that ensures CO2 emission reductions. The project performance is monitored by Non-Conventional Energy Development of Andhra Pradesh Limited (NEDCAP) by monthly physical inspection. The report is sent by them to Ministry of Non-conventional Energy Sources (MNES) of Government of India so that they can use the data for articulating their non-conventional energy policies.

D.6. Name of person/entity determining the monitoring methodology:

PricewaterhouseCoopers (P) Limited has assisted the project proponent in determining the application of monitoring methodology for the identified CDM project.

SECTION E.: Estimation of GHG emissions by sources:

E.1. Formulae used:

Detailed below

E.1.1 Selected formulae as provided in appendix B:

Not applicable

E.1.2 Description of formulae when not provided in appendix B:

E.1.2.1 Describe the formulae used to estimate anthropogenic emissions by sources of GHGs due to the project activity within the project boundary:

There is no CO_2 emission from this wind mill project.

E.1.2.2 Describe the formulae used to estimate leakage due to the project activity, where required, for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities

Since the energy generating equipment is not transferred from another activity no leakage is envisaged, as per the applied methodology.

E.1.2.3 The sum of E.1.2.1 and E.1.2.2 represents the small-scale project activity emissions:

The sum of E.1.2.1 and E.1.2.2 is zero.

E.1.2.4 Describe the formulae used to estimate the anthropogenic emissions by sources of GHGs in the baseline using the baseline methodology for the applicable project category in appendix B of the simplified modalities and procedures for small-scale CDM project activities:

The baseline for this project is the net electricity supplied to the customer by the windmills multiplied by the emission coefficient of the Southern region Electricity grid.

The baseline methodology has followed the one specified under Project category I.D in Appendix B of the simplified M&P for small scale CDM project activities.

As per the latest guidelines in I.D to estimate the baseline emissions, the emission factor is calculated as per the procedures laid in paragraph 9 (a) & (b). As this methodology suggested to adopt the procedures laid in ACM0002, the same has been considered for calculations. The baseline emission and the emission reductions from project activity are estimated based on the quantum of electricity to be exported by the project activity to the grid and the **Baseline Emission Factor (BEF)** of the

southern regional grid calculated as a **combined margin (CM)**, consisting of the combination of **operating margin (OM)** and **built margin (BM) factors.** The project proponent wishes to use the BEF calculated Ex-ante, and has fixed the same for the entire crediting period.

The detailed calculation procedures are provided in Annex 3 in line with the procedures explained above and with necessary inputs from ACM0002

The baseline emission factor has been calculated based on the Combined Margin and is 0.810 tCO2/MWh. Due to unavailability of dispatch data analysis for grid, the Simple OM method was used because low-cost/must run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term normals for hydroelectricity production.

The Simple OM emission factors was calculated using data vintages for years(s) y: (ex-ante) the full generation-weighted average for the most recent 3 years for which data are available at the time of PDD submission. ,

All these calculations including those for the southern regional grid have been provided in Annex 3.

E.1.2.5 Difference between E.1.2.4 and E.1.2.3 represents the emission reductions due to the project activity during a given period:

Refer to the table in Section E.2

E.2 Table providing values obtained when applying formulae above:

S.No	Period	Net Generation (MWh)	Average carbon emission factor (tCO_2/MWh)	Baseline emission (tCO_2/year)	CER (tCO_2/year
1	April 00- March 01	13006.46	0.810	10539.10	10539
2	April 01- March 02	24891.55	0.810	20169.55	20170
3	April 02- March 03	18031.98	0.810	14611.26	14611
4	April 03- March 04	14738.87	0.810	11942.87	11943
5	April 04- March 05	22684.55	0.810	18381.22	18381
6	April 05- March 06	22684.55	0.810	18381.22	18381
7	April 06- March 07	22684.55	0.810	18381.22	18381
8	April 07- March 08	22684.55	0.810	18381.22	18381
9	April 08- March 09	22684.55	0.810	18381.22	18381
10	April 09- March 10	22684.55	0.810	18381.22	18381
			Total		**167550**

SECTION F.: Environmental impacts:

F.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

The host Party, i.e. Ministry of Environment and Forest, Government of India, does not require Environmental Impact Assessment EIA of wind mill projects. The management of the project proponents have proactively taken up an EIA study to understand the impact on the environment and react upon it. The executive summary of the EIA study is furnished below. The study showed no significant environmental impacts due to the project activity.

The project proponent also ensured that all necessary safety and environmental requirements of relevant Indian legislation were met for the facilities implemented.

Wescare (India) Limited is internationally known for its contribution towards green power. It has received the Prestigious Green Power Purple Heart Award at the 2001 Green Purple Leadership Award ceremony held on 30th July 2001 at Portland, USA from the US Department of Energy (Centre for Resource Solutions, US Environmental Protection Agency).

Executive Summary of EIA Study: IMPACT OF THE PROPOSED PROJECT

GENERAL:

An Environment Impact Assessment identifies, predicts, and intercepts the various aspects of Environmental Conditions as per the legislative norms, policies, programs and operational procedures for commissioning any new project. Pre-operational and post-operational conditions of the environment are studied. Hence sufficient attention has given on these aspects.

The study of Environmental Impact Assessment (EIA) covers existing baseline environmental conditions and the resulting environmental conditions after the commencement of the unit. For this purpose normally the study area is 10 km radius from the proposed unit. The study area covers rural, agriculture, urban and residential area. During survey air, water and soil samples were collected and analysed. Besides these, noise level, wind speed, wind direction, temperature, atmosphere pressure, relative humidity and rainfall were also recorded. The impacts may be favourable or adverse based on the manufacturing unit. To take survey and analysis of various parameters pollution control boards' standards were followed.

The proposed project site is located in a rocky area and the management has sufficient awareness about prevention and control of pollution occurring to its surrounding area. The study of the various parameters showed that the levels of these parameters would not widely affect the existing baseline environmental conditions. In present case, the limits of the various parameters of air, water and soil were within the prescribed limits of Pollution Control Board.

In the present case, there is no gaseous emission from windmill operation. As this is a rocky area, there is no source of water either bore or surface land even at a depth of up to 400 feet. However there is no water required for any process and water is only required for drinking / domestic purpose, for which water is procured from commercial sources. Hence water pollution does not arise.

Noise levels will slightly increase due to this operation but within the limits prescribed by PCB. Though, solid waste disposal and gaseous emissions are normally given priority to study environmental impact assessment of the any proposed project, the source of these two categories is nil in the wind mill operations.

AMBIENT AIR QUALITY:

The existing atmospheric air quality in the proposed project site and its surroundings are reasonably emission free and the values of the pollutants TSPM, RSPM, NOX, SO2 are within the limits prescribed by the pollution control board. The site is located at a height of 525 feet from ground level on a rocky area where the wind energy is high and pollution is negligible due to wind turbine operation.

IMPACT ON WATER QUALITY:

As the proposed unit is a rocky area there is no natural water source and the requirement of water for windmill operation is nil. For domestic purpose commercial water source is used, hence there is no trade effluent. The sewage generated from the domestic usage will be let into the septic tank and cleared by authorized bodies periodically.

IMPACT ON LAND:

As no wastewater will be generated from the operation because of non-usage of water for operations, the soil quality in the core zone will remain as such.

The quantity of solid wastes like cotton, cloth used for lubrication in the gearbox used for windmill operations, will be minimum and stored in a specified area. The waste is disposed as per pollution board norms. There is no other metal wastages arise from wind turbine operations.

The metal wastes arise from worn-out of bearings, bolt and nuts, and other activities during the period of installation, will be less and collected in a drum and sold out.

IMPACT ON NOISE:

The proposed wind turbine operation will not produce any abnormal noise pollution due to non usage of noise producing machineries and other equipments. The noise arises from transport of vehicles only and that is intermittent in nature and does not have any adverse effect on the surrounding environment. Any how, the wind turbine operators will be provided ear-muffs for special cases like maintenance work and other installation work.

IMPACT ON SOCIO-ECONOMIC STATUS:

Due to the proposed wind turbine operation, there will be direct employment opportunity to the persons of surrounding places and indirect employment opportunities by way of transportation and other services. This will help to improve the living standards of local community and additional facilities like communication, road facilities, drainage system etc. will be created.

The wind turbine operation could fulfil electrical needs of surrounding villages. As there is no wastewater generation, there will be no land or soil contamination in these areas.

IMPACT ON FLORA AND FAUNA:

There is no reserve forest area found in the proposed core zone and buffer zone. It is also found that the various parameters of soil qualities are within the limits of pollution control board norms. Hence the existing status of flora and fauna in the surrounding villages will not be affected due to this windmill operation.

IMPACT ON SAFETY AND HEALTH:

Well established and systematic safety measurements practices will be provided for safety and healthy working conditions. Proper guidelines will be given to employees for careful handling and storage of material within the project site.

Protective equipment for body, legs, arms, face and head will be provided for ensuring safety if necessary. Accident reviews and monitoring will be done regularly. No occupational health problem is expected. However periodic monitoring and check-up will be held regularly.

The final conclusion drawn in the report is as under:

The proposed windmill operations will not produce any hazardous gaseous emission or solid waste or waste water. There will not be any significant variation in the levels of pollutants in the existing environment after the commencement of the unit.

SECTION G. Stakeholders' comments

G.1. Brief description of how comments by local stakeholders have been invited and compiled:

A meeting was organized by the project proponent at the project site to get the comments and suggestions of the local stakeholders on their project activity. A public notice was given 15 days prior to the meeting and the meeting was conducted on 10th of November 2005.

Following people participated:

1. Mr.S.Pandian President	Wescare (India) Limited
2. Mr.Sureshkumar Site-in-charge	Wescare (India) Limited
3. Employees	Wescare (India) Limited
4. Mr.M.KodandaRama Murthy District Manager Ananthapur District	Non Conventional Energy Development Corporation of Andhra Pradesh Limited (NEDCAP ltd)
5. Mr.K.Pratap Reddy Field Officer, Wind Division	NEDCAP Ltd.
6. Mr.P.Veeraiah Asst. Field Officer	NEDCAP Ltd.
7. Mr.V.V.Krishna Reddy Assistant Engineer - Wind Division Tadipatri	Andhra Pradesh Central Power Distribution Company Limited
8. Mr.K.S.HariKumar Manager – Loans	Oriental Bank of Commerce

The venue of the meeting was:

RCI Power Limited Wind Farm Site
Kadavukalle Village, Putluru Mandal,
Anantpur District, Andhra Pradesh.

The proceedings of the meeting were as follows:

Mr. C. Suresh Kumar, site-in charge, invited the guests and thanked the company for having given the opportunity to host the Local Stakeholder Meeting on the CDM Initiative of the Company.

He requested Mr. S. Pandian, President, to Chair the Meeting and conduct the proceedings. Mr. S. Pandian invited Mr. A. Kodandarama Murthy, District Manager, NEDCAP Ltd and all other government officials present to take their seats on the podium. He invited all the employees and other local people in the meeting. Then with the permission of the officials presents, Mr. S. Pandian gave a brief explanation of the Kyoto Protocol, its objective and the phenomena of Global warming and the resulting depletion of the ozone layer, the role of UNFCCC and the CDM process, all in the local language so that it could be understood by one and all.

After the Preamble, Mr. S. Pandian made a power point presentation on the Company's CDM initiative and explained the concept sidewise.

After the presentation, he requested all present to voice their views and concerns.

The representatives from NEDCAP, Oriental Bank of Commerce and other people present in the meeting expressed their views, which are detailed in the minutes of the meeting furnished below.

The meeting concluded with Mr. S. Pandian thanking all those present at the meeting for their time and patient hearing.

G.2. Summary of the comments received:

The comments received from the local stakeholders were very positive and there were no issues or concerns raised. The Minutes of the stakeholder meeting is reproduced below.

MOM of the stakeholder meeting

Minutes of the Local Stakeholders Meeting on Clean Development Mechanism Initiative of Wescare (India) Limited

Date : 10/11/2005

Venue : RCI Power Limited Wind Farm Site
Kadavukalle Village, Putluru Mandal,
Anantpur District, Andhra Pradesh.

PARTICIPANTS

1. Mr.S.Pandian President	Wescare (India) Limited
2. Mr.Sureshkumar Site-in-charge	Wescare (India) Limited
3. Employees	Wescare (India) Limited
4. Mr.M.KodandaRama Murthy District Manager Ananthpur District	Non Conventional Energy Development Corporation of AndhraPradesh Limited (NEDCAP Ltd)
5. Mr.K.Pratap Reddy Field Officer, Wind Division	NEDCAP Ltd.
6. Mr.P.Veeraiah Asst. Field Officer	NEDCAP Ltd.
7. Mr.V.V.Krishna Reddy Assistant Engineer - Wind Division Tadipatri	AndhraPradesh Central Power Distribuion Company Limited
8. Mr.K.S.HariKumar Manager – Loans	Oriental Bank of Commerce

PROCEEDINGS

Mr. C. Suresh Kumar, site-in charge, invited the guests and thanked the company for having given the opportunity to host the Local Stakeholder Meeting on the CDM Initiative of the Company.

He requested Mr. S. Pandian, President, to Chair the Meeting and conduct the proceedings. Mr. S. Pandian invited Mr. A. Kodandarama Murthy, District Manager, NEDCAP Ltd and all other government officials present to take their seats on the podium. He invited all the employees and other local people in the meeting. Then with the permission of the officials presents, Mr. S. Pandian gave a brief explanation of the Kyoto Protocol, its objective and the phenomena of Global warming and the resulting depletion of the ozone layer, the role of UNFCCC and the CDM process, all in the local language so that it could be understood by one and all.

After the Preamble, Mr. S. Pandian made a power point presentation on the Company's CDM initiative and explained the concept slide wise.

After the presentation, he requested all present to voice their views and concerns.

Mr. Kothandarama Murthy, NEDCAP, expressed his happiness at the responsible and effective manner in which company was operating the wind farm. He did not have any concerns on the CDM initiative and suggested that the company must further expand its capacity and also take steps to improve generation.
Mr. S. Pandian responded that the company would take all measures to achieve better utilization and increase the capacity and thereby generate more employment for the people from the nearby villages as it had done earlier.

Mr. Harikumar of Oriental Bank of Commerce first thanked RCI and Wescare for the opportunity to visit the site and conveyed his best wishes to the Company in its CDM endeavour. He did not have any concerns on the CDM initiative of the company.

Mr. S. Pandian enquired and requested the employees and other local people present to voice their concerns. The people / employees did not have any concerns / issued in respect of the CDM activity.

The meeting concluded with Mr. S. Pandian thanking all those present at the meeting for their time and patient hearing.

Minutes of the Meeting approved by

10th November 2005 S. Pandian

G.3. Report on how due account was taken of any comments received:

The project proponent thanked the participants for their encouragement and co-operation.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY
Project proponent 1:

Organization:	Wescare (India) Limited
Street/P.O.Box:	16, Cenotaph Road, Teynampet
Building:	Wescare Towers
City:	Chennai
State/Region:	Tamilnadu
Postcode/ZIP:	600 018
Country:	INDIA
Telephone:	91-44-39188479/39188480
FAX:	91- 44- 24322352
E-Mail:	pandian.s@wescaregroup.net
URL:	
Represented by: Mr.S.Pandian	
Title:	President
Salutation:	Mr.
Last Name:	Swami Pillai
Middle Name:	-
First Name:	Pandian
Department:	Operations
Mobile:	98848-02784
Direct FAX:	91-44-24322352
Direct tel:	91-44-39188484
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No ODA is flowing to the project. No Public Funding as part of Project financing from Parties included in Annex 1 of the convention is involved in the Project activity.

Annex 3

Baseline Calculations and CER Calculations

References:

1	http://www.cercind.org/2612/operational.pdf	Auxiliary Consumption in Hydro Power Generati
2	Performance Review of Thermal Power Stations 2004-05 (CEA) Section 11; http://www.cea.nic.in/god/opm/Thermal_Performance_Review/index_Thermal_Performance_Review.html	Auxiliary Consumption in Thermal Power Generation
3	http://www.cercind.org/pet22002407.html	Heat Rate in Gas Power Generation
4	http://www.cea.nic.in/god/opm/Thermal_Performance_Review/index_Thermal_Performance_Review.html	Heat Rate of Thermal Power Stations
5	http://mnes.nic.in/baselinepdfs/annexure2c.pdf	Heat Rate of Diesel Power Stations
6	http://mnes.nic.in/annualreport/2004_2005_English/index.html	Wind Energy Generation in States
7	CEA Annual Report for 2002-03, 2003-04, 2004-05	Power Generation in States

Generation Mix of Power in Southern Grid

Type	2002-03	2003-04	2004-05
Thermal	93350.1	96664.0	97964.3
Diesel	4457.0	3225.0	2370.1
Gas	15138.0	16183.0	12276.6
Total (Thermal + Gas)	**112945.1**	**116072.0**	**112611.1**
Wind*	1577.3	2055.7	1270.7
Hydro	18167.8	17317.0	25280.4
Nuclear	4390.0	4700.0	4406.7
Low cost/Must run	**24135.1**	**24072.7**	**30957.8**
Total	**137080.1**	**140144.7**	**143568.8**
% of Low cost/must run	**18%**	**17%**	**22%**

Unit Million Units
Source www.cea.nic.in

OPERATING MARGIN

Southern Grid Power Generation (2004-05)

Source	MoU	Thermal	Diesel	Gas		Import fro
Gross Generation	MU	97964.3	2370.1	12276.6		ER
Net Generation	MU	90018.2	2299.0	11966.5	104283.8	WR
Heat Rate	kcal/kWh	2490.0	2062.0	2000.0		NR
Fuel CV	kcal/kg	3820.0	10186.0	10750.0		NER
Fuel Consumption	Tonnes per annum	63856336.8	479796.6	2284018.6		**Total**
Total Emissions	tCO2/ annum	96187754.9	1210310.9	5761551.0	103159616.8	
Emission Factor-OM	tCO2/ MWh	**0.989**				

Southern Grid Power Generation [2003-04]

Source	MoU	Thermal	Diesel	Gas		Import fro
Gross Generation	MU	96664.0	3225.0	16183.0		ER
Net Generation	MU	87938.6	3128.3	15770.3	106837.2	WR
Heat Rate	kcal/kWh	2490.0	2062.0	2000.0		NR
Fuel CV	kcal/kg	3820.0	10186.0	10750.0		NER
Fuel Consumption	Tonnes per	63008733.0	652852.0	3010790.7		**Total**

	annum				
Total Emissions	tCO2/ annum	94910996.6	2042559.6	7594869.9	104548426.2
Emission Factor-OM	tCO2/ MWh	**0.979**			

Southern Grid Power Generation [2002-03]

Source	**MoU**	**Thermal**	**Diesel**	**Gas**	
Gross Generation	MU	93350.1	4457.0	15138.0	
Net Generation	MU	85119.8	4323.3	14753.2	104196.2
Heat Rate	kcal/kWh	2425.0	2062.0	2000.0	
Fuel CV	kcal/kg	3820.0	10186.0	10750.0	
Fuel Consumption	Tonnes per annum	59260189.1	902251.5	2816372.1	
Total Emissions	tCO2/ annum	89264508.9	2822849.1	7104439.3	99191797.2
Emission Factor-OM	tCO2/ MWh	**0.952**			

Import fro
ER
WR
NR
NER
Total

BUILD MARGIN

Southern Grid Power Generation [2004-05]

Source	MoU	Thermal	Diesel	Gas	Hydro	Nuclear	Wind	
Gross Generation	MU	14743.1	1796.1	6941.9	2751.8	2926.3	1270.7	
Net Generation	MU	13720.3	1742.2	6765.2	2738.0	2575.1	1270.7	1
Heat Rate	kcal/kWh	2490.0	2062.0	2000.0	0.0	0.0		
Fuel CV	kcal/kg	3820.0	10186.0	10750.0	0.0	0.0		
Fuel Consumption	Tonnes per annum	9610006.9	363591.0	1291508.5				
Total Emissions	tCO2/ annum	14475697.1	917176.4	3257894.7				18
Emission Factor-BM	tCO2/ MWh	**0.647**						

Southern Grid Power Generation

Source	MoU	OM (2002-03)	OM (2003-04)	OM (2004-05)
Year-wise OM	tCO2/ MWh	0.952	0.979	0.989
OM	tCO2/ MWh	0.973		
BM	tCO2/ MWh	0.647		
Emission Factor-CM	tCO2/ MWh	**0.810**		

BUILD MARGIN PIVOT

Type	Data	Total
Diesel	Sum of Gross Gen (MU)	1796.1
	Sum of Net Gen (MU)	1742.2
Gas	Sum of Gross Gen (MU)	6941.9
	Sum of Net Gen (MU)	6765.2
Hydro	Sum of Gross Gen (MU)	2751.8
	Sum of Net Gen (MU)	2738.0
Nuclear	Sum of Gross Gen (MU)	2926.3
	Sum of Net Gen (MU)	2575.1
Thermal	Sum of Gross Gen (MU)	14743.1
	Sum of Net Gen (MU)	13720.3
Total Sum of Gross Gen (MU)		29159.0
Total Sum of Net Gen (MU)		27540.8

BUILD MARGIN

SN	Type	Ownership	State	Station	Capacity (MW)	Gross Gen (MU)	Aux Co (MU)
61	Hydro	State	AP	Mini Hydro	30.0	6.3	0.0
158	Hydro	Mysore PC	Karnataka	Narayanpur	6.6	42.5	0.2
164	Hydro		Kerala	Other Hydro	5	0.0	0.0
167	Hydro		Kerala	Malampuzha	2.5	0.0	0.0
141	Hydro	KPCL	Karnataka	Almattidam 6	55	26.3	0.1
140	Hydro	KPCL	Karnataka	Almattidam 5	55	26.3	0.1
139	Hydro	KPCL	Karnataka	Almattidam 4	55	26.3	0.1
138	Hydro	KPCL	Karnataka	Almattidam 3	55	26.3	0.1
137	Hydro	KPCL	Karnataka	Almattidam 2	55	26.3	0.1
182	Hydro		Kerala	Malankara	10.5	3.0	0.0
76	Gas	State	Tamilnadu	Kuttalam	36	230.7	5.8
136	Hydro	KPCL	Karnataka	Almattidam 1	15	7.2	0.0
185	Hydro		Kerala	Chembukadavu	6.5	6.2	0.0
186	Hydro		Kerala	Urumi	6.2	0.9	0.0
75	Gas	State	Tamilnadu	Kuttalam	64	410.2	10.3
217	Thermal	NLC	Tamilnadu	NLC TS I extension	420	3237.7	268.1
51	Hydro	State	AP	Srisailam Left 6	150.0	235.3	1.2
157	Hydro	Bhoruka P	Karnataka	Shahpur	1.4	0.0	0.0
50	Hydro	State	AP	Srisailam Left 5	150.0	235.3	1.2
74	Gas	State	Tamilnadu	Valuthur	94	557.5	13.9
200	Thermal	IPP	Tamilnadu	Neyvelli Zero	250	1335.8	118.0
118	Thermal	State	Karnataka	Raichur TPS	210	1531.1	135.0
49	Hydro	State	AP	Srisailam Left 4	150.0	235.3	1.2
198	Thermal	NTPC	AP	Simhadri	500	4061.1	229.4
48	Hydro	State	AP	Srisailam Left 3	150.0	235.3	1.2
28	Gas	IPP	AP	LANCO- Kondapalli	355	2246.3	56.2
30	Diesel	IPP	AP	LVS power	36.8	0.0	0.0
199	Thermal	NTPC	AP	Simhadri	500	4061.1	229.4
26	Gas	IPP	AP	BSES- Peddapuram	220	1141.3	28.5
47	Hydro	State	AP	Srisailam Left 2	150.0	235.3	1.2
79	Diesel	IPP	Tamilnadu	Samayanallur DEPP	106	382.0	11.5
78	Diesel	IPP	Tamilnadu	Samalpatti DEPP	105.7	357.3	10.7
123	Diesel	TATA IPP	Karnataka	Belgaum	81.3	238.5	7.2
152	Hydro	Bhoruka P	Karnataka	Madhavmantrii	3	22.9	0.1
184	Hydro	KLPVT	Kerala	Kuthungal	21	36.2	0.2
124	Gas	GMR IPP	Karnataka	Tanir Bavi	220	629.6	18.9
143	Hydro	KPCL	Karnataka	Gerusuppa	240	437.6	2.2
46	Hydro	State	AP	Srisailam Left 1	150.0	235.3	1.2
77	Gas	IPP	Tamilnadu	Pillai Perumal Nallur GTPP	330.5	464.3	11.6
161	Diesel	IPP	Kerala	Kasargode	21.84	15.7	0.5
174	Hydro		Kerala	Kuttiadi	50	148.2	0.7
219	Nuclear	NPC	Karnataka	Kaiga 1	220	1463.1	175.6
69	Gas	State	Tamilnadu	Kovilkalapai	108	763.3	19.1
111	Hydro	State	Tamilnadu	Mukurthy Mini	0.7	0.0	0.0
122	Diesel	IPP	Karnataka	Bellay	25.2	40.3	1.2
109	Hydro	State	Tamilnadu	Parsons Valley	30	55.6	0.3

110	Hydro	State	Tamilnadu	Thirumurthy Mini	1.95	0.0	0.0
220	Nuclear	NPC	Karnataka	Kaiga 2	220	1463.1	175.6
60	Hydro	State	AP	Singur	15.0	1.5	0.0
119	Thermal	Jindal IPP	Karnataka	Torangulu Steam	130	258.2	21.4
120	Thermal	Jindal IPP	Karnataka	Torangulu Steam	130	258.2	21.4
176	Hydro		Kerala	Kakkad	50	210.4	1.1
191	Gas	NTPC	Kerala	Kayamkulam GT3	129.2	222.9	5.6
133	Hydro	KPCL	Karnataka	Kodasalli 3	40	71.6	0.4
156	Hydro	Bhoruka P	Karnataka	Rajankollur	2	0.0	0.0
154	Hydro	Bhoruka P	Karnataka	Harangi	9	0.0	0.0
187	Gas	State	Pondicherry	PPCL GTG	32.5	275.7	6.9
151	Hydro	KPCL	Karnataka	Kadra 3	50	77.0	0.4
132	Hydro	KPCL	Karnataka	Kodasalli 2	40	71.6	0.4
108	Hydro	State	Tamilnadu	Sathanur	7.5	10.2	0.1
80	Diesel	IPP	Tamilnadu	GMR Vasavi DEPP	196	762.2	22.9
190	Gas	NTPC	Kerala	Kayamkulam GT2	115.2	198.8	5.0
150	Hydro	KPCL	Karnataka	Kadra 2	50	77.0	0.4
117	Thermal	State	Karnataka	Raichur TPS	210	1531.1	135.0
179	Hydro		Kerala	Madupetty	2	4.1	0.0
160	Diesel	State	Kerala	Kozhikode	129	160.5	4.8
159	Diesel	State	Kerala	Brahmpuram	107	136.4	4.1
153	Hydro	Bhoruka P	Karnataka	Shahpur	6.6	25.2	0.1
189	Gas	NTPC	Kerala	Kayamkulam GT1	115.2	198.8	5.0
131	Hydro	KPCL	Karnataka	Kodasalli 1	40	71.6	0.4
134	Hydro	KPCL	Karnataka	Bhadra	33.4	41.4	0.2
18	Thermal	State	AP	Kothagudem V Stage II	250.0	2070.5	182.0
105	Hydro	State	Tamilnadu	Lowerbavani RBC	8	30.8	0.2
27	Gas	IPP	AP	Jegrupadu	216	1419.6	35.5
162	Gas	IPP	Kerala	BSES	174	111.8	2.8
178	Hydro		Kerala	Lower Pariyar	180	512.4	2.6
25	Gas	State	AP	Vijjeswaram II – 2	60.0	425.2	10.6
149	Hydro	KPCL	Karnataka	Kadra 1	50	77.0	0.4
24	Gas	State	AP	Vijjeswaram II – 1	112.0	837.4	20.9
17	Thermal	State	AP	Kothagudem V Stage I	250.0	2070.5	182.0
29	Gas	IPP	AP	Spectrum- Godavari	208	1373.0	34.3
165	Hydro		Kerala	Peppara	3	6.4	0.0
166	Hydro		Kerala	Edamalayar	75	338.3	1.7
73	Gas	State	Tamilnadu	Basin Bridge	30	10.1	0.3
72	Gas	State	Tamilnadu	Basin Bridge	30	10.1	0.3
71	Gas	State	Tamilnadu	Basin Bridge	30	10.1	0.3
68	Thermal	State	Tamilnadu	North Chennai 3	210	1305.3	120.0
70	Gas	State	Tamilnadu	Basin Bridge	30	10.1	0.3
36	Hydro	State	AP	Upper Sileru 4	60.0	136.0	3.4
67	Thermal	State	Tamilnadu	North Chennai 2	210	1305.3	120.0
8	Thermal	State	AP	Rayalaseema – 2	210.0	1676.8	157.3
6	Thermal	State	AP	Vijayawada – 6	210.0	1641.5	157.3
181	Hydro		Kerala	Kallada	15	76.9	0.4
66	Thermal	State	Tamilnadu	North Chennai 1	210	1305.3	120.0
62	Wind	IPP	AP	Wind	2.0		
115	Thermal	State	Karnataka	Raichur TPS	210	1531.1	135.0
121	Diesel	VVNL	Karnataka	Yelehanka Diesel	128	271.1	8.1

5	Thermal	State	AP	Vijayawada – 5	210.0	1641.5	157.3
7	Thermal	State	AP	Rayalaseema – 1	210.0	1676.8	157.3
35	Hydro	State	AP	Upper Sileru 3	60.0	136.0	3.4
59	Hydro	State	AP	Penna Ahobilam	20.0	0.0	0.0
145	Hydro	KPCL	Karnataka	Mallapur	9	0.0	0.0
146	Hydro	KPCL	Karnataka	Manidam DPH	9	23.5	0.1
213	Thermal	NLC	Tamilnadu	NLC TS II	210	1321.1	109.4
214	Thermal	NLC	Tamilnadu	NLC TS II	210	1321.1	109.4
215	Thermal	NLC	Tamilnadu	NLC TS II	210	1321.1	109.4
216	Thermal	NLC	Tamilnadu	NLC TS II	210	1321.1	109.4
195	Thermal	NTPC	AP	Ramagundam STPS 4	500	4088.1	269.4
130	Hydro	KPCL	Karnataka	Ghatprabha	32	96.6	0.5
148	Hydro	KPCL	Karnataka	Sirwar	1	0.0	0.0
106	Hydro	State	Tamilnadu	Punachi Mini	2	0.0	0.0
155	Hydro	Bhoruka P	Karnataka	Shivpura	18	72.3	0.4
107	Hydro	State	Tamilnadu	Maravakandy Mini	0.75	0.0	0.0
56	Hydro	State	AP	NS Left Canal	60.0	5.1	0.0
23	Gas	State	AP	Vijjeswaram I – 3	34.0	264.0	6.6
188	Diesel		Lakshdeep	Mix	10	6.0	0.2
22	Gas	State	AP	Vijjeswaram I – 2	33.0	236.1	5.9
114	Thermal	State	Karnataka	Raichur TPS	210	1531.1	135.0
21	Gas	State	AP	Vijjeswaram I – 1	33.0	229.6	5.7
4	Thermal	State	AP	Vijayawada – 4	210.0	1641.5	157.3
55	Hydro	State	AP	NS Right Canal 3	30.0	15.9	0.1
104	Hydro	State	Tamilnadu	Lower Bhavani Small	8	30.8	0.2
102	Hydro	State	Tamilnadu	Vaigai Small	6	12.3	0.1
129	Hydro	KPCL	Karnataka	Varahi	230	973.3	4.9
103	Hydro	State	Tamilnadu	Pykara Mini	2	5.0	0.0
3	Thermal	State	AP	Vijayawada – 3	210.0	1641.5	157.3
197	Thermal	NTPC	AP	Ramagundam STPS 6	500	4088.1	269.4
196	Thermal	NTPC	AP	Ramagundam STPS 5	500	4088.1	269.4
116	Thermal	State	Karnataka	Raichur TPS	210	1531.1	135.0
57	Hydro	State	AP	Pochampad	27.0	1.6	0.0
90	Hydro	State	Tamilnadu	Lower Mettur	120	254.7	1.3
183	Hydro	KLPVT	Kerala	Maniar	10	34.5	0.2
101	Hydro	State	Tamilnadu	Kadamparai	400	256.8	1.3
94	Hydro	State	Tamilnadu	Servalar	20	34.6	0.2
45	Hydro	State	AP	Srisailam Right 7	110.0	134.4	0.7
65	Thermal	State	Tamilnadu	Mettur	840	6684.0	556.1
44	Hydro	State	AP	Srisailam Right 6	110.0	134.4	0.7
92	Hydro	State	Tamilnadu	Suruliyar	35	101.4	0.5
43	Hydro	State	AP	Srisailam Right 5	110.0	134.4	0.7
113	Thermal	State	Karnataka	Raichur TPS	210	1531.1	135.0
210	Thermal	NLC	Tamilnadu	NLC TS II	210	1321.1	109.4
211	Thermal	NLC	Tamilnadu	NLC TS II	210	1321.1	109.4
212	Thermal	NLC	Tamilnadu	NLC TS II	210	1321.1	109.4
218	Nuclear	NPC	Tamilnadu	MAPP Kalpakkam	340	1480.5	177.7
142	Hydro	KPCL	Karnataka	Kalindi Supa DPH	100	294.6	1.5
112	Thermal	State	Karnataka	Raichur TPS	210	1531.1	135.0
52	Hydro	State	AP	Nagarjunasagar	815.6	501.5	2.5
194	Thermal	NTPC	AP	Ramagundam STPS 3	200	1635.2	107.8

42	Hydro	State	AP	Srisailam Right 4	110.0	134.4	0.7
193	Thermal	NTPC	AP	Ramagundam STPS 2	200	1635.2	107.8
135	Hydro	KPCL	Karnataka	Kalindi Nagjhari	810	1719.7	8.6
41	Hydro	State	AP	Srisailam Right 3	110.0	134.4	0.7
37	Hydro	State	AP	Donkarayi	25.0	132.3	3.3
192	Thermal	NTPC	AP	Ramagundam STPS 1	200	1635.2	107.8
54	Hydro	State	AP	NS Right Canal 2	30.0	15.9	0.1
63	Thermal	State	Tamilnadu	Ennore	450	1223.0	149.9
53	Hydro	State	AP	NS Right Canal 1	30.0	15.9	0.1
40	Hydro	State	AP	Srisailam Right 2	110.0	134.4	0.7
39	Hydro	State	AP	Srisailam Right 1	110.0	134.4	0.7
2	Thermal	State	AP	Vijayawada – 2	210.0	1641.5	157.3
144	Hydro	KPCL	Karnataka	Linganamakki	55	194.3	1.0
1	Thermal	State	AP	Vijayawada -1	210.0	1641.5	157.3
64	Thermal	State	Tamilnadu	Tuticorin	1050	8180.0	643.8
16	Thermal	State	AP	Kothagudem – 8	110.0	842.8	74.1
38	Hydro	State	AP	Lower Sileru	460.0	1171.3	29.3
15	Thermal	State	AP	Kothagudem – 7	110.0	842.8	74.1
147	Hydro	KPCL	Karnataka	Sharavati	1035	3853.7	19.3
175	Hydro		Kerala	Iddukki	780	2003.4	10.0
177	Hydro		Kerala	Poringal Kuthu L	16	108.0	0.5
14	Thermal	State	AP	Kothagudem – 6	120.0	919.4	80.8
13	Thermal	State	AP	Kothagudem – 5	120.0	919.4	80.8
173	Hydro		Kerala	Kuttiadi	75	222.3	1.1
100	Hydro	State	Tamilnadu	Kodayar II	40	82.8	0.4
19	Thermal	State	AP	Ramagundam B	62.5	496.0	44.6
96	Hydro	State	Tamilnadu	Sholayar I	70	258.2	1.3
99	Hydro	State	Tamilnadu	Kodayar I	60	124.2	0.6
97	Hydro	State	Tamilnadu	Sholayar II	25	92.2	0.5
98	Hydro	State	Tamilnadu	Aliyar	60	162.1	0.8
209	Thermal	NLC	Tamilnadu	NLC TSI	100	709.6	58.8
34	Hydro	State	AP	Upper Sileru 2	60.0	136.0	3.4
33	Hydro	State	AP	Upper Sileru 1	60.0	136.0	3.4
12	Thermal	State	AP	Kothagudem – 4	60.0	459.7	40.4
11	Thermal	State	AP	Kothagudem – 3	60.0	459.7	40.4
168	Hydro		Kerala	Sholayar	54	263.0	1.3
170	Hydro		Kerala	Sabaragiri	300	1224.5	6.1
10	Thermal	State	AP	Kothagudem – 2	60.0	459.7	40.4
9	Thermal	State	AP	Kothagudem – 1	60.0	459.7	40.4
86	Hydro	State	Tamilnadu	Kundah IV	100	282.4	1.4
95	Hydro	State	Tamilnadu	Sarkarpathy	30	114.7	0.6
89	Hydro	State	Tamilnadu	Mettur Tunnel	200	308.6	1.5
20	Thermal	State	AP	Nellore	30.0	153.9	15.5
85	Hydro	State	Tamilnadu	Kundah III	180	508.4	2.5
126	Hydro	VVNL	Karnataka	Munirabad	27	68.7	0.3
87	Hydro	State	Tamilnadu	Kundah V	40	113.0	0.6
32	Hydro	Shared	AP	Tungabhadra (AP Utilisation)	57.6	148.3	3.7
172	Hydro		Kerala	Panniar	30	142.4	0.7
201	Thermal	NLC	Tamilnadu	NLC TSI	50	354.8	29.4
202	Thermal	NLC	Tamilnadu	NLC TSI	50	354.8	29.4
203	Thermal	NLC	Tamilnadu	NLC TSI	50	354.8	29.4

204	Thermal	NLC	Tamilnadu	NLC TSI	50	354.8	29.4
205	Thermal	NLC	Tamilnadu	NLC TSI	50	354.8	29.4
206	Thermal	NLC	Tamilnadu	NLC TSI	50	354.8	29.4
207	Thermal	NLC	Tamilnadu	NLC TSI	100	709.6	58.8
208	Thermal	NLC	Tamilnadu	NLC TSI	100	709.6	58.8
180	Hydro		Kerala	Nariamanglam	45	232.0	1.2
84	Hydro	State	Tamilnadu	Kundah II	175	494.2	2.5
83	Hydro	State	Tamilnadu	Kundah I	60	169.5	0.8
91	Hydro	State	Tamilnadu	Periyar	140	492.7	2.5
171	Hydro		Kerala	Porimgalkuttu	32	181.6	0.9
31	Hydro	Shared	AP	Machkund (AP Utilisation)	84.0	900.6	22.5
169	Hydro		Kerala	Senagulam	48	167.0	0.8
58	Hydro	State	AP	Nizamsagar	10.0	0.0	0.0
82	Hydro	State	Tamilnadu	Moyar	36	90.2	0.5
125	Hydro	VVNL	Karnataka	Jog	120	174.2	0.9
93	Hydro	State	Tamilnadu	Papanasam	28	88.5	0.4
163	Hydro		Kerala	Pallivasal	37.5	222.6	1.1
127	Hydro	VVNL	Karnataka	Shimshapur	17.2	93.9	0.5
88	Hydro	State	Tamilnadu	Mettur Dam	40	26.0	0.1
81	Hydro	State	Tamilnadu	Pykara	70	213.4	1.1
128	Hydro	VVNL	Karnataka	Shivnasamudram	42	191.6	1.0

FACTORS

Parameters	**2002-03**			**2003-04**			**2004-05**		
	Coal	**Natural Gas**	**Diesel**	**Coal**	**Gas**	**Diesel**	**Coal**	**Gas**	**Diese**
NCV_i (kcal/kg)	3820	10750	10186	3820	10750	10186	3820	10750	1018
Heat Rate; (kcal/kWh)	2425	2000	2062	2490	2000	2062	2490	2000	2062
$EF_{CO2,i}$ (tonne CO_2/TJ)	96.1	56.1	74.1	96.1	56.1	74.1	96.1	56.1	74.1
$OXID_i$	0.980	0.999	0.990	0.980	0.999	0.990	0.980	0.999	0.990
***$COEF_{i,j\,y}$*(tonne of CO_2/tonne of fuel)**	**1.506**	**2.523**	**3.129**	**1.506**	**2.523**	**3.129**	**1.506**	**2.523**	**3.129**

Region-wise Design Station Heat Rate for Thermal Power Plants

Region/ Grid	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**

Northern	2483	2483	2491	2484	2484
Southern	**2434**	**2434**	**2425**	**2490**	**2490**
Western	2347	2347	2341	2357	2357
Eastern	2383	2383	2368	2365	2365

unit: Kcal/ Kwh

Source www.cea.nic.in

SN	Type	Ownership	State	Station	Capacity (MW)	Aux Con % (2002-03)	Gross Gen (2002-03)	Aux Con (2002-03)	Net Gen (2002-03)	Aux Con % (2003-04)	Gross Gen (2003-04)	Aux Con (2003-04)
1	Thermal	State	AP	Vijayawada -1	210	0.0877	10283	901.8191	9381.1809	0.0936	10104	945.7344
2	Thermal	State	AP	Vijayawada - 2	210							
3	Thermal	State	AP	Vijayawada - 3	210							
4	Thermal	State	AP	Vijayawada - 4	210							
5	Thermal	State	AP	Vijayawada - 5	210							
6	Thermal	State	AP	Vijayawada - 6	210							
7	Thermal	State	AP	Rayalaseema - 1	210	0.1002	3489	349.5978	3139.4022	0.0973	3331	324.1063
8	Thermal	State	AP	Rayalaseema - 2	210							
9	Thermal	State	AP	Kothagudem - 1	60	0.0914	4644.98	424.551172	4220.428828	0.0946	4183	395.7118
10	Thermal	State	AP	Kothagudem - 2	60							
11	Thermal	State	AP	Kothagudem - 3	60							
12	Thermal	State	AP	Kothagudem - 4	60							
13	Thermal	State	AP	Kothagudem - 5	120							
14	Thermal	State	AP	Kothagudem - 6	120							
15	Thermal	State	AP	Kothagudem - 7	110							
16	Thermal	State	AP	Kothagudem - 8	110							
17	Thermal	State	AP	Kothagudem V Stage I	250	0.091	4081	371.371	3709.629	0.0946	3994	377.8324
18	Thermal	State	AP	Kothagudem V Stage II	250							
19	Thermal	State	AP	Ramagundam B	62.5	0.1451	288.22	41.820722	246.399278	0.09	471	42.39
20	Thermal	State	AP	Nellore	30	0.0703	145.921	10.2582463	135.6627537	0.0984	146	14.3664
217	Thermal	NLC	Tamilnadu	NLC TS I extension	420	0.0838	86.87	7.279706	79.590294	0.0904	1993	180.1672
216	Thermal	NLC	Tamilnadu	NLC TS II	210							
215	Therm	NLC	Tamilnadu	NLC TS II	210							

	al											
214	Thermal	NLC	Tamilnadu	NLC TS II	210							
213	Thermal	NLC	Tamilnadu	NLC TS II	210							
212	Thermal	NLC	Tamilnadu	NLC TS II	210							
211	Thermal	NLC	Tamilnadu	NLC TS II	210							
210	Thermal	NLC	Tamilnadu	NLC TS II	210	0.0838	10504.41	880.269558	9624.140442	0.0904	10003	904.2712
209	Thermal	NLC	Tamilnadu	NLC TSI	100							
208	Thermal	NLC	Tamilnadu	NLC TSI	100							
207	Thermal	NLC	Tamilnadu	NLC TSI	100							
206	Thermal	NLC	Tamilnadu	NLC TSI	50							
205	Thermal	NLC	Tamilnadu	NLC TSI	50							
204	Thermal	NLC	Tamilnadu	NLC TSI	50							
203	Thermal	NLC	Tamilnadu	NLC TSI	50							
202	Thermal	NLC	Tamilnadu	NLC TSI	50							
201	Thermal	NLC	Tamilnadu	NLC TSI	50	0.0838	4378.67	366.932546	4011.737454	0.0904	4400	397.76
200	Thermal	IPP	Tamilnadu	Neyvelli Zero	250	0.0932	1395	130.014	1264.986	0.0932	1395	130.014
199	Thermal	NTPC	AP	Simhadri	500							
198	Thermal	NTPC	AP	Simhadri	500	0.09	4974	447.66	4526.34	0.09	7722	694.98
197	Thermal	NTPC	AP	Ramagundam STPS 6	500							
196	Thermal	NTPC	AP	Ramagundam STPS 5	500							
195	Thermal	NTPC	AP	Ramagundam STPS 4	500							
194	Thermal	NTPC	AP	Ramagundam STPS 3	200							
193	Thermal	NTPC	AP	Ramagundam STPS 2	200							
192	Thermal	NTPC	AP	Ramagundam STPS 1	200	0.0959	16839	1614.8601	15224.1399	0.0959	16332	1566.2388
120	Thermal	Jindal IPP	Karnataka	Torangulu Steam	130							
119	Thermal	Jindal IPP	Karnataka	Torangulu Steam	130	0.0838	872	73.0736	798.9264	0.0904	766	69.2464
118	Thermal	State	Karnataka	Raichur TPS	210							
117	Thermal	State	Karnataka	Raichur TPS	210							
116	Thermal	State	Karnataka	Raichur TPS	210							
115	Thermal	State	Karnataka	Raichur TPS	210							
114	Thermal	State	Karnataka	Raichur TPS	210							
113	Thermal	State	Karnataka	Raichur TPS	210							
112	Thermal	State	Karnataka	Raichur TPS	210	0.0844	10290	868.476	9421.524	0.0858	11400	978.12

68	Thermal	State	Tamilnadu	North Chennai 3	210								
67	Thermal	State	Tamilnadu	North Chennai 2	210								
66	Thermal	State	Tamilnadu	North Chennai 1	210	0.092	4405	405.26	3999.74	0.0916	4347	398.1852	
65	Thermal	State	Tamilnadu	Mettur	840	0.0786	6739	529.6854	6209.3146	0.0794	6735	534.759	
64	Thermal	State	Tamilnadu	Tuticorin	1050	0.077	8187	630.399	7556.601	0.0804	8084	649.9536	
63	Thermal	State	Tamilnadu	Ennore	450	0.1013	1747	176.9711	1570.0289	0.0966	1258	121.5228	
				Total Thermal-SR			**93350.071**	**8230.29905**	**85119.77195**		**96664**	**8725.3595**	

DIESEL

SN	Type	Ownership	State	Station	Capacity (MW)	Aux Con % (2002-03)	Gross Gen (2002-03)	Aux Con (2002-03)	Net Gen (2002-03)	Aux Con % (2003-04)	Gross Gen (2003-04)	Aux Con (2003-04)	Net Gen (2003-04)
188	Diesel		Lakshdeep	Mix	10	0.03	0	0	0	0.03	0	0	0
161	Diesel	IPP	Kerala	Kasargode	21.84	0.03	148	4.44	143.56	0.03	78	2.34	75.66
160	Diesel	State	Kerala	Kozhikode	129	0.03	385	11.55	373.45	0.03	313	9.39	303.61
159	Diesel	State	Kerala	Brahmpuram	107	0.03	367	11.01	355.99	0.03	266	7.98	258.02
123	Diesel	TATA IPP	Karnataka	Belgaum	81.3	0.03	355	10.65	344.35	0.03	235	7.05	227.95
122	Diesel	IPP	Karnataka	Bellay	25.2	0.03	64	1.92	62.08	0.03	42	1.26	40.74
121	Diesel	VVNL	Karnataka	Yelehanka Diesel	128	0.03	715	21.45	693.55	0.03	384	11.52	372.48
80	Diesel	IPP	Tamilnadu	GMR Vasavi DEPP	196	0.03	1209	36.27	1172.73	0.03	992	29.76	962.24
79	Diesel	IPP	Tamilnadu	Samayanallur DEPP	106	0.03	589	17.67	571.33	0.03	457	13.71	443.29
78	Diesel	IPP	Tamilnadu	Samalpatti DEPP	105.66	0.03	623	18.69	604.31	0.03	458	13.74	444.26
30	Diesel	IPP	AP	LVS power	36.8	0.03	2	0.06	1.94	0.03	0	0	0
							4457	**133.71**	**4323.3**		**3225**	**96.75**	**3128.3**

GAS

SN	Type	Ownership	State	Station	Capacity (MW)	Aux Con % (2002-03)	Gross Gen (2002-03)	Aux Con (2002-03)	Net Gen (2002-03)	Aux Con % (2003-04)	Gross Gen (2003-04)	Aux Con (2003-04)	Net Gen (2003-04)
191	Gas	NTPC	Kerala	Kayamkulam GT3	129.2								
190	Gas	NTPC	Kerala	Kayamkulam GT2	115.2								
189	Gas	NTPC	Kerala	Kayamkulam GT1	115.2	0.025	2127	53.175	2073.825	0.025	2118	52.95	2065.05
187	Gas	State	Pondicherry	PPCL GTG	32.5	0.025	265	6.625	258.375	0.025	277	6.925	270.075
162	Gas	IPP	Kerala	BSES	174	0.025		0	0	0.025	991	24.775	966.225
124	Gas	GMR IPP	Karnataka	Tanir Bavi	220	0.03	1280	38.4	1241.6	0.03	1631	48.93	1582.07
77	Gas	IPP	TN	Pillai Perumal Nallur GTPP	330.5	0.025	2169	54.225	2114.775	0.025	1314	32.85	1281.15
76	Gas	State	TN	Kuttalam	36								
75	Gas	State	TN	Kuttalam	64	0.025	0	0	0	0.025	108	2.7	105.3
74	Gas	State	TN	Valuthur	94	0.025	104	2.6	101.4	0.025	671	16.775	654.225
73	Gas	State	TN	Basin Bridge	30								
72	Gas	State	TN	Basin Bridge	30								
71	Gas	State	TN	Basin Bridge	30								
70	Gas	State	TN	Basin Bridge	30	0.025	276	6.9	269.1	0.025	89	2.225	86.775
69	Gas	State	TN	Kovilkalapai	108	0.025	726	18.15	707.85	0.025	745	18.625	726.375
29	Gas	IPP	AP	Spectrum-Godavari	208	0.025	1250	31.25	1218.75	0.025	1100	27.5	1072.5
28	Gas	IPP	AP	LANCO-Kondapalli	355	0.025	2477	61.925	2415.075	0.025	2238	55.95	2182.05
27	Gas	IPP	AP	Jegrupadu	216	0.025	1583	39.575	1543.425	0.025	1505	37.625	1467.375
26	Gas	IPP	AP	BSES-Peddapuram	220	0.025	850	21.25	828.75	0.025	1249	31.225	1217.775
25	Gas	State	AP	Vijjeswaram II - 2	60								
21	Gas	State	AP	Vijjeswaram I - 1	33	0.025	2031	50.775	1980.225	0.025	2147	53.675	2093.325
22	Gas	State	AP	Vijjeswaram I - 2	33								
23	Gas	State	AP	Vijjeswaram I - 3	34								
24	Gas	State	AP	Vijjeswaram II - 1	112								
							15138	**384.85**	**14753.2**		**16183**	**412.73**	**15770.3**

HYDRO

SN	Type	Ownership	State	Station	Capacity (MW)	Aux Con % (2002-03)	Gross Gen (2002-03)	Aux Con (2002-03)	Net Gen (2002-03)	Aux Con % (2003-04)	Gross Gen (2003-04)	Aux Con (2003-04)	Net Gen (2003-04)
186	Hydro		Kerala	Urumi	6.2	0.005	0	0	0	0.005	0	0	0
185	Hydro		Kerala	Chembukadavu	6.5	0.005	0	0	0	0.005	0	0	0
184	Hydro	KLPVT	Kerala	Kuthungal	21	0.005	23	0.115	22.885	0.005	19	0.095	18.905
183	Hydro	KLPVT	Kerala	Maniar	10	0.005	23	0.115	22.885	0.005	21	0.105	20.895
182	Hydro		Kerala	Malankara	10.5	0.005	0	0	0	0.005	0	0	0
181	Hydro		Kerala	Kallada	15	0.005	35	0.175	34.825	0.005	36	0.18	35.82
180	Hydro		Kerala	Nariamanglam	45	0.005	230	1.15	228.85	0.005	196	0.98	195.02
179	Hydro		Kerala	Madupetty	2	0.005	2	0.01	1.99	0.005	8	0.04	7.96
178	Hydro		Kerala	Lower Pariyar	180	0.005	414	2.07	411.93	0.005	363	1.815	361.185
177	Hydro		Kerala	Poringal Kuthu L	16	0.005	78	0.39	77.61	0.005	88	0.44	87.56
176	Hydro		Kerala	Kakkad	50	0.005	150	0.75	149.25	0.005	126	0.63	125.37
175	Hydro		Kerala	Iddukki	780	0.005	1905	9.525	1895.475	0.005	1246	6.23	1239.77
174	Hydro		Kerala	Kuttiadi	50								

173	Hydro		Kerala	Kuttiadi	75	0.005	304	1.52	302.48	0.005	259	1.295	257.705
172	Hydro		Kerala	Panniar	30	0.005	78	0.39	77.61	0.005	76	0.38	75.62
171	Hydro		Kerala	Porimgalkuttu	32	0.005	123	0.615	122.385	0.005	142	0.71	141.29
170	Hydro		Kerala	Sabaragiri	300	0.005	804	4.02	799.98	0.005	698	3.49	694.51
169	Hydro		Kerala	Senagulam	48	0.005	130	0.65	129.35	0.005	128	0.64	127.36
168	Hydro		Kerala	Sholayar	54	0.005	138	0.69	137.31	0.005	202	1.01	200.99
167	Hydro		Kerala	Malampuzha	2.5	0.005	0	0	0	0.005	0	0	0
166	Hydro		Kerala	Edamalayar	75	0.005	259	1.295	257.705	0.005	155	0.775	154.225
165	Hydro		Kerala	Peppara	3	0.005	6	0.03	5.97	0.005	1	0.005	0.995
164	Hydro		Kerala	Other Hydro	5	0.005	0	0	0	0.005	0	0	0
163	Hydro		Kerala	Pallivasal	37.5	0.005	157	0.785	156.215	0.005	193	0.965	192.035
158	Hydro	Mysore PC	Karnataka	Narayanpur	6.6	0.005	36	0.18	35.82	0.005	38	0.19	37.81
157	Hydro	Bhoruka P	Karnataka	Shahpur	1.4	0.005	0	0	0	0.005	0	0	0
156	Hydro	Bhoruka P	Karnataka	Rajankollur	2	0.005	0	0	0	0.005	0	0	0
155	Hydro	Bhoruka P	Karnataka	Shivpura	18	0.005	67	0.335	66.665	0.005	54	0.27	53.73
154	Hydro	Bhoruka P	Karnataka	Harangi	9	0.005	0	0	0	0.005	0	0	0
153	Hydro	Bhoruka P	Karnataka	Shahpur	6.6	0.005	22	0.11	21.89	0.005	22	0.11	21.89
31	Hydro	Shared	AP	Machkund (AP Utilisation)	84	0.005	579.61	2.89805	576.712	0.005	529	2.645	526.355
32	Hydro	Shared	AP	Tungabhadra (AP Utilisation)	57.6	0.005	118.52	0.5926	117.9274	0.005	148	0.74	147.26
33	Hydro	State	AP	Upper Sileru 1	60	0.005	245.59	1.22795	244.3621	0.005	401	2.005	398.995
34	Hydro	State	AP	Upper Sileru 2	60								
35	Hydro	State	AP	Upper Sileru 3	60								
36	Hydro	State	AP	Upper Sileru 4	60								
37	Hydro	State	AP	Donkarayi	25	0.005	40	0.2	39.8	0.005	111	0.555	110.445
38	Hydro	State	AP	Lower Sileru	460	0.005	613.74	3.0687	610.6713	0.005	977	4.885	972.115
39	Hydro	State	AP	Srisailam Right 1	110	0.005	538.65	2.69325	535.9568	0.005	309	1.545	307.455
40	Hydro	State	AP	Srisailam Right 2	110								
41	Hydro	State	AP	Srisailam Right 3	110								
42	Hydro	State	AP	Srisailam Right 4	110								
43	Hydro	State	AP	Srisailam Right 5	110								
44	Hydro	State	AP	Srisailam Right 6	110								
45	Hydro	State	AP	Srisailam Right 7	110								
46	Hydro	State	AP	Srisailam Left 1	150	0.005	559.7	2.7985	556.9015	0.005	328	1.64	326.36
47	Hydro	State	AP	Srisailam Left 2	150								
48	Hydro	State	AP	Srisailam Left 3	150								
49	Hydro	State	AP	Srisailam Left 4	150								
50	Hydro	State	AP	Srisailam Left 5	150								
51	Hydro	State	AP	Srisailam Left 6	150								
52	Hydro	State	AP	Nagarjunasagar	815.6	0.005	869.01	4.34505	864.665	0.005	369	1.845	367.155
53	Hydro	State	AP	NS Right Canal 1	30	0.005	0	0	0	0.005	0	0	0
54	Hydro	State	AP	NS Right Canal 2	30								
55	Hydro	State	AP	NS Right Canal 3	30								
56	Hydro	State	AP	NS Left Canal	60	0.005	0	0	0	0.005	0	0	0
57	Hydro	State	AP	Pochampad	27	0.005	82.99	0.41495	82.57505	0.005	64	0.32	63.68
58	Hydro	State	AP	Nizamsagar	10	0.005	0	0	0	0.005	6	0.03	5.97
59	Hydro	State	AP	Penna Ahobilam	20	0.005	0	0	0	0.005	0	0	0
60	Hydro	State	AP	Singur	15	0.005	6.25	0.03125	6.21875	0.005	6	0.03	5.97
61	Hydro	State	AP	Mini Hydro	30	0.005	11.7	0.0585	11.6415	0.005	8	0.04	7.96

152	Hydro	Bhoruka P	Karnataka	Madhavmantrii	3	0.005	0	0	0	0.005	13	0.065	12.935
151	Hydro	KPCL	Karnataka	Kadra 3	50								
150	Hydro	KPCL	Karnataka	Kadra 2	50								
149	Hydro	KPCL	Karnataka	Kadra 1	50	0.005	238	1.19	236.81	0.005	223	1.115	221.885
148	Hydro	KPCL	Karnataka	Sirwar	1	0.005	0	0	0	0.005	0	0	0
147	Hydro	KPCL	Karnataka	Sharavati	1035	0.005	2950	14.75	2935.25	0.005	3316	16.58	3299.42
146	Hydro	KPCL	Karnataka	Manidam DPH	9	0.005	18	0.09	17.91	0.005	11	0.055	10.945
145	Hydro	KPCL	Karnataka	Mallapur	9	0.005	1	0.005	0.995	0.005	0	0	0
144	Hydro	KPCL	Karnataka	Linganamakki	55	0.005	111	0.555	110.445	0.005	721	3.605	717.395
143	Hydro	KPCL	Karnataka	Gerusuppa	240	0.005		0	0	0.005	358	1.79	356.21
142	Hydro	KPCL	Karnataka	Kalindi Supa DPH	100	0.005	257	1.285	255.715	0.005	241	1.205	239.795
141	Hydro	KPCL	Karnataka	Almattidam 6	55								
140	Hydro	KPCL	Karnataka	Almattidam 5	55								
139	Hydro	KPCL	Karnataka	Almattidam 4	55								
138	Hydro	KPCL	Karnataka	Almattidam 3	55								
137	Hydro	KPCL	Karnataka	Almattidam 2	55								
136	Hydro	KPCL	Karnataka	Almattidam 1	15	0.005	0	0	0	0.005	0	0	0
135	Hydro	KPCL	Karnataka	Kalindi Nagjhari	810	0.005	1812	9.06	1802.94	0.005	1718	8.59	1709.41
134	Hydro	KPCL	Karnataka	Bhadra	33.4	0.005	18	0.09	17.91	0.005	11	0.055	10.945
81	Hydro	State	Tamilnadu	Pykara	70	0.005	254	1.27	252.73	0.005	141	0.705	140.295
82	Hydro	State	Tamilnadu	Moyar	36	0.005	105	0.525	104.475	0.005	53	0.265	52.735
83	Hydro	State	Tamilnadu	Kundah I	60	0.005	764	3.82	760.18	0.005	429	2.145	426.855
84	Hydro	State	Tamilnadu	Kundah II	175								
85	Hydro	State	Tamilnadu	Kundah III	180								
86	Hydro	State	Tamilnadu	Kundah IV	100								
87	Hydro	State	Tamilnadu	Kundah V	40								
88	Hydro	State	Tamilnadu	Mettur Dam	40	0.005	41	0.205	40.795	0.005	15	0.075	14.925
89	Hydro	State	Tamilnadu	Mettur Tunnel	200	0.005	89	0.445	88.555	0.005	70	0.35	69.65
90	Hydro	State	Tamilnadu	Lower Mettur	120	0.005	168	0.84	167.16	0.005	97	0.485	96.515
91	Hydro	State	Tamilnadu	Periyar	140	0.005	227	1.135	225.865	0.005	213	1.065	211.935
92	Hydro	State	Tamilnadu	Suruliyar	35	0.005	75	0.375	74.625	0.005	41	0.205	40.795
93	Hydro	State	Tamilnadu	Papanasam	28	0.005	65	0.325	64.675	0.005	47	0.235	46.765
94	Hydro	State	Tamilnadu	Servalar	20	0.005	19	0.095	18.905	0.005	19	0.095	18.905
95	Hydro	State	Tamilnadu	Sarkarpathy	30	0.005	97	0.485	96.515	0.005	51	0.255	50.745
96	Hydro	State	Tamilnadu	Sholayar I	70	0.005	320	1.6	318.4	0.005	199	0.995	198.005
97	Hydro	State	Tamilnadu	Sholayar II	25								
98	Hydro	State	Tamilnadu	Aliyar	60	0.005	108	0.54	107.46	0.005	86	0.43	85.57
99	Hydro	State	Tamilnadu	Kodayar I	60	0.005	150	0.75	149.25	0.005	141	0.705	140.295
100	Hydro	State	Tamilnadu	Kodayar II	40								
101	Hydro	State	Tamilnadu	Kadamparai	400	0.005	203	1.015	201.985	0.005	408	2.04	405.96
102	Hydro	State	Tamilnadu	Vaigai Small	6	0.005	4	0.02	3.98	0.005	5	0.025	4.975
103	Hydro	State	Tamilnadu	Pykara Mini	2	0.005	0	0	0	0.005	0	0	0
104	Hydro	State	Tamilnadu	Lower Bhavani Small	8	0.005	21	0.105	20.895	0.005	9	0.045	8.955
105	Hydro	State	Tamilnadu	Lowerbavani RBC	8								
106	Hydro	State	Tamilnadu	Punachi Mini	2	0.005	0	0	0	0.005	0	0	0
107	Hydro	State	Tamilnadu	Maravakandy Mini	0.75	0.005	0	0	0	0.005	0	0	0
108	Hydro	State	Tamilnadu	Sathanur	7.5	0.005	2	0.01	1.99	0.005	2	0.01	1.99
109	Hydro	State	Tamilnadu	Parsons Valley	30	0.005	16	0.08	15.92	0.005	18	0.09	17.91
110	Hydro	State	Tamilnadu	Thirumurthy	1.95	0.005	0	0	0	0.005	0	0	0

				Mini									
111	Hydro	State	Tamilnadu	Mukurthy Mini	0.7	0.005	0	0	0	0.005	0	0	0
133	Hydro	KPCL	Karnataka	Kodasalli 3	40								
132	Hydro	KPCL	Karnataka	Kodasalli 2	40								
131	Hydro	KPCL	Karnataka	Kodasalli 1	40	0.005	218	1.09	216.91	0.005	214	1.07	212.93
130	Hydro	KPCL	Karnataka	Ghatprabha	32	0.005	59	0.295	58.705	0.005	62	0.31	61.69
129	Hydro	KPCL	Karnataka	Varahi	230	0.005	844	4.22	839.78	0.005	721	3.605	717.395
128	Hydro	VVNL	Karnataka	Shivnasamudram	42	0.005	14	0.07	13.93	0.005	79	0.395	78.605
127	Hydro	VVNL	Karnataka	Shimshapur	17.2	0.005	57	0.285	56.715	0.005	57	0.285	56.715
126	Hydro	VVNL	Karnataka	Munirabad	27	0.005	47	0.235	46.765	0.005	41	0.205	40.795
125	Hydro	VVNL	Karnataka	Jog	120	0.005	146	0.73	145.27	0.005	160	0.8	159.2
							18167.8	**90.8388**	**18076.9**		**17317**	**86.585**	**17230.4**

NUCLEAR

SN	Type	Ownership	State	Station	Capacity (MW)	Aux Con % (2002-03)	Gross Gen (2002-03)	Aux Con (2002-03)	Net Gen (2002-03)	Aux Con % (2003-04)	Gross Gen (2003-04)	Aux Con (2003-04)	Net Gen (2003-04)	A ((
220	Nuclear	NPC	Karnataka	Kaiga 2	220									
219	Nuclear	NPC	Karnataka	Kaiga 1	220	0.12	3317	398.04	2918.96	0.12	3123	374.76	2748.24	
218	Nuclear	NPC	Tamilnadu	MAPP Kalpakkam	340	0.12	1073	128.76	944.24	0.12	1577	189.24	1387.76	
							4390	**526.8**	**3863.2**		**4700**	**564**	**4136**	

OM PIVOT

Count of Gross Gen (2002-03)	
Type	Total
Diesel	11
Gas	13
Hydro	86
Nuclear	2
Thermal	18
Wind	
Grand Total	130

BM Base

SN	Type	Ownership	State	Station	Capacity (MW)	Aux. Con % (2004-05)	Gross Gen (2004-05)	Aux Con (2004-05)	Net Gen (2004-
1	Thermal	State	AP	Vijayawada -1	210.0	9.6%	9848.8	943.5	8905.3
2	Thermal	State	AP	Vijayawada - 2	210.0				
3	Thermal	State	AP	Vijayawada - 3	210.0				
4	Thermal	State	AP	Vijayawada - 4	210.0				
5	Thermal	State	AP	Vijayawada - 5	210.0				
6	Thermal	State	AP	Vijayawada - 6	210.0				
7	Thermal	State	AP	Rayalaseema - 1	210.0	9.4%	3353.6	314.6	3039.0
8	Thermal	State	AP	Rayalaseema - 2	210.0				
9	Thermal	State	AP	Kothagudem - 1	60.0	8.8%	5363.4	471.4	4892.0
10	Thermal	State	AP	Kothagudem - 2	60.0				
11	Thermal	State	AP	Kothagudem - 3	60.0				
12	Thermal	State	AP	Kothagudem - 4	60.0				
13	Thermal	State	AP	Kothagudem - 5	120.0				
14	Thermal	State	AP	Kothagudem - 6	120.0				
15	Thermal	State	AP	Kothagudem - 7	110.0				
16	Thermal	State	AP	Kothagudem - 8	110.0				
17	Thermal	State	AP	Kothagudem V Stage I	250.0	8.8%	4140.9	364.0	3776.9
18	Thermal	State	AP	Kothagudem V Stage II	250.0				
19	Thermal	State	AP	Ramagundam B	62.5	9.0%	496.0	44.6	451.4
20	Thermal	State	AP	Nellore	30.0	10.1%	153.9	15.5	138.4
21	Gas	State	AP	Vijjeswaram I - 1	33.0	2.5%	229.6	49.8	1942.5
22	Gas	State	AP	Vijjeswaram I - 2	33.0		236.1		
23	Gas	State	AP	Vijjeswaram I - 3	34.0		264.0		
24	Gas	State	AP	Vijjeswaram II - 1	112.0		837.4		

25	Gas	State	AP	Vijjeswaram II - 2	60.0		425.2		
26	Gas	IPP	AP	BSES-Peddapuram	220	2.5%	1141.3	28.5	1112.8
27	Gas	IPP	AP	Jegrupadu	216	2.5%	1419.6	35.5	1384.1
28	Gas	IPP	AP	LANCO-Kondapalli	355	2.5%	2246.3	56.2	2190.2
29	Gas	IPP	AP	Spectrum-Godavari	208	2.5%	1373.0	34.3	1338.6
30	Diesel	IPP	AP	LVS power	36.8	3.0%	0.0	0.0	0.0
31	Hydro	Shared	AP	Machkund (AP Utilisation)	84.0	2.5%	900.6	22.5	878.1
32	Hydro	Shared	AP	Tungabhadra (AP Utilisation)	57.6	2.5%	148.3	3.7	144.6
33	Hydro	State	AP	Upper Sileru 1	60.0	0.5%	544.1	2.7	541.4
34	Hydro	State	AP	Upper Sileru 2	60.0				
35	Hydro	State	AP	Upper Sileru 3	60.0				
36	Hydro	State	AP	Upper Sileru 4	60.0				
37	Hydro	State	AP	Donkarayi	25.0	0.5%	132.3	0.7	131.6
38	Hydro	State	AP	Lower Sileru	460.0	0.5%	1171.3	5.9	1165.4
39	Hydro	State	AP	Srisailam Right 1	110.0	0.5%	941.0	4.7	936.3
40	Hydro	State	AP	Srisailam Right 2	110.0				
41	Hydro	State	AP	Srisailam Right 3	110.0				
42	Hydro	State	AP	Srisailam Right 4	110.0				
43	Hydro	State	AP	Srisailam Right 5	110.0				
44	Hydro	State	AP	Srisailam Right 6	110.0				
45	Hydro	State	AP	Srisailam Right 7	110.0				
46	Hydro	State	AP	Srisailam Left 1	150.0	0.5%	1411.6	7.1	1404.5
47	Hydro	State	AP	Srisailam Left 2	150.0				
48	Hydro	State	AP	Srisailam Left 3	150.0				
49	Hydro	State	AP	Srisailam Left 4	150.0				
50	Hydro	State	AP	Srisailam Left 5	150.0				

51	Hydro	State	AP	Srisailam Left 6	150.0				
52	Hydro	State	AP	Nagarjunasagar	815.6	0.5%	501.5	2.5	499.0
53	Hydro	State	AP	NS Right Canal 1	30.0	0.5%	47.7	0.2	47.5
54	Hydro	State	AP	NS Right Canal 2	30.0				
55	Hydro	State	AP	NS Right Canal 3	30.0				
56	Hydro	State	AP	NS Left Canal	60.0	0.5%	5.1	0.0	5.1
57	Hydro	State	AP	Pochampad	27.0	0.5%	1.6	0.0	1.6
58	Hydro	State	AP	Nizamsagar	10.0	0.5%	0.0	0.0	0.0
59	Hydro	State	AP	Penna Ahobilam	20.0	0.5%	0.0	0.0	0.0
60	Hydro	State	AP	Singur	15.0	0.5%	1.5	0.0	1.5
61	Hydro	State	AP	Mini Hydro	30.0	0.5%	6.3	0.0	6.3
62	Wind	IPP	AP	Wind	2.0				
63	Thermal	State	Tamilnadu	Ennore	450	12.3%	1223.0	149.9	1073.0
64	Thermal	State	Tamilnadu	Tuticorin	1050	7.9%	8180.0	643.8	7536.2
65	Thermal	State	Tamilnadu	Mettur	840	8.3%	6684.0	556.1	6127.9
66	Thermal	State	Tamilnadu	North Chennai 1	210	9.2%	3916.0	359.9	3556.1
67	Thermal	State	Tamilnadu	North Chennai 2	210				
68	Thermal	State	Tamilnadu	North Chennai 3	210				
69	Gas	State	Tamilnadu	Kovilkalapai	108	2.5%	763.3	19.1	744.2
70	Gas	State	Tamilnadu	Basin Bridge	30	2.5%	40.5	1.0	39.5
71	Gas	State	Tamilnadu	Basin Bridge	30				
72	Gas	State	Tamilnadu	Basin Bridge	30				
73	Gas	State	Tamilnadu	Basin Bridge	30				
74	Gas	State	Tamilnadu	Valuthur	94	2.5%	557.5	13.9	543.6
75	Gas	State	Tamilnadu	Kuttalam	64	2.5%	640.9	16.0	624.9
76	Gas	State	Tamilnadu	Kuttalam	36				
77	Gas	IPP	Tamilnadu	Pillai Perumal Nallur GTPP	330.5	2.5%	464.3	11.6	452.7
78	Diesel	IPP	Tamilnadu	Samalpatti DEPP	105.7	3.0%	357.3	10.7	346.6
79	Diesel	IPP	Tamilnadu	Samayanallur DEPP	106	3.0%	382.0	11.5	370.6
80	Diesel	IPP	Tamilnadu	GMR Vasavi DEPP	196	3.0%	762.2	22.9	739.4
81	Hydro	State	Tamilnadu	Pykara	70	0.5%	213.4	1.1	212.4
82	Hydro	State	Tamilnadu	Moyar	36	0.5%	90.2	0.5	89.7
83	Hydro	State	Tamilnadu	Kundah I	60	0.5%	1567.4	7.8	1559.6
84	Hydro	State	Tamilnadu	Kundah II	175				
85	Hydro	State	Tamilnadu	Kundah III	180				
86	Hydro	State	Tamilnadu	Kundah IV	100				
87	Hydro	State	Tamilnadu	Kundah V	40				

88	Hydro	State	Tamilnadu	Mettur Dam	40	0.5%	26.0	0.1	25.9
89	Hydro	State	Tamilnadu	Mettur Tunnel	200	0.5%	308.6	1.5	307.0
90	Hydro	State	Tamilnadu	Lower Mettur	120	0.5%	254.7	1.3	253.4
91	Hydro	State	Tamilnadu	Periyar	140	0.5%	492.7	2.5	490.3
92	Hydro	State	Tamilnadu	Suruliyar	35	0.5%	101.4	0.5	100.9
93	Hydro	State	Tamilnadu	Papanasam	28	0.5%	88.5	0.4	88.1
94	Hydro	State	Tamilnadu	Servalar	20	0.5%	34.6	0.2	34.4
95	Hydro	State	Tamilnadu	Sarkarpathy	30	0.5%	114.7	0.6	114.1
96	Hydro	State	Tamilnadu	Sholayar I	70	0.5%	350.4	1.8	348.6
97	Hydro	State	Tamilnadu	Sholayar II	25				
98	Hydro	State	Tamilnadu	Aliyar	60	0.5%	162.1	0.8	161.3
99	Hydro	State	Tamilnadu	Kodayar I	60	0.5%	207.1	1.0	206.0
100	Hydro	State	Tamilnadu	Kodayar II	40				
101	Hydro	State	Tamilnadu	Kadamparai	400	0.5%	256.8	1.3	255.5
102	Hydro	State	Tamilnadu	Vaigai Small	6	0.5%	12.3	0.1	12.2
103	Hydro	State	Tamilnadu	Pykara Mini	2	0.5%	5.0	0.0	5.0
104	Hydro	State	Tamilnadu	Lower Bhavani Small	8	0.5%	61.5	0.3	61.2
105	Hydro	State	Tamilnadu	Lowerbavani RBC	8				
106	Hydro	State	Tamilnadu	Punachi Mini	2	0.5%	0.0	0.0	0.0
107	Hydro	State	Tamilnadu	Maravakandy Mini	0.75	0.5%	0.0	0.0	0.0
108	Hydro	State	Tamilnadu	Sathanur	7.5	0.5%	10.2	0.1	10.2
109	Hydro	State	Tamilnadu	Parsons Valley	30	0.5%	55.6	0.3	55.3
110	Hydro	State	Tamilnadu	Thirumurthy Mini	1.95	0.5%	0.0	0.0	0.0
111	Hydro	State	Tamilnadu	Mukurthy Mini	0.7	0.5%	0.0	0.0	0.0
112	Thermal	State	Karnataka	Raichur TPS	210	8.8%	10717.9	945.3	9772.6
113	Thermal	State	Karnataka	Raichur TPS	210				
114	Thermal	State	Karnataka	Raichur TPS	210				
115	Thermal	State	Karnataka	Raichur TPS	210				
116	Thermal	State	Karnataka	Raichur TPS	210				
117	Thermal	State	Karnataka	Raichur TPS	210				
118	Thermal	State	Karnataka	Raichur TPS	210				
119	Thermal	Jindal IPP	Karnataka	Torangulu Steam	130	8.3%	516.3	42.8	473.6
120	Thermal	Jindal IPP	Karnataka	Torangulu Steam	130				
121	Diesel	VVNL	Karnataka	Yelehanka Diesel	128	3.0%	271.1	8.1	263.0
122	Diesel	IPP	Karnataka	Bellay	25.2	3.0%	40.3	1.2	39.1
123	Diesel	TATA IPP	Karnataka	Belgaum	81.3	3.0%	238.5	7.2	231.3
124	Gas	GMR IPP	Karnataka	Tanir Bavi	220	3.0%	629.6	18.9	610.7
125	Hydro	VVNL	Karnataka	Jog	120	0.5%	174.2	0.9	173.3
126	Hydro	VVNL	Karnataka	Munirabad	27	0.5%	68.7	0.3	68.4
127	Hydro	VVNL	Karnataka	Shimshapur	17.2	0.5%	93.9	0.5	93.4
128	Hydro	VVNL	Karnataka	Shivnasamudram	42	0.5%	191.6	1.0	190.6
129	Hydro	KPCL	Karnataka	Varahi	230	0.5%	973.3	4.9	968.4

130	Hydro	KPCL	Karnataka	Ghatprabha	32	0.5%	96.6	0.5	96.1
131	Hydro	KPCL	Karnataka	Kodasalli 1	40	0.5%	214.8	1.1	213.7
132	Hydro	KPCL	Karnataka	Kodasalli 2	40				
133	Hydro	KPCL	Karnataka	Kodasalli 3	40				
134	Hydro	KPCL	Karnataka	Bhadra	33.4	0.5%	41.4	0.2	41.2
135	Hydro	KPCL	Karnataka	Kalindi Nagjhari	810	0.5%	1719.7	8.6	1711.1
136	Hydro	KPCL	Karnataka	Almattidam 1	15	0.5%	138.7	0.7	138.0
137	Hydro	KPCL	Karnataka	Almattidam 2	55				
138	Hydro	KPCL	Karnataka	Almattidam 3	55				
139	Hydro	KPCL	Karnataka	Almattidam 4	55				
140	Hydro	KPCL	Karnataka	Almattidam 5	55				
141	Hydro	KPCL	Karnataka	Almattidam 6	55				
142	Hydro	KPCL	Karnataka	Kalindi Supa DPH	100	0.5%	294.6	1.5	293.2
143	Hydro	KPCL	Karnataka	Gerusuppa	240	0.5%	437.6	2.2	435.4
144	Hydro	KPCL	Karnataka	Linganamakki	55	0.5%	194.3	1.0	193.3
145	Hydro	KPCL	Karnataka	Mallapur	9	0.5%	0.0	0.0	0.0
146	Hydro	KPCL	Karnataka	Manidam DPH	9	0.5%	23.5	0.1	23.3
147	Hydro	KPCL	Karnataka	Sharavati	1035	0.5%	3853.7	19.3	3834.5
148	Hydro	KPCL	Karnataka	Sirwar	1	0.5%	0.0	0.0	0.0
149	Hydro	KPCL	Karnataka	Kadra 1	50	0.5%	231.0	1.2	229.8
150	Hydro	KPCL	Karnataka	Kadra 2	50				
151	Hydro	KPCL	Karnataka	Kadra 3	50				
152	Hydro	Bhoruka P	Karnataka	Madhavmantrii	3	0.5%	22.9	0.1	22.7
153	Hydro	Bhoruka P	Karnataka	Shahpur	6.6	0.5%	25.2	0.1	25.0
154	Hydro	Bhoruka P	Karnataka	Harangi	9	0.5%	0.0	0.0	0.0
155	Hydro	Bhoruka P	Karnataka	Shivpura	18	0.5%	72.3	0.4	72.0
156	Hydro	Bhoruka P	Karnataka	Rajankollur	2	0.5%	0.0	0.0	0.0
157	Hydro	Bhoruka P	Karnataka	Shahpur	1.4	0.5%	0.0	0.0	0.0
158	Hydro	Mysore PC	Karnataka	Narayanpur	6.6	0.5%	42.5	0.2	42.2
159	Diesel	State	Kerala	Brahmpuram	107	3.0%	136.4	4.1	132.3
160	Diesel	State	Kerala	Kozhikode	129	3.0%	160.5	4.8	155.7
161	Diesel	IPP	Kerala	Kasargode	21.84	3.0%	15.7	0.5	15.3
162	Gas	IPP	Kerala	BSES	174	2.5%	111.8	2.8	109.0
163	Hydro		Kerala	Pallivasal	37.5	0.5%	222.6	1.1	221.4
164	Hydro		Kerala	Other Hydro	5	0.5%	0.0	0.0	0.0
165	Hydro		Kerala	Peppara	3	0.5%	6.4	0.0	6.3
166	Hydro		Kerala	Edamalayar	75	0.5%	338.3	1.7	336.6
167	Hydro		Kerala	Malampuzha	2.5	0.5%	0.0	0.0	0.0
168	Hydro		Kerala	Sholayar	54	0.5%	263.0	1.3	261.7
169	Hydro		Kerala	Senagulam	48	0.5%	167.0	0.8	166.1
170	Hydro		Kerala	Sabaragiri	300	0.5%	1224.5	6.1	1218.4
171	Hydro		Kerala	Porimgalkuttu	32	0.5%	181.6	0.9	180.7
172	Hydro		Kerala	Panniar	30	0.5%	142.4	0.7	141.7
173	Hydro		Kerala	Kuttiadi	75	0.5%	370.5	1.9	368.7
174	Hydro		Kerala	Kuttiadi	50				
175	Hydro		Kerala	Iddukki	780	0.5%	2003.4	10.0	1993.4
176	Hydro		Kerala	Kakkad	50	0.5%	210.4	1.1	209.3
177	Hydro		Kerala	Poringal Kuthu L	16	0.5%	108.0	0.5	107.4

178	Hydro		Kerala	Lower Pariyar	180	0.5%	512.4	2.6	509.8
179	Hydro		Kerala	Madupetty	2	0.5%	4.1	0.0	4.0
180	Hydro		Kerala	Nariamanglam	45	0.5%	232.0	1.2	230.8
181	Hydro		Kerala	Kallada	15	0.5%	76.9	0.4	76.5
182	Hydro		Kerala	Malankara	10.5	0.5%	3.0	0.0	2.9
183	Hydro	KLPVT	Kerala	Maniar	10	0.5%	34.5	0.2	34.3
184	Hydro	KLPVT	Kerala	Kuthungal	21	0.5%	36.2	0.2	36.0
185	Hydro		Kerala	Chembukadavu	6.5	0.5%	6.2	0.0	6.2
186	Hydro		Kerala	Urumi	6.2	0.5%	0.9	0.0	0.9
187	Gas	State	Pondicherry	PPCL GTG	32.5	2.5%	275.7	6.9	268.8
188	Diesel		Lakshdeep	Mix	10	3.0%	6.0	0.2	5.8
189	Gas	NTPC	Kerala	Kayamkulam GT1	115.2	2.5%	620.5	15.5	605.0
190	Gas	NTPC	Kerala	Kayamkulam GT2	115.2				
191	Gas	NTPC	Kerala	Kayamkulam GT3	129.2				
192	Thermal	NTPC	AP	Ramagundam STPS 1	200	6.6%	17169.8	1131.5	16038.3
193	Thermal	NTPC	AP	Ramagundam STPS 2	200				
194	Thermal	NTPC	AP	Ramagundam STPS 3	200				
195	Thermal	NTPC	AP	Ramagundam STPS 4	500				
196	Thermal	NTPC	AP	Ramagundam STPS 5	500				
197	Thermal	NTPC	AP	Ramagundam STPS 6	500				
198	Thermal	NTPC	AP	Simhadri	500	5.7%	8122.1	458.9	7663.2
199	Thermal	NTPC	AP	Simhadri	500				
200	Thermal	IPP	Tamilnadu	Neyvelli Zero	250	8.8%	1335.8	118.0	1217.9
201	Thermal	NLC	Tamilnadu	NLC TSI	50	8.3%	4257.8	352.5	3905.2
202	Thermal	NLC	Tamilnadu	NLC TSI	50				
203	Thermal	NLC	Tamilnadu	NLC TSI	50				
204	Thermal	NLC	Tamilnadu	NLC TSI	50				
205	Thermal	NLC	Tamilnadu	NLC TSI	50				
206	Thermal	NLC	Tamilnadu	NLC TSI	50				
207	Thermal	NLC	Tamilnadu	NLC TSI	100				
208	Thermal	NLC	Tamilnadu	NLC TSI	100				
209	Thermal	NLC	Tamilnadu	NLC TSI	100				
210	Thermal	NLC	Tamilnadu	NLC TS II	210	8.3%	9247.4	765.7	8481.7
211	Thermal	NLC	Tamilnadu	NLC TS II	210				
212	Thermal	NLC	Tamilnadu	NLC TS II	210				
213	Thermal	NLC	Tamilnadu	NLC TS II	210				
214	Thermal	NLC	Tamilnadu	NLC TS II	210				
215	Thermal	NLC	Tamilnadu	NLC TS II	210				
216	Thermal	NLC	Tamilnadu	NLC TS II	210				

217	Thermal	NLC	Tamilnadu	NLC TS I extension	420	8.3%	3237.7	268.1	2969.6
218	Nuclear	NPC	Tamilnadu	MAPP Kalpakkam	340	12.0%	1480.5	177.7	1302.8
219	Nuclear	NPC	Karnataka	Kaiga 1	220	12.0%	2926.3	351.2	2575.1
220	Nuclear	NPC	Karnataka	Kaiga 2	220				

ALL STATES

SN	Type	Owner ship	State	Station	Capacity (MW)	Aux Con % (2002-03)	Gross Gen (2002-03)	Aux Con (2002-03)	Net Gen (2002-03)	Aux Con % (2003-04)	Gross Gen (2003-04)	Aux Con (2003-04)	Net Gen (2003-04)
1	Thermal	State	AP	Vijayawada -1	210.0	8.8%	10283.0	901.8	9381.2	9.4%	10104.0	945.7	9158.3
2	Thermal	State	AP	Vijayawada - 2	210.0								
3	Thermal	State	AP	Vijayawada - 3	210.0								
4	Thermal	State	AP	Vijayawada - 4	210.0								
5	Thermal	State	AP	Vijayawada - 5	210.0								
6	Thermal	State	AP	Vijayawada - 6	210.0								
7	Thermal	State	AP	Rayalaseema - 1	210.0	10.0%	3489.0	349.6	3139.4	9.7%	3331.0	324.1	3006.9
8	Thermal	State	AP	Rayalaseema - 2	210.0								
9	Thermal	State	AP	Kothagudem - 1	60.0	9.1%	4645.0	424.6	4220.4	9.5%	4183.0	395.7	3787.3
10	Thermal	State	AP	Kothagudem - 2	60.0								
11	Thermal	State	AP	Kothagudem - 3	60.0								
12	Thermal	State	AP	Kothagudem - 4	60.0								
13	Thermal	State	AP	Kothagudem - 5	120.0								
14	Thermal	State	AP	Kothagudem - 6	120.0								
15	Thermal	State	AP	Kothagudem - 7	110.0								

16	Thermal	State	AP	Kothagudem - 8	110.0								
17	Thermal	State	AP	Kothagudem V Stage I	250.0	9.1%	4081.0	371.4	3709.6	9.5%	3994.0	377.8	3616.2
18	Thermal	State	AP	Kothagudem V Stage II	250.0								
19	Thermal	State	AP	Ramagundam B	62.5	14.5%	288.2	41.8	246.4	9.0%	471.0	42.4	428.6
20	Thermal	State	AP	Nellore	30.0	7.0%	145.9	10.3	135.7	9.8%	146.0	14.4	131.6
21	Gas	State	AP	Vijjeswaram I - 1	33.0	2.5%	2031.0	50.8	1980.2	2.5%	2147.0	53.7	2093.3
22	Gas	State	AP	Vijjeswaram I - 2	33.0								
23	Gas	State	AP	Vijjeswaram I - 3	34.0								
24	Gas	State	AP	Vijjeswaram II - 1	112.0								
25	Gas	State	AP	Vijjeswaram II - 2	60.0								
26	Gas	IPP	AP	BSES-Peddapuram	220	2.5%	850.0	21.3	828.8	2.5%	1249.0	31.2	1217.8
27	Gas	IPP	AP	Jegrupadu	216	2.5%	1583.0	39.6	1543.4	2.5%	1505.0	37.6	1467.4
28	Gas	IPP	AP	LANCO-Kondapalli	355	2.5%	2477.0	61.9	2415.1	2.5%	2238.0	56.0	2182.1
29	Gas	IPP	AP	Spectrum-Godavari	208	2.5%	1250.0	31.3	1218.8	2.5%	1100.0	27.5	1072.5
30	Diesel	IPP	AP	LVS power	36.8	3.0%	2.0	0.1	1.9	3.0%	0.0	0.0	0.0
31	Hydro	Shared	AP	Machkund (AP Utilisation)	84.0	0.5%	579.6	2.9	576.7	0.5%	529.0	2.6	526.4
32	Hydro	Shared	AP	Tungabhadra (AP Utilisation)	57.6	0.5%	118.5	0.6	117.9	0.5%	148.0	0.7	147.3
33	Hydro	State	AP	Upper Sileru 1	60.0	0.5%	245.6	1.2	244.4	0.5%	401.0	2.0	399.0
34	Hydro	State	AP	Upper Sileru 2	60.0								
35	Hydro	State	AP	Upper Sileru 3	60.0								
36	Hydro	State	AP	Upper Sileru 4	60.0								
37	Hydro	State	AP	Donkarayi	25.0	0.5%	40.0	0.2	39.8	0.5%	111.0	0.6	110.4
38	Hydro	State	AP	Lower Sileru	460.0	0.5%	613.7	3.1	610.7	0.5%	977.0	4.9	972.1
39	Hydro	State	AP	Srisailam Right 1	110.0	0.5%	538.7	2.7	536.0	0.5%	309.0	1.5	307.5
40	Hydro	State	AP	Srisailam Right 2	110.0								
41	Hydro	State	AP	Srisailam Right 3	110.0								
42	Hydro	State	AP	Srisailam Right 4	110.0								
43	Hydro	State	AP	Srisailam Right 5	110.0								
44	Hydro	State	AP	Srisailam Right 6	110.0								
45	Hydro	State	AP	Srisailam Right 7	110.0								
46	Hydro	State	AP	Srisailam Left 1	150.0	0.5%	559.7	2.8	556.9	0.5%	328.0	1.6	326.4
47	Hydro	State	AP	Srisailam Left 2	150.0								
48	Hydro	State	AP	Srisailam Left 3	150.0								
49	Hydro	State	AP	Srisailam Left 4	150.0								
50	Hydro	State	AP	Srisailam Left 5	150.0								
51	Hydro	State	AP	Srisailam Left 6	150.0								
52	Hydro	State	AP	Nagarjunasagar	815.6	0.5%	869.0	4.3	864.7	0.5%	369.0	1.8	367.2
53	Hydro	State	AP	NS Right Canal 1	30.0	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
54	Hydro	State	AP	NS Right Canal 2	30.0								
55	Hydro	State	AP	NS Right Canal 3	30.0								
56	Hydro	State	AP	NS Left Canal	60.0	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
57	Hydro	State	AP	Pochampad	27.0	0.5%	83.0	0.4	82.6	0.5%	64.0	0.3	63.7
58	Hydro	State	AP	Nizamsagar	10.0	0.5%	0.0	0.0	0.0	0.5%	6.0	0.0	6.0
59	Hydro	State	AP	Penna Ahobilam	20.0	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
60	Hydro	State	AP	Singur	15.0	0.5%	6.3	0.0	6.2	0.5%	6.0	0.0	6.0
61	Hydro	State	AP	Mini Hydro	30.0	0.5%	11.7	0.1	11.6	0.5%	8.0	0.0	8.0

62	Wind	IPP	AP	Wind	2.0								
63	Thermal	State	Tamil nadu	Ennore	450	10.1%	1747.0	177.0	1570.0	9.7%	1258.0	121.5	1136.5
64	Thermal	State	Tamil nadu	Tuticorin	1050	7.7%	8187.0	630.4	7556.6	8.0%	8084.0	650.0	7434.0
65	Thermal	State	Tamil nadu	Mettur	840	7.9%	6739.0	529.7	6209.3	7.9%	6735.0	534.8	6200.2
66	Thermal	State	Tamil nadu	North Chennai 1	210	9.2%	4405.0	405.3	3999.7	9.2%	4347.0	398.2	3948.8
67	Thermal	State	Tamil nadu	North Chennai 2	210								
68	Thermal	State	Tamil nadu	North Chennai 3	210								
69	Gas	State	Tamil nadu	Kovilkalapai	108	2.5%	726.0	18.2	707.9	2.5%	745.0	18.6	726.4
70	Gas	State	Tamil nadu	Basin Bridge	30	2.5%	276.0	6.9	269.1	2.5%	89.0	2.2	86.8
71	Gas	State	Tamil nadu	Basin Bridge	30								
72	Gas	State	Tamil nadu	Basin Bridge	30								
73	Gas	State	Tamil nadu	Basin Bridge	30								
74	Gas	State	Tamil nadu	Valuthur	94	2.5%	104.0	2.6	101.4	2.5%	671.0	16.8	654.2
75	Gas	State	Tamil nadu	Kuttalam	64	2.5%	0.0	0.0	0.0	2.5%	108.0	2.7	105.3
76	Gas	State	Tamil nadu	Kuttalam	36								
77	Gas	IPP	Tamil nadu	Pillai Perumal Nallur GTPP	330.5	2.5%	2169.0	54.2	2114.8	2.5%	1314.0	32.9	1281.2
78	Diesel	IPP	Tamil nadu	Samalpatti DEPP	105.7	3.0%	623.0	18.7	604.3	3.0%	458.0	13.7	444.3
79	Diesel	IPP	Tamil nadu	Samayanallur DEPP	106	3.0%	589.0	17.7	571.3	3.0%	457.0	13.7	443.3
80	Diesel	IPP	Tamil nadu	GMR Vasavi DEPP	196	3.0%	1209.0	36.3	1172.7	3.0%	992.0	29.8	962.2
81	Hydro	State	Tamil nadu	Pykara	70	0.5%	254.0	1.3	252.7	0.5%	141.0	0.7	140.3
82	Hydro	State	Tamil nadu	Moyar	36	0.5%	105.0	0.5	104.5	0.5%	53.0	0.3	52.7
83	Hydro	State	Tamil nadu	Kundah I	60	0.5%	764.0	3.8	760.2	0.5%	429.0	2.1	426.9
84	Hydro	State	Tamil nadu	Kundah II	175								
85	Hydro	State	Tamil nadu	Kundah III	180								
86	Hydro	State	Tamil nadu	Kundah IV	100								
87	Hydro	State	Tamil nadu	Kundah V	40								
88	Hydro	State	Tamil nadu	Mettur Dam	40	0.5%	41.0	0.2	40.8	0.5%	15.0	0.1	14.9
89	Hydro	State	Tamil nadu	Mettur Tunnel	200	0.5%	89.0	0.4	88.6	0.5%	70.0	0.4	69.7
90	Hydro	State	Tamil nadu	Lower Mettur	120	0.5%	168.0	0.8	167.2	0.5%	97.0	0.5	96.5
91	Hydro	State	Tamil nadu	Periyar	140	0.5%	227.0	1.1	225.9	0.5%	213.0	1.1	211.9
92	Hydro	State	Tamil nadu	Suruliyar	35	0.5%	75.0	0.4	74.6	0.5%	41.0	0.2	40.8
93	Hydro	State	Tamil nadu	Papanasam	28	0.5%	65.0	0.3	64.7	0.5%	47.0	0.2	46.8
94	Hydro	State	Tamil nadu	Servalar	20	0.5%	19.0	0.1	18.9	0.5%	19.0	0.1	18.9
95	Hydro	State	Tamil nadu	Sarkarpathy	30	0.5%	97.0	0.5	96.5	0.5%	51.0	0.3	50.7

96	Hydro	State	Tamil nadu	Sholayar I	70	0.5%	320.0	1.6	318.4	0.5%	199.0	1.0	198.0
97	Hydro	State	Tamil nadu	Sholayar II	25								
98	Hydro	State	Tamil nadu	Aliyar	60	0.5%	108.0	0.5	107.5	0.5%	86.0	0.4	85.6
99	Hydro	State	Tamil nadu	Kodayar I	60	0.5%	150.0	0.8	149.3	0.5%	141.0	0.7	140.3
100	Hydro	State	Tamil nadu	Kodayar II	40								
101	Hydro	State	Tamil nadu	Kadamparai	400	0.5%	203.0	1.0	202.0	0.5%	408.0	2.0	406.0
102	Hydro	State	Tamil nadu	Vaigai Small	6	0.5%	4.0	0.0	4.0	0.5%	5.0	0.0	5.0
103	Hydro	State	Tamil nadu	Pykara Mini	2	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
104	Hydro	State	Tamil nadu	Lower Bhavani Small	8	0.5%	21.0	0.1	20.9	0.5%	9.0	0.0	9.0
105	Hydro	State	Tamil nadu	Lowerbavani RBC	8								
106	Hydro	State	Tamil nadu	Punachi Mini	2	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
107	Hydro	State	Tamil nadu	Maravakandy Mini	0.75	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
108	Hydro	State	Tamil nadu	Sathanur	7.5	0.5%	2.0	0.0	2.0	0.5%	2.0	0.0	2.0
109	Hydro	State	Tamil nadu	Parsons Valley	30	0.5%	16.0	0.1	15.9	0.5%	18.0	0.1	17.9
110	Hydro	State	Tamil nadu	Thirumurthy Mini	1.95	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
111	Hydro	State	Tamil nadu	Mukurthy Mini	0.7	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
112	Thermal	State	Karnataka	Raichur TPS	210	8.4%	10290.0	868.5	9421.5	8.6%	11400.0	978.1	10421.9
113	Thermal	State	Karnataka	Raichur TPS	210								
114	Thermal	State	Karnataka	Raichur TPS	210								
115	Thermal	State	Karnataka	Raichur TPS	210								
116	Thermal	State	Karnataka	Raichur TPS	210								
117	Thermal	State	Karnataka	Raichur TPS	210								
118	Thermal	State	Karnataka	Raichur TPS	210								
119	Thermal	Jindal IPP	Karnataka	Torangulu Steam	130	8.4%	872.0	73.1	798.9	9.0%	766.0	69.2	696.8
120	Thermal	Jindal IPP	Karnataka	Torangulu Steam	130								
121	Diesel	VVNL	Karnataka	Yelehanka Diesel	128	3.0%	715.0	21.5	693.6	3.0%	384.0	11.5	372.5
122	Diesel	IPP	Karnataka	Bellay	25.2	3.0%	64.0	1.9	62.1	3.0%	42.0	1.3	40.7
123	Diesel	TATA IPP	Karnataka	Belgaum	81.3	3.0%	355.0	10.7	344.4	3.0%	235.0	7.1	228.0
124	Gas	GMR IPP	Karnataka	Tanir Bavi	220	3.0%	1280.0	38.4	1241.6	3.0%	1631.0	48.9	1582.1
125	Hydro	VVNL	Karnataka	Jog	120	0.5%	146.0	0.7	145.3	0.5%	160.0	0.8	159.2
126	Hydro	VVNL	Karnataka	Munirabad	27	0.5%	47.0	0.2	46.8	0.5%	41.0	0.2	40.8
127	Hydro	VVNL	Karnataka	Shimshapur	17.2	0.5%	57.0	0.3	56.7	0.5%	57.0	0.3	56.7
128	Hydro	VVNL	Karnataka	Shivnasamudram	42	0.5%	14.0	0.1	13.9	0.5%	79.0	0.4	78.6
129	Hydro	KPCL	Karnat	Varahi	230	0.5%	844.0	4.2	839.8	0.5%	721.0	3.6	717.4

			aka										
130	Hydro	KPCL	Karnataka	Ghatprabha	32	0.5%	59.0	0.3	58.7	0.5%	62.0	0.3	61.7
131	Hydro	KPCL	Karnataka	Kodasalli 1	40	0.5%	218.0	1.1	216.9	0.5%	214.0	1.1	212.9
132	Hydro	KPCL	Karnataka	Kodasalli 2	40								
133	Hydro	KPCL	Karnataka	Kodasalli 3	40								
134	Hydro	KPCL	Karnataka	Bhadra	33.4	0.5%	18.0	0.1	17.9	0.5%	11.0	0.1	10.9
135	Hydro	KPCL	Karnataka	Kalindi Nagjhari	810	0.5%	1812.0	9.1	1802.9	0.5%	1718.0	8.6	1709.4
136	Hydro	KPCL	Karnataka	Almattidam 1	15	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
137	Hydro	KPCL	Karnataka	Almattidam 2	55								
138	Hydro	KPCL	Karnataka	Almattidam 3	55								
139	Hydro	KPCL	Karnataka	Almattidam 4	55								
140	Hydro	KPCL	Karnataka	Almattidam 5	55								
141	Hydro	KPCL	Karnataka	Almattidam 6	55								
142	Hydro	KPCL	Karnataka	Kalindi Supa DPH	100	0.5%	257.0	1.3	255.7	0.5%	241.0	1.2	239.8
143	Hydro	KPCL	Karnataka	Gerusuppa	240	0.5%		0.0	0.0	0.5%	358.0	1.8	356.2
144	Hydro	KPCL	Karnataka	Linganamakki	55	0.5%	111.0	0.6	110.4	0.5%	721.0	3.6	717.4
145	Hydro	KPCL	Karnataka	Mallapur	9	0.5%	1.0	0.0	1.0	0.5%	0.0	0.0	0.0
146	Hydro	KPCL	Karnataka	Manidam DPH	9	0.5%	18.0	0.1	17.9	0.5%	11.0	0.1	10.9
147	Hydro	KPCL	Karnataka	Sharavati	1035	0.5%	2950.0	14.8	2935.3	0.5%	3316.0	16.6	3299.4
148	Hydro	KPCL	Karnataka	Sirwar	1	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
149	Hydro	KPCL	Karnataka	Kadra 1	50	0.5%	238.0	1.2	236.8	0.5%	223.0	1.1	221.9
150	Hydro	KPCL	Karnataka	Kadra 2	50								
151	Hydro	KPCL	Karnataka	Kadra 3	50								
152	Hydro	Bhoruka P	Karnataka	Madhavmantrii	3	0.5%	0.0	0.0	0.0	0.5%	13.0	0.1	12.9
153	Hydro	Bhoruka P	Karnataka	Shahpur	6.6	0.5%	22.0	0.1	21.9	0.5%	22.0	0.1	21.9
154	Hydro	Bhoruka P	Karnataka	Harangi	9	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
155	Hydro	Bhoruka P	Karnataka	Shivpura	18	0.5%	67.0	0.3	66.7	0.5%	54.0	0.3	53.7
156	Hydro	Bhoruka P	Karnataka	Rajankollur	2	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
157	Hydro	Bhoruka P	Karnataka	Shahpur	1.4	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
158	Hydro	Mysore PC	Karnataka	Narayanpur	6.6	0.5%	36.0	0.2	35.8	0.5%	38.0	0.2	37.8
159	Diesel	State	Kerala	Brahmpuram	107	3.0%	367.0	11.0	356.0	3.0%	266.0	8.0	258.0
160	Diesel	State	Kerala	Kozhikode	129	3.0%	385.0	11.6	373.5	3.0%	313.0	9.4	303.6
161	Diesel	IPP	Kerala	Kasargode	21.84	3.0%	148.0	4.4	143.6	3.0%	78.0	2.3	75.7
162	Gas	IPP	Kerala	BSES	174	2.5%		0.0	0.0	2.5%	991.0	24.8	966.2
163	Hydro		Kerala	Pallivasal	37.5	0.5%	157.0	0.8	156.2	0.5%	193.0	1.0	192.0
164	Hydro		Kerala	Other Hydro	5	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0

165	Hydro		Kerala	Peppara	3	0.5%	6.0	0.0	6.0	0.5%	1.0	0.0	1.0
166	Hydro		Kerala	Edamalayar	75	0.5%	259.0	1.3	257.7	0.5%	155.0	0.8	154.2
167	Hydro		Kerala	Malampuzha	2.5	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
168	Hydro		Kerala	Sholayar	54	0.5%	138.0	0.7	137.3	0.5%	202.0	1.0	201.0
169	Hydro		Kerala	Senagulam	48	0.5%	130.0	0.7	129.4	0.5%	128.0	0.6	127.4
170	Hydro		Kerala	Sabaragiri	300	0.5%	804.0	4.0	800.0	0.5%	698.0	3.5	694.5
171	Hydro		Kerala	Porimgalkuttu	32	0.5%	123.0	0.6	122.4	0.5%	142.0	0.7	141.3
172	Hydro		Kerala	Panniar	30	0.5%	78.0	0.4	77.6	0.5%	76.0	0.4	75.6
173	Hydro		Kerala	Kuttiadi	75	0.5%	304.0	1.5	302.5	0.5%	259.0	1.3	257.7
174	Hydro		Kerala	Kuttiadi	50								
175	Hydro		Kerala	Iddukki	780	0.5%	1905.0	9.5	1895.5	0.5%	1246.0	6.2	1239.8
176	Hydro		Kerala	Kakkad	50	0.5%	150.0	0.8	149.3	0.5%	126.0	0.6	125.4
177	Hydro		Kerala	Poringal Kuthu L	16	0.5%	78.0	0.4	77.6	0.5%	88.0	0.4	87.6
178	Hydro		Kerala	Lower Pariyar	180	0.5%	414.0	2.1	411.9	0.5%	363.0	1.8	361.2
179	Hydro		Kerala	Madupetty	2	0.5%	2.0	0.0	2.0	0.5%	8.0	0.0	8.0
180	Hydro		Kerala	Nariamanglam	45	0.5%	230.0	1.2	228.9	0.5%	196.0	1.0	195.0
181	Hydro		Kerala	Kallada	15	0.5%	35.0	0.2	34.8	0.5%	36.0	0.2	35.8
182	Hydro		Kerala	Malankara	10.5	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
183	Hydro	KLPVT	Kerala	Maniar	10	0.5%	23.0	0.1	22.9	0.5%	21.0	0.1	20.9
184	Hydro	KLPVT	Kerala	Kuthungal	21	0.5%	23.0	0.1	22.9	0.5%	19.0	0.1	18.9
185	Hydro		Kerala	Chembukadavu	6.5	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
186	Hydro		Kerala	Urumi	6.2	0.5%	0.0	0.0	0.0	0.5%	0.0	0.0	0.0
187	Gas	State	Pondicherry	PPCL GTG	32.5	2.5%	265.0	6.6	258.4	2.5%	277.0	6.9	270.1
188	Diesel		Lakshdeep	Mix	10	3.0%	0.0	0.0	0.0	3.0%	0.0	0.0	0.0
189	Gas	NTPC	Kerala	Kayamkulam GT1	115.2	2.5%	2127.0	53.2	2073.8	2.5%	2118.0	53.0	2065.1
190	Gas	NTPC	Kerala	Kayamkulam GT2	115.2								
191	Gas	NTPC	Kerala	Kayamkulam GT3	129.2								
192	Thermal	NTPC	AP	Ramagundam STPS 1	200	9.6%	16839.0	1614.9	15224.1	9.6%	16332.0	1566.2	14765.8
193	Thermal	NTPC	AP	Ramagundam STPS 2	200								
194	Thermal	NTPC	AP	Ramagundam STPS 3	200								
195	Thermal	NTPC	AP	Ramagundam STPS 4	500								
196	Thermal	NTPC	AP	Ramagundam STPS 5	500								
197	Thermal	NTPC	AP	Ramagundam STPS 6	500								
198	Thermal	NTPC	AP	Simhadri	500	9.0%	4974.0	447.7	4526.3	9.0%	7722.0	695.0	7027.0
199	Thermal	NTPC	AP	Simhadri	500								
200	Thermal	IPP	Tamilnadu	Neyvelli Zero	250	9.3%	1395.0	130.0	1265.0	9.3%	1395.0	130.0	1265.0
201	Thermal	NLC	Tamilnadu	NLC TSI	50	8.4%	4378.7	366.9	4011.7	9.0%	4400.0	397.8	4002.2
202	Thermal	NLC	Tamilnadu	NLC TSI	50								
203	Thermal	NLC	Tamilnadu	NLC TSI	50								
204	Thermal	NLC	Tamilnadu	NLC TSI	50								
205	Thermal	NLC	Tamilnadu	NLC TSI	50								

206	Thermal	NLC	Tamil nadu	NLC TSI	50								
207	Thermal	NLC	Tamil nadu	NLC TSI	100								
208	Thermal	NLC	Tamil nadu	NLC TSI	100								
209	Thermal	NLC	Tamil nadu	NLC TSI	100								
210	Thermal	NLC	Tamil nadu	NLC TS II	210								
211	Thermal	NLC	Tamil nadu	NLC TS II	210								
212	Thermal	NLC	Tamil nadu	NLC TS II	210								
213	Thermal	NLC	Tamil nadu	NLC TS II	210	8.4%	10504.4	880.3	9624.1	9.0%	10003.0	904.3	9098.7
214	Thermal	NLC	Tamil nadu	NLC TS II	210								
215	Thermal	NLC	Tamil nadu	NLC TS II	210								
216	Thermal	NLC	Tamil nadu	NLC TS II	210								
217	Thermal	NLC	Tamil nadu	NLC TS I extension	420	8.4%	86.9	7.3	79.6	9.0%	1993.0	180.2	1812.8
218	Nuclear	NPC	Tamil nadu	MAPP Kalpakkam	340	12.0%	1073.0	128.8	944.2	12.0%	1577.0	189.2	1387.8
219	Nuclear	NPC	Karnataka	Kaiga 1	220	12.0%	3317.0	398.0	2919.0	12.0%	3123.0	374.8	2748.2
220	Nuclear	NPC	Karnataka	Kaiga 2	220								

CER Calculation:

Year	Period	Power Generation MWhr	Average carbon emission factor (tCO2/MWh)	Baseline emission (tCO2/year)	CER (tCO2/year)
1	April 00- March 01	13006.458	0.810	10539.10	10539
2	April 01- March 02	24891.552	0.810	20169.55	20170
3	April 02- March 03	18031.976	0.810	14611.26	14611
4	April 03- March 04	14738.874	0.810	11942.87	11943
5	April 04- March 05	22684.548	0.810	18381.22	18381
6	April 05- March 06	22684.548	0.810	18381.22	18381
7	April 06- March 07	22684.548	0.810	18381.22	18381

8	April 07- March 08	22684.548	0.810	18381.22	18381
9	April 08- March 09	22684.548	0.810	18381.22	18381
10	April 09- March 10	22684.548	0.810	18381.22	18381
				Total	**167550**

Annex 4

Monitoring Plan

Project Management & Monitoring:

Monitoring of Generation Data

Each Wind Turbine has a local control system (LCS) in the Control Panel, which records the generation from that Turbine. A number of such Wind Turbines are connected to the common metering point, known as HTSC (High Tension Service Connection), which has a digital meter certified and owned by APTRANSCO. This HTSC meter will record the total generation from all these Wind Turbines and auxiliary consumption .The sum total of the LCS readings of the individual Wind Turbines will not be equal to the HTSC meter readings due to internal line loss in the range of 5 to 7%.

The daily reading from individual turbines (LCS) is recorded. The HTSC Meter reading is also recorded and compared for variance. The Site-in-Charge is responsible for the collection, reporting and archiving of this data in Physical/ electronic form. The readings taken at the Wind farm from the LCS display is sent as a soft copy to the Head Office for monitoring and analysis.

The HTSC meter is inspected and the reading is recorded and certified by the APTRANSCO Officials, each month on a prescribed date. A copy of this Monthly Power generation reading so taken by representatives of APTRANSCO is furnished to the Site-in- Charge who in turn transmits the same to the Head Office. The APTRANSCO meter is of the Tri-vector type, which records the electricity, exported and imported.

Training program:

There is no specialised training required for recording and monitoring the generation and the staffs are trained on the job. Additionally, senior management personnel conduct training programs at the Site with respect to technical subjects. Further training on HR and other subjects are given in Chennai by external faculty.

Emergency Preparedness plan:

The Technicians at the Site are all aware of the steps to be taken during Emergencies at the Site. The Quality System process Manual is available at the Site for guidance. Danger boards have been put out at the High Voltage Electrical Installations. The staffs are also trained in the First aid and Safety methods.

THERE IS NO EXPECTED UN-INTENTIONAL EMISSION FROM THIS PROJECT ACTIVITY

Calibration and Maintenance of Meters:

The HTSC meter, which records the generation, is monitored and maintained by the APTRANSCO Officials. They record the generation every month and provide tamper proof seals which can be broken by them only.

The individual meter in the Turbine is maintained by the company.

For all purposes including revenue realisation, it is the APTRANSCO certified data, which is used by the Project Proponent.

Monitoring Data - Adjustments & Uncertainties

The uncertainty level of data is low. The individual meter readings are compared with the HTSC reading and checked in the event of any variance beyond the 10% limit (between LCS and HTSC reading), corrective action is initiated internally if the cause is the LCS in the Control panel. If any action is required at the HTSC meter, the same will be communicated / reported the officials immediately for necessary action at their end.

The HTSC meter is of standard Tri-vector type of approved specification and installed by AP TRANSCO and tamper proof. The seal is broken open at the time of recording the data and closed after the same.

Performance Review and Internal Audit of Reported data

There is a monthly review of generation data internally. The data of actual generation is compared to the scheduled generation and variance analysis is done and recorded in the monthly Operations Report. Corrective action is taken as required.

Annex 5

IRR Calculation

Proposed Wind farm at Kadavukalle Village, Tadipatri, AP - 13.50 MW (54 Nos. WEGs of 250 KW capacity)

Assumptions and Notes

1	Generation Expected	4	lac units /WEG p.a.	
2	Tariff is Rs.	3.62	per unit	
	Increase in Tariff	6%	p.a.	
3	Discount offered	10%	on tariff rate to consumer	
4	Wheeling charges	2%		
5	Lease Rentals	0.87	Average Rs. Lac per month per WEG	
	Increase p.a. proportionate to tariff increase	6%	based on structuring of lease on case to case	
7	Operation & Maintenance exp.	1%	of capital cost of asset	
	O & M Increase p.a.	5%		
8	Insurance on WEG	0.21	lac per WEG p.a.	21000.00
9	Manpower costs Rs.	1	lac p.m.	
	Increase p.a.	7.5%		
10	Administrative exp	0.75	lac p.m.	
	Increase p.a.	5%		
12	CO2 emission reduction.	800	MT for every 1 million units generation	
13	Carbon Trading Revenue	5	US $ per MT	
14	US $ Exchange rate	43	Rs. / 1 USD	
15	Increase in Carbon Trading rev. on a/c of better price and inc. in $ rate	10%		
16	Taxation	38.50%	(35% Income Tax + 10% surcharge)	

	Project Description	**IRR with CDM rev**		**IRR Without CDM Rev.**	
		IRR	Pretax * equivalent		Pretax * equivalent
a	Tadipatri 13.50 MW		7.1%		4.9%

* Corporate Income tax rate of 38.5% is assumed
The pretax equivalent of 7.1% with carbon trading revenue is barely over Bank rate.
Without Carbon Trading Revenue, the IRR is 4.90% which is below bank rate
Hence it is the factoring of the Carbon Trading income which is the Deciding factor. The rate of US $ 5 per ton of CO2 is also expected to increase In the coming years.
The generation of 4 lac units assumed though conservative is a figure which can definitely be achieved. Improved generation will better The return on investment

The project can see reasonable returns only after the 10 year period upto 20 years.
At 4.5 lac units generation per WEG, the IRR will improve and focus must be on improved generation.

Project at		Nos		KW			
Tadipatri	54	WEGs	250	capacity	13.5	MW	

Cost of Project

Total cost incl. Commissioning & Installation	6400	lacs
Lease Finance Requested	6400	
Deposits placed	1964	
Net inflow from Lessor	4436	

Lease Finance:

			GTB	**CB**	**SFL**	**LGF**	**ICCFL**	**Total**
No. of WEGs			20	16	12	2	4	54
Lease Assistance			2460	1920	1320	220	480	6400
Deposit placed			840	640	210	70	204	1964
Min. gen. per WEG/p.a.		lac units	4.00	4.00	4.00	4.00	4.00	4.00
Wheeling charges	2.00%	lac units	0.08	0.08	0.08	0.08	0.08	0.08
Banking charges	2.00%	lac units	0.08	0.08	0.08	0.08	0.08	0.08
Net Realisation		lac units	3.84	3.84	3.84	3.84	3.84	3.84
Prevailing tariff		Rs.	3.62	3.62	3.62	3.62	3.62	3.62
Discount offered	10%	Rs.	0.36	0.36	0.36	0.36	0.36	0.36
Rate realised per unit		Rs.	3.26	3.26	3.26	3.26	3.26	3.26
Total gen. For all WEGs		lac units	80	64	48	8	16	216
Net of wheeling/banking		lac units	**76.80**	**61.44**	**46.08**	**7.68**	**15.36**	**207.36**
Total generation income		Rs.lacs	260.64	208.64	156.48	26.08	52.16	704.00
Net of wheeling/banking		Rs.lacs	**250.21**	**200.29**	**150.22**	**25.04**	**50.07**	**675.84**
CO2 emission reduction		MT/ 10 lac units	800	800	800	800	800	800
CO2 credits from generation		MT	6400	5120	3840	640	1280	17280
Realisation per MT		US $	5	5	5	5	5	5
Rate / $		Rs.	43	43	43	43	43	43
Annual Carbon trading income		Rs.in lacs	**13.76**	**11.01**	**8.26**	**1.38**	**2.75**	**37.15**

Considering CDM Revenue				I	II	III	IV	V	VI
Realisation pa. for all WEGs			106%	675.84	716.39	759.37	804.94	853.23	904.
Carbon Credit realisation			110%	37.15	40.87	44.95	49.45	54.39	59.
Total Income				**712.99**	**757.26**	**804.33**	**854.39**	**907.63**	**964.**
Lease Rentals commitments				566.33	608.44	648.87	686.77	728.84	761.
Balance after Lease commit				**146.66**	**148.82**	**155.45**	**167.62**	**178.78**	**203.**
O&M Expenditure		1%	105%	64.00	67.20	70.56	74.09	77.79	81.
Insurance		0.21		11.34	11.34	11.34	11.34	11.34	11.
Manpower	1 lac p.m.	12	107.5%	12.00	12.90	13.87	14.91	16.03	17.
Admin .exp	0.75 pm	9	105%	9.00	9.45	9.92	10.42	10.94	11.
				96.34	**100.89**	**105.69**	**110.75**	**116.10**	**121.**
PBT				50.32	47.93	49.76	56.86	62.69	81.
Taxation			38.5%	19.37	18.45	19.16	21.89	24.13	31.
PAT				30.95	29.47	30.60	34.97	38.55	50.
PAT				30.95	29.47	30.60	34.97	38.55	50.
Refund of deposit									
	Cash flow for IRR		-1964	30.95	29.47	30.60	34.97	38.55	50.
	Post tax IRR		**4.35%**						
			61.50						
	Pre tax equivalent		7.07%						

Without Considering CDM Revenue				I	II	III	IV	V	VI
Realisation pa. for all WEGs			106.00%	675.84	716.39	759.37	804.94	853.23	904
Carbon Credit realisation				0.00	0.00	0.00	0.00	0.00	0
Total Income				**675.84**	**716.39**	**759.37**	**804.94**	**853.23**	**904**
Lease Rentals commitments				566.33	608.44	648.87	686.77	728.84	761
Balance after Lease commit				**109.51**	**107.95**	**110.50**	**118.17**	**124.39**	**143**
O&M Expenditure		1%	105%	64.00	67.20	70.56	74.09	77.79	81
Insurance		0.21		11.34	11.34	11.34	11.34	11.34	11
Manpower	1 lakh p.m.	12	107.5%	12.00	12.90	13.87	14.91	16.03	17
Administrati	0.75 pm	9	105%	9.00	9.45	9.92	10.42	10.94	11

on expenses							
		96.34	**100.89**	**105.69**	**110.75**	**116.10**	**12**
PBT		13.17	7.06	4.81	7.41	8.29	2
Taxation	38.5%	5.07	2.72	1.85	2.85	3.19	
PAT		8.10	4.34	2.96	4.56	5.10	1
PAT		8.10	4.34	2.96	4.56	5.10	1
Refund of deposit							
Cash flow for IRR	-1964	8.10	4.34	2.96	4.56	5.10	1
Post tax IRR	**3.01%**						
	61.50						
Pre tax equivalent	4.90%						