



Business Project Plan

on

HEALTHY KITCHEN FOR
25500 RURAL FAMILIES
IN BANGLADESH

Implemented
by

IVDS – 5 Star Stoves,
Bangladesh



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EXECUTIVE SUMMARY

Approximately 86% of the total population in Bangladesh still relies primarily on solid fuels. It is an inefficient cooking system which causes indoor air pollution. Cooking with traditional stove produces smoke & particles less than 10 μm dia results respiratory problems. Traditionally women are responsible for cooking food poses threats to health, as over 4 million death by household air pollution from cooking with solid fuels. A diversity of ICS have been designed and developed. Using alternate fuel with efficient stoves can rise fuel efficiency along with reducing health hazards. More than twenty five thousand household will be covered by the project within 3 years from FY 2019 to FY 2021. 7500 families use 37500 kg wood daily and 60% can be saved by the use of fuel efficient stoves. The Project aims healthy Cooking to support g7500 HH by providing efficient 5 star stove. As an agriculture based country about 75% of energy comes from biomass in rural area are agricultural waste and residues. These residues are used in a non-efficient and non-hygienic way. Mainly this energy consumption is happened in rural area's cooking system with only 8-12% efficiency. By producing high efficiency pellet we can solve energy crisis, assuring hygiene in rural cooking and save the environment.



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1. Introduction :

5 Star Stoves is a sustainable answer to clean cooking using solid fuels. Around 3 billion people on the planet and 30 million households in Bangladesh use wood and other biomass to cook. This results in excessive deforestation and the resulting increase in fuel prices due to the reduction of natural resources. It contributes to ill health of the households due to household air pollution, caused by the incomplete combustion from open fires.

We have developed our own biomass value chain approach to address the energy needs of people living around our cities, industrial towns and urban slums. People are spending money on unhealthy cooking devices and fuels. We aim to provide the best possible technology answer to using solid biomass as and link our service model to the technology to make it affordable for the household.

The value creation process starts with the delivery of biomass to the densification plant, by collectors and harvesters. The feedstock is then pulverized, dried and pelletised, cooled and bagged for distribution. Distribution is done via our own agents to the n households, where our micro gasification stove provides a clean cooking solution to the family.

We are targeting five locations. These locations all have the essentials for a successful business outcome. Feedstock availability, available infrastructure and dense household populations using wood and LPG as cooking fuels.

Our model is to get the best technology in the household and produce improved fuels (pellets) to them for use in the stove providing a clean and cost effective solution for the household and positive financial returns for the business and our investor.

For an overall view, refer to our slide deck at: <https://prezi.com/o1a1ah6qwc4a/>, www.ivds-5starstovsbd.com

2. Project overview

Vision: To Promote Energy for all forever and affordable Clean cooking solution for rural people through women enterprise development.

Mission: To provide thermal clean energy for clean cooking & ensure Indoor Air Pollution (IAP) free cooking environment for rural people which is cost effective enterprising and contributes to a safer living environment

Goal: Sufficient access to 25500HH of clean cooking solutions at 10 Upazilas under 3 districts and one pellet mills at Narsingdi in Bangladesh upto 2019-2024 .

Specific objective

- 1.To Reduce household air pollution, save women and children`s lives and slow the pace of near-term climate change.
- 2.To avert the risk of diseases related to household air pollution such as premature
- 3.mortality deaths, stroke, respiration disease, lungs and heart disease with access to improved cook stove and technologies.
- 4.To combat climate change while also protecting public health and transforming the rural



- economy to cleaner energy source.
5. To protect women's and children's health and improving Air Quality, avoided premature mortality death and disability in the Rural Bangladesh
 6. To achieve ambitious Paris agreement, climate goals, slashing indoor air pollution and enhancing and contributing to other sustainable development goals (SDGs 2,4,5,7,8,12 and 13)
 7. Lowering total percentage of the rural population primary reliance on inefficient traditional solid biomass stoves Project proposal: Cleaner Cook Stoves Reduce Climate emission
 8. Reduce greenhouse gas emissions from household energy sector and helping to move the economy beyond polluting energy source and towards a safer and more sustainable future.
 9. Improve public health and protecting natural vegetation covers, combating deforestation and improving the livelihood of the rural women and girls.
 10. Lowering the policy and market barriers access to cleaner cook stove and other clean low carbon energy solution.
 11. Lowering indoor air pollution and tackling the root cause of climate change.
 12. Reducing greenhouse gas emissions, increasing community resilience to climate change impacts, and achieving socioeconomic development and environmental goals.

ACTIVITIES :

- a. Sensitizing and awareness raising and behavior change campaign to popularize among households in the communities as a climate mitigation strategy and health benefits.
- b. Manufacture and distribute clean cook stove for the rural household population.
- c. Policy and institutional capacities
- d. Established stakeholder platform to help convene the clean cooking sector that has a target to reach 1 million households by 2020 in rural Bangladesh
- e. Intuitional Capacity building and policy advocacy , stakeholders workshop
- f. Establishment of viable community institutional structure to promote greater participation of its development.
- g. The project will Focus capacity building on empowerment of the local communities, particularly women for greater participation.
- e. Develop and introduce training programs for local communities and
- f. Focus on localized training of women to enhance their inclusion in clean cook stove.
- g. Collection of data, including information about the types of jobs being offered (part time, full time, contractual); the levels of skills required (skilled, semi-skilled, and unskilled); who is being employed; and employees' socioeconomic status.
- h. To plant seed plants for plantation . distribute 2 trees with a stoves

Outcomes :

- ❖ Increase 25500HH access to sources of clean energy for households and generate livelihood activities
- ❖ Training programs for 300 individuals to work on promotional programs and offer job for 200 workers in Pellet Mill.
- ◆ Access to clean cooking". Clean fuels and technologies are critical for achieving the goals set by other Sustainable Development Goals that pertain to poverty alleviation (SDG2), good health and wellbeing (SDG 4), gender equality (SDG 5), and climate action (SDG 13).
- ❖ Providing households with access to clean cooking stove is of vital importance in honoring Paris agreement and Climate Goals.
 - ❖ the low-emission stoves serve as an important transitional solution—with benefits for women's and children's health and livelihoods.
 - ❖ Improve public health with reduce household air pollution level.



- ❖ Reducing harmful Greenhouse Gas emission and black carbon stock

Legal status :

- Department of Social Services: No. NA-0324/97; Dated- 26th November 1
- NGO Affairs Bureau: No. 1739, Dated 19th September 2002
- Trade license
- Bank account

5 Star Stoves Bangladesh have taken their Stoves Design and trade mark registration from Pattern and Design Authority Under Ministry of Industry, Government of Bangladesh.

Target Population:

- 25500 Energy Poor Families of at 10Haors and costal based upazilas under 5 districts in Bangladesh within three years
- 300 Women Entrepreneurs (5 Star Ladies) sales and after sales services
- 200 Women Technician at Biomass Pellet & Network

3.Project and Location:

The proposed Pellet Mill is located in 24.085339, 90.843782 coordinates. The Land measuring more than 30.5 decimal at Mouza: Uzilab, Khotian : SA-1930 , RS-1314,899,672Dag no : 69/193,52/166, 46/185 & 68/189,190,191,192 at Belabo Upazilla- under Narsinghdi District, of Bangladesh.

The proposed site is located beside the main road (Dhaka-Bhairab highway). A link road has connected the proposed plot with the main road.



Figure: Proposed location for Pellet Mill

4.Business Experience & Qualifications :

IVDS is an organization, has vast hand experience in Participatory and rights based approach, working for more than 22 years in the field of rural and urban development of Bangladesh. Experience on different issues like, Hygiene Promotion, Water and Environmental Sanitation, Improve clean cook stoves, Bio mass and Renewable Energy, Capacity Building of Local Organization and Strengthening of Local Government, groups are mobilized to create health and secure living environments, Disaster Risk Management, Training, evaluation; Participatory Strategic Planning, Community Situation Analysis (CSA), Community Action Plan (CAP). Good conceptual, analytical, networking and communication skill. Management team of this Organization has a Very good knowledge on decision making process and problem solving and Maintain well communication with executive body.



5. History & background

Integrated Village Development Society (IVDS) is a local non-government, nonpolitical and non-profitable community based organization established in 1994. IVDS has also has a business wing called 5 Star Stove Bangladesh established in 2013.

In 2013, IVDS obtained membership of Global Alliance for Clean Cook Stoves (GACC) and Catalyzing Clean Energy in Bangladesh (CCEB) USAID. In that time, Executive board of IVDS decided to establish an independent business wing for ICS program. In the general meeting Executive named that business wing as 5 Star Stoves Bangladesh. In 2015, Five Star Stoves Bangladesh obtained Membership from Household Energy Platform (HEP) Bangladesh under Sustainable and Renewable Energy Development Authority (SREDA) Ministry of Power and Energy, government of Bangladesh. Since then won a range of recognition from SEED, SE4ALL, E4ALL, CTIPFAN in Africa & Asia other technical and social accolades. 5 Star Stoves Bangladesh was awarded by Startup Bangladesh- & SREDA in 2017. 5 Star Stoves Bangladesh is now part of the IDCOL program with 2 models registered Micro –Gasification stoves. We have completed user acceptance testing and technical feasibility assessments and price pointing of all energy incumbents.

6. Products & service offering

We provide a pay to alternate fuel and cook stove business model. This includes the provision of a micro gasification stove and energy pack at an affordable price and access to the fuel in the form of biomass pellets. We either produce ourselves or buy in (pellets are now available in Bangladesh). The customers have the option to buy our products via mobile payments and orders are dispatched and tracked via our IT backend.

5 Star Ladies is the distribution channel we rely on to service our households. This provides direct communication with the consumers. Once a 5 Star Lady recruits a household she receives commission for the sales of the cooking unit and ongoing revenue for the sale of fuel pellets to the household. It now incentivises the 5 Star Lady to service the stove and household as her future revenue stream depends on having a happy customer who uses the stove and buys fuel pellets. Our target price point is to provide a competitive cost to cook for the bottom of the LPG market, kerosene and the top end of the fuel wood market.

We have done extensive community engagements to test the stove technology and gauge the opinion of women in the role as 5 Star Ladies. We have done some adjustments to the product to ensure that it can fit 2 large rice cooking pots and taken comments on board of the preferences of our prospective 5 Star Ladies.

We are an approved manufacturer as part of IDCOL's World Bank Funded Manufactured Stoves program and supported by SE4ALL, E4ALL and CTI PFAN.

5 Star Stoves Bangladesh is a partnership of 5 Star Stoves and IVDS (The Integrated Village Development Society). IVDS has successfully distributed more than 38,000 stoves via various improved cookstoves programs and so we feel we are well placed with excellent technology (our base stove is 99% combustion efficient) and an experienced implementation partner with boots on the ground in the target market.

7. Project Model



We are considered as the pioneer for ESCO cooking by E4ALL. As an energy service company we offer an expensive stove at a discounted cost and recoup the cost of the stove from a premium levied on the sale of the fuel. We require a 3 year commitment to repay the stove and investment in the service. From the deposit the sales agent is paid a commission and then ongoing commission for the sale of pellets. This ensures that the customer service is incentivized and there is a decent sales incentive to mobilize a new value chain or distribution channel.

5 Star Sisters is the distribution channel we rely on to service our households. This is done from a mobile device. Once a 5 Star Sisters recruits a household it offers an on-going revenue opportunity as she receives commission for the sales of the cooking unit and ongoing revenue for the sale of fuel pellets to the household. It now incentivizes the 5 Star Sisters to service the stove and household as her future revenue stream depends on having a happy customer who uses the stove and buys fuel pellets. Our target price point is to provide a competitive cost to cook for the bottom of the LPG market, some kerosene and the top end of the wood burning market.

We have done extensive community engagements to test the stove technology and gauge the opinion of women in the role as 5 Star Sisters.

ESCO businesses are unfortunately capital intensive to set up and require scale to execute. Fortunately there is already a pellet plant available in Dhaka, which reduces the capital ask. It allows us to change our current business model from manufacturing and sales of stoves only model to a more sustainable model of recurring revenue from the sales of pellets in a higher value market.

8. Technical Aspects of Product :

The proposal envisages setting up of a new industrial unit for manufacturing clean cooking stoves, Pellet & Briquette at Lakhpur, Amlabo, Belabo under Narsingdi district. The project has been designed on the basis of 100-ton per day and 36000 ton per year of Pellet, Briquette and 25500 unite of stoves per year.

The machinery and equipment required for the project are proposed to be imported from India and China.

8.1. TLUD MicroGassification Stoves :

A top-lit updraft gasifier (also known as a TLUD) is a micro-kiln used to produce charcoal, especially biochar, and heat for cooking.^[1] A TLUD pyrolyzes organic material, including wood or manure, and uses re burner to eliminate volatile byproducts of pyrolyzation. The process leaves mostly carbon as a residue, which can be incorporated into soil to create terra preta. A TLUD



gasifier takes it further from a rocket stove in more efficient way of smoke-free, highly efficient combustion of the fuel.



Figure: Energy Efficient 5 star stove

8.2. Pellet Fuel :

Pellet fuels (or pellets) are bio fuels made from compressed organic matter or biomass. Biomass pellet fuel is an environmental energy resource in bulk which produced by biomass pellet mill from sawdust, husk, nutshell, corn cob, camellia oleifera shell, cotton seed hulls etc. [] [] [] []

The diameter of biomass pellet is usually 6-8mm, and length of pellet is 4-5 times than diameter, broken ratio is below 1.5%--2.0%, dry basis moisture content is below 10-15%, ash content is below 1.5%, sulphur content and chlorine content are below 0.07%, nitrogen content is below 0.5%. If use additive agent, finished products should belong to agricultural and forestry products which should mark the species and amount of use. The EU standard has no specific figure for calorific value of pellets & Briquette are-4250-4600.



Figure: Pellet

8.3. Briquette Fuel :

BRIQUETTES a small brick made of compressed Sawdust, Leaves, Forest Waste, Sugarcane waste, Bamboo Waste, Paper Waste, Wood Shavings, MDF, Pine etc. Briquettes produce very high BTUs – over 8100 per pound, because they're made from kiln-dried wasteby-product and produce almost no ash.



Figure: Briquette

9. Process Technology:

Pellet/Briquette as well as stove manufacturing technology is available in the country. There is an improved cooking stove industry running successfully in the country. As such, it is expected that there will be no dearth of technology know how for implementation and operation of the project.

9.1. Project design of plant Machinery and equipment.

Imported machinery

The proposed project will be equipped with machinery and equipment's for preparation of pellets, briquettes and Clean Cooking stoves and also for the quality control. Most of the machinery will be imported. In this connection the sponsors have submitted price quotation from foreign suppliers containing machinery for the project. Apart from the process and quality of machinery, the project will also require some machinery for services and utility like electric generator, sub- stations, equipment's etc.

Price quotation reveal that the price of the imported machinery at 550000 USD only.

Local Machinery:

In addition to the above machinery and equipment to be imported, the project will require some local machinery and equipment like Dying Hopper, Belt conveyor, Screw Conveyor , Elevator, TDTG 50/28, Pre bin for Dryer , Screw breaking Feeder, TWLLD etc.

The total cost of the local machinery has been estimated at 10285 USD.

9.2. Manufacturing Process:

TLUD Micro Gassification Stoves (Clean Cooking Stoves)

TLUD Stoves is Tier-4 pellet Fuel stove (pellet based forced draft gasification stoves) made of 430 grade SS fabrication steel and Cast Iron Fuel Chamber with the accessories of a power bank, 2 led light and 10wt solar panel.

A TLUD gasifier stove is commonly constructed with two concentric cylindrical containers. The inner cylinder is the fuel pot. The fuel pot has holes in the base. These holes are the primary air inlet. The fuel pot also has holes on the neck, like the skirt, serving as a secondary air inlet. The outer cylinder has holes near the bottom on the sides. During combustion, air enters these holes, either by natural air draft or forced with a DC fan depending on requirement and construction model.

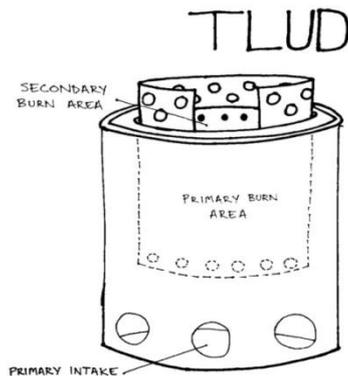


Figure: TLUD gasifier Stove

Pellet & Briquette

The manufacturing process of the Pellets and Briquette is described the following steps as shown in the above diagram.

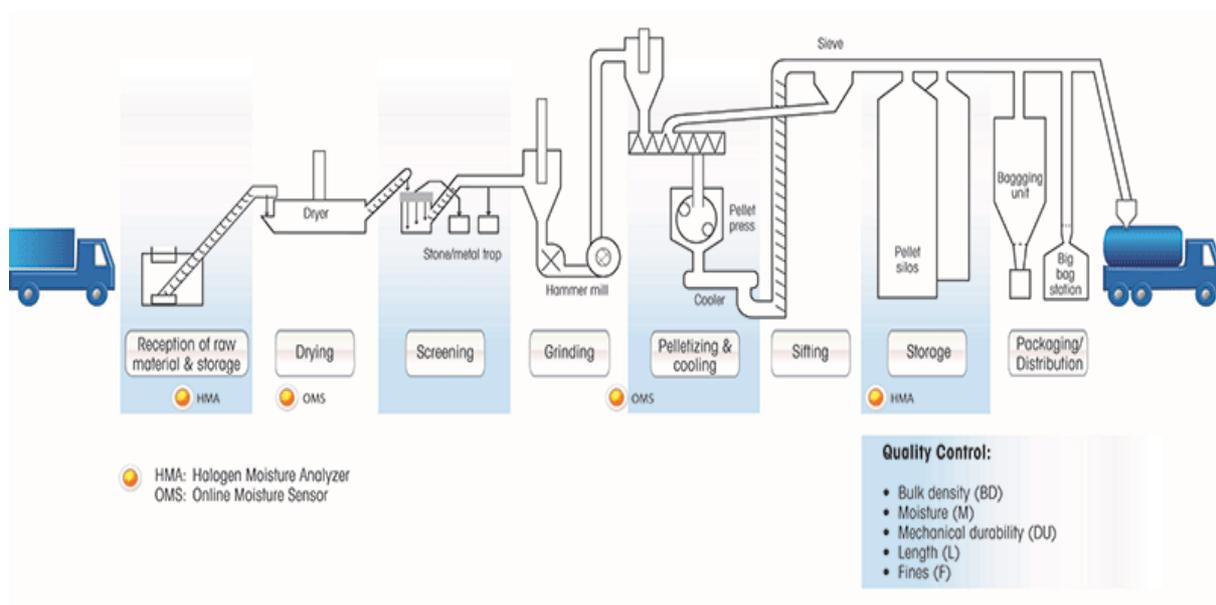


Figure: Schematic of Pellet production

a) Raw Materials

The making of the Pellets & Briquettes use Saw Dust, Rice Husk, Straw, Miz Straw, Bamboo, Branches, Dry Leaf, Bagasse, Hayacinth, Nolkhagra as Raw Materials. Saw Dust



and Rice Husk are Generally Used to making the Pellets & Briquettes. For large pellet plant, when the raw materials are ready, the first thing to do is raw material size reduction. The raw materials to produce wood pellet must be under the diameter of 5mm, so the logs and branches must be processed into small pieces. In this stage, the large pellet plant usually uses the wood chipper, which is common size reduction equipment that can cut the wood logs and branches into small wood chips with a diameter no more than 40mm in order to be further processed.

b) Grinding :

Grinding is also a size reduction step to make wood pellet, it is a necessary step for both large and small pellet plants. During the grinding process, the raw materials will be fed into a hammer mill which will grind the raw materials into smaller pieces with a diameter under 5mm. But the hammer mill can only process the wood raw materials with a diameter no more than 50mm, therefore, the wood logs and branches cannot be fed directly into the hammer mill, they must be processed by the wood chipper first

c) Screening / Initial sieving :

Raw materials Should be screen to ensure they have no impurities such as metals ,stones and others impurities. For large wood pellet plants, after the drying process, the raw material will be sieved to separate the contaminants such as stone and metal particles away from the wood raw materials. These contaminants may cause the mechanical failure of the pellet mills, so if the raw materials of your pellet plant has the potential to be contaminated by these solid particles, it is necessary for you to sieve the raw materials before fed them into the pellet mill. The machine for the initial sieving process is normally a de-stoner or magnetic separator. For small scale pellet plant, due to its limited capital, this is not a necessary step.

d) Drying :

For large wood pellet plants, after the initial size reduction step, the raw materials must be dried. In order to produce high quality wood pellets, the raw material must maintains a moisture content of 8% - 12%, so the raw material must be put into a dryer to reduce its moisture content. The most common dryer for large pellet plant is the rotary drum dryer, which is the most cost effective choice for large pellet plant. The drying process is also a necessary step for the small scale pellet plant to produce commercial wood pellet.

e) Pelletizing

After the grinding process, the wood raw materials are reached the size and moisture requirements for wood pellet manufacture. Therefore, the following step is to pelletize the raw materials into wood pellet. The machine used to pelletize the raw materials into wood pellet is called pellet mill. There are two kinds of pellet mills, ring die pellet mill and flat die pellet mill. Ring die pellet mill has a capacity over 1ton per hour, it is used for large pellet plant. Flat die pellet mill has a capacity about 500kg per hour, which used for small pellet plant.

f) Cooling

After the pelletizing process, the wood pellet is very vulnerable. It has been press over and over in the pellet mill, which makes it hot and easy to be deformed. To make the wood pellet regain its proper rigidity and temperature, the wood pellet will be fed into a pellet cooler right after the pelletizing



process. The types of pellet cooler can be divided into three types, the horizontal cooler, the vertical cooler and the counter flow cooler. All of them can be used to cool the wood pellet, but the counter flow cooler is my recommendation, as it is the most advanced pellet cooler in the market.

f) Final sieving

At this stage, the wood pellet sieving purpose is different from the initial sieving. This step only exists in the commercial wood pellet plant. As the commercial wood pellet has a strict limit on fine content, therefore, after the pellet cooling process, the wood pellet products will be sieved in order to separate the fine particles from the well made wood pellet. For the final sieving process, the vibrating screen is common equipment for wood pellet plant.

h) Packaging

After Cooling the hardened and strengthened Pellets & Briquettes can be packaged for production and to ensure convenience during Distribution. We can easily distribute the packaged Pellets in bulk using trucks and other vehicles.

9.3. Building and Other Civil Works:

The proposed construction of the project comprise mainly of two building normally factory building and office building. The factory building will consist of raw and finished product go-down, parking area, passage etc. Office building will consist of factory offices, quality control laboratory, toilet and passage etc.

In designing the building lay out the promoters have tried to adopt a layout which conforms with low cost plant as designed in the country. The layout has also been made by taking into consideration of the aspects of flexibility, efficiency, cross contamination, flow of material and Personnel etc.

9.4. Furniture, Fixture and office Equipment:

The project will require some furniture fixture and office equipments for which an amount of Tk.21.83 lacs need to be provided.

9.5, Technical Service and Quality Control:

The machinery of the project will be installed by the local technical personnel by utilization of local expertise. In this connection amount of Tk-50.00 lacs has been estimated for civil, mechanical and electrical installation of machinery and other equipment's.

For efficient operational and maintaining quality of products the project will require services of qualified Diploma Engineer and Managerial Personnel who will be recruited locally. The project will also be equipped with quality control appliances to ensure quality of the product at various steps of production.

10.Utilities:

10.1. Power:



The project will require power for the operation of the machinery and also for other uses. The requirement of connected load for the project has been estimated at 50Kwhof which the minimum demand will be around 40 kwh. The power will be available from the local REB. Since the project is located nearby an industrial zone there will not be any problem in getting the industrial power connection.

The nearest electric pole of the power line is adjacent to the project site and therefore, it is assumed that there will be no problem as well as cost involvement to getting power connection at the project site. Since the power requirement of the project is more than 50kwh, it will require its own equipment. One set of transformer with Sub-Station equipment has been incorporated in the machinery list of the project for the purpose.

10.2 .Water:

The project will require water for production process and of the uses. The daily requirement of water for the project has been estimated at 8000 liters. The required water will be available from local sources. Water tank having capacity of 9000 liters and one underground water tank of 15000-liters capacity will be constructed.

10.3. Fuel and Lubricant:

The project will require diesel and grease / lubricants etc. The annual requirement of diesel has been estimated at 70000 liters and grease/ lubricant at 3000-liters on lum sum basis.

11. Transport:

The project will require transport for carrying raw and finished materials to and from the factory and this will be met by hired transport as and when required.

12. Raw Materials:

The proposed project will require local raw materials and finish packing materials. The annual requirement of raw and packing materials on the basis of two shifts of eight hours per shift per day and 350 working days in a year . has been shown in

13. Market overview



13.1. Market opportunity

Bangladesh has a Country Action Plan to commit to the introduction of ICS to 30M households and various organizations support the cause from IDCOL, SREDA, DoE, GIZ, CCEB, GACC, SNV etc. The country has a large rural population, but migration to the cities is increasing due to better opportunities, which increased slum populations.

Consumer segment	Findings in support	Findings in opposition
Urban and peri-urban middle class (number of households: 1.9M)	<ul style="list-style-type: none"> More disposable income Easier access to media/communication Channels Aspire to buy new products/technologies .Heavily influenced by desire for social status 	<ul style="list-style-type: none"> Aspire to the LPG May have already “outgrown” the biomass ICS
Urban and peri-urban lower middle Class (number Of households: 2.3M)	<ul style="list-style-type: none"> Have access to credit/savings Higher literacy rate/education Aspire to move up the social ladder ,Purchase wood fuel for cooking 	<ul style="list-style-type: none"> Portion of biomass fuel is collected Aspire to rice cooker or electric stove
Urban and peri-urban low income (number of households: 1.3M)	<ul style="list-style-type: none"> Heavily influenced by community opinion Leaders Interested in reducing fuel costs Have access to credit 	<ul style="list-style-type: none"> Whenever possible, try to collect their fuel Aspire to kerosene and electric stoves # Low willingness to pay
Rural middle Class (number Of households: 7.9M)	<ul style="list-style-type: none"> Have access to credit Educated heads of household Owens other assets 	<ul style="list-style-type: none"> Portion of biomass fuel is collected Low willingness to pay

Based on this analysis, urban and peri-urban lower middle class households have been selected by the donor agencies as the target consumer segment for the demand creation campaigns in Bangladesh so far. Within this segment, one primary intended audience and one secondary intended audience have been selected for demand creation activities by the same donor agencies. The primary intended audience is men age 25 – 35 years and the secondary intended audience is women age 20 – 30 years. The campaigns conducted by the donor agencies had reached intended audiences living in the upazillas

13.2. Competitive Landscape

Our stoves are durable and designed to be used continuously. As we forge long relationships with the customers, the stoves are serviced and the entire organization remuneration is based on the successful use of the stove and pellets.

Our competition is generally with manufactures of stoves and we try to sell stoves via existing marketing channels at a profit to stay sustainable.

We manufacture, but our aim is to provide the best quality instead of a cost effective stove to attain satisfaction of our customers and users. People trying to adopt the business model has failed as they were still buying in stoves and needed to make a mark-up then costing too much.

We feel that we have the following advantage in the market:



Competitive advantage	5 Star Stoves	Other stoves	Natural draft stoves
Own technology	Yes	No	No
Full value chain approach	Yes	No	No
Business model	Utility busin providing serviced energy	Manu. & distrib.	Manu. & distrib.
Fuel specific	Yes, pellets only	Part adaptable, pellets and sticks	Sticks only, some mixed biomass
Managed backend process	Yes	No	No
Household CAPEX Outlay	Notional cost with Power Pack at \$10	\$100	\$30-50
Business case for the enterprise	Fuel resale	Resale of stoves	Resale of stoves
Peripheral value	Mobile phone charge for free & low cost LED option	None	None

14. Sales, marketing & distribution strategy

14.1. Pricing model

Our price for the model is below the price of LPG and above the price for firewood. This would equate to a top price of around \$13 per household, attracting the top and bottom end of the two customer energy segments. This further allows us to market to a residential and small tea stall and restaurant market segment of kerosene users. A customer pays a deposit payment of \$20 and a 3 year payment and service plan for a fully kitted two plate stove. This allows for a 12 month payback per stove and a further 18 months profit take to reinvest into the service and stove infrastructure.

14.2. Sales & Distribution Strategy

We manage our own value chain via our 5 Star Sister agents and conduct sales door to door or part of group presentation settings.

14.3. Branding & Promotion Strategy

We operate in a very low brand aware scenario for a startup phase as we are geographically focused and put our energy into face time sales. Our brand strategy will come into play once we are looking to an in country program roll-out.

15. OPERATIONAL OVERVIEW

15.1. Production operations

For Bangladesh, our biomass pellet aspirations for now is to buy in pellets in bulk and resell pellets via our own distribution channel.

Our stove manufacturing capability is adaptable to the demand as all is CAD assisted designs and require very little time to assemble. We own our own machine press tooling and can so locate and produce where there is electricity supply. The majority of our effort is targeted at the sourcing of quality components and the shipping process to get ready for assembly. We are not a manufacturing and sales business, but an energy business. This means that we don't have to continuously manufacture to stay viable, due to our multiple revenue streams.

15.2. Supply chain

Dhaka already has a pellet producer and we have tentative agreements on the standard, packaging and price for wholesale pellets from the supplier, as well as back-up supply from neighboring India.



We manufacture / assemble our own stoves according to our own designs. The component sourcing process depends on local availability, but for Bangladesh most electronic components and steel is imported. So we'll aim to import and assemble locally to counteract the extortionate duties levied on clean cook stoves.

15.3. Distribution model

Our stove and pellet distribution model targets the IDVS approved IDCOL distribution areas where we know we can offer enough people a reasonable value proposition.

Physical infrastructure used will be IVDS offices / containers as sales congregation points for the 5 Star Ladies. Pellets will be distributed from there via bicycle to customers on a pre-paid basis.

15.4. Other key partnerships

We work with CTI-PFAN, SE4ALL, and GIZ& E4ALL. Our stoves are approved by IDCOL for the World Bank Funded Manufactured Stoves Program. We are supported by E4ALL and they are supporting us in tracking funding opportunities and departmental buy in to look at programmatic based funding options.

15.5. Systems

We have developed our own custom IT system to performance manage our business. It allows us to track and record all customers and agents. This gives us the opportunity to track use, agent performance and carbon savings. It further allows us to run our pre-paid delivery service model taking in mobile payment or any other pay option.

16. Growth strategy

We have laid the stepping stones for our platform development. Our aim is to build the project out into a country wide program.

16.1. Revenue Growth Strategy

Our main revenue source is the sales of biomass pellets as a fuel for the cook stoves. To drive pellet sales we would need more stoves in the market or stoves which consume more pellets. We have a ready range of low cost stoves for the small restaurant market, which can substantially increase pellet demand volume.

Secondary would be to find more products to align to our distribution for secondary income. This will be inline of cooking or female targeted fast moving consumable goods, complementary to the service we provide. To reach the desired level of sales of per month, we need to invest the following.

16.2. Business Scalability

The business concept travels easy as a micro franchise and we are getting considerable interest from a range of local NGO's and entrepreneurs. We still need to find outside a paper exercise what the right size would be an attractive size input for a return investment. Saying that



funding is scarce and unless we ring-fence our stove payback for reinvestment, it will be hard pressed to make micro franchises grow outside the existing infrastructure.

17. Organizational Capacity Growth Plan

The proposed Social Business project will be implemented in collaboration with Five Star Stoves-Bangladesh (FSSB), a private enterprise run by valid trade license; Integrated Village Development Society (IVDS) a non-profit organization registered under Department of Social Services and NGO Affairs Bureau.

Owner of Five Star Stove Technology FSSB will lead the project. As an eligible entity IVDS will receive grants/donation from donor agencies. As a pioneer of Women Entrepreneurship model development, Enterprises & Five Star Stoves Cap will provide advisory services to the project in terms of women entrepreneurship and Willem the strategy, technical, IT and oversight of the business development according to its contribution.

We aim to create women entrepreneurship based business model called 5 Star Ladies, which will enable poor rural women to start their own business. We will support those women entrepreneurs with our adequate products supply, IT backend to build their capacity.

18. Investment Strategy

Our base investment has been completed and the business has access to its own stove designs and tooling to fabricate the combustion chambers. 5 Star Stoves has 2 stove types approved for the IDCOL program and has an all-round tier 4 stove ready post development for commercialization for the next commercial scale production run of stoves. We have aligned ourselves with IDCOL and ADB's E4ALL program. We are looking to E4ALL and to commence business complementary to the current IDCOL stoves programme.

We are looking at country expansion of the project. At this point debt and equity will be an option and we have already done work with ADB departments to take a view on the prospective large scale infrastructure development opportunity lying beneath our business. We completed a round of discussions with IDCOL around the concessionary funding of pellet plants and comfortable that the tabled options would be aligned to a profitable pellet business.

19. Impact

We create new value chains and so create new opportunities outside the existing energy landscape.

19.1. Social Impact

Our 5 Star Ladies run their own mini energy franchises. They support their households with their energy needs. We create new opportunities for new entrants into the market, rather than rehashing the same stove deal via the same shop at a more expensive price or micro credit chain. Our stoves' emissions are well above tier 4 for emissions and 99% combustion efficient. Health is not an option for us, it is a MUST!

19.2.Environmental impact

We don't use firewood or charcoal. Our biomass pellet fuel is reliant on forestry or agricultural waste and so takes the pressure of logging of trees for firewood / charcoal.

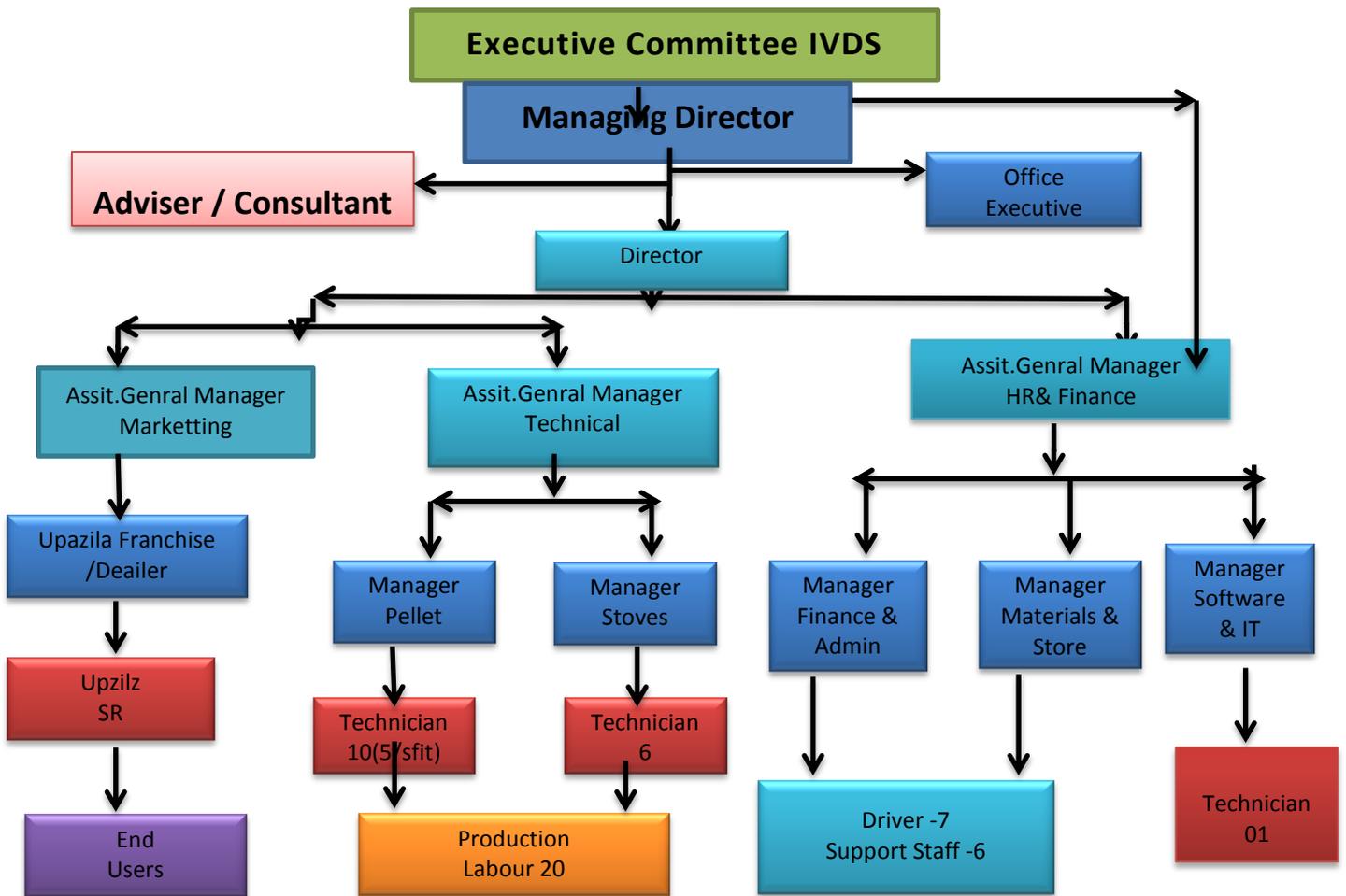
20. Management

S M M Kamal Bhuiyan is our CEO and has vast experience of managing IVDS as a local NGO. IVDS distributed more than 38,000 stoves and are accustomed to manufacturing and the resale of biomass cooks toves. Willem Malherbe & Mohammad Mosharrof Hossain, developed the technology, business process and organizational set-up to run the business.



Sl. No	Name	Designation	Qualification	Responsibilities
	SMM Kamal Buiyan	CEO	Master in Social Science (MSS) 22 Years of experience	# Responsible for the performance of the project # Report to the board of directors/ investors / donors. # Successfully implementing project activities #Developing strategic plans #Controlling finance flow # an effective management team
	Mushraat Jahan Fahmida	Director - Implementation & Technical	MSc in EEE/ Mechanical Engineer Minimum 4 years of exp	# Overall project implementation and providing technical # support and advice to target communities for deployment of Clean Cooking Solutions & Marketing ; # Document the lessons learnt in the implementation of the project and make recommendations for future interventions;
	Sabikunnahar	Assistant Director - Finance & admin (women)	Master in Business Administration (MBA) 5 Years of exp	# To plays a critical role in the organization, and exercises oversight of functions including accounting and finance, contracts and grants management, human resources, information technology, general administration, and regulatory/quality assurance in support of operations and service objectives.
	Ms Farzana Mofiz	Manager (Marketing)	MBA , 5 Years of experience	# Managing all marketing for the company and activities, developing marketing strategy. #Coordinating marketing campaigns with sales activities # Monitoring and reporting on effectiveness of marketing commu
	Tanivir Hasan	Manager (Stove Factory)	EEE Engineer 5 years Experience	# Delegate Tasks to Factory Staff as Necessary Create and Enforce Quality Control Standard Operating Proce #Create and Implement Machine Maintenance Standard Operat #Analyze Factory Production Data and Devising Improvement Strategies as Necessary
	MS Monira Akter	Manager Pellet Plants	years of exp Engineer 7yess experience	# Be responsible for production output, product quality and on-time shipping # Allocate resources effectively and fully utilize assets to Produce

The Organizational structure will be following line and staff method.



21. FINANCIAL OVERVIEW

21.1. Key drivers and assumptions



The main driver for the business is the resale of pellets. This allows continued operational income even in times when stove sales drop off. It creates the opportunity for a secondary value chain outside the manufacture and resale of stoves.

The sales revenue per household of \$9-\$12 per month converted to pellet sales (Includes the cost of factoring the cost of the stove over a 12 month payback) Top of the wood and bottom of the LPG market segments.

21.2. Revenue & profitability

The new business model will be an addition to the existing stove programme manager for the IDCOL program and so offer an existing backbone, without the risks of a new start-up.

Our aim is to achieve a 12 month payback on a stove investment and to use the repayment for recirculation in our Reinvestment Fund, to allow us to continue offering the best technology at an affordable price.

We have no liabilities and the assets we own are the intellectual design property for the stoves and the tooling to manufacture the stoves. We have an enormous amount of good will leveraged from IVDS, which aids us in our community engagements, assembly of stoves and general business development.

21.3. Capex Requirement:

A. Project Cost :

Sl no.	Category	unit	Unit price In BDT	Total BDT	Total USD
1	Land and Land Development	210sft	2.5	2100000	25000
2	Imported Machinery 5-6t/H Pellet Machinery & Equipment's	1	46200000	46200000	550000
4	Local Machinery	-	863940	863940	10285
5	Office Equipment Installation	-	503580	503580	5995
6	Furniture, Fixture & Fittings	-	249900	249900	2975
7	Vehicles	1	3500700	3500700	41675
8	Operation Exp. 6 month	6m	350000	2100000	25000
9	Stoves making cost	15000	20	25200000	300000
10	Preliminary Expenses	-	-	336000	4000
11	Tree seed lings	25000	84	2100000	25000
12	Trainings	10800	1361	14700000	175000
13	Raw Materials	2394T	5000t	11970000	142500
14	User Manuals , Brochures , booklet	50000	84	1260000	50000
Total				105204120	1252430
Local Contribution 30%				32065236	381729
Seeking Grants					890701

B. Forecasted Profit & Loss Statement

BDT in Lacs

Description	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5
-------------	------	------	------	------	------



Sl.no						
1	Sales	3261.5	3506.5	3751.5	4016.5	4241.5
2	Cost of production	2657.05	2847.55	3023.61	3206.28	3390.59
3	Gross Profit	604.45	658.95	727.89	810.22	850.91
4	Admin Cost	470.135	494.935	520.295	547.265	572.875
5	EBIT	134.315	164.015	207.595	262.955	278.035
6	Financial Cost	60	60	60	60	60
7	Profit Before Tax	74	104	147	202	218
8	Tax-15%	11.5	15	22	30	32
9	Profit after Tax	62.5	89	125	172	186
11	Retained Earnings	62.5	89	125	172	186
Total BDT in Lacs		62.5	89	125	172	186
Total In USD(1usd=84BDT)		74405	105952	148809	204761	221428

C. Cost of Product

Cost

BDT in Lacs

Sl.no.	Particulars		Yr-1	Yr-2	Yr-3	Yr-4	Yr-5
		100%	65%	70%	75%	80%	85%
1	Raw Materials (Pellet & Stoves)	3115	2025	2188	2337	2492	2648
2	Packing Materials	302	208	224	240	256	272
3	Salary & Wages	104.25	229.9	241.4	253.46	266.13	279.44
4	Utilities	92	92	94	95	96	98
5	Financial Cost (Inte)	224	224	224	224	224	224
6	Depreciation	471.43	47.15	47.15	47.15	47.15	47.15
7	Incentives & Other Expenses	106	106	106	106	106	106
Total BDT in Lacs		4414.7	2932.05	3124.55	3302.61	3487.28	3674.59
Total in USD			3490535.714	3719702.4	3931678.6	4151524	4374512



D. Sales Estimate & Sales Value :

. Sales Estimates and Sales Value									
BDT in Lac									
Sl No	Products	Quantity	Sale Value in Tk	Total Sales Value in Tk. Inlac	Yr-1(65%)	Yr-2 (70%)	Yr-3(75%)	Yr-4 (80%)	Yr-5 (85%)
1	Stoves Registration fee - BDT1500/HH	25500 (5000/Y)	1500/pc	382.5	76.5	76.5	76.5	76.5	76.5
2	Pellet	17500- ton/day*350*	16000/T	2800	1820	1960	2100	2260	2380
3	Briquette	17900- ton/day*350*	12000/T	2100	1365	1470	1575	1680	1785
Total in BDT in lacs				5282.5	3261.5	3506.5	3751.5	4016.5	4241.5
Total in USD(1USD=84BDT)				6288690.476	3882738.1	4174404.8	4466071	4781548	5049404.8

E. Operation / Administrative Cost :

SL No	Particulars	Unit	Unit Month	Unit Rate	Period					Total
					1-YR	2-YR	3-YR	4-YR	5-YR	
1	Salary & Wages	62	15	6.95	229.9	241.4	253.46	266.13	279.44	1270.33
2	Postage, telephone, Telegram, Telex and Fax	12	12	0.5	6	6	6	6	6	30
3	Stationery & Printing	12	12	0.5	0.6	0.6	0.6	0.6	0.6	3
4	Travelling & Conveyance	12	12	1	1.2	1.2	1.2	1.2	1.2	6
5	Selling Expenses and promotion (5% of sales price)	(5% of sales price)		5282.5	163.08	175.33	187.57	200.82	212.07	938.87
6	Depreciation on Furniture, Fixture, Office Equipment & vehicle-10%	10% OF Price		471.43	47.15	47.15	47.15	47.15	47.15	235.75
7	Write off on Preliminary and pre-operating expenses	lumsun		2.5	2.5	2.5	2.5	2.5	2.5	12.5
8	Audit & Miscellaneous Expenses			1	1	1	1	1	1	5
9	Insurance premium for transport vehicles			0.35	0.35	0.35	0.35	0.35	0.35	1.75
10	Repair and Maintenance for vehicles and office equipment (1% of price)	1% of price		471.43	4.71	4.71	4.71	4.71	4.71	18.84
11	Other Administrative Expenses (1% of selling price)				13.65	14.7	15.75	16.8	17.85	78.75
Total in BDT in lacs					470.14	494.94	520.29	547.26	572.87	2600.79
Total in USD(1USD=84BDT)					559678	6E+05	619392	651500	681988	3096178



F. Salay & Wages Statement :

SL	Particulars	Unit	Unit Month	Unit Rate	Period					Total	
					1-YR	2-YR	3-YR	4-YR	5-YR		
1	Managing Director (kamal)	1	15	50000	750000	787500	826875	868218	911629	4144223	
4	General -Manager-	1		75000	1125000	1181250	1240312	1302328	1367444	6216335	
5	Assistant General Manager (marketing)	1		60000	840000	882000	926100	972405	1021025	4641530	
6	Assistant General Manager (HR & Admin)	1		60000	900000	945000	992250	1041862	1093955	4973068	
7	Assistant General Manager (Techical)	1		60000	900000	945000	992250	1041862	1093955	4973068	
8	Manager (Marketing)	10		30000	4500000	4725000	4961250	5209312	5469778	24865340	
9	Manager (Pellet & Briquette)	1		40000	600000	630000	661500	694575	729303	3315378	
10	Manager (Stoves)	1		40000	600000	630000	661500	694575	729303	3315378	
11	Manager (HR & Admin)	1		40000	600000	630000	661500	694575	729303	3315378	
13	Manager (Software & IT)	1		40000	600000	630000	661500	694575	729303	3315378	
15	Technician (Stoves) 5/shift *2 shift	10		20000	2800000	2940000	3087000	3241350	3403417	15471767	
16	Technician (Pellet) 6	6		20000	1800000	1890000	1984500	2083725	2187911	9946136 5	
17	Driver -Track	1		25000	375000	393750	413437	434109	455814	2072111	
18	Driver -Caver Van	4		20000	600000	630000	661500	694575	729303	3315378	
20	Hiace	1		25000	375000	393750	413437	434109	455814	2072111	
22	Support Staff/Labour	20		15000	4500000	4725000	4961250	5209312	5469778	24865340	
23	Honarium Adviser/Consultant	1		75000	1125000	1181250	1240312	1302328	1367444	6216335	
		62		14	695000	22990000		25346475	26613799	27944489	127034262



22.Risk Analysis

We view the following risks as the most prominent and prepared the following measures to ensure business continuity and risk mitigation measures.

Risk	Measure
User adoption	<p>The stove appearance is aspirational and supports a better lifestyle. Training and instruction from trained pellet agents to communicate the value proposition, who are incentivised to sell pellets and maintain the stoves.</p> <p>Mass implementation planned to create the perception of a new standard being set.</p> <p>Multiple product options of cell phone charging and LED lighting options, at no additional cost.</p> <p>Local economy improvement and value proposition communication</p>
Feedstock and pellet availability	<p>Ensuring that there is always an alternative feedstock available or back-up production plan in place.</p> <p>Planned capacity at running one shift a day for 250 days per year. Retaining the spare shift to accommodate for a rise in demand or to accommodate growth flexibility.</p> <p>Collaborating with capacity in the market to support production.</p>
Fuel Competitors	<p>Unscrupulous competitors can target the stoves.</p> <p>The entry threshold is high to manufacture good quality pellets and we collaborate with existing capacity to</p> <p>The system is a closed loop and the agent can only be paid in the system. The upside is too great to pilfer some pellets on the side and the stoves are fully tracked monitoring pellet consumption per stove and per household.</p>
Counter party risk	<p>Vetting the right team who already have prior clean cookstove experience and looking for a more sustainable business model.</p> <p>Strong performance based contracts ensuring consistent supply and delivery provisions.</p> <p>Centrally controlled managed back-end.</p>



23. Stress Test Scenarios and Upside Analysis

To reduce risk we try and build in as much incentive as possible for our supply chain to ensure that we will be able to manage ourselves out our challenges and that our supply chain is incentivized to deliver at all cost. Feedstock prices are set at Tk 2500 per ton. We can buffer prices up to Tk3,500 per ton. At this point it is more lucrative to pay for labor to collect biomass from environmental clean-ups. Pellet sales pricing at Tk37.5 per kg can be reduced down to Tk35 per kg.

The comparative cost environment we operate in is at a floor price for wood at Tk30 per day and a ceiling of LPG at Tk90 per day. With an average daily cost we can target the top end of the wood burning market at a Tk7.50 per day premium or a Tk 52.5 saving from LPG.

Taking 500 stoves out of service would reduce the IRR to 65% from 69% and a 1,000 or 12% stoves down to 60% IRR.

A worst case scenario, where no growth is introduced, and only 21,000 stoves rolled out, a 17.5% return should still be achievable over the 5 year timeframe.

All variables are highlighted in yellow in the accompanying excel financial model and can be toggle to test various scenarios.

24. Conclusion

We are aware that we are promoting a new approach to the clean cooking market. It is only by changing that you come to different result. Our approach is not only environmentally sound, by making use of waste industrial, agricultural and forestry biomass and so curbing deforestation. We offer the household the best technology, fully serviced, with additional functionality to charge a mobile phone and run LED lighting for a nominal cost of the power pack. It is clean and powerful to cook on and will enhance the mother, wife, daughter and grandmother's cooking experience. The price to cook is competitive against other stove and fuel options.

We believe that we will provide a sustainable solution to the clean cooking industry, where people are already paying for their energy.

We trust that you find our business plan compelling and agree that we offer the household exceptional value and a hope that you find the return reasonable for your investment.

=====THE END=====



Consultation Demonstration and Field testing Report of **5 Star Stoves Bangladesh**



A sister concern
of
Integrated Village Development Society (IVDS) Bangladesh



February, 2015



Background

Millions of hectares of forest are lost every year, threatening this valuable asset. Global greenhouse gas emissions continue their upward trend. Global emissions of carbon dioxide (CO₂) continued their upward trend and those in 2011 were almost 50 per cent above their 1990 level. Millions of hectares of forest are lost every year, many species are being driven closer to extinction and renewable water resources are becoming scarcer.

According to the World Health Organization (WHO) almost 46,000 Bangladeshi women and children die each year due to indoor air pollution. Many more suffer from respiratory diseases, tuberculosis, asthma, cardiovascular disease, eye problems and lung cancer. Almost 90% of the rural population in Bangladesh cooks with biomass, such as cow dung or wood. Using traditional stoves, the poorly ventilated houses soon fill up with smoke.

To create a safer environment for women and children, the Bangladesh Council of Science and Industrial Research (BCSIR) developed improved cooking stoves that remove smoke from the kitchen. By burning fuel efficiently, the stoves can potentially cut biomass consumption upto 40-50%. This reduces carbon dioxide emissions in households, reducing the likelihood of respiratory diseases. Bondhu Chula also provide the rural population with employment opportunities.

NGOs have been adapted and distributing it through-out the country under the brand Bondhu Chula, since 2006.

According to GIZ In eight years, over 1.5 million stoves have been installed in households, around 80,000 BondhuChulas are being sold every month in Bangladesh. More than 5,800 shop owners are engaged in the production and sale of improved cooking stoves. More than 1,700 promoters, most of whom are women, raise awareness and conduct training in their communities on the use of improved cooking stoves.

Since 2008 IVDS has been working with Improved Cook Stoves (ICS) in Kishoreganj, Narshingdi, Comilla, Narayanganj districts of Bangladesh. Till 2014 IVDS worked with giz, Siddiqi sanitation, Bangladesh Council of Scientific and Industrial Research (BCISR) and distributed around 10,000 stoves among rural households.

As per its mission IVDS started working with ICS for major 2 reasons- 1) Protecting maternal and child health and 2) Ensure environmental sustainability (reducing environmental pollution and deforestation).

IVDS collected user feedback from the households and found that existing technology of stoves is good for consumption of less fuels. ***But there is lack of technologies in saving biomasses and woods.*** There is a high demand for technologies in fuel in addition to stoves.



In 2013 IVDS obtained membership of Global Alliance For Clean Cook Stoves (GACC). Through this network IVDS has been introduced with 5 Star cook stoves and started discussion about local context and technological issues. 5 Star Stoves brings to the partnership the proprietary stove technology of its two and single plate micro gasification stove. The tooling to produce the combustion chambers and the supply chain to support the procurement from tested and vetted component manufacturers or their appointed agents.

Executive Director of Integrated Village Development Society IVDS SMM Kamal Bhuiyan approached Willem from 5 Star Stoves, to bring the business model and technology to Bangladesh. NDA/NCA and agreement have been signed among both parties with a vision to 1) Field test of 5 Star Cook Stove and initiate social business in Bangladesh by using 5 Star Cook Stoves in Bangladesh. 2) Implement non-working grant funded cook stove projects. 3) Offer prospective investors a realistic impact investment opportunity, which makes commercial sense for everyone in the value chain.

After the agreement signing IVDS and 5 Star Cook Stove jointly submitted Expression of Interest (EoI) to SE4ALL-USAID.

5 Star stoves Bangladesh works with all the relevant stakeholders in business. This includes local government, relevant departments and agencies dealing with energy and natural resources. Influencing policy to relax lending criteria for green CSR programs at the local banks has been initiated. CCEB in Bangladesh an USAID funded program and IDCOL as part of the government's clean cook stove program have been attracted by 5 Star Stove Bangladesh. This is done on an informal basis where 5 Star Stove Bangladesh works with the programs as subject experts and positions itself for prospective investments from the government sector.

This report has been made on the basis of activities done to achieve the objectives of consultation, demonstration and field testing of 5 star stoves Bangladesh at Pre-Development Phase in Bangladesh.

Objectives:

- I. To identify project sites with the right component mix. Looking at infrastructure, feedstock availability and people to support the business and household profiles meeting cost and service profile of 5 star stoves Bangladesh.
- J. To identify five prospective sites in key locations (at Gazipur, Kishoreganj, Moulvibazar, Narsingdi, Brahman Bariya), all with the prospect of accommodating five year growth plan of 5 star stoves Bangladesh.
- K. To test extensive user acceptance of 5 star stoves in Bangladesh.

Methodology

5 Star Stoves Bangladesh team organized several field visits throughout the country. Besides, representatives from different national, international agencies also visited 5 Star Stoves Bangladesh. Consultation meetings, workshops and discussion were held during these visits and relevant feedbacks were gathered that have been incorporated in this report.

The team presented climate change talks at schools and met up with all relevant local officials that ensured connection with local people and official buy in.

Consultation workshops, stakeholder meetings and demonstrations were conducted at community level

During demonstration rice boiling and tea making testing sessions were done and target audiences asked their queries, provided their valuable feedback and suggestions.

Besides, demand analysis was done on availability of feedstock. During the consultation Potential Local Partners/Agents/Franchisee/5Star Ladies were shortlisted based on their interest.

The team observed and collected data on environment pollution, current utilization of wastages, soil fertility, current practices of using fuel through interview and transect walk.

Eventually scope of entrepreneurship and family income opportunity with 5 Star Stoves has been identified.

Detail activities done

On 03 May, 2014 IVDS team visited Narayanganj district. During the visit a Consultation workshop was conducted at IVDS Technical & Business Management School and College where Teachers, Guardians, Students were present. 5 Star cook stove was presented among the participants.

Participants were enthusiastic and eager to get the stove immediately. They asked the

presenter few questions likely- When the stove will be available in the market? Where the pellets will be available? Who are the marketing agencies of this stove in Bangladesh?





2nd visit of field testing was on 04 May 2015 at IVDS local office, Katiadi, Kishoreganj. During this visit 5 Star stove was demonstrated among the housewives and community people. A consultation workshop was held in participation with 10 Women Entrepreneurs (5 Star Lady), local elites, representatives of local government.

On 05 May 2015 the team visited Practical Action Bangladesh office and presented the stove's features. During the presentation 5 Star stove was demonstrated among researchers and staffs of Practical Action. Participants provided their feedback based on their vast experience in the relevant field. Feedback is given below:

II. Demand of such type of stove will be higher in urban and semi-urban areas rather than rural areas.

JJ. Compared to LP Gas Cylinder cost of pellets of 5 Star cook stoves will be cheaper

KK. 5 Star Cook Stove can be an alternative solution in the areas where

there is no gas line or cylinders are being used.

LL. There is a limitation in 5 Star Stove. That is- there is no flame controlling system [Increasing and decreasing volume of flames/tuning]. Inventing this feature will add more value to this product.



Participants have had few questions:

- Where the fuel will be available?
- How much it will cost?
- Will the stove be manufactured locally?

In the evening (4-7pm) of 05 May, 2015 a team of SE4ALL visited IVDS office at Indira road, Dhaka.



Molly M Word, Sara Kawlin, Mrs. Elizabeth Walls, Dr. Pet Quarrel, Bob Icott were the members of the visiting team. During their visit 20 5 Star ladies, local NGO representatives Md. Abdul Malik, Nurul Islam, Nahida Sultana, Hasina Morsheda, Taslima Begum were present. Mr. Welliem was presenting 5 star stove among the

- presence. The team has had some queries as below:
- ❖ What is the marketing policy?
 - ❖ What is the role of 5 star lady?
 - ❖ How much will cost for the stove and pellets?
 - ❖ What are the locations/sites for pellet mills?
 - ❖ What is the partnership model for marketing? All the visitors appreciated the project.

5 star stove became one of the pre-qualified among 7 ICS projects under SE4ALL's assessment.

On 10/06/14 a Stakeholder Meeting held at Khanpur, Narayanganj. Representatives from local NGOs, Businessman, local elites and Govt. officials were present in the meeting. Participants provided their



feedback in the meeting.



On 16/06/14 CCEB Workshop held at BICC. CCEB-USAID Global Marketing Facilitation Workshop held at Dhaka. 5 Star Cook Stove was presented in the workshop. Participants visited stall of 5 Star Stove and appreciated it. During the stall visit other participants from

different part of the country have show their deep interest for partnering with 5 Star Stoves.

On 13/09/14 the project team visited Kulaura under Moulvibazar district. A Consultation meeting and Demonstration was held at local partner organization WAFFH



office.



On 14/09/14 a Consultation and Demo was held at Rajprashad RM High School of Narshingdi district. Teachers, Guardians and Students were present in the meeting.



On 27/09/14 a Stakeholder Meeting was held at Raipura, Narshingdi. Representatives of local NGOs, Businessman, elites and govt. officials were present in the meeting.

On 27/09/14 a Consultation meeting was held at Laxmipur High School, Kuliarchar. Teachers, Guardians and Students were present in the meeting.



On 29-30/09/14 SE4ALL organized an investing forum where Business Plan of 5 star stove project was presented.



On 07/10/14 a Community level Consultation and Demonstration was held at Kaliakoir, Gazipur.

5 Star Cook Stove at AFCEF5 competition:

E4All-ADB organized at Singapore on 4-6/02/15. Total 35 projects participated in the competition. 5 Star cook stove project achieved runner-up award among 9 finalists.



On 29/12/1014 an EOI was submitted to IDCOL. IDCOL is testing through Dhaka University for efficiency and performance at local based.



Findings

- During the field visit It has been found that 5 Star Stove is completely a new technology in rural Bangladesh. Nobody has been introduced with such stove earlier.
- Mostly potential raw materials were found in all over Bangladesh is saw dust. Besides, water hyacinths, residuals of sugar cane, straw etc. are also available.
- The five sites will give the business scale and diversify the risk of any plant downtime.
- A set of public questions about 5 Star Cook Stove has been found as given below:



- Is this stove and pellet available in the market now?
- When it will be available?
- Where the stove and pellets will be available?
- How much the stove cost?
- How much will it cost for pellets?
- What are the accessories included in the stove set?
- Has there any scope of multiple use of accessories (battery, solar panel, LED light?)
- Will the price hiked?
- What is the preparation for smooth delivery of pellets?
- Who will provide technical support/trouble shooting?
- Has there any warranty?
- What is the longibity of the stove?
- How the flame will be tuned? (Increasing and decreasing like gas stoves)
- How much pellets will be required for each time cooking?
- Is it a Monopoly Business?
- When the demand will be increased, will the price become higher?
- Has there any model for tea stall and orphanage?
- What is the legal approval and certification status of this stove?
- Is the stove safe for children? Will it become too hot?
- What is the price of biomass for selling to pellet mill? Or 5 star ladies?
- Through women SME

E. Potential Partners Identified as below:

**We Are Friends for Human (WAFFH), Moulvibazar
Koli, Gazipur
Mymensingh Green Energy
Clean cooking Solution
eSheBee
Natural Fibres**

F. Potential Sites for Installing pellet mill:

The following project sites have been identified with the right component mix. Looking at infrastructure, feedstock availability and people to support the business and household profiles meeting our cost and service profile:



- Seven prospective sites in key locations are at Gazipur, Kishonegonj, Moulubi Bazar, Narsingdi, Satkhira, Mymensingh and Brahman Baria. There are no pellets available in the market. The five sites will give the business scale and diversify the risk of any plant downtime.
- 7) We have done extensive user acceptance testing doing rice boil and tea making tasting sessions. The cooking tests shown that a 5 person household can use a minimum of 800 grams of pellets per day to satisfy their cooking needs. So we plan for a minimum activity and are comfortable that we can double production if it is required. This can be done by running a second shift.
 - 8) Educational Institute based campaign could be the easiest way to present climate change talks and meet up with all relevant local officials, to ensure the awareness on environmental impact of the stove.
 - 9) The stoves components need to be procured and bodies fabricated.

Conclusion/What Next?

- Considering the lessons learned from above mentioned activities. Five Star Cook Stoves Bangladesh decided to run the business in Bangladesh through partnership.
- Densification sites and possible alternatives have been identified and we conducted preliminary dealings with the owners of the sites. Upon closing that should be formalize and compete the agreements for the sites.
- The site developments will consist of setting up a closed production unit of 300m² for the hammer mill, dryer, pellet plant, cooler and packaging line, with 700m² of covered space for feedstock preparation and drying.
- The installation and connection of the production gear to a 250KVA transformer, the procurement, installation and commissioning of the plant. This will put us in readiness to produce biomass pellets.
- The assembly of stove needs to happen in tandem, to tie in with the completion of the densification site and pellet supply availability.
- Negotiations with the authorities to relax import duties on imported stoves is urgently required.
- We can import completed stoves or import components and assemble locally.
- The assembly of the stoves are basic and do not require intricate assembly lines.
- We can have our own tooling which could be applied for the local build and assembly.
- The fleet of small commercial delivery vehicles should be procured and in place to support the delivery of pellets and collection of biomass to and from the plants to the homes.
- Once the stoves are distributed to the right profile households and the pellet plant producing pellets. The main function of the business is to ensure that the demand for pellets from the households are matched with the supply from the pellet plant.
- Order process should be managed by the IT backend. This will give real time information to steer the business.
- The successful management of the business would be to ensure that we get the pre-paid pellets to the household in the shortest possible turn-around time.



- The household must have a fully serviced stove and a first class cooking experience.
- The business should grow with the retained profits, post the initial investment.
- A provision should be there in the growth of the business to self-liquidate the investment after 5 years, targeting a return on equity of 17.5%.
- Five Star Cook Stoves can have the opportunities of financial assistance of Bangladesh Bak, IDCOL and some other donor agencies.
- A Comprehensive locally relevant business plan should be developed immediately and negotiations should be done with all concerned agencies properly.

-:The End:-