



Village Level Pellet production

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Seminar Outline

PART 1	Introduction
PART 2	SDG and Biomass pellet
PART 3	Development of Biomass Pellets
PART 4	Village level pellet production
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ECOSENSE APPLIANCES Pvt Ltd

We, at Ecosense, are committed to provide energy efficient cooking products and solutions, through continual research.

We believe in saving lives and cooking energy through developing appliances and providing clean energy access to all.



Scenario

One-third of the world's population burn organic material such as wood, dung or charcoal (biomass fuel) for cooking, heating and lighting.



CURRENT SENARIO

Socio-economic effects of Indoor air pollution

→ Health Impact

2 million death due to Indoor air pollution across globe per year.

→ Gender based violence

Women are exposed to rape crime while collecting firewood for cooking.

→ Environmental Impact

The forest pay a huge price to make fiirewood and charcoal available in market.



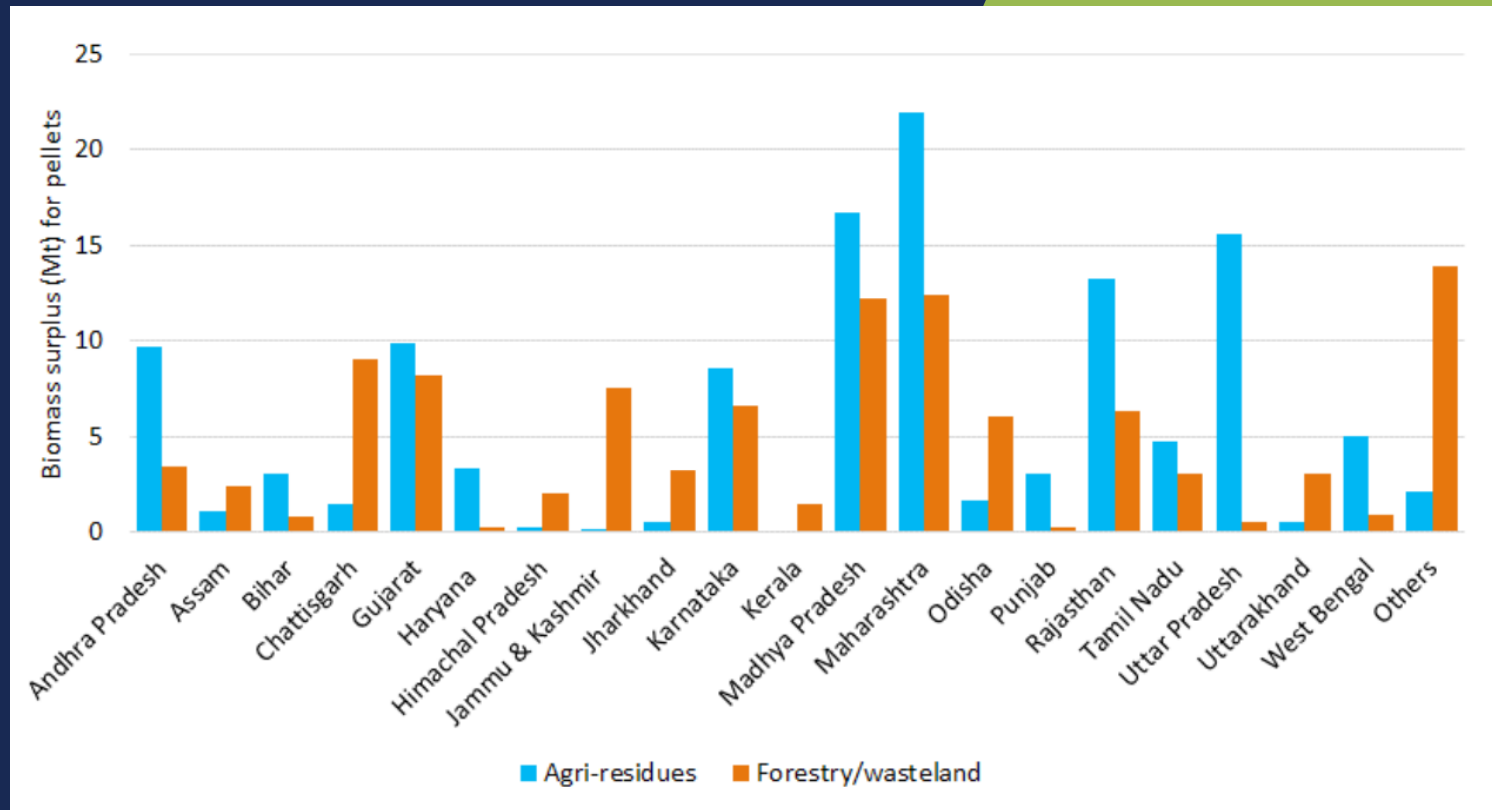
Introduction to Pellets

BMF refers to burned plant or animal material; wood, charcoal, dung and crop residues account for more than one-half of domestic energy in most developing countries and for as much as 95% in lower income countries.

The process of manufacturing fuel pellets involves placing ground biomass under high pressure and forcing it through a round opening called a "die." When exposed to the appropriate conditions, the biomass "fuses" together, forming a solid mass. This process is known as "extrusion."

Biomass pellets are generally a superior fuel when compared to their raw feedstock. Not only are the pellets more energy dense, they are also easier to handle and use in automated feed systems. These advantages, when combined with the sustainable and ecologically sound properties of the fuel, make it very attractive for use.

Biomass availability in India



Agriculture Biomass surplus availability in Indian States, Maharashtra, Madhya Pradesh and Uttar Pradesh etc



Usage of biomass for cooking

Solid Firewood, naturally compacted

Generally used for cooking.

Mainly sourced from daily collection taking 4-5 hrs

Forest Residue, leaf litter and fruits, very low density

Not suitable without compaction, generally disposed by burning which is not at all used in cooking.

Generally sourced from near to house location

Agricultural Residue, very low density

Few commodities are used, few agricultural residue are used.

Pellets Development from agricultural – Forest waste



We have developed more than 20 recipes from various raw materials found in different parts of India and developed pellets and tested them in improved cookstoves.

Village level Production of Biomass Pellets

- The need to reduced the cost of Pellets to be used in Improved cookstoves.
- The pellets transportation cost increases to reach remote villages in India.
- Using raw material sourced locally to convert to biomass pellets.
- Get the small pellet production to local village level to develop pellet supply chain.

Sustainable village level pellet production

Villagers say this year's drought was unbearable. Experts blame it on presence of 'Mad Babul' trees in the region, which suck the ground water up. Changing lifestyle of animal herders, changing rain pattern are also to be blamed.

Locally Sourced Raw material

key points

- Using Babul Tree as raw material to produce pellets.
- Babul tree, found at large scale in forest near kalsar.

Shredder and pellet machine installed

Key Points

- Establish pellet machine and shredder at local NGO's office.

Supply chain established for pellets in village

Key Points

- A transportation chain was established to get raw material from forest to pellet manufacturing unit.
- Ready pellet to be transported to a local market self-help group office for sale.



Shredder Machine

The shredder machine is established to breakdown the babul tree sticks into powder form. One man-power is needed to operate the shredder machine.

- Daily intake of Raw material in pellet manufacturing unit is 1ton of babul tree branches.
- Intake Babul Tree branches moisture is 35%, the shredded powder moisture is around 35% and after pellets are formed with 12% moisture.
- 100kg shredded powder of babul tree will be converted to 70kg pellets with 12% moisture.

Shredder Machine And Training Period

Specifications:

- a. Weight- 200 Kgs approximately
 - b. Motor capacity- 7.5 HP 3 Phase
 - c. Output- 90-100 Kg/hr*
 - d. No. of running blades-12 nos
 - e. Dimensions: 40X28x56 Inches
- *Depending on raw material and grill size





Pellet Machine

The Pellet machine is established to Compress the shredded powder into cylindrical pellets which are then used to burn in Improved cookstoves for clean cooking practice.

One man-power is needed to operate the shredder machine.

- The pellet machine runs for 10hrs a day with 80kg/hr pellet production in the local NGO production site.
- 1 Man-power is required to run the pellet machine.
- 1 man-power is required to pack the pellets and store in the production unit.

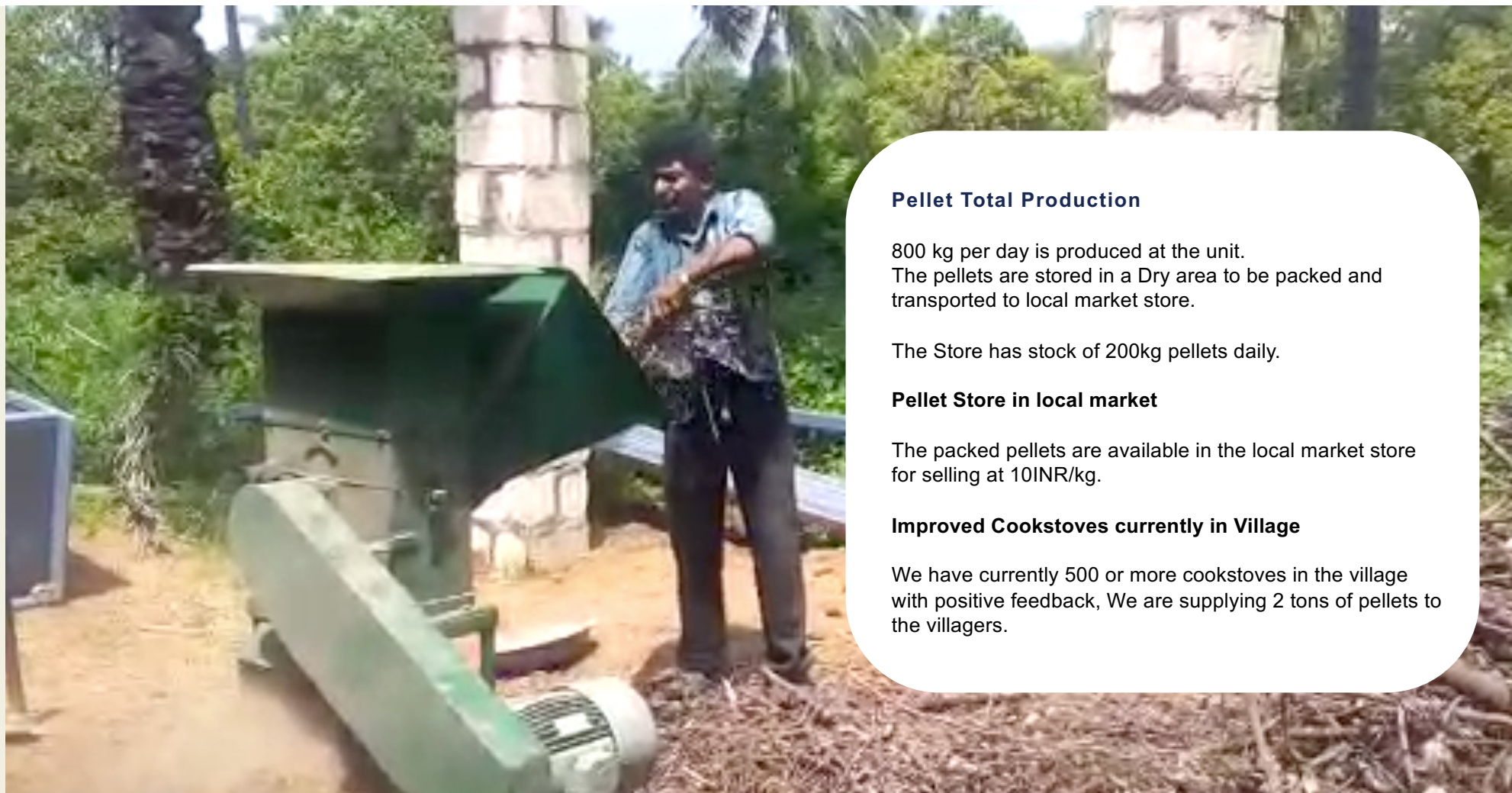
Specifications:

- a. Weight- 250 Kgs approximately
 - b. Output- 80-100 Kg/hr*
 - c. Power- 10 HP 3 Phase
 - d. Dimension: 46X22X30 Inches
- *Depending on raw material

Total Pellet production Unit

The pellet manufacturing unit installed in Kalsar is fully in production and is manufacturing 70kg – 80 kg/ hour Biomass pellets. The ready Pellets are stored in the NGO office, the pellets are transported each week to the local market for user to buy.

Activity	Machine/ Man-power	DATA / OUTCOME
Collection of Babul Tree branches from nearby forest.	Man-power, vehicle to transport.	<ul style="list-style-type: none">• Approx 1 Ton of raw material collected and transported from forest to production unit.
Converting the branches of babul tree to powder form	The shredder machine reduces the branches to powder.	<ul style="list-style-type: none">• The 35% babul tree branches were converted to powder, 1 ton raw material is reduced by 30%.
Converting powder into pellet machine	The pellets are generated by compressing the powder through a mould and cylindrical pellets are generated.	<ul style="list-style-type: none">• The pellets are produced 80kg/hr and the production shift is for 10hours/day.



Pellet Total Production

800 kg per day is produced at the unit.
The pellets are stored in a Dry area to be packed and transported to local market store.

The Store has stock of 200kg pellets daily.

Pellet Store in local market

The packed pellets are available in the local market store for selling at 10INR/kg.

Improved Cookstoves currently in Village

We have currently 500 or more cookstoves in the village with positive feedback, We are supplying 2 tons of pellets to the villagers.

Current Pellet Production Capacity



Babul tree Pellet recipe and Efficiency in Improved Cookstove

Pellet Recipe

The Pellets are completely made using only Babul Tree Branch Powder without any binders. The moisture is 12% while manufacturing pellets.

Burning of Babul tree Pellets

Burn Time : 55min
Ash content : less than 1%
Efficiency : 42%
Flame temperature : 800-900 degree.

Local food

The Staple food, ROTLA (flat Bread) cooks perfectly and has the same flavor as being cooked over traditional stove.

Self Sufficient Energy Village 3 Branches

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Reducing Indoor Air Pollution

The main objective is to reduce indoor air pollution and



Sustainable supply of structured fuel

The structured fuel 'PELLET' is a perfect solution to deforestation and crime against women issue.



Providing with Improved cookstoves.

The improved cookstoves holds the solution to reduce pain during cooking.



Children under the age of 5 yrs
Children are primary sufferer of IAP
as they spend most of time with
mothers while cooking.



Housewife
The entire responsibility of
cooking falls upon the women in
household and suffer the most
due to IAP.



Young Girls
Girls are forced to help their mother to collect
firewood and help in the cooking process impacting
their studies.

Village Level Pellet Production Unit and Improved cookstoves Impact

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- 1 Village level Entrepreneur developed**
 - 2 Creating Jobs for women in clean cooking**
 - 3 Aim to Improve lives of 15,000 people in one village**
 - 4 Reduction of cost of pellets**
 - 5 Ready and easy accessibility of pellets Fuel for Improved Cookstoves**

Next Steps : Continuous Pellet Manufacturing





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