PELLET MANUFACTURING AND RENEWABLE HEAT APPLICATION IN COOKING

AT ECREEE BIOENERGY WEEK, GHANA

22 – 24 JUNE 2017

designing a sustainable future

Abellon

The Group

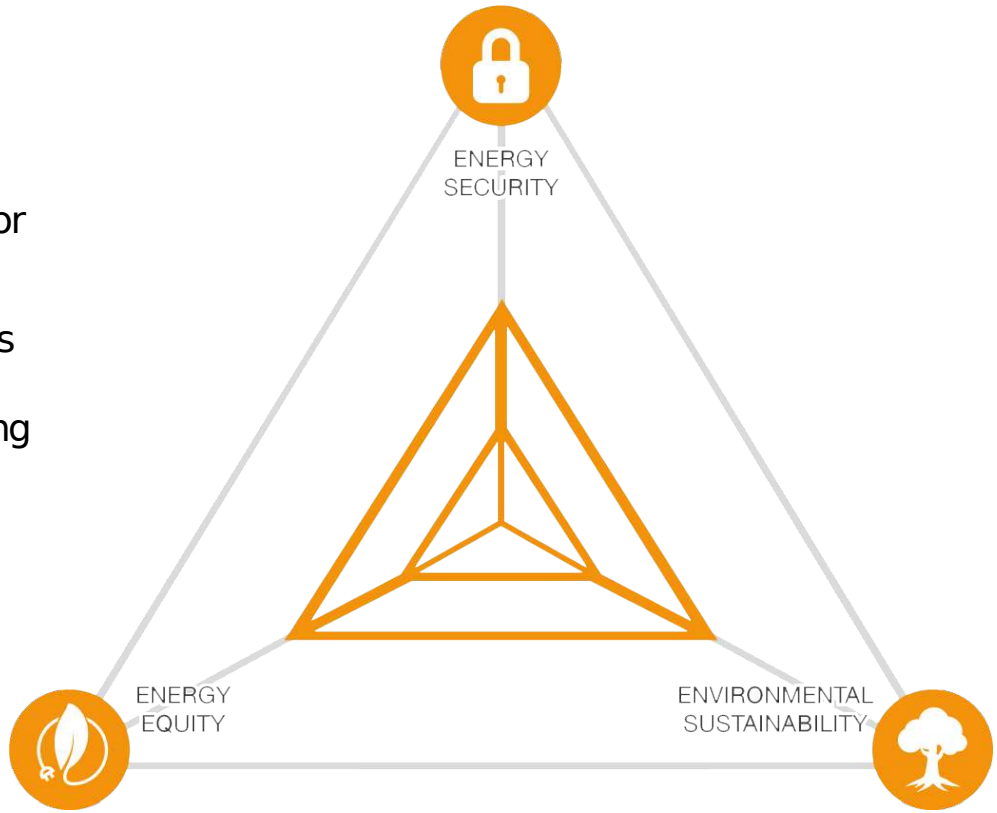
Nation Building through **Innovation**

Reason for Being

Energy access is a key driver to create economic growth and to emerge from poverty into the mainstream economy. This objective needs to be achieved in a manner that is environmentally and financially sustainable, promotes energy independence and is good for local communities.

Abellon's mission is to find innovative solutions achieving all these objectives by combining knowledge from diverse disciplines and aligning efforts with local stakeholders.

Triple Bottom Line Approach: Integrating sustainable development models, income and employment generation, no food-fodder-fuel conflict, and energy self reliance for the nation.



Abellon – Integrated Model

RENEWABLE POWER

- Solar Energy
- Waste to Energy
- Any-Source Biomass Power

RENEWABLE HEAT

- Biomass Pellets
- Pellets Based Appliances

AGRI SCIENCES

- Agroforestry
- Soil & Plant Nutrition
- Dairy Farming

BUSINESS VERTICALS

BIOMASS RESOURCES

- Biomass Characterisation
- Biomass Collection
- Energy Farming

TECHNOLOGY DEVELOPMENT

- Equipment Development
- Pellet Torrefaction
- Energy Storage

RENEWABLE FUELS

- Lignocellulosic Ethanol
- Algae Biodiesel

DEVELOPMENT VERTICALS

Global Presence

Renewable Heat

Biomass Pellets and Based Appliances

Biomass Pellets

Industrial Pellets

- Suitable for industrial heating applications world wide.

Pellet Based Appliances

Capabilities: India & Global

Pellet manufacturing facility, India

Pellet manufacturing facility, India

Pellet manufacturing facility, Ghana

Pellet operations, North America

Pellet operations, Europe

Abellon
Agrisciences
Sustainable
Biomass

Decentralized Biomass Collection Model

Over 5000 biomass samples successfully analyzed

Energy farming model ensuring uninterrupted supply of biomass with productive use of waste & marginal land.

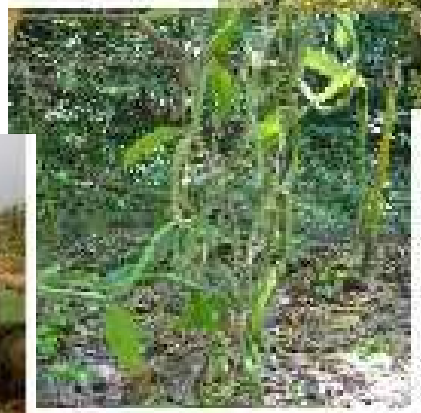
Agroforestry Project



Over ***120 acres*** of marginal land in Modasa, Gujarat for inter-cropping of energy & food crop plantation with best agriculture practices for specialty, high-yield crops

Agroforestry Project: India

Large scale Bamboo Plantation in 120 acres of land
Over 135,000 Bamboo planted till date



Solar Agro-Electric Model: India

– Efficient and sustainable resource management practices – Dual use of land – Dual use of water
– Harvesting solar radiation and agricultural produce

Agro Forestry: Food & Energy Crop

Bamboo & Banana

Bamboo & Sandalwood

Bamboo & Papaya

BioEnergy Crops – Bamboo

BioEnergy Crops Plus Food Crop – Bamboo + Banana, Papaya, Drumstick, Garlic, Ginger

Energy Materials as well as Food Materials

Ghana Pellet Manufacturing and Applications

Abellon CleanEnergy Ghana

- Pellet manufacturing facility: A pioneering effort for the country

- Value from waste model: Potential to utilize 100,000 tons of wood based residues, generate revenues and energy self reliance for the country

- Member of the BCTA & Global Alliance for Clean Cookstoves

- Recently recognized as winner of the 2015 African Business Award for Innovation

BUSINESS CALL TO ACTION

GLOBAL ALLIANCE FOR CLEAN COOKSTOVES

Challenges in Ghana: Efficient Biomass Utilization

Widely practiced harmful and inefficient waste disposal

Unused potential of Biomass

Biomass Residue Sources – Small Sawmill Clusters

Sokoban Wood Village: 150 TPD

No. wood processing unit: 300

Understanding with with Kumasi Metropolitan Assembly (KMA) for cleaning and collection of residue and save cost

Biomass Residue Collection – Small Sawmill Clusters

Wood Village Consist of Carpenters, Saw millers, Lumber cutters, Planners etc

Saw mill shed

Truck to Load Biomass

Women stuffing biomass sacks

Biomass is ready in sacks to load

Pellet Manufacturing Facility in Ghana

Fuel Used for Cooking

Fire Wood

Charcoal

Agri Residue

80% of population *relies on traditional biomass, including fuel wood or charcoal, agricultural waste and animal dung to fulfill their daily energy needs.*

Current Technologies for Cooking

3 Stone Fire

- Most common stove in Northern Ghana and rural areas
- Used with firewood and other biomass fuels which are collected
- Very poor fuel utilization
- Easily adaptable

- Ease of use ◕
- Availability ●

Mud Stove

- Self-made stoves based on local materials
- Used with firewood and other biomass fuels
- Adaptable to cooking needs and pots

- Ease of use ◕
- Availability ◑

Coal Pot

- Most popular charcoal stove, made of thick scrap metal
- Sold by retailers in different sizes based on need, easily available in public markets
- Lifetime between 2-4 years

- Ease of use ◑
- Availability ◕

Tire Rim

- Charcoal stove made from a used vehicle rim
- Very heavy to carry and not easily adaptable
- Lifetime between 3-5 years

- Ease of use ◔
- Availability ◑

Key | ○ Minimal ◔ Low ◑ Medium ◕ Medium-High ● High

Pellets: A Sustainable Source of Energy

Cost Effective

Customers can significantly lower their energy costs through use of eco-pellets.

Efficient

Their uniform shape and size ensures that Eco-Pellets offer remarkable consistency & burning efficiency. Eco-Pellets have low moisture and ash content, which further add to their performance

Sustainable & Eco Friendly

Use of Eco-Pellets reduces emissions through utilization of biomass residue, and replacement to conventional fossil fuels..

Safe

Eco-pellets are absolutely safe to use and store as there is no risk of fire hazards

Easily Available

Eco-Pellets are manufactured locally, within the country, using the abundant biomass resources available as a result of a thriving timber industry. Thus, unlike imported fuels such as LPG and Diesel, there is no fear of shortages, stock-outs, or undue price fluctuations.

Smokeless Operation

Eco-Pellets offer smokeless operation as well as clean and hygienic working environment

Convenient Pack Size

Eco-Pellets are available in 15kg bags for small commercial, industrial and residential use. We can also supply pellets in bulk quantities for large scale industrial requirements.

Pellet based Gasification Application

Industrial

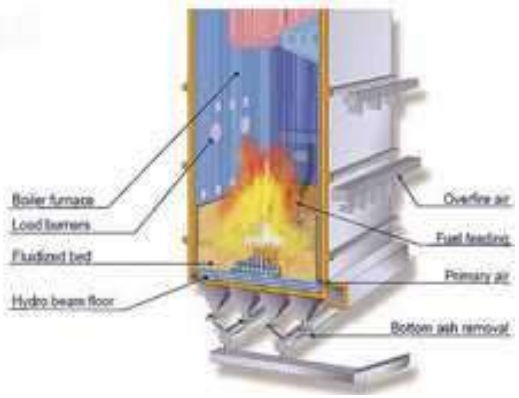
- Utility requirement for industrial units and Boilers
- Co-firing in Large thermal Power plants

Commercials / Institutions / SME

- Heating needs at community level and large spaces such as malls, educational institutions, etc.
- Cooking Needs at Chops Bars, Restaurants, Hotels.
- Agri Processing for Heating and Drying.

Retails

- Use in pellet stoves in domestic / home heating and cooking



Time to Switch…Pellet Based Industrial Boilers

Converting Oil / Gas Based Boiler to Pellet Based Boiler – Upto Limited Capacity

Time to Switch...Pellet based Boilers

LPG Boiler

Save

25 – 30%

Biomass Pellet Based Gasifier Boiler


Customer are Saving
25% each month using Pellets

Bulk Cooking with Steam...

Save 20-25 % fuel cost just by switching over from Direct flame to Steam Cooking

Conveting LPG Oven into Pellet Based Oven

Abellon Eco-Stove Models - Cooking

SMART - 15

Cooking capacity: 250-750 persons
Shell capacity: 15 kg
Heat Output: 24 kW - 72 kW

Suitable Pot Size: 40-50
For Rice making: Upto 60

SMART - 9

Cooking capacity: 250-500 persons
Shell capacity: 9 kg
Heat Output: 14.4 kW - 43.2 kW

Suitable Pot Size: 30-40
-For Rice making: Upto 40

Abellon Eco-Stove Models - Cooking

SMART - 3

Abellon eco smart

Cooking capacity: 50-100 persons
Shell capacity: 3 kg
Heat Output: 7.2 kW - 14.4 kW
Suitable Pot Size: 8-15
- For Rice making: Upto 20

Eco-Stove Segments & Availability

- Pellet Based Cooking Equipment.
- We are currently having 300+ customers avilable in 8 Cities of Ghana

  Kumasi, Accra, Takoradi, Sunyani, Tamale, Obuasi, Wineeba and Odumasi

EcoStove - Benefits

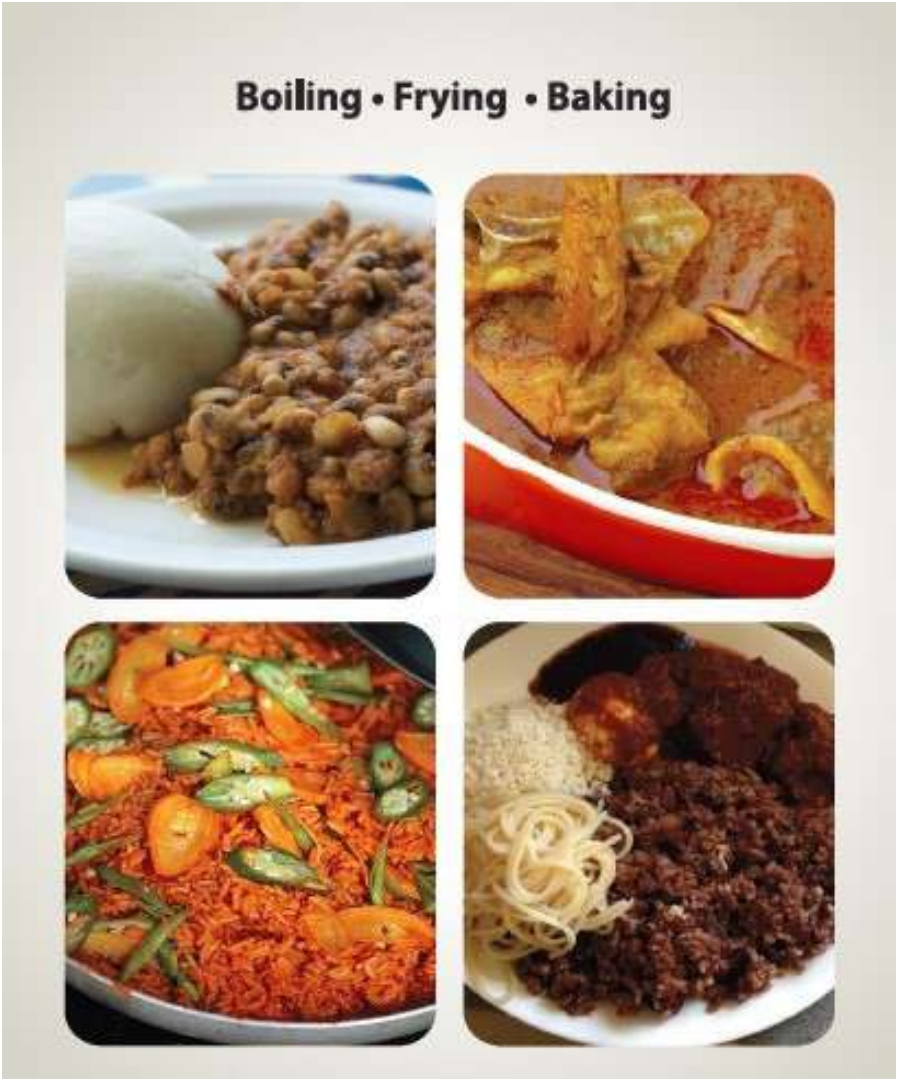
- Consistent and uniform flame
- Flame Regulator like Gas
- Clean and hygienic environment
- Smokeless and noiseless operation
- Safe - no risk of fire / Blast
- Better Work and Health Condition.
- Adjustable in Existing Set up
- **Made in Ghana Product approved by Ghana Standard Authority.**

Saving Against Gas

- **1 Kg Gas = 2.6 Kg Eco-Pellets**
- **Ghs 4.5 Gas = Ghs 3.4 Eco-Pellets.**

Eco-Stove Application in Cooking

- Rice Preparation.
- Cassava Boiling (Fufu)
- Kenkey Preparation
- All Type of Soups and Stews.
- Preparation of Cereals / Beans
- Fish, Chicken and Yam Frying
- Tom Brown and Porridge



Challenges and Solutions: Pellet Manufacturing

Challenge

- Changing traditional practices of burning/decomposition/landfill disposal of waste/biomass
- Diversity and spread of biomass availability
- Seasonal variations in biomass supply
- Collection and processing of biomass
- Quality of biomass: moisture and ash content

Solution

- Assigning value to waste: Providing incentive economic value for waste supplied
- Generating awareness of income and employment opportunities from waste, ill effects of traditional biomass disposal
- Mapping of biomass species and their characteristics: over 300 species mapped Globally
- Decentralized Biomass Collection Model:
  - Tie ups with rural community for biomass collection within 50km radius
  - Partnerships with organized players for process biomass
- Agro forestry model promoting bamboo as an energy crop.
  - Sample project covering 120 acres of land set up in Modasa,Gujarat

Challenges and Solutions: Pellet Manufacturing

Challenge: Technology

– Pelletization technology at nascent stage in developing countries of Asia and Africa.

– Finding the right technology partner is a challenge

Solution: Technology

– Tie-up with leading global pelletization technology suppliers

Challenges and Solutions: Sales & Service

Challenge: Uninterrupted supply of Pellets to customers

– Ensuring 24x7 availability of pellets to customers

Solution

– Own state of the art pellet manufacturing facilities at strategic locations

– Future plans including decentralized manufacturing through containerized projects closer to customer location

– Strong sales & distribution network: e.g., 90 sales & service people supported by 70+ distributors, covering 20 states in India.
20 Sales & Service people supported by distributors covering 8 cities of Ghana and Ecowas.

Challenge: After sales service support

Solution

– Dedicated service teams: e.g., over 45 members responsible for product installations, training and hand-holding of customers in India

–Detailed Product Information Manuals and Videos

- Post installation training and hand holding

– Provision for Annual Maintenance Service Contract (AMC) for preventive and break-down maintenance services

– 24 x 7 help line service

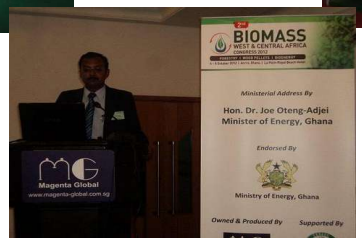
Challenges and Solutions: Others

Challenge: Acceptance of BioEnergy

- Low awareness of bioenergy at end user level
- Need for a systematic approach at policy level
- Changing mindsets of people to adopt new and renewable based technology
- Subsidy led and highly influenced residential sector
- pressure to achieve economics

Solution

- Awareness spreading through multiple mediums such as industry conferences & exibitions, trials and demonstrations, case studies, paper presentations, etc.
- Representations at global and local level forums specially targeting policy makers
- Promoting strength of the model through national and global award participation and certifications.
- Targeting commercial and industrial segments for sales in the first phase to build economies of scale
- Wide range of equipment that can cater to a diversity of cooking and heating applications
- Proven viability: Can deliver 15-20% savings over fuels such as LPG, Diesel, FO



Learning

– Biomass:

Multicipaty of biomass; seasonal variation and availability; ability to tackle logistical hurdles; need for ensuring long term sustainability of supply

– Technology:

Non availability of indigineous technology; need for global sourcing capability

– Business:

New business model with teething issues; awareness and acceptance building play a critical role; importance of trageting multiple customers/applications to ensure viabilty in intial phase

– After sales support:

Continuous customer support and service – an integral key to success

Conclusion

- Biomass Pellets are locally made fuel
- It is available and sustainable
- Biomass Pellet Gasifying technology is available and adopable
- Suitable for large, medium and small scale cooking and heating
- It is clean & environment friendly
- It is economical
- It is safe
- It can be stored without any prior permission

There are already customers using biomass....

Awards & Accolades

Zayed Future Energy Prize 2014

Ashden Award 2011

African Business Award 2015

Dun & Bradstreet Award 2015

Renewable Energy India Award 2015

Recognition for Biomass Sourcing Model

Energy Globe Award 2015 (National Wiinner)

Dubai International Award 2014

UN Land for Life Award 2013-14 (Semi Finalist)

Power Gen Project of the Year (Reader's Choice) 2013

World Boienergy Award 2012 (Semi Finalist)

Golden Peacock Award 2011

AREA Award 2009-2010

and more...

Independence begins at the bottom...

A society must be built in which every village has to be self sustained and capable of managing its own affairs. It will be a free and voluntary play of mutual forces. In this structure composed of innumerable villages, there will be ever widening, never acsending circles.

Life will not be a pyramid with the apex sustained by the bottom. But it will be an oceanic circle whose center will be the individual. Therefore, the outermost circumference will not wield power to crush the inner circle but will give strength to al within and derive its own strength from it.

Contact: **Pragnesh Mishra**
Country Head
Abellon CleanEnergy Ghana Ltd.
Kumasi – Ashanti Region
Mobile: 0542965206

Thank you