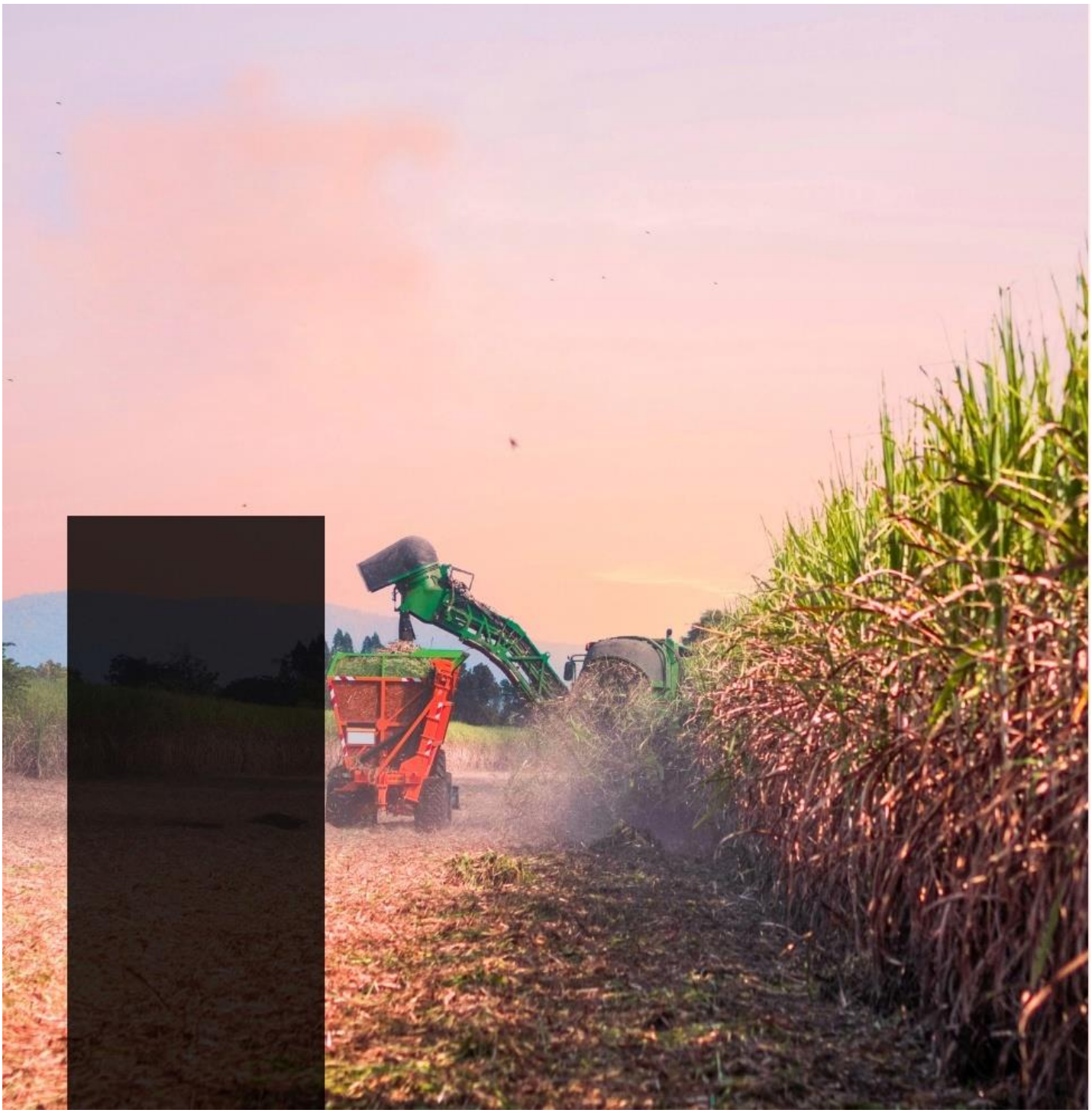
BHOOMI BIO
PRODUCTS PRIVATE LIMITED

Creating Sustainable Energy Of Tomorrow



BHOOMI BIO
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INTRODUCING

BHOOMI BIO PRODUCTS PRIVATE LIMITED

Bhoomi Bio Products Private Limited is one of the pioneering and leading company in India that have been working on advanced biomass/waste clean energy solutions/innovations that aims to reduce GHG emissions and improve environment. Our long-term goal is to achieve a cleaner environment by replacing fossil fuel in industrial and other sectors.

Bhoomi Bio Products Private Limited has set up state of art of the pellet production facility is located at Sambalpur Odisha. Our cumulative biomass pellets production, aggregation capacity is expected to reach about 5000 MT per month across India, that would aim to contribute carbon free transition faster.

VISION

To be an innovative and leader in promoting environmentally sustainable biomass-based products and processes with a focus on sustainable development and jobs creation.

MISSION

To develop partnership for sustainable biomass production and promote biomass based clean energy solutions and innovative business models involving community (farmers and women).

INDIA REVISES POLICY ON BIOMASS COFIRING FOR UTILITY-OWNED, COAL-FIRED POWER PLANTS

India's Ministry of Power on May 14,2024 issued a revised policy on biomass cofiring, announcing it will now require certain coal-based thermal power plants to begin cofiring 5% biomass within one year. The requirement ramps up to 7% two years later.

The new requirements update regulations first issued in 2017 and revised in 2021. According to documents published by the Ministry of Power, all coal-based thermal power plants owned by utilities that have bowl mills will be required to use a 5% blend of biomass pellets made primarily of agri-residues starting in May 2025. The obligation increases to 7% two years later.

Similarly, coal-based thermal power plants owned by utilities that have ball and race mills will be required to use a 5% blend of torrefied biomass pellets by May 2025, increasing to 7% two year later, while coal-based thermal power plants owned by utilities that have ball and tube mills will be required to use a 5% blend of torrefied pellets with a volatile content below 22% by May 2025.

OUR THURST AREAS

Focus Technologies

- Densification (Briquetting and Pelletization)
- Anaerobic Digestion (biogas, CBG)
- Decentralized Renewable Energy system design

Focus Biomass/Waste

Briquette and Pelleting Machine

Forest Waste and Residues:

- Sawdust
- Sander dust
- Wood chips
- Wood shavings
- Tree bark
- Twigs
- Pine needles
- Wild grasses
- Shrubs and bamboo leaves
- Bamboo dust
- Veneer waste
- Wood peeling waste etc.

Other Processed Waste:

- Press mud
- Bagasse
- MSW
- RDF
- Paper waste
- Coffee ground waste, etc.

Agricultural Waste and Residues:

- Rice husk
- Sunflower
- Groundnut shells
- Almonds shells
- Coconut shells
- Cotton stalks
- Arhar stalks
- Sugar cane leaves and trash
- Mustard stalks
- Bajra cobs
- Coir dust
- Paddy straw
- Wheat straw
- Mentha plant waste
- Maize plant waste
- Corn cob waste
- Coffee waste
- Tea waste, etc.

Less Emission and More Energy

Calorific Value of Briquettes Made from Various Raw Materials

The calorific or heating value is an essential indicator of the quality of pressed fuel briquettes/pellets. It measures the energy content of the fuel. It is defined as the amount of heat that evolves when a pressed fuel is

completely burnt, and the combustion products are cooled. The Gross Calorific Value (GCV) refers to the calorific value with the condensation of water in the latent heat also known as the higher heating value.

Type of Material	Production	Power Requirements
Arhar stalk	1.98	4000
Babool stalk	0.99	4300
Bagasse	1.8	4100
Bamboo dust	8	4160
Barks wood	4.4	2770
Castor seed shell	7.5	3750
Coffee husk	3.2	4371
Coconut	3.5	4800
Corn cob	1.5	4100
Cotton stalks/chips	3	4252
Coir pitch	9.1	4146
Cow dung	14.89	3100
Groundnut shells	2.8	4200
Jute waste	3	4428
Maize stalk	2.1	3800
Mustard shell	3.7	4300

Type of Material	Production	Power Requirements
Mustard straw	34	4200
Pine needles	1.86	4000
Palm husk	4.9	3900
Paddy straw	15.5	3469
Press mud (maili)	14.25	3600
paper waste	1.5	4350
Rice husk	19.2	3200
Sawdust	0.7	4000
Sawdust cow +dung	8.2	3800
Soya bean husk	4.1	4100
Sunflower stalk	4.3	4300
Sugarcane leaves	10	3996
Tea husk waste	3.8	4237
Wood chips	1.2	4100
Wheat straw	8	4100

ADVANTAGE OF PLANT LOCATION:

Odisha is one of the fastest growing states in India with an enviable growth rate of 7.8% in the Financial year 2022-23 and the lowest unemployment rate of 0.9% in India but with a comparative low GDP per capital of INR 1,50,676 (Rank 22 in India). Energy is one of the critical inputs in raising the standard of living of the citizens.

The state of Odisha produces 90% of its electrical power from coal. As Ministry of power has mandated cofiring of biomass pellets in all coal based thermal power plants2, Odisha would need ~1284 MW of power emanating from biomass pellets. This would require ~25,600 MT of Biomass pellets on a daily basis.

As the first commercial step, a plan to setup a biomass pellet production plant of 120 Tonnes per day feedstock capacity (dry basis, moisture <9%), which will utilize ~45,000 Tonnes of paddy straw annually to produce non-torrefied biomass pellets for coal based thermal power plants in the 250 Kms vicinity of Parmanpur Village, Sambalpur district of Odisha.

The location for the plant has been identified at Nuamunda, Parmanpur, Baradunguri, Sambalpur, Odisha, which is just 33 Kms from Bargarh district, which is also known as Odisha's Rice Bowl. Village Parmanpur has been identified based on factors such as supply chain feasibility, market for end-products, utility requirements and support provided by local and state administration.

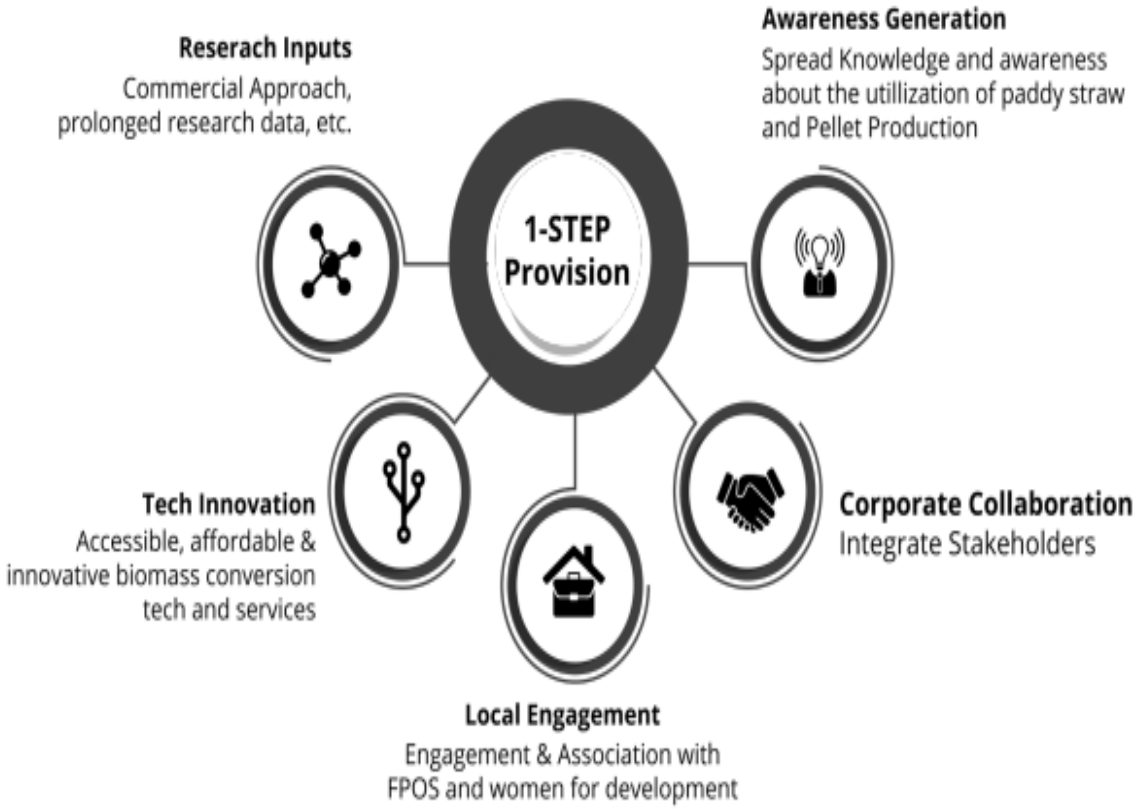
Consultancy & Advisory Services

- Technical, Financial and market assessment studies
- Technical due diligence
- Renewable Energy Planning Activities
- Contributes to an increasing role of biomass and waste utilization in the energy transition and the circular economy

Innovative Business Models

Working with women's and FPOs in biomass aggregation, collection, storage, processing, and overall management of biomass enterprise.

Integrating Sustainable Biomass Technology Involving Farmers & Elimination of Air Pollution



BIOMASS AGGREGATION AND COLLECTION MODELS

Lack of robust institutional and market mechanism for efficient agri-residues aggregation, collection, and storage is critical gap in biomass value chain development.

Bhoomi Bio Products private Limited is working with rural youths in States of Odisha, Telangana, Andhra Pradesh; creating viable business models in agro-residues aggregation, collection, storage & processing; dealing with farmers, and all stakeholders.

- Converts agricultural residues into briquettes/pellets for industries, HHs, and TPPs.
- Avoids biomass burning
- Production of biomass pellets saves GHG emission
- Helps combat Air Pollution and climate change.

Corn Cob

Mustard Straw

Bamboo Residue

Paddy

Soyabean

BIOMASS AGGREGATION AND COLLECTION MODELS IN STATE OF ODISHA

S.NO	SAMBALPUR
Type of Biomass	Paddy Straw, Groundnut
Major Activity	Biomass Aggregation & Pellet Production (Under implementation)
Capacity	120TPD

BIOMASS AGGREGATION AND COLLECTION MODELS IN STATE OF TELANGANA

S.NO	TELANGANA
Type of Biomass	Paddy Straw, Groundnut
Major Activity	Biomass Aggregation & Pellet Production (Under implementation)
Capacity	120TPD

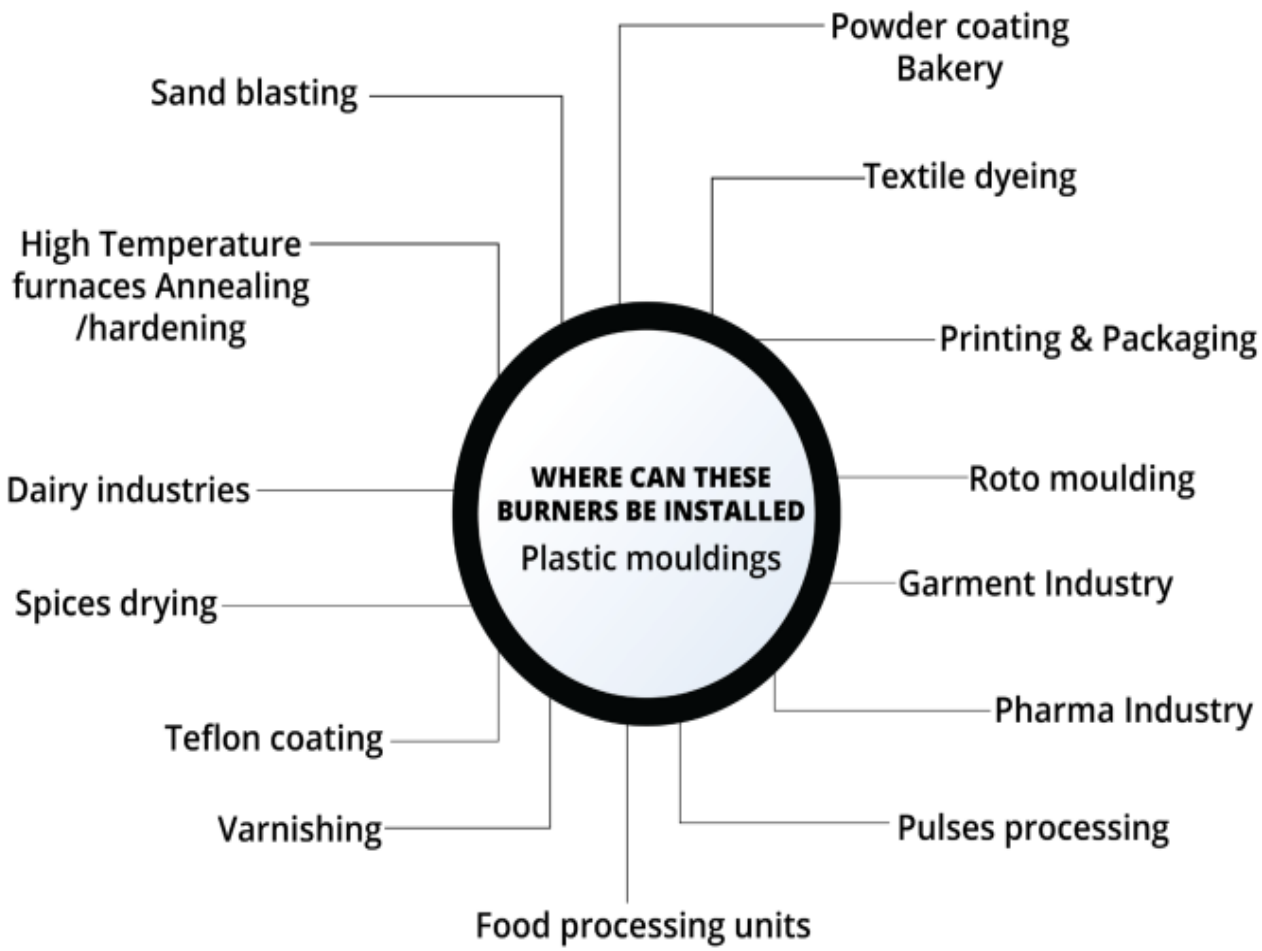
BIOMASS AGGREGATION AND COLLECTION MODELS IN STATE OF ANDHRA PRADESH

S.NO	Andhra Pradesh
Type of Biomass	Paddy Straw, Groundnut
Major Activity	Biomass Aggregation & Pellet Production (Under implementation)
Capacity	120TPD

KEY FEATURES OF INNOVATIVE TECH

Features of listed below

- High Combustion Efficiency- > 90%
- Automatic Ignition system with PID controller.
- Process temperature controls with programmable thermostats
- Energy cost saving - 30-50% against Diesel /LPG.
- Designed specifically to handle multiple type of pellets and class leading ash handling capabilities.



TORREFYER

Bhoomi Bio has developed **TorChar technology**, a continuous torrefaction machine that turns unused agricultural residues into torrefied forms. **All agricultural waste, including RDF, can also be torrefied** in loose or compacted forms as pellets, with very high energy and mass recovery.

After torrefaction, the agro-residues comes out in the form of a black material, which can directly be used in industrial boilers as it is or along with coal as the case may be. The torrefaction yield is between 70 to 80% depending on the biomass used and its characteristics.

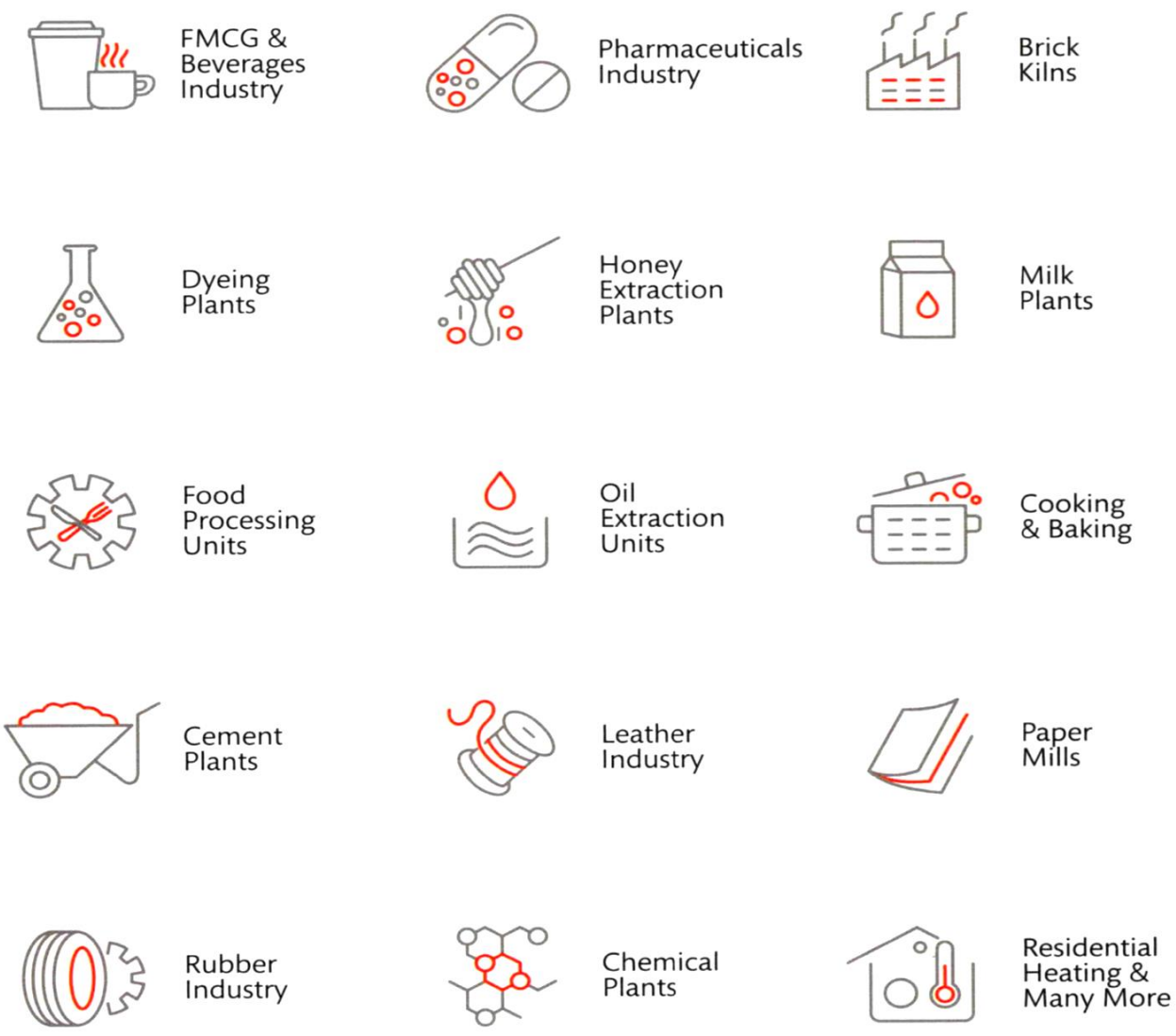
BHOOMI BIO

A Powerfull tool to fight climate change and address air pollution Problems

STRENGTH

Industries That cam Grow by Utilizing Briquettes and Pellets

Biomass Briquettes and Pellets can be used by the industrial, Commercial and household sectors.



Benefits of using Biomass

Briquettes and Pellets

Concentrated

More Combustion Time

Easy for Transportation

Economical

Tax Benefit

Lower Emission of Harmful Gasses

High Thermal Value

Made from Leftover Biomass Waste

KEY ACHIEVEMENTS

- Building a thriving business environment across biomass value chain
- Undertaking innovative design and development work – Torrefaction system, low-cost pellet mill, advanced biomass gasifier, pellet burner efficiency improvement etc.
- Handhold Local stakeholders on technical, finance, knowledge, and market linkages to reach common goals.
- Bhoomi Bio Products Private Limited partner to develop viable business model for decentralized Agri residues-based pellet production involving local community (FPOs and Women) across States– I STEP model
- Bhoomi Bio Products Private Limited partner with rural entrepreneurs in Agri-residues collection, aggregation, and supply chain
- Models by providing agriculture implements and local infrastructure support.

BIOMASS PELLET PRODUCTION FACILITY AT SAMBALPUR, ODISHA

Bhoomi Bio Products Private Limited has a biomass pellet production facility with European pellet mill with 16 mm diameter Pellets with 120 TPD production capacity.

GLIMPSES OF BIOMASS PELLETS PRODUCTION FACILITY AT SAMBALPUR, ODISHA