



Financing Renewables Energy Projects in India

A presentation by:

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Global Renewable Energy Forum

May 18 – 21, 2008

Foz do Iguacu, Brazil

Presentation Outline

A. Power Scenario in India

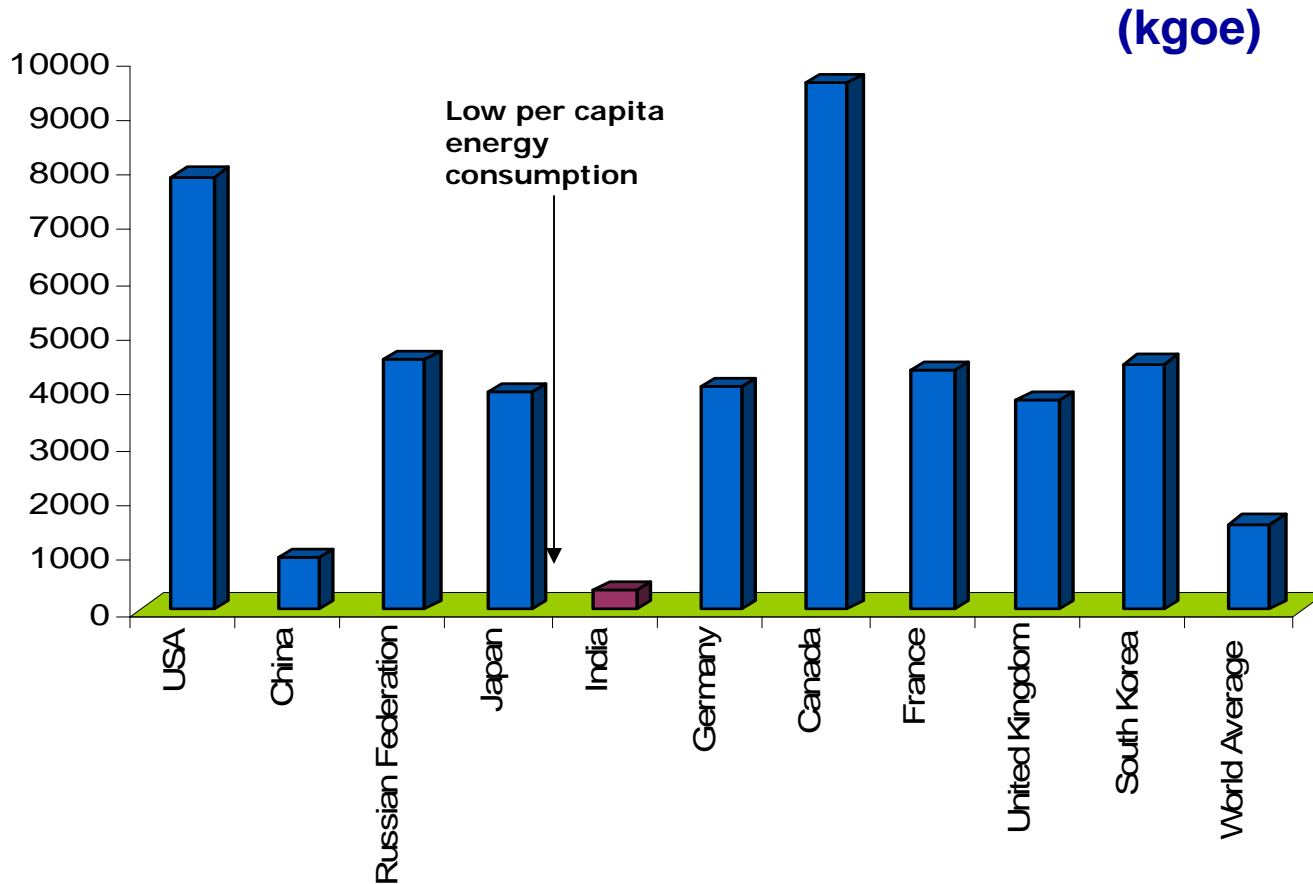
- B. Development of Renewable Energy in India – Institutional Building
- C. About IREDA
- D. IREDA's Experience in Renewable Energy Financing
- E. Photographs

Power Scenario in India

- Power Installed Capacity : 1,44,336 MW
- Energy Generation (*p.a.*) : 704.45 bn kWh
- Supply Demand Gap : 13.8 % Peak
: 9.6 % Energy
- Per Capita Power Consumption : 665 kWh/Year
- Access to Electricity (Rural) : 44% households

Target for Capacity Addition during XI Plan (2007 – 2012) : 78578 MW

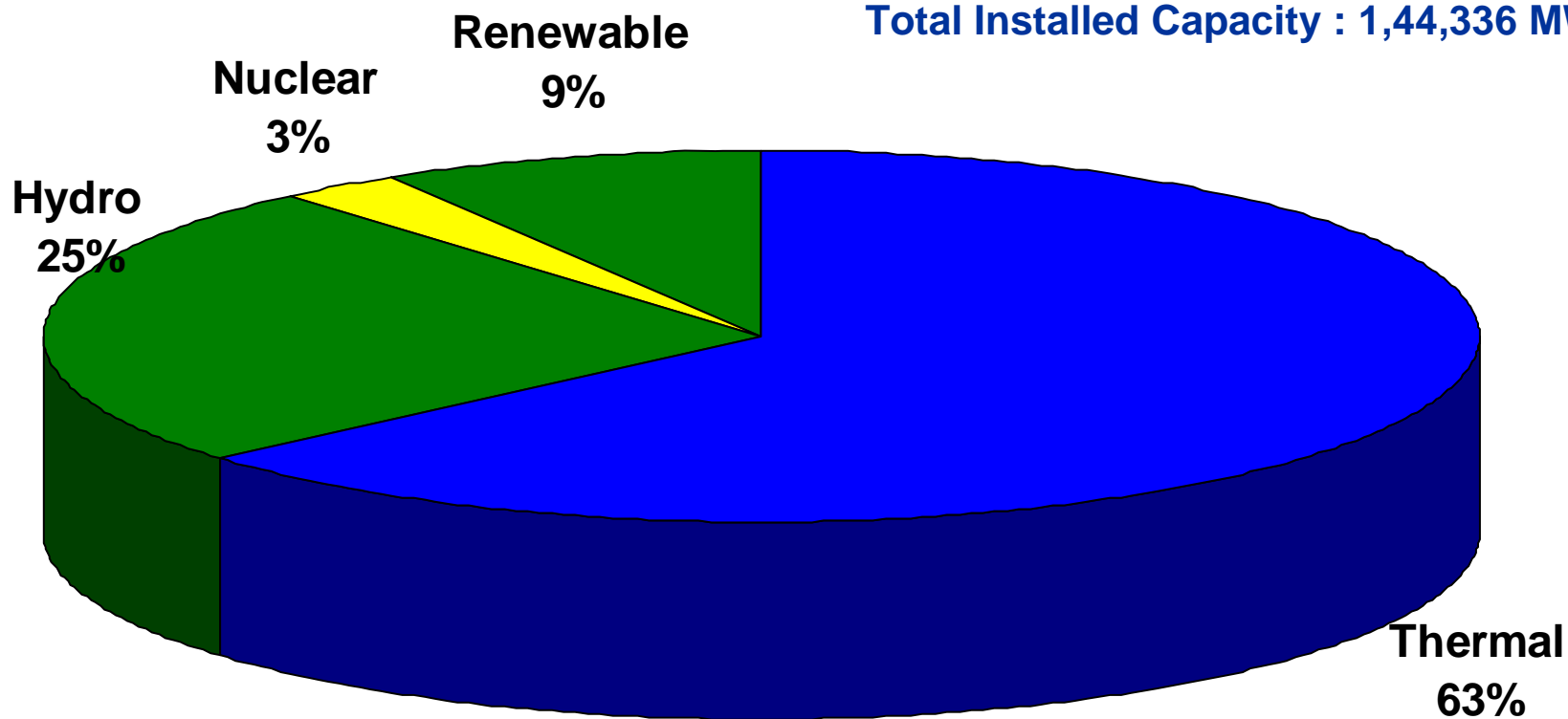
Per Capita Energy Consumption





Power Sector at a Glance

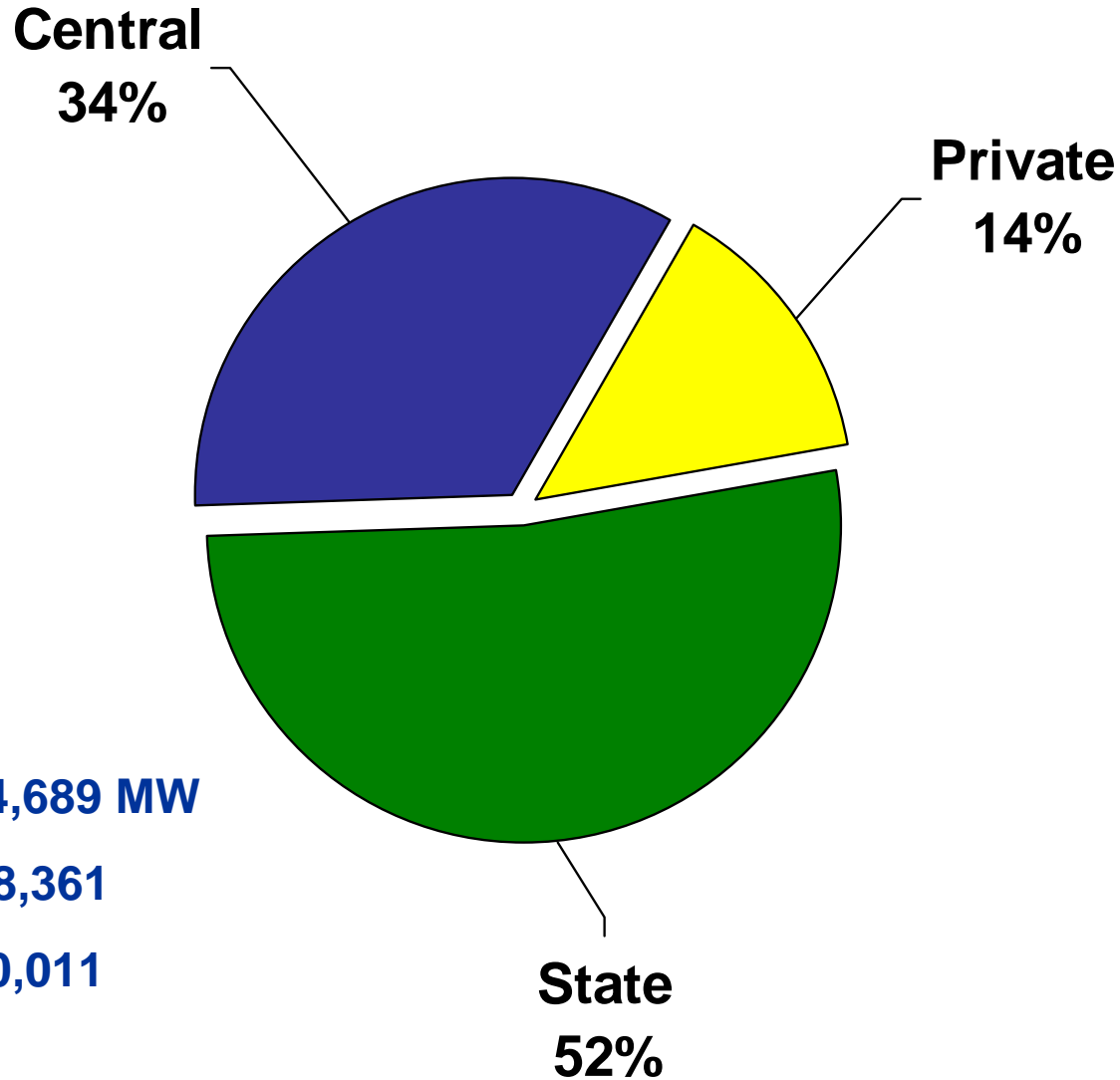
Total Installed Capacity : 1,44,336 MW



- Thermal 91,907
- Hydro 35,909
- Renewable 12,400
- Nuclear 4,120

Renewable Energy accounts 34% of the installed capacity in India

Sector-Wise Installed Capacity



State Sector : 74,689 MW

Central Sector : 48,361

Private Sector : 20,011

Power Sector Reforms

The Electricity Act 2003

- **Objective : Competition, Protection of Consumers interests & Power for all Areas**
- **Creates liberal framework for power development.**
- **Creates competitive environment.**
- **Facilitates private investment.**
- **Delicenses generation except for hydro : Captive generation free from controls.**
- **Rural Areas : Stand alone Generation and Distribution delicenced.**
- **Stringent provisions for controlling theft of electricity.**
- **Obliges States to restructure Electricity Boards.**
- **Mandates creation of Regulatory Commissions (ERCs).**
- **Retail tariff to be determined by ERCs.**
- **Open access in Transmission allowed.**
- **Open access in Distribution to be allowed by ERCs in phases.**
- **Gradual phasing out of cross subsidies.**
- **Power Trading permitted with licensing.**

The Electricity Act 2003

Relevance to Renewable Energy

- **National Policy to permit stand-alone systems including renewable energy sources for rural areas.**
- **Open access for carrying electricity from generating plants to point of use.**
- **Determination of tariff to consider promotion of generation of electricity from renewable energy sources.**
- **Establishment, operation and maintenance of generating stations de-licensed.**
- **State authorities to specify minimum percentage of renewable energy consumption.**
- **Transmission and distribution of electricity in rural areas de-licensed.**

Indian Renewable Energy Scenario

Sector	Potential	Achievement <i>(As on 31.03.2008)</i>
Wind	45000 MW	8757 MW
Small Hydro	15000 MW	2180 MW
Biomass Power/ Bagasse Cogeneration	16000 MW	606 MW
Waste to Energy	3500 MW	800 MW
Solar PV	2700 MW	55 MW
	20 MW/sq.km	3 MW
Renewables : Total installed capacity		12400 MW

Target for Capacity Addition during XI Plan (2007 – 2012) : 14000 MW



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Institutional Building:

- **1981** : Constitution of Commission for Additional Sources of Energy (CASE)
- **1982** : Constitution of Department of Non Conventional Energy Sources (DNES) under Ministry of Energy.
- **1987** : Incorporation of Indian Renewable Energy Development Agency Limited (IREDA)
- **1992** : The DNES converted into a full fledged Ministry of Non Conventional Energy Sources (MNES)

Institutional Building : Outcome

- Promotion through :
 - R&D
 - Demonstration projects
 - Programs supported by Government subsidies

- Overcoming financing barrier through :
 - The catalytic role of IREDA
 - Innovative financing mechanisms
 - Success stories for commercial banks to follow



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The Beginning

Incorporated on March 11, 1987 as a Public Limited Government Company.

Mission

Be a pioneering, participant friendly and competitive institution for financing and promoting self-sustaining investment in energy generation from renewable sources, energy efficiency and environment technologies for sustainable development.

Sectors being financed

- ❁ **Solar Energy**
- ❁ **Wind Energy**
- ❁ **Hydro Energy**
- ❁ **Biomass Cogeneration**
- ❁ **Biomass Power Generation**
- ❁ **Waste to Energy**
- ❁ **Energy Efficiency and Conservation**
- ❁ **Bio Fuels**
- ❁ **New & Emerging Technologies**

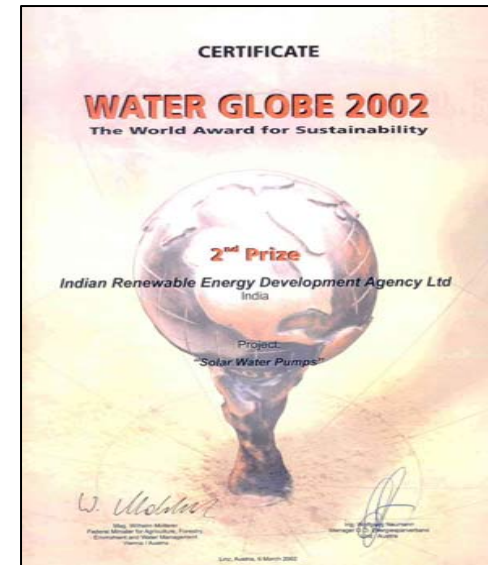
International Assistance

- **Government of Netherlands** - **18 Million Dutch Guilders**
- **Asian Development Bank** - **100 Million US \$**
- **The World Bank I LOC** - **145 Million US \$**
- **DANIDA** - **15 Million US \$**
- **KfW, Germany** - **61.35 Million Euro**
- **World Bank II Ind LOC** - **135 Million US \$**

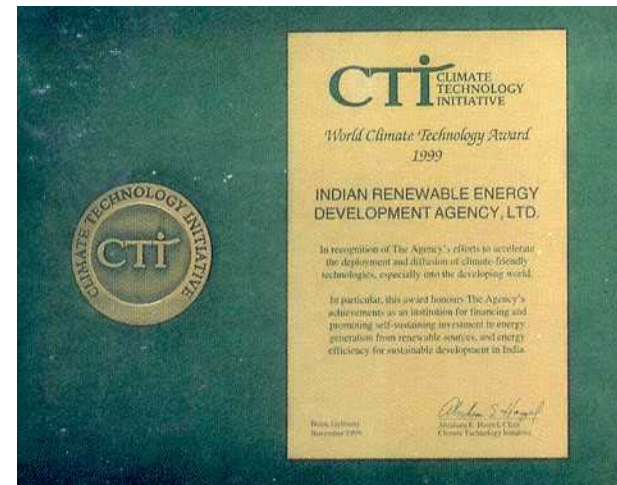
IREDA is likely to receive €250 Million financial assistance from Nordic Investment Bank, European Investment Bank & KfW, Germany

International Recognition

🕯️ **Second Prize in Water Globe Award Category of the Energy Award 2002 presented at Linz, Austria.**



🕯️ **World Climate Technology Award for the year 1999 by Climate Technology Initiative (CTI), Paris, France.**





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Highlights Of Cumulative Lending Operations

(As on 31. 03.2008)

- Number of Projects Approved : 1849
- IREDA's Loan Commitment : 2132 Million US\$
- Loan Disbursements : 1200 Million US\$
- Sanctioned Capacity : 3086 MW
- Conventional Fuel Replacement : 1.28 Million MTCR / Year
[or 0.4 Million MTOE/Year]

IREDA envisages capacity addition of 1750 MW during XI Plan Period (2007 – 2012)

Impact of IREDA funded projects

- **Created awareness in the country.**
- **Encouraged entry of private sector investments in RE sector.**
- **Catalyzed market development by showcasing success stories - encouraging other lenders to support the sector.**
- **Helped in creating manufacturing, design & engineering, operation and maintenance capabilities.**
- **Encouraged several states to declare policies and incentives to encourage private investments in RE sector.**
- **Assisted in policy shift from technology demonstration to commercialization making RE development demand driven.**
- **Helped in creating direct and indirect employment generation, economic development and improving living conditions.**

Drivers

Renewable Energy	Energy efficiency
•Rising energy demand	•Competitive Advantage
•Energy security	•Legislative Mandate
•Access to energy	•Bottom Line
•Climate change	•Rising Energy Costs

Key Obstacles to Growth

- **Absence of assured customer / market**
 - **All RE projects are :**
 - Small in size
 - Widely dispersed in remote locations
 - Lacking infrastructure (evacuation facilities, roads etc)
 - Generally high cost (not factoring positive environmental and social impacts)
 - **90% of small hydro potential is in hilly areas which have no industry – *No demand.***
 - **Only buyer State Utility – *Not willing to pay more for RE Power.***
- **Absence of aggregating agency / trader.**
 - **All small RE projects are forced to market their products (electricity) directly to monopoly buyer (State Utility) – Buyer's Market.**
- **Higher cost of generation due to :**
 - **Small size (no economies of scale)**
 - **Disadvantaged locations**
- **Lack of adequate capital (both debt and equity) at affordable cost.**

How do we address these issues?

- **Government:**
- Providing conducive Policy support
- Intensive Resource mapping
- Providing Financial incentives to improve project viability – preferably through generation based incentives
- **IREDA:**
- Developing sector specific evaluation criteria for proper risk management
- Factoring in financial benefits of the Clean Development Mechanism (CDM) in order to improve project viability
- Providing end to end Financing solutions including tying up equity, long term debt and assured power off take through strategic alliances
- Encouraging Insurance Companies to design new instruments for risk coverage

Lessons learned in Indian RE Programme

- **Renewable energy sources require much higher efforts to penetrate the market in comparison to conventional energy sources, which are mature and proven.**
- **Developing nature of renewables require adequate and conducive policies and regulatory framework for effective market development.**
 - Properly designed feed-in tariff
 - Development of associated infrastructure – roads, evacuation & transmission facilities etc
 - Rationalization of grid connectivity charges levied by the different states.
- **Better understanding and increased awareness of economic benefits of RE technologies is required amongst regulators.**
- **Frequent policy changes are counterproductive.**
- **Due to riskier nature of RE sector, presence of a dedicated financing institution is very useful - leading to multiplier effect.**



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3 MW Small Hydro Project District Darjeeling, West Bengal



1 MW Small Hydro Project District Kullu, Himachal Pradesh



1 MW Small Hydro Project, Sangrur District, Punjab

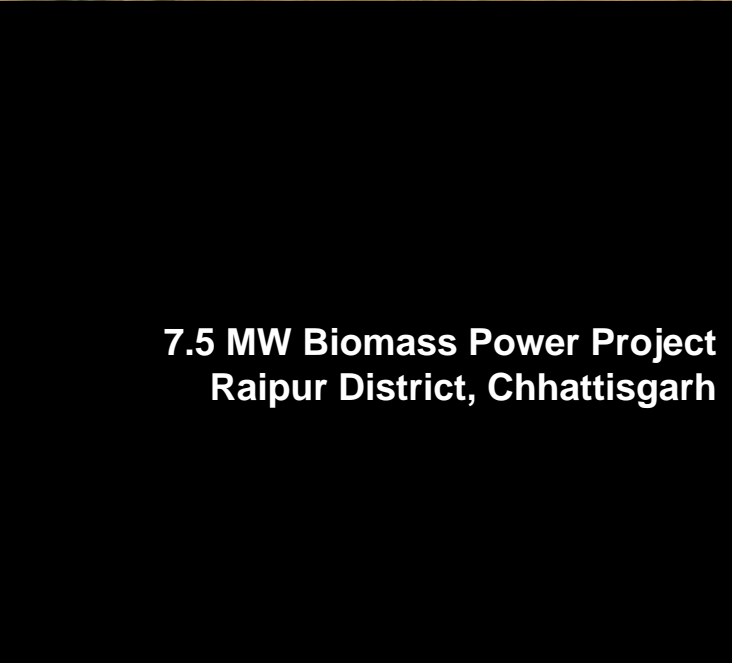


4.2 MW Wind Farm Project set up in Chitradurga District, Karnataka





**20 MW Biomass Power Project
Turicorin District, Tamil Nadu**

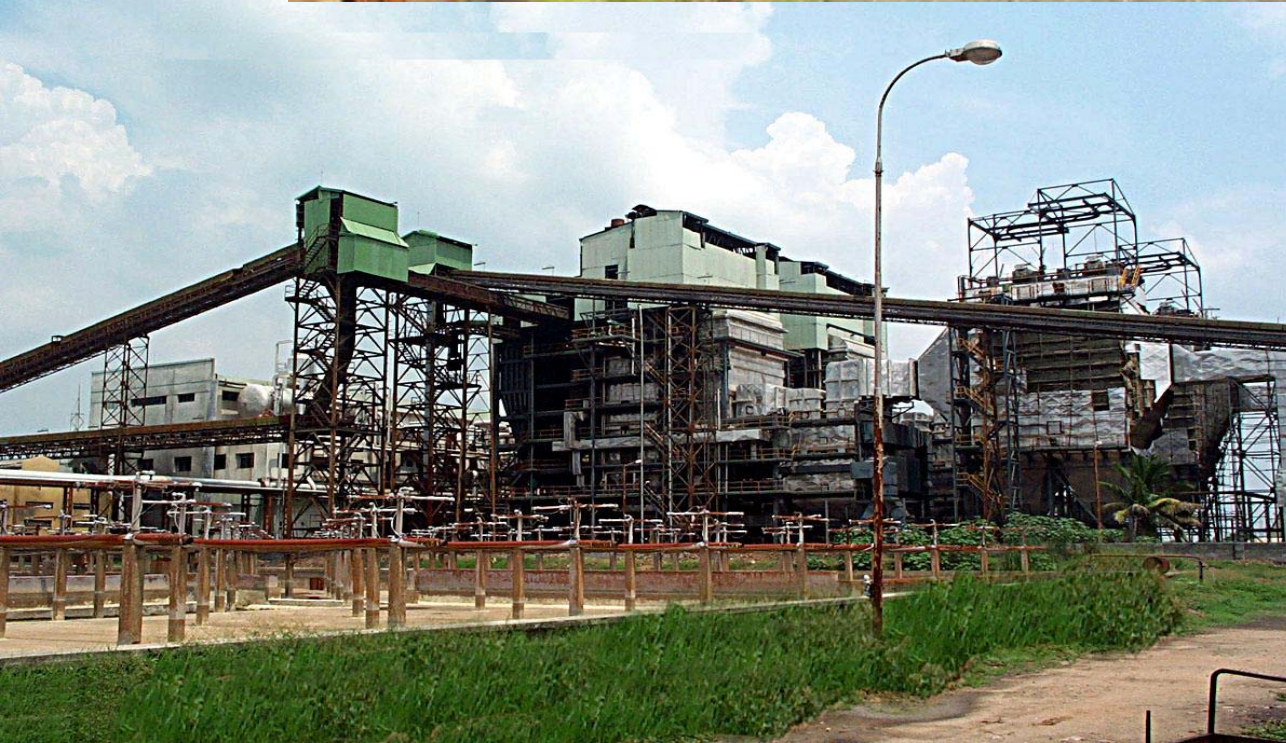


**7.5 MW Biomass Power Project
Raipur District, Chhattisgarh**





8 MW Waste Heat Recovery Captive Power Plant, Raipur, Chhattisgarh



**40 MW Bagasse based Cogeneration & Energy Efficiency Project
Pennadam, Cuddalore District, Tamil Nadu**



**22 MW Cogeneration
Project, Nagpur District,
Maharashtra**

**24 MW Baggase Cogeneration Power Project,
Davengere District, Karnataka**





6 MW Waste-to-Energy Project Vijayawada District, Andhra Pradesh





Thank you



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