सत्यमेव जयते

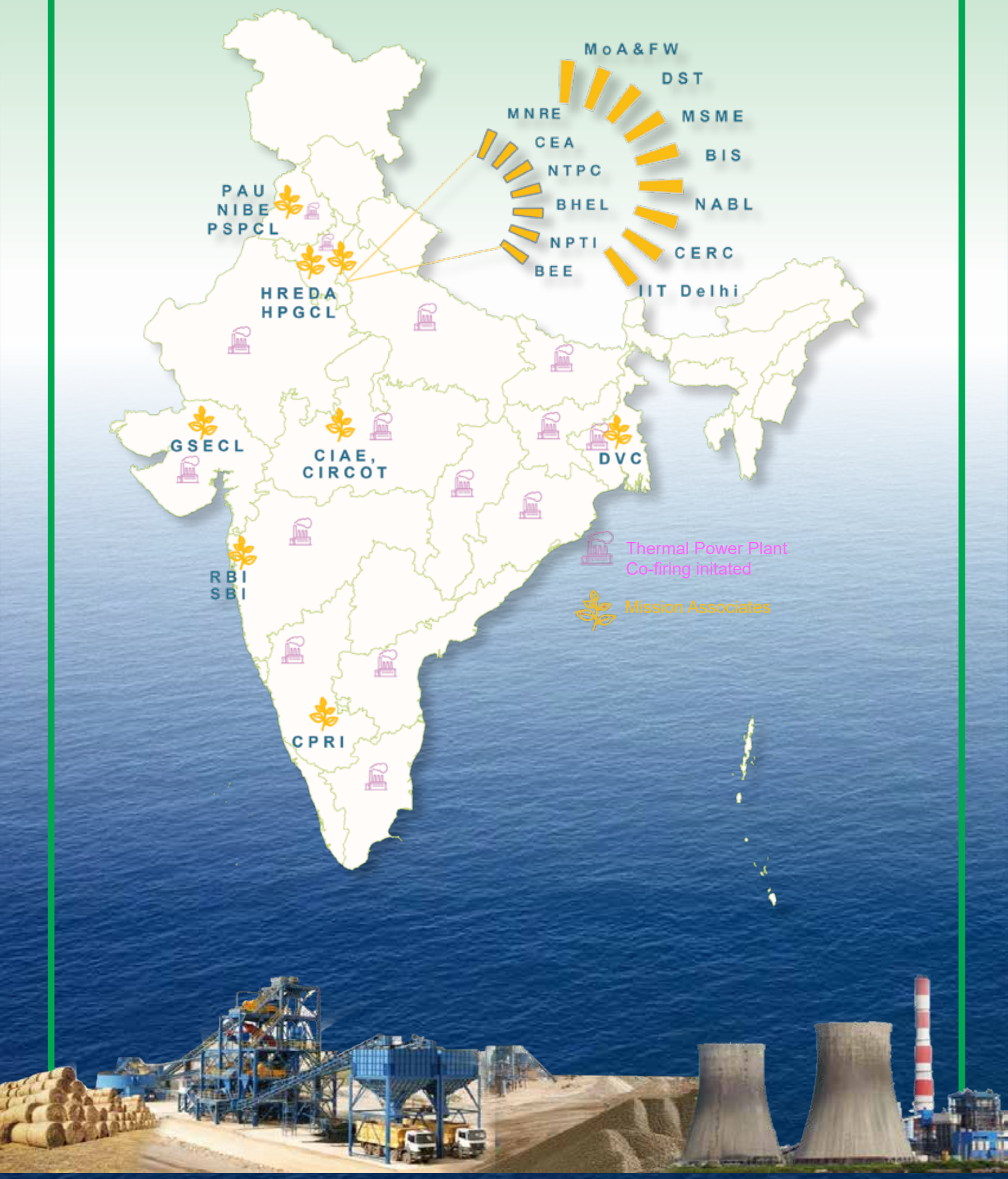
GOVERNMENT OF INDIA
MINISTRY OF POWER

Accelerating Biomass Co-firing

2+ Million MT
Biomass Co-fired
(till 31.03.2025)

NATIONAL MISSION ON USE OF BIOMASS IN THERMAL POWER PLANTS
(SAMARTH : Sustainable Agrarian Mission on use of Agri-Residue in Thermal Power Plants)

Harbingers of Biomass co-firing!



CONTENTS

मनोहर लाल
MANOHAR LAL

सत्यमेव जयते

विद्युत मंत्री एवं
आवासन और शहरी कार्य मंत्री
भारत सरकार

Minister of Power and
Minister of Housing and Urban Affairs
Government of India

Message

India's journey towards becoming a developed nation by 2047 is firmly rooted in sustainable growth and energy security. In line with the Hon'ble Prime Minister's vision of ensuring reliable and clean energy for every citizen, the SAMARTH Mission is turning the country's agro-waste challenge into a clean energy opportunity.

With studies indicating 750 million tonnes of agro waste generated annually and 230 million tonnes surplus, the mission promotes biomass co-firing in thermal power plants, reducing coal dependency, lowering carbon emissions, and addressing stubble burning. It is heartening to learn that in a span of three & half years, a remarkable milestone of use of over 2.1 million metric tons of biomass pellets in Thermal Power Plants has been achieved, boosting rural livelihoods and strengthening the bioenergy value chain.

As India moves towards its ambitious target of 500 GW of non-fossil fuel capacity by 2030, SAMARTH stands as a testament to India's commitment to indigenous, sustainable energy solutions, positioning the nation as a global leader in clean energy innovation.

I commend the dedicated efforts of all stakeholders—farmers, innovators, energy producers, and officials—and wish them continued success. Together, we are driving India towards becoming a green energy powerhouse.

(Manohar Lal)

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श्रीपाद नाईक
राज्य मंत्री
विद्युत एवं नवीन और नवीकरणीय ऊर्जा
भारत सरकार

सत्यमेव जयते

SHRIPAD NAIK
Minister of State for Power and
New and Renewable Energy
Government of India

MESSAGE

India's farmers are at the heart of our nation's growth story, and their welfare is central to our vision of Viksit Bharat. As our Hon'ble Prime Minister has rightly said, "India's development journey is incomplete without the prosperity of its farmers."

Today, we are at a pivotal moment where we can turn agriculture residue-related challenges into powerful economic opportunities. One such challenge—stubble burning—has long impacted air quality, soil fertility, and agricultural productivity. To this end, the Ministry of Power has set up National Mission on use of Biomass in Thermal Plants (SAMARTH – the Sustainable Agrarian Mission on the use of Agro-Residue in Thermal Power Plants). The Mission represents a powerful confluence of clean energy and rural empowerment. By promoting the use of agro-residue in thermal power plants, this initiative is transforming an environmental challenge into an economic opportunity. The Mission has enabled to evolve a reliable biomass supply chain, promoted entrepreneurship in rural areas, and opened new avenues for employment through pellet manufacturing and allied industries.

With the setup of testing laboratories, issue of benchmark pricing, and supportive procurement frameworks, SAMARTH Mission is working towards building a robust and sustainable biomass market. These efforts are laying the foundation for biomass energy to become a reliable and scalable part of India's green energy transition. SAMARTH is also paving the way for a new rural economy—creating income for farmers, fostering innovation, and advancing India's leadership in renewable energy. It is a shining example of how sustainable development can be inclusive, innovative, and impactful.

I sincerely thank and encourage to all those farmers, entrepreneurs, power producers, and officials who are tirelessly working to drive this mission forward. By embracing biomass as a clean energy solution, we are not only empowering rural communities but also strengthening India's position as a global leader in green innovation.

Together, with SAMARTH Mission initiative let us continue moving towards a cleaner, greener, and more prosperous India.

(SHRIPAD NAIK)

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Leader's Message

Sh. Pankaj Aggarwal
Secretary,
Ministry
of Power

The future of India's power sector depends on integrating cleaner fuels while maintaining grid reliability. Biomass co-firing in thermal power plants is an innovative solution that supports this transition. The government is committed to increasing the share of renewables, modernizing existing power infrastructure, and reducing dependence on fossil fuel. Through SAMARTH Mission, India is establishing the necessary ecosystem—procurement systems, pricing frameworks, and quality standards—to scale up biomass adoption efficiently and effectively.

Beyond environmental gains, SAMARTH Mission is opening doors for entrepreneurship and innovation across the biomass value chain—from pellet production to advanced technologies like torrefaction. Support from MNRE, CPCB, and other agencies through grants and targeted financial incentives is helping build a self-sustaining market for biomass energy.

SAMARTH is not just a policy intervention—it is a catalyst for inclusive economic growth and environmental stewardship. It ensures that farmers, industries, and energy producers—all are benefitted and be part of India's green transition. As we shape a future-ready power sector, biomass co-firing will remain a significant strategy, driving progress toward sustainability, self-sufficiency, and long-term energy security.

Sh. Ghanshyam Prasad
Chairperson, Central Electricity Authority (CEA)

Indian power system is witnessing increasing penetration of renewables at a rapid pace with an aim to fulfil energy transition target set by Ministry of Power i.e. establishing 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030. Transmission networks play a vital role in this exercise via integration and transmission of power from the non-fossil resources to the drawee entities. It is, therefore, important to plan and establish strong and resilient transmission network for reliable and quality power supply to the consumers.

For integration of such a huge quantum of renewable generation, CEA had earlier published "Transmission Plan for Integration of over 500 GW RE Capacity by 2030". Subsequently, National Electricity Plan - Transmission covering both the Inter State and Intra-State transmission plan till the year 2032 was brought out by CEA. Resource Adequacy Plan of transmission system for each State/UT till the year 2034-35, covering both intra-state and Inter State Transmission System (ISTS), is also being prepared by CEA.

CTU is publishing the Rolling Plan every year to assess the requirement of ISTS and to give a perspective of upcoming and planned ISTS in the National grid in next five year timeframe. The "Annual ISTS Rolling Plan 2029-30" prepared by CTU in association with all the stakeholders is an important document for Generation Developers, Transmission Service Providers (TSPs) and other stakeholders for clear visibility of the growth of ISTS in next 5 years. New industrial demand centres of green hydrogen and green ammonia would also be benefitted from the report.

This report would also be extremely useful to various STUs as a guide to plan their downstream network and other transmission strengthening schemes in commensurate timeframe for optimal utilization of national resources.

Leader's Message

Sh. Rajesh Verma
Chairperson
CAQM

In alignment with the Hon'ble Prime Minister's visionary statement *"India of the 21st century is moving forward with a very clear roadmap for climate change and environmental protection,"* the Commission for Air Quality Management (CAQM) reaffirms its unwavering commitment to improving air quality in the National Capital Region (NCR).

Towards abatement of air pollution caused by large scale uncontrolled burning of agricultural residue in the NCR and adjoining areas, particularly the paddy straw, the Commission, through a statutory direction issued on 17.09.2021, under the powers vested upon it by the CAQM Act, 2021, directed all Thermal Power Plants located within a radius of 300 kms of Delhi to co-fire bio-mass based pellets @5-10% of the annual coal requirement in each of such plants (with focus on paddy straw). Such a mandate was further extended to all the captive power plants operating in NCR vide Direction No. 72 dated 17.03.2023.

In furtherance of such efforts, the Commission vide Direction No. 92 dated 03.06.2025 has also targeted for 50% co-firing of paddy straw pellets / briquettes in all brick kilns operating in the non-NCR areas of Haryana and the entire State of Punjab.

The **Environment (Utilisation of Crop Residue by Thermal Power Plants) Rules, 2023**, formulated by MoEFCC lay down a regime for levying environmental compensation on the identified TPPs for not achieving the prescribed levels of co-firing of biomass pellets. This framework is a strong affirmation of our commitment to upholding environmental norms and promoting responsible industrial practices.

Such initiatives not only target the critical issue of stubble burning but also align with our goals for a broader environmental sustainability and also facilitate deriving economic value through use of bio-mass and in the process of pelleting.

The National Mission on use of Biomass in Thermal Plants- **SAMARTH Mission** has been actively facilitating the integration of agro-residues into thermal power generation, thereby not only helping to abate air pollution but also contributing to rural development and prosperity. With SAMARTH Mission's dedicated efforts, all the identified 11 TPPs are well on their way to achieve the targeted milestones.

The CAQM reaffirms its commitment to work in close coordination with all stakeholders to drive innovative, inclusive, and scalable solutions aimed at improving the air quality and fostering a healthier and sustainable growth in NCR and adjoining areas.

Sh Piyush Singh
Additional Secretary
(Thermal and Coal, T&R, Admin, OM).

In line with India's vision of an Aatmanirbhar Bharat, **the Government of India is committed to driving energy transition and climate action during the Amrit Kaal.** The Ministry of Power has **prioritized green energy transition, with a strong focus on addressing environmental challenges** like stubble burning. This is exemplified through the establishment of the National Mission on the Use of Biomass in Thermal Power Plants- SAMARTH Mission.

This initiative integrates use of biomass pellets with coal, thereby reduces carbon emissions and dependence on fossil fuels, while providing economic benefits to farmers and rural entrepreneurs. It creates a sustainable market for crop residues and ensures a cleaner, healthier environment.

SAMARTH Mission has been driving the adoption of biomass co-firing through a multi-pronged strategy including formulation of comprehensive policies, technical guidelines, research and development, development of Indian standards, procurement and testing guidelines, price benchmarking, skill development etc. to ensure seamless adoption in thermal power plants.

In addition, the Mission is also undertaking awareness and capacity-building programs to engage power producers, pellet manufacturers, Farmers, and financial institutions, fostering greater stakeholder participation. Regulatory frameworks and financial incentives have been put in place to encourage agri-residue based Biomass utilisation in Thermal Power plants.

With **focused efforts, cutting-edge technologies, and policy-driven interventions,** India's thermal power sector is on a path toward a greener and more sustainable future through Biomass Cofiring. The Ministry of Power remains steadfast in supporting this transition, ensuring that India's thermal power industry plays a pivotal role in our journey toward a low-carbon, energy-secure future.

Leader's Message

As India's largest power generator and the champion of biomass co-firing, NTPC is proud to lead the implementation of the National Mission on the Use of Biomass in Thermal Power Plants. By integrating agricultural residues into coal-based power generation, NTPC is addressing two critical national challenges: air pollution caused by stubble burning and the urgent need to reduce carbon emissions.

With more than 20 of our thermal power stations successfully co-firing biomass, NTPC is demonstrating how agro residues can be repurposed into clean energy, reducing reliance on fossil fuels while delivering environmental and social benefits.

We are continuously innovating for future-scaling of biomass usage in Thermal Power Stations and investing in advanced technologies such as torrefied biomass pellets for improved fuel properties, green charcoal from municipal solid waste, and R&D efforts to achieve co-firing ratios of 20% or higher. These advancements are focused on enhancing combustion efficiency, lowering emissions, and supporting country's climate commitments.

Through initiatives like SAMARTH Mission, NTPC remains committed to making biomass co-firing a cornerstone of India's clean energy transition ensuring that it is sustainable, inclusive, and technology driven.

Sh. Gurdeep Singh
Chairman and Managing Director (CMD) of NTPC Limited.

Smt. Tripta Thakur
Director General, NPTI, Ministry of Power

India's thermal power sector is at the cusp of a transformative shift—one that aligns with our national vision for sustainability, energy security, and climate responsibility. **Biomass co-firing** represents a pivotal strategy in this transition. By repurposing agro-residues as a renewable energy resource, National Mission on use of Biomass in Thermal Plants- **SAMARTH Mission creates a powerful synergy**—benefiting **farmers** through enhanced income opportunities, industries through sustainable business opportunities, and the energy sector by contributing to our decarbonization targets.

As the **apex national institution for power sector training and human resource development,** the **National Power Training Institute (NPTI)** is playing an instrumental role in enabling this transition. Our focus is on disseminating awareness and **specialized knowledge** to stakeholders across the value chain, ie: farmers, pellet manufacturers and thermal power plant officials for the effective adoption of biomass technologies. Notably, under the **SAMARTH Mission,** over **80 awareness and capacity-building programs** have been conducted across **18 states**, reaching more than **15,000 stakeholders**—demonstrating the breadth and impact of our efforts.

NPTI remains fully committed to supporting the Ministry of Power's strategic objectives under the **SAMARTH Mission,** contributing to the creation of a resilient, sustainable biomass supply chain & higher Biomass utilisation in TPPs. SAMARTH mission is not only driving an environmental imperative but also is **spurring rural development, industrial innovation, and clean energy adoption.**

Together, through awareness, collaboration, and innovation, NPTI is standing shoulder by shoulder with SAMARTH for paving the way for a **cleaner, more efficient energy future, in alignment with India's Net-Zero commitment by 2070.** NPTI is proud to be a driving force in this national transformation.

Editorial Message

Sh. Satish Upadhyay
Mission Director,
National Biomass Mission (SAMARTH),
Ministry of Power

India aims to achieve 50% of its energy from non-fossil fuel sources by 2030 and reach net-zero emissions by 2070. The rapidly evolving biomass pellet ecosystem is crucial in this transition towards greener energy solutions. Biomass co-firing, which blends biomass pellets with coal in thermal power plants, is a key strategy to reduce the carbon footprint of India's coal-dominated energy sector.

The demand for biomass pellets in India is rising, driven by the government's push for renewable energy and the need to address environmental issues like air pollution from crop residue burning.

As India moves towards a sustainable and low-carbon energy future, the SAMARTH Mission (Sustainable Agrarian Mission on the Use of Agro-Residue in Thermal Power Plants) stands as a beacon of innovation and progress. Led by the Ministry of Power, this initiative is more than a policy intervention; it is a transformational movement that integrates environmental responsibility with economic growth.

India, an agrarian powerhouse, generates over 754 million tonnes of biomass annually, with nearly 228 million tonnes of surplus agricultural residue. While this biomass has immense potential as a clean energy source, much of it remains underutilized or burned in open fields, contributing to severe air pollution and environmental degradation. The SAMARTH Mission aims to address this challenge by fostering an efficient biomass supply chain, promoting biomass co-firing in thermal power plants, and creating new economic opportunities for farmers, entrepreneurs, and industries.

The mission has made remarkable strides in recent years. With over 68 thermal power plants adopting biomass co-firing, substantial reductions in carbon emissions and improvements in air quality have been achieved. In 2024, the mission reached a milestone of 1 million metric tonnes of biomass co-firing leading to saving of ~1.2 million metric tonnes of CO2. Additionally, benchmark pricing policies, financial incentives, and capacity-building programs have been established to accelerate the adoption of biomass energy solutions.

Despite these achievements, to fully harness the potential of biomass energy, collaborative efforts from policymakers, industry leaders, and research institutions are essential. This booklet serves as a comprehensive resource, highlighting the mission's achievements, policy advancements, and the roadmap for scaling up biomass utilization in India.

As we move forward, the SAMARTH Mission remains dedicated to foster a robust biomass ecosystem, supporting India's clean energy transition, and reinforcing its position as a global leader in sustainable energy solutions. Together, let us strive for a Agri-residue Pellet propelled Prosperity.

SATISH UPADHYAY,
Mission Director, SAMARTH Mission & ED (Biomass) NTPC Ltd.
Ministry of Power, Government of India

Executive Summary

As a growing economy, India is actively pursuing pathways toward decarbonization and sustainability. Among the pivotal initiatives supporting this shift is the National Mission on the Use of Biomass in Thermal Power Plants under the Ministry of Power, also known as the SAMARTH Mission (Sustainable Agrarian Mission on the Use of Agro-Residue in Thermal Power Plants). This mission aims to address the dual challenge of environmental sustainability and economic viability by utilizing agricultural residues as biomass pellets in thermal power plants. By doing so, it reduces reliance on coal and mitigates air pollution caused by stubble burning.

The Ministry of Power had issued a Policy on 'Biomass Utilization for Power Generation through Co-firing in Pulverized coal fired boilers' on 17.11.2017 to utilize 5-10% of biomass pellets. Revised Biomass Co-Firing Policy dated 8th October 2021, latest modified vide OM dated 3rd May and 16th June 2023, which mandates all TPPs in the country to co-fire 5-7% biomass pellets along with coal.

India generates millions of tonnes of agricultural residues annually, much of which is burned in the fields, significantly contributing to air pollution and greenhouse gas emissions. Biomass, derived from agricultural and organic residues, is central to India's renewable energy goals. With over 755 million tonnes of biomass produced annually, 228 million tonnes are surplus, creating an untapped reservoir for energy generation. This biomass can replace coal in thermal power plants, preventing CO2 emissions through circular economy and curbing the environmental impact of stubble burning in agricultural states.

SAMARTH Mission has taken several initiatives in the front of policy intervention, developing SOPs for thermal power plant based on their type of boiler, providing assistance in developing financial schemes with MNRE and CPCB, developing online portal for assisting all the stakeholders, holding workshops and conferences in collaboration with BEE, NPTI, CPRI and NIBE to sensitize, aware and build capacity among the stakeholder and ignite entrepreneurship among the young generation. Mission is also focusing on research and development activities of developing standards in testing of biomass pellets, performance of pellet machinery and upcoming technologies and challenges in association with CPRI, NRFMTT, ICAR-CIRCOT, PAU, NETRA and BIS. Mission has also taken steps to provide ease of doing business such as enabling 'e-Nam portal' for selling of agro-residue by enabling pellet manufactures under 'Priority Sector Lending' by RBI and extending storage infrastructure facilities for storage of biomass under 'Integrated Scheme on Agricultural Marketing' by MoA&FW.

Pioneering the Shift to Biomass pellets

BACKGROUND

Since last few years, Delhi/NCR regions has been facing high pollution level and getting covered under the blanket of smog in the month of October-November due to burning of huge quantum of stubble i.e., ~22 MMTPA burning in the state of Punjab and Haryana. This led to formulation of biomass co-firing policy and subsequently 'National Mission on Use of Biomass in Coal Based Thermal Power Plants'.

It was decided to explore the possibility of use of surplus biomass/stubble for co-firing with coal in thermal power plants.

MoP issueda policy on 17.11.2017 for biomass pellets co-firing and subsequent advisory was sent to all coal based power plants by CEA.

MoP set-up National Mission on Use of Biomass in TPPs on 12.07.2021.

EIGHT POWERFUL ENTITIES
Joined hands together to form National Mission

To reduce the carbon footprint of thermal power plants and prevent stubble burning, the Ministry of Power has established the 'National Mission on Use of Biomass in Thermal Power Plants' on 12.07.2021, under which biomass pellets co-firing in TPPs is being promoted. It was constituted by bringing together the expertise of eight (8) organizations which are Central Electricity Authority (CEA), Bureau of Energy Efficiency (BEE), Ministry of New & Renewable Energy (MNRE), NTPC Ltd. (NTPC), Damodar Valley Corporation (DVC), Bharat Heavy Electricals Ltd. (BHEL), Central Power Research Institute (CPRI) and National Power Training Institute (NPTI).

Mission Structure & Objectives

Ministry of Power

3-Teir Structure

Steering Committee headed by Secretary (Power)

Executive Committee headed by Member (Thermal), CEA

Mission Directorate headed by Executive Director, NTPC

Subgroup 1
(Headed by DG, CPRI)
Research on properties/ characteristics of biomass

Subgroup 2
(Headed by DO, NTPC)
Technical specification finalization, boiler design for biomass co-firing.

Subgroup 3
(Headed by AS (Th), MOP)
Supply chain issues, logistics & business development.

Subgroup 4
(Headed by DG, BEE)
Identification of labs and certification bodies for testing.

Subgroup 5
(Headed by JS (R&R), MOP)
Regulatory framework and economics of biomass co-firing in coal based TPPs.

OBJECTIVES

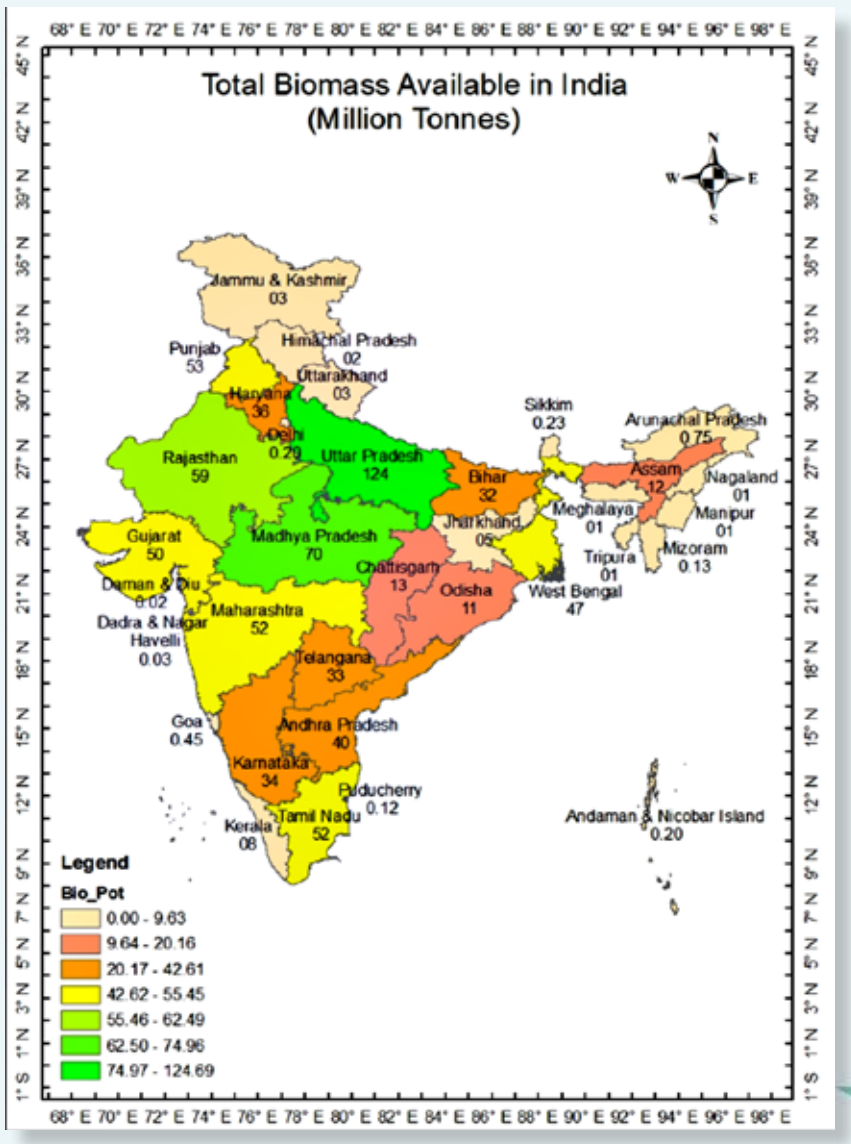
- To expand Biomass co-firing across all TPPs in the country and to have a larger share of carbon neutral power generation from the thermal power plants.
- To take up R&D activity to handle the biomass pellets with higher amount of silica & alkali.
- To facilitate overcoming the constraints in supply chain of biomass pellets and Argo-residue and its transportation up to the power plants.
- To resolve regulatory issues in biomass co-firing.

India's Solid Biomass Potential

Biomass is a renewable & organic material that comes from plants. It is also a Carbon neutral fuel as CO_2 released during the combustion is absorbed in the by the plants in the next cycle of crop/plant.

India spans a land area of 32.9 lakh sq. km, of land under annual cultivation, producing an average of 774 million tons of crops each year. Over the last few decades, the volume of agricultural residue generated in our country has benn growing significantly.

ALL INDIA MAPPING	
Total Crop Area (Million Hectare)	206.09 MH
Total Crop Production	774.38 MMTPA
Total Biomass Generation	754.44 MMTPA
Surplus Biomass generation	228.49 MMTPA
Surplus Biomass Power potential	~28 GW



Reference:- Ministry of New and Renewable Energy (MNRE), report titled "Evaluaon Study for the Assessment of Biomass Power and Bagasse Cogeneraon Plants in the Country"

Defining: Quality Pellets for Quality Energy

WHAT ARE BIOMASS PELLETS?

Biomass pellet is a small, cylindrical, and condensed form of organic material derived from various renewable sources. The choice of the conversion route depends on biomass type, its availability, and the form of energy desired. To produce torrefied and non-torrefied pellets we need to adopt thermochemical and densification process respectively. The form change results in a much higher specific density of the material which increases its combustion efficiency as compared to the loose material.

TYPES OF BIOMASS PELLETS

Non-torrefied Pellets are formed through physical transformation of loose biomass(raw material) into a compactly compressed unit of right shape suitable for burning. The form change results in a much higher specific density of the material which increases its combustion efficiency as compared to the loose material.

Parameter	Coal	Biomass Pellets
Carbon (Percentage)	34-35	10-15
Volatile Material (Percentage)	20-21	50-60
Ash (Percentage)	38	10
Moisture (Percentage)	12-18	8
GCV	3500	2800-3400

Torrefied Pellets are formed after torrefaction; a process in which biomass is heated between 250 °C to 300°C in lack of oxygen to convert it into coal like material. Torrefaction of biomass improves its physical properties like grind-ability, particle shape, size, and distribution, pellet-ability, and composition properties like moisture, carbon and hydrogen contents, and calorific value. This improved properties of biomass makes it suitable to be co-fired in higher ratio.

Technical Data	Specifications for Torrefied / Non-Torrefied pellets	IS & ISO Testing Standards
Base Material	Agro Residue/ Crop Residue (wood-based pellets will not be acceptable)	NA
Diameter	Not more than 25mm No other dimension should exceed 35 mm	IS 17643: 2021 Or ISO 17829 :2015
Bulk Density	Not less than 600 Kg/m3	IS 17642: 2021 or ISO 17828:2015
Fines % (Length <3.15 mm) (ARB) in wt%	Fines<=5%	IS 17656: 2021 Or ISO 18846: 2016
Moisture (ARB) in wt%	Not more than 14%	IS 17655 (Part 1, 2 & 3): 2021 ISO 18134-1:2015; ISO 18134-2: 2017
Gross Calorific Value (ARB) in Kcal/kg	Non-Torrefied pellets: 2800-4000 & Torrefied pellets: 3400-5000	IS 17654: 2021 or ISO 18125:2017
Hard Groove Grindability Index (HGI)	Not less than 50	ISO 5074

Crafting Pellets: The Process Unveiled

Typically, Non-torrefied Biomass Pellet Production line consist of major equipment/machines as below:

CHIPPER GRINDER:

is used for cutting and chipping Agro-residue.

FLASH DRYER:

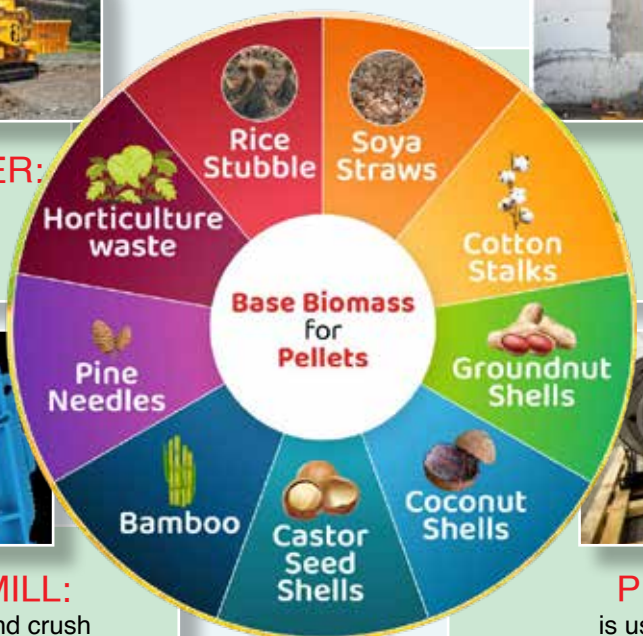
are used for reducing the moisture levels in Agro-residue.

HAMMER MILL:

is used to shred and crush Agro-residue into smaller pieces.

PELLET MILL:

is used to create pellets from crushed agro-residue material.



In addition to the above Torrefied pellets production line also consist of Torrefaction reactor.

FIXED BED REACTOR

TYPES OF TORREFACTION REACTOR:

- Rotating Drum Dryer
- Screw Type Reactor
- Compact Bed Reactor
- Fixed Bed Reactor

Benefits for Stakeholders

Biomass Pellets Co-firing is a low-cost option for utilising biomass efficiently and to reduce carbon-footprint of thermal power generation. Biomass pellets are used as a partial substitute fuel in high-efficiency coal fired boilers. With huge sustainable energy resources of surplus agricultural residues, we can improve rural economy, increase green energy share, energy security, and reduce air pollution.

MARKET SCENARIO:

Farmers

Farmers Serviceable Availabe Market : ~Rs 9,000-13,000 crores (@Rs 1.5-2/kg)

BENEFITS

- Provides Additional income source for farmers by selling of Agro-Residues
- Emplyment generation from pre-processing of Agro-Residue

Pellet Manufactures

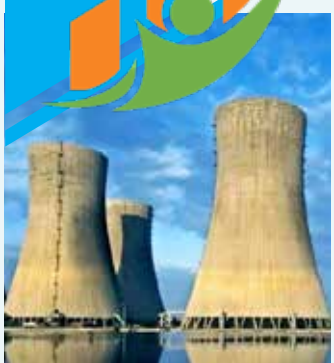
Pellet Manufactures Serviceable Available Market : ~Rs. 28,000-30,000 crores (@ Rs. 8-8.5/kg)

BENEFITS

- Blue Ocean Business Strategy
- Financial Assistance for setting-up pellet plant
- Contribute to India's Green Energy Transition

Thermal Power Plants

Total Potential of CO_2 saving annually by Thermal Power Plants: ~465 LMT @ 5% Biomass Cofiring

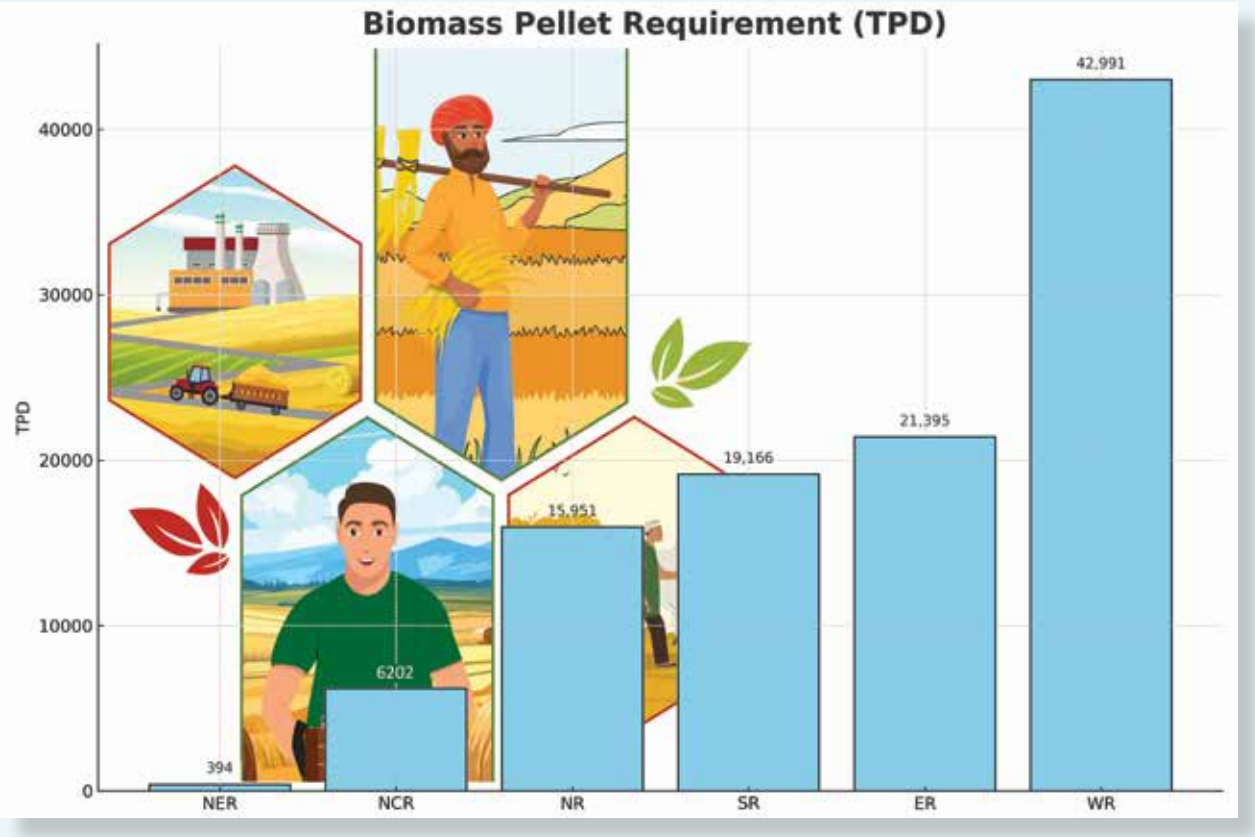


BENEFITS

- Handy Solution for GHG (Green House Gases) reduction
- Less dependence on Coal
- No Impact in MOD (Merit Order Dispatch)

Meeting the Nation's Biomass pellet demand/requirement

Biomass pellet demand or requirement in thermal power plants as per 5% biomass cofiring mandate thermal power plants located in Western Region (WR), Eastern Region (ER), Southern Region (SR) & Northern Region (NR) accounts for 41%, 20%,18% and 15% respectively.



On the supply side, India has a robust infrastructure for biomass fuel production, comprising approximately **985 pellet manufacturing plants**. Among these, ~ **300 plants** specialize in pellet manufacturing, as per data available with the SAMARTH Mission. These facilities are strategically located across various states to cater to the needs of power plants and other allied industries (such as steel, cement, aluminum, brick kilns etc.).

In addition to facilitating administrative/policy support, Financial assistance, etc., with Mission's other initiatives like working closely with States to strategize conducive procurement environment. e.g., Multiple Tenders, Small quantity, short term, eliminating mediators leading into Boosting of Supply, Demand Creation and Capacity Building, Pellet Manufacturing Capacity in NCR as well as India has shown significant growth as below:

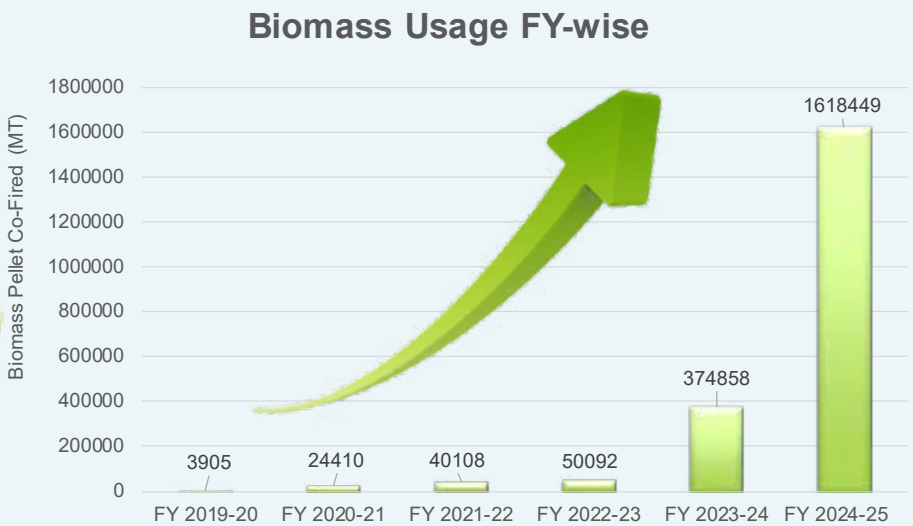
Rated Pellet Manufacturing Capacity-NCR: Increased >2 times; ~ 10,400 TPD in March'25 w.r.t ~ 4700 TPD in March'24

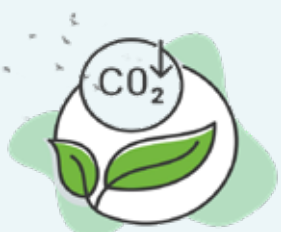
Rated Pellet Manufacturing Capacity-All India: Increased >2 times; ~30,800 TPD in March'25 w.r.t ~ 14,800 TPD in March'24

Nationwide progress of Biomass Co-firing

Multi-fold increase (~4.3 times) in Biomass co-firing in FY24-25 w.r.t. FY 23-24.

Total Cumulative Biomass Usage
(Till 31.03.2025)
21.18 LMT
(68 Plants = 90072 MW)





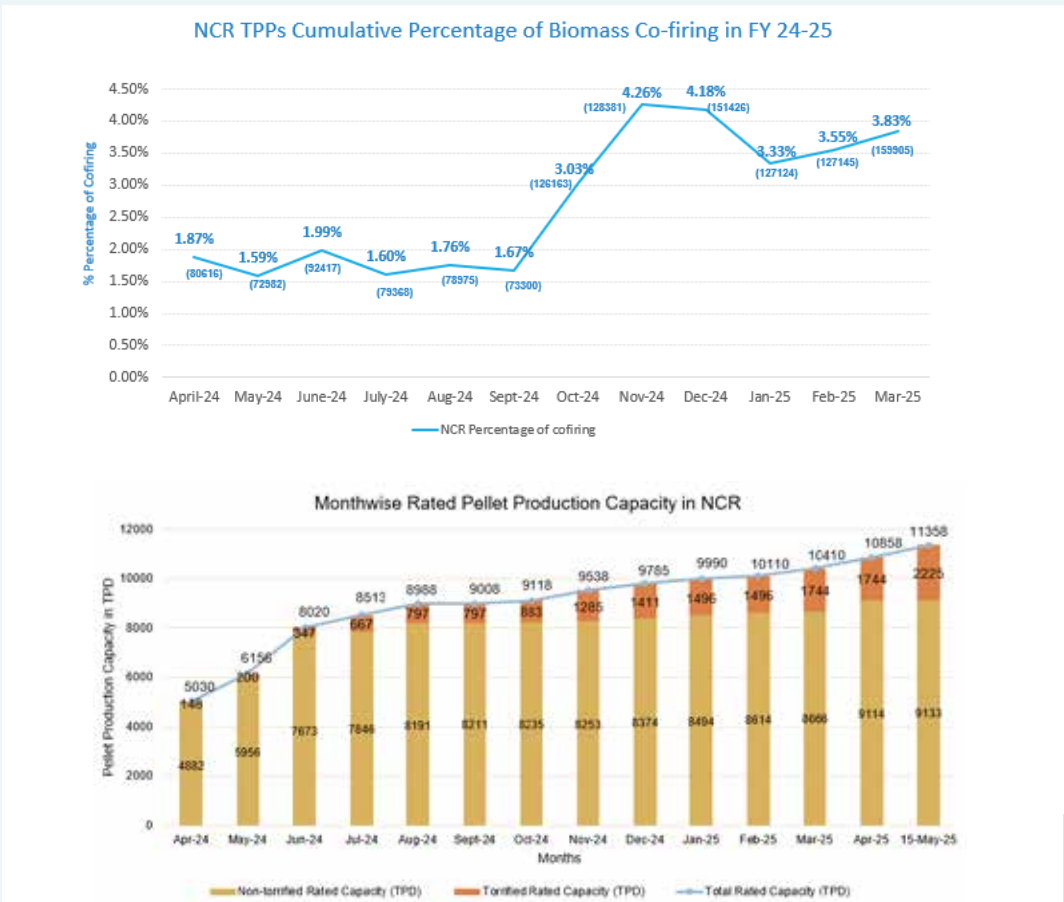
CO2 Emission Reduction: 25.5 LMT (Till 31.03.25)

Social Impacts of Biomass Pellets Co-firing

Global energy consumption continues to rise, with renewable energy sources gaining attention. According to the International Energy Agency, renewable energy could supply nearly 30% of the world's energy by 2024. Biomass pellets and co-firing present a pathway to transition towards sustainable energy.

Biomass cofiring i.e. integrating biomass with coal in power generation presents a range of compelling social, environmental, and economic advantages. On a social level, it stimulates rural economies by generating employment opportunities in the collection, processing, and transportation of biomass, thereby revitalizing communities associated with agricultural operations. From an environmental standpoint, this approach cuts greenhouse gas emissions and reduces reliance on fossil fuels, promoting cleaner air and a more sustainable energy portfolio. Economically, cofiring offers a pragmatic, cost-efficient path for retrofitting existing coal infrastructure, simultaneously addressing waste management by repurposing agricultural residues. This balanced approach accelerates the shift to renewable energy while delivering tangible benefits across society. Overall, biomass cofiring represents a practical and inclusive strategy for advancing the renewable energy transition while generating widespread societal benefits.

NCR Biomass Cofiring Multifold Growth



Key Contributors

Multipronged Strategy: 3E – Enable, Encourage & Enforce

Strategy	Focus Area	Key Actions	Description/Highlights
Enable	**Institutional & Market Ecosystem**	Policy, SOP, Model Contract Grant-Loan Scheme Market Development Platforms Long-Term Contracts Digital Biomass Procurement BIS Standards for Pellets R&D Support	Establishing the foundation for biomass ecosystem with supportive regulations, enabling framework/ financial/technical infrastructure incentives and standards.
Encourage	**Stakeholder Capacity & Participation**	Capacity Building & Awareness Skill Development (Entrepreneurs & Farmers) Price Benchmarking Geographical Expansion within state ECR Pass-Through Mechanism(Section 63-CaseII)	Empowering stakeholders and incentivizing wider participation through training, financial/pricing clarity, adaptive Policy
Enforce	**Regulatory Compliance & Accountability**	CAQM Orders & Close Monitoring MoEFCC notification regarding Biomass Cofiring Compliance Supreme Court Directives	Regulatory push to ensure adherence by stakeholders and drive timely implementation of co-firing mandates.

TRACING THE PATH: SAMARTH's Timeline

Jul 2021
Constitution of National Mission on use of Biomass in TPPs

Oct 2021
Issue of Revised Policy on Biomass Co-firing

Nov 2022
Financial Grant Schemes for setting up pellet plants (M

Jan 2023
Release of Standard Bidding Document for Biomass procurement

Feb 2023
Procurement Provision of pellets on GeM portal

Mar 2023
Launch of 'SAMARTH' website

Apr 2022
Issue of Model SOPS (FBC Boiler) to Thermal Power Plants for Biomass Co-firing

Mar 2023
3P National Conference'

May 2023
Special Provision for Manufacturers at SAMARTH webportal for display of available Pellets along with price

May 2023
Inclusion of Bamboo and its by-products for manufacturing Biomass pellets

2+ Million MT Biomass Co-fired (till 31.03.2025)

Jun 2023
Issue of Modified Revised Biomass Policy indicating price benchmarking/ procurement process of biomass pellets

Jul 2023
Provisioning of necessary administrative approvals for Biomass Pellet Plant Installation through National Single Window

Dec 2024
1 Million MT Biomass Co-fired in NCR TPPs (CY 2024)

May 2024
Clarification regarding the "pass-through" mechanism for thermal power plants setup under Section 63 Case 2 Scenario 4

Dec 2023
Identification of 'Biomass Pellet Manufacturing' by RBI under 'Priority Sector'

Nov 2023
Raw Biomass (Agri Residue) is now available for trade on e-NAM Portal under miscellaneous category

Aug 2023
Issue of benchmark price for procurement of Non-torrefied biomass pellets (NCR, NR & WR)

Jun 2023
Issue of Bankable Project Report in collaboration with SBI

Jun 2023
Exclusive Loan Schemes for setting up pellet plants (SBI and other FIs)

Biomass Co-firing Energizing Sustainable Development Goals (SDGs)

A. SDG 7: Affordable and Clean Energy

- Biomass co-firing in thermal power plants enhances energy sustainability by integrating renewable biomass with coal, reducing greenhouse gas emissions and ensuring energy security.
- Emission Reduction & Renewable Integration: Biomass co-firing lowers CO2 emissions compared to coal-based power generation.

B. SDG 9: Industry, Innovation, and Infrastructure

- Biomass co-firing drives industrial innovation and strengthens energy infrastructure through sustainable fuel diversification.
- **Technological Advancements:** Innovations in biomass pelletization optimize combustion efficiency.
- **Economic Growth:** Stimulates employment across agriculture, manufacturing, and logistics.
- **Infrastructure Development:** Requires investment in harvesting, processing, and logistics for a resilient biomass supply chain.

C. SDG 13: Climate Action

- Substituting coal with biomass significantly mitigates the carbon footprint of power generation, advancing global climate commitments
- **GHG Mitigation:** Biomass co-firing can reduce emissions by 20-50%, depending on the biomass blend.
- **Sustainable Sourcing:** Utilization of agricultural residues and certified forestry by-products minimizes environmental impact.

D. SDG 15: Life on Land

- Sustainable biomass production promotes responsible land use and biodiversity conservation.
- Responsible Forestry: Certified biomass sourcing ensures sustainable harvesting and land use..
- **Economic Growth:** Stimulates employment across agriculture, manufacturing, and logistics.
- **Biodiversity Protection:** Certification schemes for responsible biomass sourcing can minimize impacts on land degradation. These programs foster responsible land use and protect wildlife habitats.

SAMARTH Research Publications

Sustainable Biomass Supply Network Model: A Pathway to Efficient Energy Transition"

Mentor: Satish Upadhyay, Executive Director NTPC & Mission Director, National Mission on Biomass

Author: Praful Chandra Dongre, Joint Director CPRI & Member, National Mission on Biomass

Co-Authors: Ramesh Chandra, DGM, DVC; Prakhar Malviya, Sr. Manager, NTPC & Ravinder Yadav, Project Engineer, BEE & Member, National Mission on Biomass

ABSTRACT

Biomass represents a promising renewable energy source with significant potential to reduce the carbon footprint of coal-fired thermal power plants and various industrial processes. Unlike other renewable energy sources such as wind power, biomass offers a reliable energy supply with minimal volatility. Despite these advantages, biomass remains underutilized as a renewable energy resource, largely due to constraints in supply chain systems. The primary barriers hindering the development of biomass and biofuel technologies include the high cost of feedstock, lack of consistent and reliable supply chains, and uncertainties in logistics and operational management. This study examines the main components of the biomass pellet supply chain, providing a comprehensive overview and classification of existing contributions in the overview of solid biofuel supply chains. This study of interface platforms highlights the interdependencies among logistics, supply-driven and demand-based collection models and underscores the importance of coordinated logistics to enhance the overall efficiency and sustainability of the biomass supply chain. To address current challenges, this paper focusses on holistic digital models that encompass all facilities within the entire biomass supply chain. Such models should incorporate strategic, tactical, and operational decision-making levels, enabling comprehensive solutions to address issues related to inventory control and real-time decision-making. Additionally, this study identifies state and district-level optimization as a critical area for future research, emphasizing the need for localized solutions to improve biomass utilization and supply chain performance. By addressing these multifaceted challenges, the study provides directions to enhance the viability of biomass as a renewable energy source, contributing to sustainable energy transitions and reducing the carbon footprints of industrial and power generated systems.

Keywords: Biomass Pellet, Supply chain, bioenergy, Pelletization

Unlocking India's Biomass Market Potential

Author: Abhinav Kumar, Executive Biomass, NTPC & National Mission on Biomass

Co-Author: Dharmesh Kumar Kewat, Executive Biomass, NTPC & National Mission on Biomass

ABSTRACT

Annually, India produces estimated surplus Agro-residue of around 230 Million MT, which is the excess Raw biomass after all conventional uses. This surplus Agro-residue brings huge potential for an untapped market for Farmers & Entrepreneurs, along with Green Energy generation for Thermal Power Plants. Ministry of Power identifying this potential established a National Mission (a.k.a. SAMARTH) for leading India's path towards the Green Energy Transition through Biomass co-firing. A major demand - supply gap has been identified in the Biomass market leading to lower co-firing ratios. Thus, this paper would cover the present status of Biomass co-firing, the Market Size of Biomass ecosystem, Challenges/issues in present scenario and roadmap/mechanisms for rapid development of Biomass market/ supply-chains.

Keywords: Biomass, Market Size, Market Development, Supply-chain, Policy InterventionsKeywords: Biomass Pellet, Supply chain, bioenergy, Pelletization

Exploring Business Opportunities in Biomass & MSW Torrefied Pellets in NCR

Mentor: Satish Upadhyay, Executive Director NTPC & Mission Director, National Mission on Biomass

Author: Dharmesh Kumar Kewat, Executive Biomass, NTPC & National Mission on Biomass

Co-Authors: Zubin Anand & Abhinav Kumar, Executive Biomass, NTPC & National Mission on Biomass, Ministry of Power

ABSTRACT

This research paper explores the business opportunities arising from the production and utilization of torrefied Agro-residue & Municipal Solid Waste (MSW) charcoal pellets in the National Capital Region (NCR) of India. Biomass torrefaction, a thermal process that converts biomass into a coal-like material, enhances the energy density and hydrophobic properties of the biomass, making it a more efficient and sustainable fuel alternative. The study identifies economically viable locations for setting-up of torrefaction units on the basis of Raw material availability, focusing on selected districts in Haryana and Punjab. The paper examines potential industries for off-take, including high energy-intensive sectors such as steel manufacturing, pharmaceuticals, textiles, cement, paper and pulp, food processing, and metal smelting. Additionally, it highlights the role of thermal power plants in biomass co-firing and the establishment of Eco-Fuel Centres to distribute torrefied biomass pellets to small and micro businesses. A detailed cost analysis of torrefied biomass pellet production is provided, covering capital cost components, manufacturing costs, and vendor profit margins. The study proposes a DBFOT (DesignBuild-Finance-Operate-Transfer) business model, where entrepreneurs design, construct, finance, and operate the torrefaction units, with the Investor, maintaining a strategic oversight and off-take agreements. The paper concludes with a summary of Raw material assessments, prospects for the torrefied biomass pellet industry, and recommendations for stakeholders to capitalize on the identified business opportunities.

Keywords: Biomass Torrefaction, Torrefied MSW Charcoal Pellets, Business Opportunities, National Capital Region (NCR)

Harnessing Biomass Torrefaction in Renewable Energy

Technological Assessment, Current Challenges and Prospective Applications for Sustainability

Mentor: Satish Upadhyay, Executive Director NTPC & Mission Director, National Mission on Biomass
Author: Praful Chandra Dongre, Joint Director CPRI & Member, National Mission on Biomass

Co-Authors: Abhinav Kumar, Executive Biomass, NTPC & National Mission on Biomass

ABSTRACT

India generates substantial quantities of agricultural residues annually, including rice husks, wheat straw, cotton stalks etc. The torrefaction process provides an efficient pathway for valorising these biomass resources, addressing the dual challenge of waste management and environmental pollution from stubble burning. Torrefied biomass, with its enhanced energy density and combustion properties, serves as a viable substitute for coal in industrial boilers and thermal power plants, as well as a potential feedstock for bioenergy production systems. While biomass represents a potential renewable energy source due to its abundance, certain property characteristics such as high moisture levels, volatile content, inefficient storage and handling processes make raw biomass difficult for direct use. To overcome this limitation, pre-treatment is necessary before converting it into an energy-efficient fuel. Torrefaction offers a viable solution to address the challenges associated with biomass feedstock. The pre-treatment process, conducted under anoxic conditions, can yield a solid biomass fuel with high energy density and consistent quality, suitable for combustion and Co-firing applications. Torrefaction is a mild form of pyrolysis performed at 200°C–300°C in an inert environment, resulting in solid biofuels with enhanced physiochemical properties, including increased energy density, higher calorific value, reduced moisture & volatile content, hydrophobic, and improved grindability. To provide a comprehensive review of the progress in biomass torrefaction technologies, this study aims to perform an in-depth literature survey of torrefaction principles, processes, systems, and to identify a current trend in practical torrefaction development and environmental performance. Hence, this paper presents an overview of recent advances in torrefaction technology. In this review, a survey of the recent research work on torrefaction is presented. Additionally, the difficulties faced and the viewpoints from the evolution of torrefaction are highlighted. The production and uses of biochar for resource efficiency and environmental sustainability are supported by this cutting-edge review.

Keywords: Co-firing, Biomass, torrefaction, grindability, thermal degradation, biochar.

IGNITING A GREENER TOMORROW

Policy Formulation

MOP has issued **Benchmarked price** for procurement of non-torrefied biomass pellets for NCR, NR & WR Plants.

Model SOP on co-firing of Biomass pellet in PF & FBC Boilers issued to all TPPs.

Model Contract for Biomass procurement issued.

Enabling Guidelines

Financial Assistance

Bankable Project report issued for Biomass pellet plants in association with SBI.

Financial grant to New Pellet plants through **MNRE and CPCB schemes**

Exclusive loan schemes for Biomass pellet manufacturing by SBI and other Govt. Banks.

IGNITING A GREENER TOMORROW

Awareness & Capacity building

80 nos. Capacity-building programs organized in 18 states across the country.

02 nos. District level workshop organized at Nagpur and Solapur. 3 nos. TPPs, visit organized for power plant officials, and 03 nos. PSSC Skill development programm.

05 nos. Regional Seminars organized at Chandigarh, Kolkata, Pune, Lucknow & Nayeli.

Biomass co-firing video (English & Hindi) created for display through digital channels.

IGNITING A GREENER TOMORROW

Research and Development

12 nos. of projects undertaken through Sub-Group 1 of Mission.

8 nos. of research project under DST.

Testing & Standardization

Testing facility at all project labs of NTPC and development of new facilities through CPRI.

Issue of 18 nos. of **IS Standards** through BIS for testing of Solid biofuels (Biomass).

Identification of 22 nos. **NABL accredited labs** for testing of Biomass pellets

Three Forces, One Mission: SAMARTH

BIOMASS CO-FIRING:
Turning Today's Waste into Tomorrow's Sustainable Energy

IGNITING A GREENER TOMORROW

Advertisement Campaign

- Newspaper advertisements in Punjab, Haryana, Uttar Pradesh, and Delhi
- Hoarding and posters across Punjab, Haryana, and Uttar Pradesh
- Social Media campaigns through Facebook, Instagram, YouTube, LinkedIn & Twitter

INSTIGATING THE NATION TOWARDS BIOMASS @ IITF 2024

FOOTPRINTS OF SAMARTH

MD, SAMARTH, MoP awarded with the "Biomass Changemaker of the Year" at the JEEV Awards by H.E. Kenneth Felix, Ambassador of Brazil to India.

SAMARTH Mission, in collaboration with the BIS, organized a Training Program on Indian Standards for Solid Biofuels

Launch of the Solid Biofuels Compendium, developed in collaboration with the Ministry of Power and BIS.

Satish Upadhyay, MD, SAMARTH at National Dialogue on Industrial Waste Circularity, April 25 20205, Indian Habitat Centre.

FOOTPRINTS OF SAMARTH

One Day Workshop on Addressing Technological Challenges and Establishing Standards for Pelletization & Torrefaction"

DG NPTI addressing Biomass Stakeholders at National Biomass Conference

Nukkad Natak at SAMARTH Mission Pavilion at IITF 2025

STRENGTHENING BIOMASS ECOSYSTEM- AWARENESS & CAPACITY BUILDING

Joint High Level Committee (CAQM, CEA & SAMARTH) visit to NPL- L&T Rajpura, Punjab

Commencement of Biomass co-firing at Gandhi Nagar TPS , Gujarat

Inauguration of a 50 kg/hr Biomass Torrefaction Pilot Unit at ICAR, Nagpur

Site visit to NTPC Dadri

Event on Addressing Technological Challenges and Establishing standards for Pelletization & Torefaction at NETRA, NTPC

Capacity Building Program at Ranchi, Jharkhand

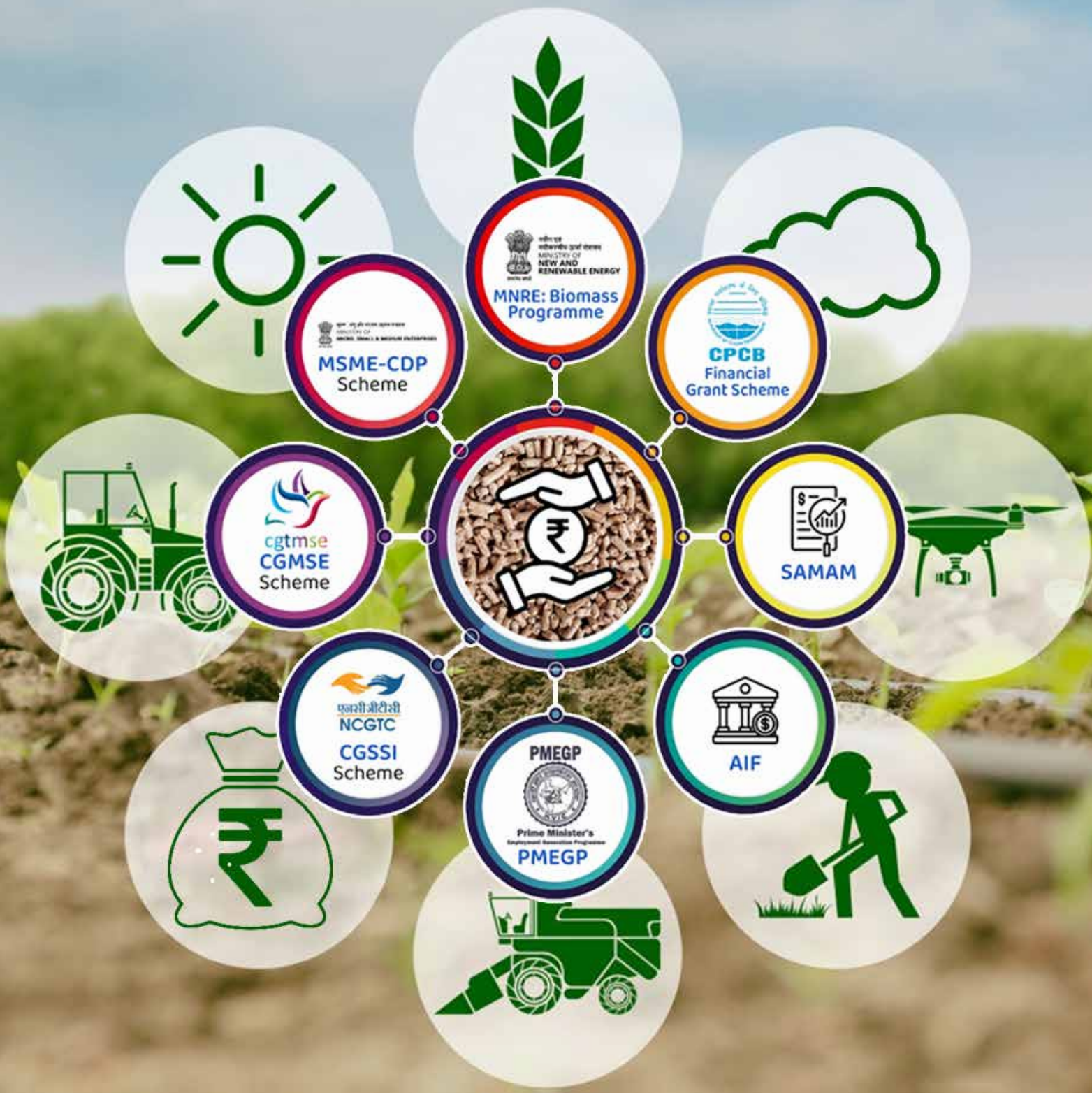
Accredited NABL Biomass Testing Labs

SR. NO.	LAB NAME	ADDRESS	CONTACT PERSON	CONTACT DETAILS
1	R&D LABORATORY, SARDAR SWARAN SINGH NATIONAL INSTITUTE OF BIO-ENERGY	12TH K.M. STONE, JALANDHAR-KA-PURTHALA ROAD, WADALA KALAN	SACHIN KUMAR	9988864647 / sachin.bcd@nibe.res.in
2	IDMA LABORATORIES LIMITED	PLOT NO 391, INDUSTRIAL AREA, PHASE-1, Panchkula, HARYANA, INDIA	RAJ RANI	9988694609 / raj@idmagroup.co.in
3	AES LABORATORIES PVT. LTD.	B - 118, PHASE - 2, Noida, UTTAR PRADESH, INDIA	Vishal Arora	9811331569 / vishal.arora@aeslabs.com
4	Pollucon Laboratories Pvt. Ltd.	5/6 "Pollucon House", Old Shantinath Mill Lane, Navjivan Circle, Udhana Mag-dalla Road, Surat, GUJARAT, INDIA	DEVANG GANDHI	9328967090 / pollucon@gmail.com
5	HTH LABORATORIES PRIVATE LIMITED	PLOT NO. 50-C, SECTOR-25, PART-II, HUDA, Panipat, HARYANA, INDIA	RISHABH DUA	9991675756 / haryanatesthousecs@gmail.com
6	ANACON LABORATORIES PVT. LTD.	FP 34, 35, Food Park, Five Star Industrial Area, MIDC Butibori, Nagpur, MAHA-RASHTRA, INDIA	S D GARWAY	9823167077 / sd.garway@anacon.in
7	TEAM TEST HOUSE (A UNIT OF TEAM INSTITUTE OF SCIENCE & TECHNOLO-GY PVT. LTD.)	G1-584, SITAPURA INDUSTRIAL AREA, Jaipur, RAJASTHAN, INDIA	KAVITA MATHUR	9413339593 / director@teamtesthouse.com
8	Ganesh Consultancy & Analytical Services	294/A, Hebbal Industrial Area, Mysore, KARNATAKA, INDIA	B S SUBHASH	9900176550 / lab.ganesh@gmail.com
9	KAILTECH TEST AND RESEARCH CEN-TRE PRIVATE LIMITED	141-C, ELECTRONIC COMPLEX INDUS-TRIAL AREA, PARDESIPURA, Indore, MADHYA PRADESH, INDIA	SUSHIL MALHOTRA	7694018482 / contact@kailtech.net
10	COAL AND COMBUSTION LABORATO-RY, NCPS, NTPC LIMITED	NCPS DADRI, GAUTAM BUDH NAGAR, Ghaziabad, UTTAR PRADESH, INDIA	KANUPRIYA VYAS	9650991462 / kanupriyapurohit@ntpc.co.in
11	PRECITECH LABORATORIES PVT. LTD.	1ST FLOOR BHANUJYOT COMPLEX, PLOT NO. C5/27, Vapi, GUJARAT, INDIA	PRASHANT R BHIDKAR	9879010042 / prashant@precitechlab.com
12	LEON INSPECTION & TESTING INDIA PRIVATE LIMITED	NO.4, 1ST & 3RD FLOOR, 5TH CROSS STREET, DR. RADHAKRISHNAN SALAI, MYLAPORE, Chennai, TAMIL NADU, INDIA	C Bhaskara Rao	8099602125 / ops.chennai@leonoverseas.com
13	JP ASSOCIATES AND LABORATORIES	PLOT NO. X-4 GHUGUS ROAD, MIDC	SONAL JAGDISH NAG-DEVE	9834451253 / jplabsindia@gmail.com
14	SHANKER LABORATORIES	F-277, FLATTED FACTORY COMPLEX, CAPTAIN GAUR MARG, Okhla	Neeraj Katyal	9999993311 / shankerlaboratories@gmail.com
15	KULKARNI LABORATORY	3RD, SAVALI PRESTIGE BUILDING, 1ST FLOOR, NANDED PHATA, SINGHGAD ROAD	Umesh Kulkarni	8308778129 / kulk_umesh@yahoo.com
16	MS TESTING LABORATORY LLP	A-4/3/19 SSGT ROAD	BALJEET SINGH	8882164954 / mstestinglab@gmail.com
17	SRT LABORATORIES PRIVATE LIMITED	FLAT NO. 01, SECOND FLOOR, BUILDING NO. 02, SHREE FALSHURTI COMPLEX	RIKESH KUMAR TIWARI	9559363455 / kulk_umesh@yahoo.com
18	ASHWAMEDH ENGINEERS & CON-SULTANTS, LABORATORY SERVICES DIVISION	SURVEY NO. 102, PLOT NO. 26, WADALA PATHARDI ROAD	APARNA PHARANDE	9325385516 / aparna@ashwamedh.net
19	QA TESTING LABORATORIES PRIVATE LIMITED	B-76, SECTOR-64	Ratnesh Rai	9873649004 / ratnesh.rai@qatestinglaboratories.com
20	INTERSTELLAR TESTING CENTRE PVT LTD	PLOT NO. 86, INDUSTRIAL AREA, PHASE-1	MANJARI GARGESH	6283411523 / manjari@itclabs.com
21	CHANDIGARH POLLUTION TESTING LABORATORY	PLOT NO. E-126, PHASE-VII, INDUSTRIAL AREA	Sital singh	9814500295 / cptle126@gmail.com
22	SGS INDIA PRIVATE LIMITED-MULTI LABORATORY	28 B/1 (SP), 28 B/2 (SP), SECOND MAIN ROAD, AMBATTUR INDUSTRIAL ESTATE	Pratheeshkumar N	8939992163 / Pratheeshkumar.N@sgs.com
23	LANDMARK MATERIAL TESTING AND RESEARCH LABORATORY PVT. LTD	G-200 RIICO INDUSTRIAL AREA, MAN-SAROVAR	ANIL DIXIT	9414297329 / lrljprr@gmail.com

List of IS Standards issued by BIS on Solid bio-fuels

Sr. no.	IS- number	Title
1	IS 17642 : 2021 ISO 17828:2015	Solid biofuels - Determination of bulk density
2	IS 17643 : 2021 ISO 17829 :2015	Solid Biofuels - Determination of length and diameter of pellets
3	IS 17653 : 2021 ISO 18122:2015	Solid biofuels - Determination of ash content
4	IS 17654 : 2021 ISO 18125:2017	Solid biofuels - Determination of calorific value
5	IS 17655 (Part 1): 2021 ISO 18134-1:2015	Solid biofuels - Determination of moisture content Oven dry method Part 1 Total moisture Reference Method
6	IS 17655 (Part 2) :2021 ISO 18134-2: 2017	Solid biofuels Determination of moisture content Oven dry method Part 2 Total moisture Simplified method
7	IS 17655 (Part 3):2021 ISO 18134-3 :2015	Solid biofuels Determination of moisture content Oven dry method Part 3 Moisture in general analysis sample
8	IS 17656 : 2021 ISO 18846 : 2016	Solid biofuels - Determination of fines content in samples of pellets
9	IS 17832 : 2022 ISO 16948 :2015	Solid biofuels - Determination of total content of carbon hydrogen and nitrogen
10	IS 17833 : 2022 ISO 16994:2016	Solid biofuels - Determination of total content of sulfur and chlorine
11	IS 17834 : 2022 ISO 16995 : 2015	Solid biofuels - Determination of the water soluble chloride sodium and potassium content
12	IS 17844 : 2022 ISO 18123:2015	Solid biofuels - Determination of the content of volatile matter
13	IS-18557 (Part-1):2024 ISO 17831-1 : 2015	Determination of Mechanical durability of Pellets & Briquettes: Pellets
14	IS-18557 (Part-2):2024 ISO 17831-2 : 2015	Determination of Mechanical durability of Pellets & Briquettes: Briquettes
15	IS 18724 :2024	Solid biofuels – Fuel Specifications and classes- Pellets from Agro and Herbaceous Residues.
16	IS 18725 : 2024	Solid Biofuels - Fuel Specifications and Classes - Briquettes from Agro and Herbaceous Residues
17	IS 18640:2024	Solid biofuels – Sample Preparation
18	IS 18721 :2024	Solid Biofuels - Vocabulary

Available Green Financing tools to support MSME and Entrepreneurs for Biomass Eco System



The Minds Behind the Mission

SH. RAKESH SRIVASTAVA
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SH. PRAFUL CHANDRA R. DONGRE
Joint Director, CPRI -Member

SH. SATISH UPADHYAY
ED, NTPC - Mission Director

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Deputy Director, CEA -Member

SH. RAVINDER YADAV
Project Engineer, BEE- Member

SH. S.K.SAHI
Scienist E (Biomass), MNRE

DR. N.K. SRIVASTAVA
Director (Projects), NPTI -Member

MD. NIZAMUDDIN
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AGM, NTPC -Technical Services

SH. PRAKHAR MALVIYA
DGM, NTPC - Technical Services

SH. G. CHINNATHAMBI
Sr. Manager, NTPC -Technical Services

SH. DHARMESH KR. KEWAT
Executive, NTPC - Technical Services

SH. ABHINAV KUMAR
Executive, NTPC - Technical Services

SH. ZUBIN ANAND
Executive, NTPC - Technical Services

Your Gateway to Biomass Knowledge

SAMARTH FAQ

FARMER RESOURCES:

- Bank Support for FPOs
- Farming Machinery Pellet
- Manufacturers List
- KVKs/CBBOs Contacts

PELLET MANUFACTURER RESOURCES:

- Pellet Machine Manufacturers OEMs
- Government Schemes
- Bank Loan Products
- Raw Biomass Aggregators

THERMAL POWER PLANT RESOURCES:

- Policies and Notifications
- Technical Support
- Documents
- IS Standards
- NABL Labs for Biomass Testing

Thermal Power Plants: Biomass co-firing initiated

TOP 5 BIOMASS PELLET CONSUMERS

FY 2023-24

1. **APCPL, Jhajjar TPS**: 96,536 MT
2. **Apraava- Jhajjar**: 79,476 MT
3. **NCTPP, Dadri**: 35,750 MT
4. **UPRVUNL- Harduaganj TPS**: 26,147 MT
5. **PSPCL Lehra**: 16,801 MT

FY 2024-25

1. **NCTPP, Dadri**: 2,73,829 MT
2. **Apraava- Jhajjar**: 2,15,165 MT
3. **APCPL, Jhajjar TPS**: 2,22,963 MT
4. **L&T- NPL Rajpura**: 1,77,260 MT
5. **PSPCL Ropar**: 94,935 MT

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National Biomass Mission

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SAMARTH Mission
(National Biomass Mission)

SAMARTH DIGITAL PRESENCE

Connect with Samarth

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