



सत्यमेव जयते

GOVERNMENT OF INDIA  
MINISTRY OF POWER



# NATIONAL MISSION ON USE OF BIOMASS IN THERMAL POWER PLANTS

Sustainable Agrarian Mission on Use of Agri-Residue in Thermal Power Plants  
( SAMARTH)

WELCOME TO CII-POWER PLANT SUMMIT 2024

## Biomass Cofiring: Policy Framework for Sustainable Energy Transition

--Mohd Nizamuddin.

# Contents



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# Background



Global warming is increasing from past few decades. Deadly heat waves fueled by climate change impacted the country, leading to power outages, increased dust and air pollution, and accelerated glacial melt in the Himalayas



In 2022, 36.8 Gt of CO<sub>2</sub> generated globally and as per Emission statistics -India emitted 3.9 billion metric tonnes



As per COP26 at UNFCCC, India has committed to meet 50 percent of energy demand through renewable sources and to reduce the carbon intensity by more than 45 percent by 2030.

India has set an ambitious target of having 500 GW of installed renewable capacity by 2030.



**Location wise regional summary of all India Installed capacity (IN MW) of power stations as on 31/07/2024**

Region	Ownership/Sector	Modewise breakup								Grand Total
		Thermal					Renewable		Nuclear	
		Coal	Lignite	Gas	Diesel	Total	Hydro	RES		
<b>Northern</b>										
1	STATE SECTOR	19525.00	250.00	2878.90	0.00	22653.90	5223.75	767.70	0.00	28645.35
2	PVT SECTOR	13130.00	1080.00	772.00	0.00	14982.00	2938.00	39523.92	0.00	57443.92
3	CENTRAL SECTOR	12950.00	250.00	2344.06	0.00	15544.06	11612.52	379.00	1620.00	29155.58
<b>Total of Northern</b>		45605.00	1580.00	5994.96	0.00	53179.96	19774.27	40670.62	1620.00	115244.85
<b>Western</b>										
4	STATE SECTOR	22290.00	900.00	2849.82	0.00	26039.82	5391.00	604.23	0.00	32035.05
5	PVT SECTOR	42496.01	500.00	4676.00	0.00	47672.01	481.00	49915.99	0.00	98069.00
6	CENTRAL SECTOR	19600.00	0.00	3280.67	0.00	22880.67	1520.00	666.30	3240.00	28306.97
<b>Total of Western</b>		84386.01	1400.00	10806.49	0.00	96592.50	7392.00	51186.52	3240.00	158411.02
<b>Eastern</b>										
7	STATE SECTOR	6970.00	0.00	80.00	57.52	7107.52	4470.55	283.36	0.00	11861.43
8	PVT SECTOR	7067.00	0.00	0.00	35.19	7102.19	512.00	1772.79	0.00	9386.98
9	CENTRAL SECTOR	23620.00	0.00	0.00	0.00	23620.00	1005.20	15.10	0.00	24640.30
<b>Total of Eastern</b>		37657.00	0.00	80.00	92.71	37829.71	5987.75	2071.25	0.00	45888.71
<b>Southern</b>										
10	STATE SECTOR	21192.50	0.00	791.98	186.79	22171.27	11747.15	637.08	0.00	34555.50
11	PVT SECTOR	10279.00	250.00	5120.24	273.70	15922.95	0.00	54559.94	0.00	70482.89
12	CENTRAL SECTOR	11100.00	3390.00	359.58	0.00	14849.58	0.00	541.90	3320.00	18711.48
<b>Total of Southern</b>		42571.50	3640.00	6271.80	460.49	52943.80	11747.15	55738.92	3320.00	123749.87
<b>North Eastern</b>										
13	STATE SECTOR	0.00	0.00	411.35	36.00	447.35	422.00	276.25	0.00	1145.61
14	PVT SECTOR	0.00	0.00	0.00	0.00	0.00	0.00	302.80	0.00	302.80
15	CENTRAL SECTOR	750.00	0.00	1253.60	0.00	2003.60	1605.00	30.00	0.00	3638.60
<b>Total of North Eastern</b>		750.00	0.00	1664.95	36.00	2450.95	2027.00	609.05	0.00	5087.01
<b>ALL INDIA</b>										
16	STATE SECTOR	69977.50	1150.00	7012.05	280.31	78419.86	27254.45	2568.62	0.00	108242.93
17	PVT SECTOR	72972.01	1830.00	10568.24	308.89	85679.15	3931.00	146075.44	0.00	235685.59
18	CENTRAL SECTOR	68020.00	3640.00	7237.91	0.00	78897.91	15742.72	1632.30	8180.00	104452.93
<b>Total of ALL INDIA</b>		210969.51	6620.00	24818.21	589.20	242996.92	46928.17	150276.36	8180.00	448381.45

**Break up of RES all India as on 31/07/2024 is given below (In MW):**

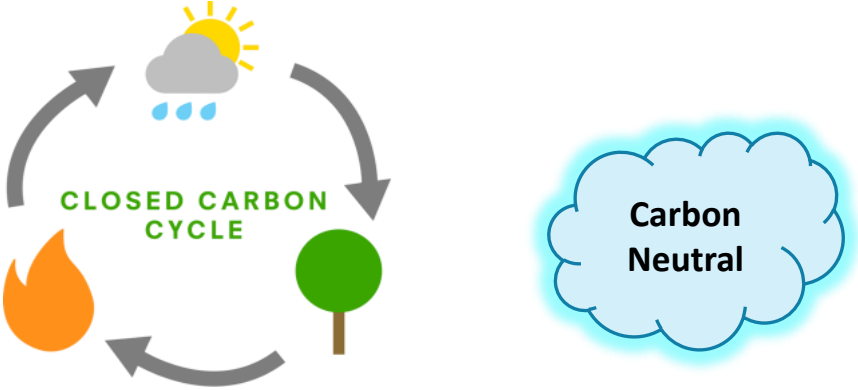
Small Hydro Power	Wind Power	Bio-Power		Solar Power	Total Capacity
		BM Power/Congen	Waste to Energy		
5036.75	47075.43	10355.35	600.86	87207.97	150276.36

# Introduction to Biomass co-firing

## Biomass

**Biomass is renewable organic material that comes from plants. It is defined as biological material which is directly or indirectly produced by photosynthesis.**

*Source: US EIA & IEA*



**Next Cycle of Plant's generation removes as much CO<sub>2</sub>, as is emitted into the atmosphere from its agro-residue(Biomass) combustion and thus is **Carbon Neutral**.**

## Biomass co-firing

A low-cost option for converting biomass efficiently and cleanly to electricity by adding biomass as a partial substitute fuel in high-efficiency coal fired boilers.



**Carbon neutral**



**Existing Infrastructure utilization**



**GHG reduction**



**Reduction in Coal Dependency**

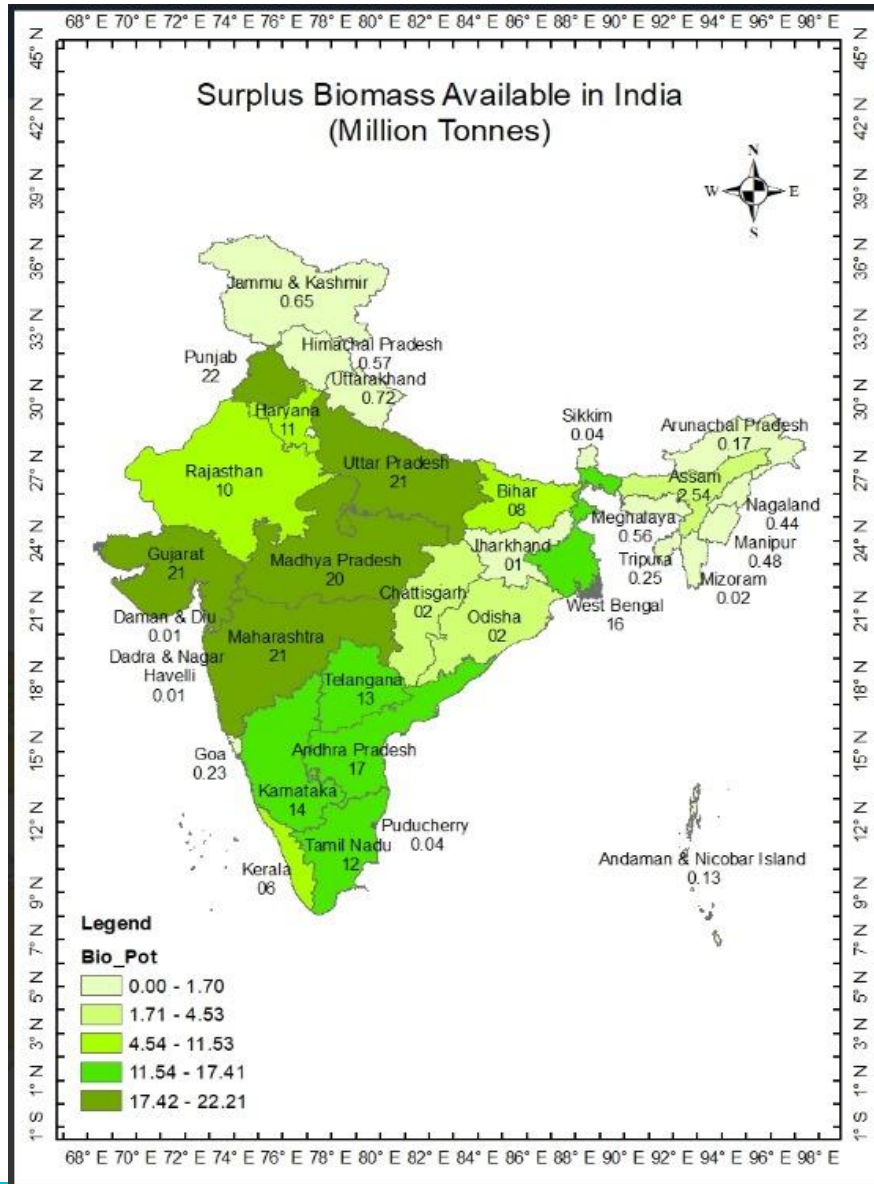


**Supplement Renewable source**



**Income generation**

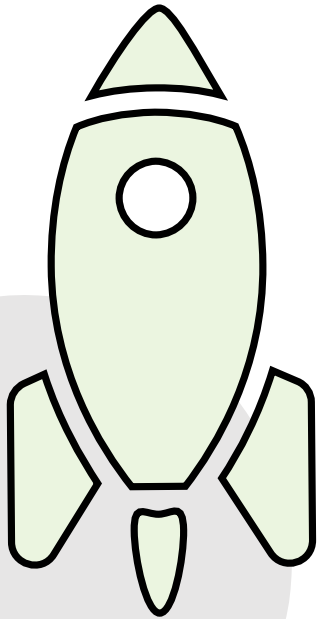
# Agro-residue: Potential Green Energy Resource



<b>Total Crop Area (Million Hectare)</b>	<b>206.09</b>
<b>Total Crop Production</b>	<b>774.38 MMTPA</b>
<b>Total Biomass Generation</b>	<b>754.44 MMTPA</b>
<b>Surplus Biomass generation</b>	<b>228.49 MMTPA</b>
<b>Total Installed Capacity- Coal Based TPP</b>	<b>209.7 GW</b>
<b>Pellet Required @10% co-firing</b>	<b>~ 77.5 MMTPA</b>
<b>Raw Biomass Required @ 25% Loss</b>	<b>~100 MMTPA</b>
<b>Biomass Required (TPD) @10%</b>	<b>~2,06,097 TPD</b>
<b>CO2 Saving Potential</b>	<b>~90 MMTPA</b>



# Formation of SAMARTH Mission



**November 2017**

MoP issued a Policy on **17.11.2017** for Biomass Co-firing and subsequent Advisory issued to all power plants by CEA to promote use of biomass pellets.

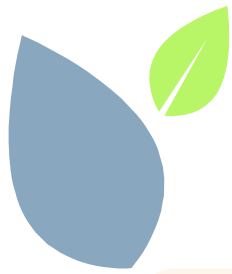
**May 2021**

Meeting held under the chairmanship of Secretary (Power) to discuss draft concept note on “**National Mission on use of biomass in thermal power plants**”. After deliberations structure of Mission was finalized.

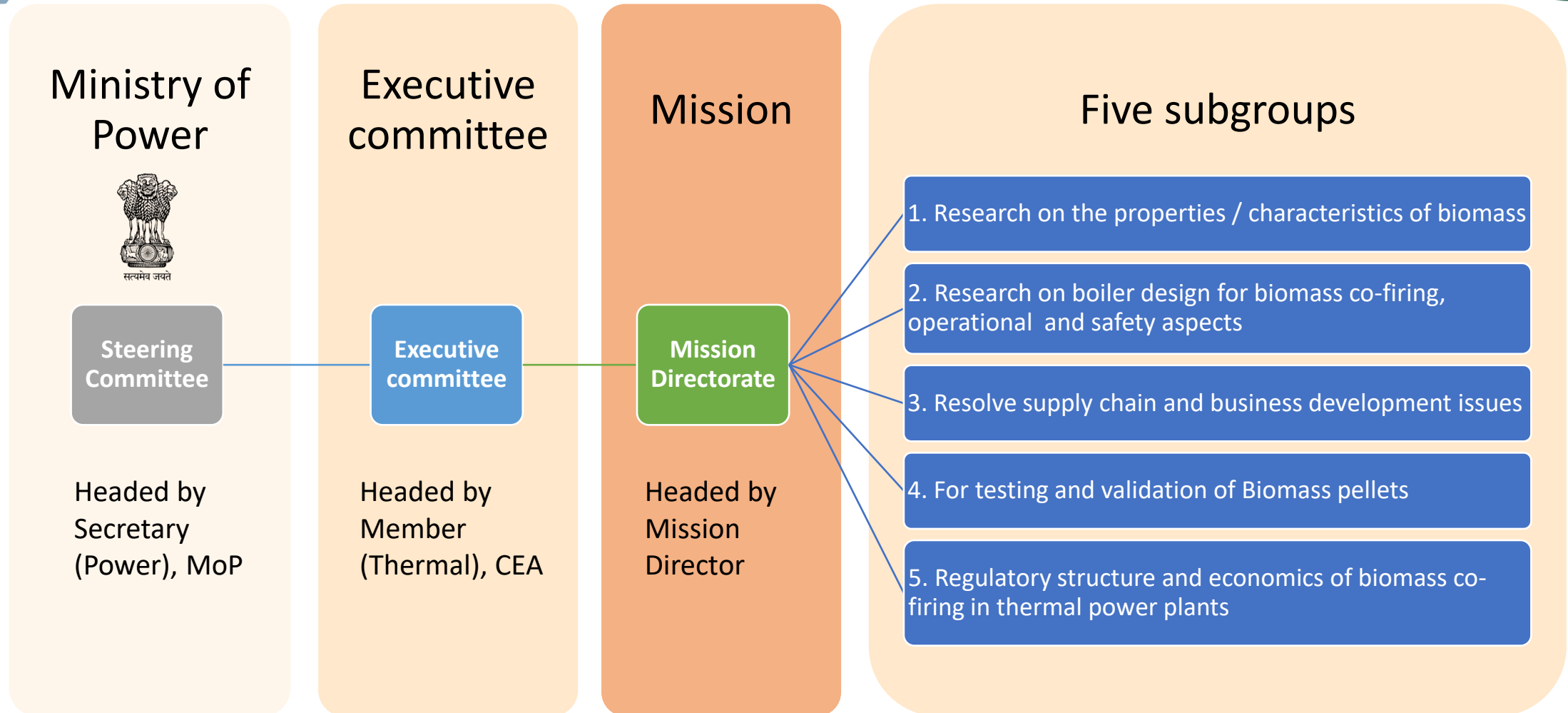
**July 2021**

MoP set-up National Mission on use of Biomass in TPPs on **12.07.2021** constituting Steering Committee, Executive Committee, Mission Directorate and 5 sub-groups. Rechristened as SAMARTH – **Sustainable Agrarian Mission on use of Agri-Residue in Thermal Power Plants.**

**NATIONAL MISSION ON USE OF BIOMASS IN THERMAL POWER PLANTS**



# Mission Structure





# Mission Objectives



1. To **increase the level of co-firing** to 5% and higher levels for higher carbon neutral power generation from the thermal power plants.
2. To take up **R&D activity** in Biomass and boiler design to handle the higher levels of co-firing.
3. To address the constraints in **supply chain** of biomass pellets and agro-residue and training of personnel.
4. To **formulate** mechanism to provide initial capital/ Seed **Financing** to encourage entrepreneurs & SMEs to establish pellet manufacturing facilities.
5. To identify critically needed infrastructure and **encourage necessary investments** by working with government and stakeholders, as well as industry and academia.
6. To **sensitize all stakeholders** like Ministries/ Departments/ State Governments/ farmers/ local bodies/ agencies etc.
7. Preparation **of guidelines**, release of RFQ/RFP/ other requisite documents
8. To resolve the **regulatory issues** in biomass co-firing.

# Enabling Policies



MoP's Revised Biomass Co-firing Policy dated 08.10.2021, modified vide notification dated 16.06.2023 mandates the following.

➤ All coal-fired thermal power plants in the country to use 5-10% blend of biomass pellets made, primarily of agro-residue along with coal. TPPs shall achieve specific targets based on mill-types.

- **Bowl Mill:** Use of 5 % blend of Biomass pellets (Non-Torrefied) by 2024-25, which shall increase to 7% by 2025-26.
- **Ball & Race mill:** Use of 5 % blend of Biomass pellets (Torrefied) by 2024-25, which shall increase to 7% by 2025-26.
- **Ball & Tube mill:** Use of 5% blend of Torrefied pellets with volatile content below 22% by 2024-25.

## RPO

◦ Ministry of new and Renewable Energy (MNRE), GOI vide order dated 26/09/2019 clarified that:

❖ The power generated from co-firing of biomass in thermal power plants is renewable energy, &

❖ Eligible for meeting non solar Renewable Purchase Obligation (RPO)

❖ ## **Draft RGO (Renewable Generation Obligation)**

# Enabling Policies



MoP's Revised Biomass Co-firing Policy dated 08.10.2021, modified vide notification dated 16.06.2023 mandates the following.

- The policy for cofiring of biomass would be in force for 25 years or till the useful life of the Thermal power plant whichever is earlier .
- Additional cost on account of biomass co-firing shall be Pass through in Tariff or be claimed under Change-in-Law provisions.( for TPP under Sec 63), Such additional impact on ECR shall not be considered in deciding the MERIT ORDER DISPATCH(MOD)

## RPO

- Ministry of new and Renewable Energy (MNRE), GOI vide order dated 26/09/2019 clarified that:
  - ❖ The power generated from co-firing of biomass in thermal power plants is renewable energy, &
  - ❖ Eligible for meeting non solar Renewable Purchase Obligation (RPO)



# Draft notification on RGO (by BEE):

COD of Coal/Lignite based TPP	Minimum RGO (%)	Due date for RGO compliance
On and before 31 <sup>st</sup> March 2023	6	1 <sup>st</sup> April 2026
	10	1 <sup>st</sup> April 2028
1 <sup>st</sup> April 2023 to 31 <sup>st</sup> March 2025	10	1 <sup>st</sup> April 2025
1 <sup>st</sup> April 2025 onwards	10	From COD

Draft notification was put up for stakeholder views in Oct 2023. More than 31 stakeholders has submitted their view. Put up to Ministry for further course of action.

# Agro-residue: Financial Aspects / Economic Potential

## Market Scenario@ 10% Biomass co-firing



**Agro-Residue**  
Total Estimated Surplus Biomass :  
**~230 Million MT**  
Requirement @ 10% co-firing  
**~ 100 Million MT**

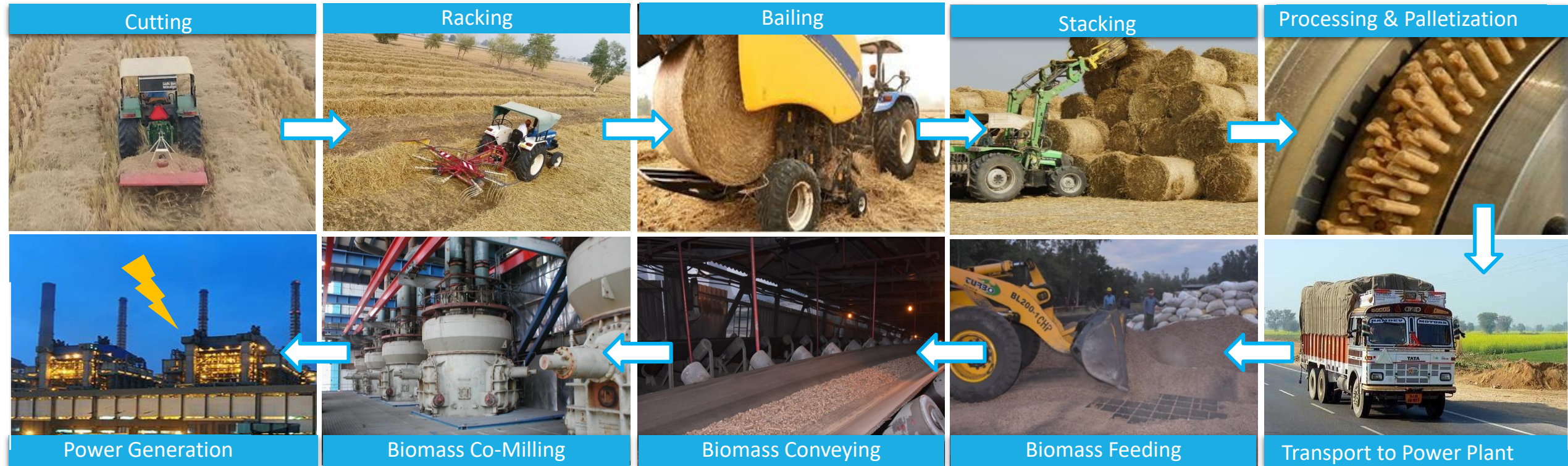
**Farmers**  
SAM (Serviceable Available Market)  
for Farmers:  
**Rs. 15000- 30,000 Crore**  
(@ ₹1.5-3.0/Kg of Agro-residue)

**Pellet Manufacturers**  
SAM (Serviceable Available Market)  
for  
Pellet Manufacturers:  
**Rs. 5,81,25-6,58,75 Crore**  
(@ ₹7.5-8.5/Kg of Agri-residue pellets)

**Thermal Power Generators**  
Total potential of Green Energy generation:  
**~100 BU**

**Total Available Market (TAM) from Power Sector ~ Rs. 75,000 – 95,000 Crore**

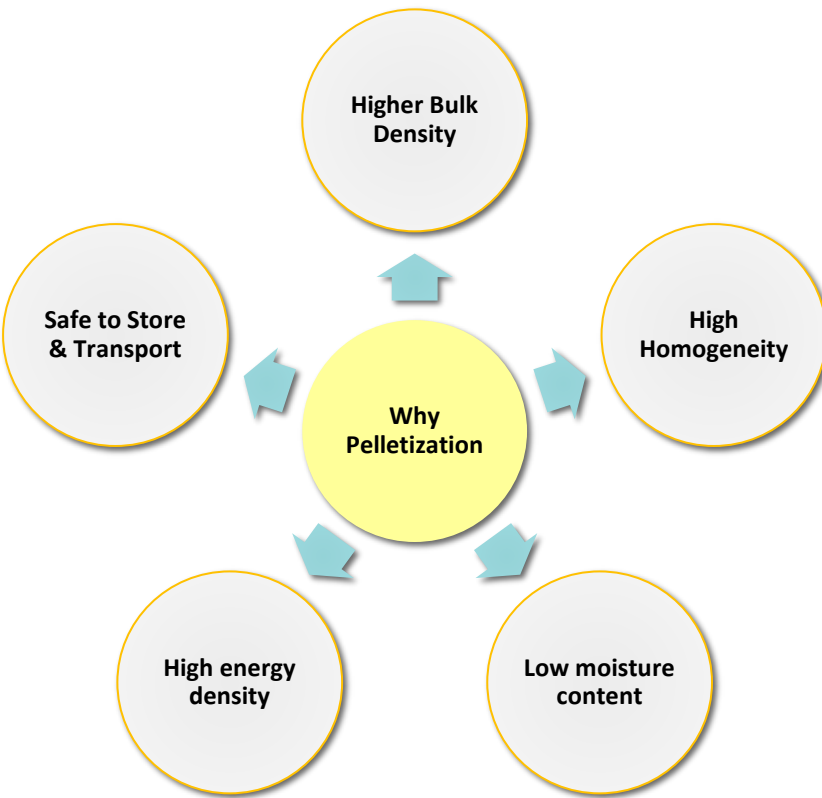
# BIOMASS CO-FIRING : FARM TO FACTORY PROCESS FLOW (TYP.)



# Biomass Pellets

**Biomass Pellets** are compressed masses made from organic materials that can be used as fuel for homes, businesses, and industrial facilities

**Pelletisation** is the process of compressing/molding biomass into small pellets making it easier for transportation and storage, and further improving its combustion properties.



# Enabling Policies



MoP's Revised Biomass Co-firing Policy dated 08.10.2021, modified vide notification dated 16.06.2023 mandates the following.

- **Torrefied pellets to be procured only by those power plants for which it is technically unavoidable.**
- **Use of short-term tenders for faster procurement pellets, supporting pellet manufacturing.**
- **Price benchmarking of biomass pellets to be undertaken by GoI committee. Recommendations of the committee by 01.01.2024.**

## RPO

- Ministry of new and Renewable Energy (MNRE), GOI vide order dated 26/09/2019 clarified that:
  - ❖ The power generated from co-firing of biomass in thermal power plants is renewable energy, &
  - ❖ **Elegible for meeting non solar Renewable Purchase Obligation (RPO)**





# Benefits for Stakeholders



- Create economic value of agro-residue by promoting it as a fuel in power plants.
- Improves air quality Index as Eliminates/minimizes burning of agro-residue.
- Encourage decentralize pellets manufacturing units, Generation of employment opportunities.
- Cost effective solution for reducing GHG emissions.

## GENCOs

Handy solution- Minimal Infrastructure change

Less dependency on coal

Lesser Carbon Footprint

Considered under RPO/RGO

## Pellet Manufacturers

New & lucrative Green Energy Business Opportunity

Various Government schemes for Financial assistance for setting-up pellet plant.

An opportunity for being a part of India's journey to Green energy Transition.

## Farmers

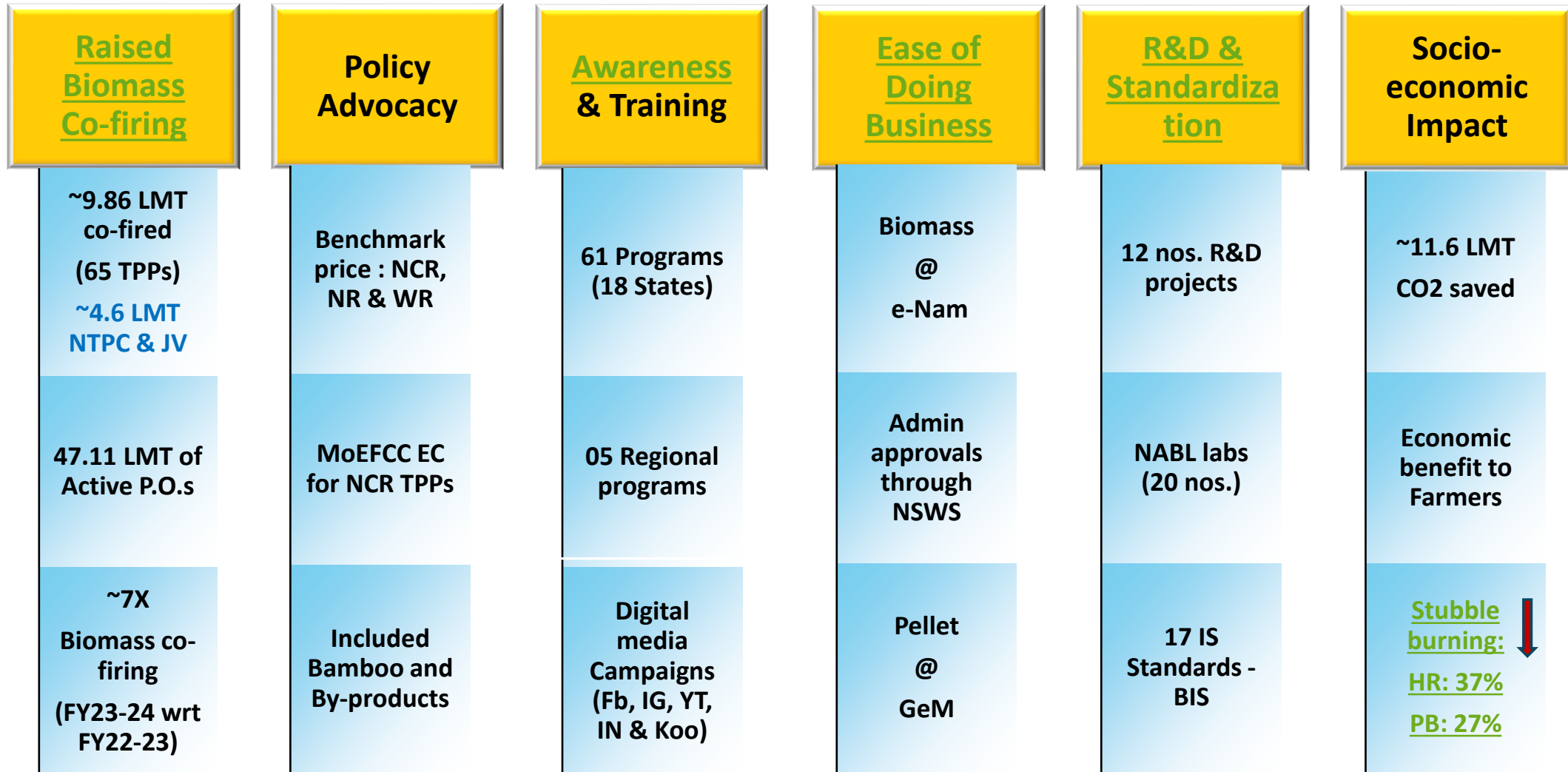
Ensures additional income source for farmers

Employment generation in biomass value chain

Restores soil health by saving from negative effects of stubble burning

Helps the farmers to clear the land for next crop at no cost.

# Mission Activities & Major Developments



# Government Schemes for Pellet Manufacturing



- **MSME - Cluster Development Programme (MSE-CDP)**

For creation of tangible assets as Common Facility Centres (CFCs) like Common Production/ Processing Centre.

Gol grant up to 60 – 90 % of the cost for projects up to Rs.15 crore is available.

- **MSME - Prime Minister's Employment Generation Programme (PMEGP)**

25% subsidy to individuals for establishing projects costing Rs. 5 to Rs. 25 lakhs in the rural areas.

- **Ministry of Agriculture-“Sub-mission on Agricultural Mechanization“**

Subsidy is provided for purchase of various types of agricultural equipment and machinery to the extent of 40-50% for States.

- **Exclusive schemes by National Banks**

Leading National Banks like SBI (New scheme for Financing Biofuel Projects) along with others launched Financial Assistance Schemes to support Biomass stakeholders.

- **MNRE Umbrella Scheme – National Bioenergy Programme Support promotion of Manufacturing of Biomass pellets in the country.**

<b>Non-torrefied Pellet plants</b>	<b>Rs 21 Lakhs/Tons Per Hours (TPH) capacity or 30% of the capital cost considered to plant and machinery of 1TPH whichever is lower (maximum of Rs 105 lakhs per project)</b>
<b>Torrefied Pellets Pellet plants</b>	<b>Rs 42 Lakhs/Tons Per Hours (TPH) capacity or 30% of the capital cost considered to plant and machinery of 1TPH whichever is lower (maximum of Rs 210 lakhs per project)</b>

- **CPCB grant scheme for Pellet plants in NCR.**

CPCB is providing one time grant up to Rs 28 lacs per TPH for establishing paddy straw based biomass pellet manufacturing units in NCR region.



# Mission Website: An Interactive Interface

- Interactive platform for all the stakeholders - Farmers, Pellet Manufacturers, GENCOs, Regulators etc.
- Interface like MIS on use of Biomass in TPPs & tender Status.

## Website Features:

1. Vendors Database is available for GENCOs.
2. Pellet Manufacturers can provide their details for getting better visibility and reach.
3. Update about all policies, upcoming activities of Mission are available.
4. Biomass usage/Tender status reporting can be done by Nodal officers.
5. Various MIS related to Biomass usage/Tender status available.
6. Information on enabling Policies / Resources available

GOVERNMENT OF INDIA - Ministry of Power

## SAMARTH- Sustainable Agrarian Mission on use of Agri-Residue in Thermal Power Plants

NATIONAL MISSION ON USE OF BIOMASS IN THERMAL POWER PLANTS

HOME PAGE ABOUT US COMMITTEES MISSION DIRECTORATE SUBGROUPS POLICIES/NOTIFICATIONS GALLERY RTI IMPORTANT LINK CONTACT US LOGIN VENDOR

### Vision & Objective

#### Vision

Conversion of Biomass to Power in an ecofriendly and cost effective manner with suitable market mechanism thereby mitigation of air quality deterioration.

उष्णकृश भावकार तैल के साथ पर्यावरण के अनु और सस्ते तरीके से बायोमैस का विकसित में रूपान्तरण जिससे वायु गुणवत्ता में सुधार हो।

#### Objective

(a) To increase the level of co-firing from present 5% to higher levels to

### Current & Upcoming Activities

One Day Awareness Program on Sensitizing the farmers on Stubble/Crop residue (Parali) Burning, Krishi Vigyan Kendra, Baghpat, UP

**18.02.2022**

One Day Online Training Program on Capacity Building Program for Biomass Pellets Co-Firing for Thermal Power Plants, ONLINE

**January 2022**

**27.01.2022**

One Day Awareness Program on Capacity Building Program on capacity building (Biomass Pellets co-firing) for TPPs officials Units, ONLINE

**Let's be partners towards Clean Air**

NATIONAL MISSION ON USE OF BIOMASS IN THERMAL POWER PLANTS  
बर्लस स्तर परालि में बायोमैस के प्रयोग पर राष्ट्रीय मिशन  
Phone: 0120-4946813/4948705, Mail: md-biomass-power@gov.in

National Mission on use of Biomass in Thermal Power Plants  
Important Links: Disclaimer, Privacy Policy, Hyperlinking Policy, Contact Us, Terms & Conditions  
Address: National Mission on use of Biomass in Thermal Power Plants, 7th Floor, EOC, NTPC, Plot No.- A-8A, Sector-24, Noida (UP) Pin-201301, Email: md-biomass-power@gov.in

Map Satellite NTPC EOC Noida

# Prominent Mission Achievements



- ❑ Initiation of **Co-firing by 65 nos.** of thermal power plants across the country.
- ❑ Cumulative biomass co-firing of 9.83 LMT across the country **reducing** more than 11 LMT **carbon footprint**
- ❑ Issuance of Long-term **Model contract** for procurement of Biomass
- ❑ Provision of customized window for Biomass pellet procurement **through GeM portal**
- ❑ Identification of pellet manufacturing activity under **Priority Sector Lending (PSL)** by RBI
- ❑ Provision of **lending/grant schemes** by financial institutions, MNRE, CPCB for setting of pellet manufacturing units, with increase CFA under revised rates issued by MNRE in July 2024.
- ❑ Conducted 61 **Capacity Building/ Awareness** programs reaching > **9500 stakeholders** covering **18 states**.
- ❑ **12 nos. research projects** are under progress under Sub-Group 1 and projects under 8 R&D areas are initiated by DST
- ❑ **17 nos. of IS-standards** for testing of solid bio-fuels have been issued by BIS.
- ❑ **20 nos. of NABL** testing labs identified for testing of biomass pellets across the country.
- ❑ Launch of Mission Website

# Thrust Areas



Challenges

Creating Pellets Demand –  
Increase tendering/ Procurement by TPPs(Other Regions)

Develop Production capacity across the Country –  
Increasing Pellet manufacturing capacity

Identifying Proven Technology/Machines –  
Torrefied as well as Non-Torrefied Pellets

Work-Force Capacity Building –  
Skill Development

# Way Forward



Several key strategies are identified for development of biomass as a key substitute to coal.

- Price Declaration by States of biomass pellets used for co-firing in TPPs for faster pellet procurement and market stability.
- Development of Pellet manufacturers through utilization of CPCB/ MNRE schemes (increased CFA).
- Skill Development of pellet plant operators through Power Sector Skill Council
- Standardization of machine manufacturing biomass pellets.
- Encouraging states to make enabling policies for biomass and make relevant inclusions in respective tariff regulations.
- Awareness programs for Ex-situ utilization of agro-residue in higher Stubble burning prone districts.
- Technical assistance to Farmers for development of collection/aggregation/transportation



# Thanks

For QUERIES?

Contact Us



<https://samarth.powermin.gov.in>



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+91-1202356577



# IREDA Financing Scheme - “Manufacturing of Biomass Pellets/ Briquettes/Torrefied Pellets/ Refuse Derived Fuels (RDF)”

All the commercially viable Biomass pellets /Torrefied Pellets/Briquette/ RDF manufacturing plants are eligible for the assistance;

## Features:-

- The minimum loan eligibility from IREDA is Rs.50 Lakh. Loan upto 70 % of the project cost is available.
- Interest rates are as per IREDA Credit Risk Rating system (CRRS).

Grade of the Project	Rate of Interest (% pa)
I	10.25%
II	10.75%
III	11.15%
IV	11.45%

- Repayment periods < 6 years; The moratorium period < 12 months

## Securities:-

- Pledge of shares (minimum 51%) of the company
- Hypothecation of movable assets of the project
- Personal Guarantee, BG etc. not less than 10% of loan amt
- Trust & Retention account (TRA)

## Conditions:-

- The site specific Biomass resource availability/ Survey Reports report to be provided.
- Market Survey reports indicating the potential buyers of Pellets/ Briquettes around the site.
- The subsidy/grant, if any, the Government shall be adjusted against loan sanctioned by IREDA.