Proposal					
For					
Smokeless Stoves & Biomass Pelleting Machine					
Village : Panawadi, Tal: Purandar, Dist: Pune					
Submitted to					
Rtn Past President Arun Sathe, Director, Rotary Club of Poona &					
Co-Director, Dist3131 Rotary Foundation Team &					
Governor's Special Representative for Rotary Club of Pune Inspira					
For kind support					
by					
Science and Technology Park, Pune					
Α					
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www.scitechpark.org.in					

Science and Technology Park, Pune

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### **1 ABOUT US:**

Science and Technology Park (Scitech Park) is one of the Science and Technology Entrepreneurs Park (STEPs) set up in the year 1986, jointly by National Science and Technology Entrepreneurship Development Board (NSTEDB) of Department of Science and Technology, Government of India, within the campus of University of Pune.

Scitech Park has been using Science & Technology as a vehicle to facilitate implementation of social Transformation. Scitech Park effectively manages elimination of poverty amongst section of the population dependent on informal economy, marginalized sections of society and sections prone to vulnerability like women, children and elderly. The program activities are directed to create linkages to basic services for social inclusion, and provide an information exchange platform between the government, NGOs, Corporates.

Social intervention programs driven by Scitech Park in association with its incubatee companies and partner organizations are implemented through innovative products & technologies and transformative actions, focused health, education, vocational training, and skill development for enhancing the livelihoods of marginalized people. Activities performed within the ambit of the proposed actions are structured to be innovation driven, inclusive and sustainable.

The Scitech Park is also recognized as Technology Business Incubator (TBI) by Department of Science and Technology, Govt. of India which qualifies for supporting companies in CSR activities under the companies act 2013.

### 2 SOCIAL CHALLENGES AND DISRUPTIVE TECHNOLOGIES DELIVERED

Scitech Park has incubated 70+ companies primarily in the areas of renewable energy and clean technology, biotechnology, electronics and telecommunications, IT applications, education, social incubation, Application of Remote Sensing and GIS for socio economic surveys, marine services, agri and food technology, health and hygiene, mobile computing etc. Some companies and their domain areas are listed below:

- Gangotree Eco Technologies Pvt. Ltd.: Incubated on 30th August 2012 and is working in the field of Renewable Energy and Clean Technology like smokeless stoves, biomass pelletizer, community biogas plant etc.
- Tirubaa Technologies Pvt. Ltd.: Star performing graduated incubatee company of Scitech Park in the field of education. This company has developed product like Eduprojector which is a projector with built in PC and acts as a great digital technology for improvement of quality of education.
- Vishwjeet Green Power Technology Pvt. Ltd.: Incubated on 20th September, 2013 and is working in the field of Renewable Energy like solar LED lights, solar water pumping system etc.
- Ayugen Biosciences Pvt. Ltd.: Graduated incubatee company of Scitech Park working in the field of DNA based diagnostics for cervical cancer detection and treatment for women.
- WatchWitz Technologies Pvt. Ltd.: Star performing graduated incubatee company of Scitech Park which works in education sector having developed a product called virtual classroom used to educate children in remote areas of the country.
- Lexcode Regulatory Compliance Technologies Pvt. Ltd.: Incubated on 19th September, 2013 in the field of IT applications. This company offers products and services in corporate crime control and regulatory compliance.
- Siddhivinayak Agri Processing Pvt. Ltd.: Star performing graduated Incubatee Company of Scitech Park in the field of agri and food technology. The company is involved in developing supply chain for perishable items like potato and banana.
- Cubane Speciality Chemicals Pvt. Ltd.: Graduated Incubatee Company of Scitech Park working in the field of Renewable Energy and Clean Technology and provides chemical programmes and solutions to the pulp and paper industry.
- Jampot Photonics Pvt. Ltd.: Incubated on 31<sup>st</sup> March, 2015 in the field of Electronics and telecommunications. This company specializes in photonics specially in imparting training programmes to students and professionals. The training

programmes designed by Jampot provides practical exposure to photonics hardware, optoelectronics, ray optics, light experiments using LEDs and also photonic integrated circuit design techniques using state of art simulation softwares.

 Membrane Applications Pvt. Ltd.: Incubated on 18<sup>th</sup> December, 2014 in the field of Renewable Energy and Clean Technology. This company has been incorporated to identify, develop, design, install, applications using various types of membrane systems and pilot trials of industries. The company's vision is to 'Provide safe and potable drinking water through synthesis of globally proven water-treatment technologies and processes'.

## **3** APPLICATION OF TECHNOLOGIES FOR SOCIAL MISSION

The Park has been undertaking several CSR projects by building technology based ventures to resolve the problems of people who are at the bottom of the economic pyramid and to enhance their livelihood and sustainability in the following areas:

- a. Setting up of Rural Technology Business Incubator (RTBI) to promote grassroot technologies at Lanja in Ratnagiri District and proposes to establish similar such facilities in several major districts of Maharashtra.
- b. Setting up of Centralized Membrane Based Ultra Filtration Unit and providing Scitech Jaldoot vehicles to provide clean safe drinking water at doorstep to identified remote villages.
- Providing alternate power through Solar LED Lamps to remote villages having acute power shortage.
- d. Conducted Skill Training Programs for Physically Challenged Students on Assembly of LED Torches and Solar powered LED Lamps, Mobile Repair and Maintenance and Computer Hardware Repair and Maintenance.
- e. Conducted Skill Training on New Emerging Technologies to 600 trainees from backward and remote regions of Maharashtra under European Union and DST sponsored NET Skill Programme.
- f. **Provided Soyamilk machine to tribal schools to support Eradication of Malnutrition** on a pilot basis. Based on the positive results is working on increasing the

distribution and usage of the machine across schools and anganwadis in the hinterlands.

## 4 PROGRAMME PROPOSAL

#### 4.1 Purpose

Creating a smoke free area in and around Panavdi Village located near Saswad, Taluka Purandar, District Pune.

#### 4.2 Objective:

- 1. Providing smokefree stoves to all households.
- Creating an infrastructure for supply of biomass pellets by setting up a biomass pelletizing plant.
- 3. Avoid deforestation by reducing dependency on forest wood.
- Reduce health hazards especially in women and children from smoke emitted by burning of wood.
- 5. Employment generation and entrepreneurship opportunity.
- 6. Prevent migration of population.
- Revenue augmentation of Gram Panchayat(Local Government Body) which can be used for the welfare of the village.

## **5 TARGET GROUP OF PEOPLE:**

While the indirect impact will be for the entire Panawadi village and its adjoining population consisting of approximately 1200+ spread across 280 households the direct impact will be for 340+ women who cook for the households and around 50 infants who stay with the womenfolk.

#### 5.1 Present Scenario in the Project Area

#### **Geographical Location**

Panavdi is a Village in Purandar Taluka in Pune District of Maharashtra State, India. It is situated at Latitute - 18°16'12.00"North; Longitute - 74° 1'7.57" East and at an altitude of around 900 meters above sea level. It is located 41 KM towards South from Pune and 12 KM from Saswad, the nearest town. Panavdi is surrounded by Haveli Taluka towards west, Pune Taluka towards North, Bhor Taluka towards South, Khandala Taluka towards South. Purandar and Vajragad are two forts located in the vicinity of the village.

Though River Rudraganga flows through the valley; the water is inadequate for cultivation and drinking for the villagers.



Panawadi Village Surrounding Valleys

### **Demographic Data:**

#### Population Data

Particulars	Numbers
Total Number of Households	280
Total Population	1200
Primary source of livelihood	Farming

#### Landholding Data

Quantity of Land	Number of families
15 acres and more	20
10-15 acres	30
5-10 acres	70
1-5acres	50
Less than 1 acre	75
No land	35

#### **SMOKELESS STOVES & BIOMASS PELLETING MACHINE**

There are around 280 households with a population of ~1200 of which 100 families have migrated. Due to migration the reduced current population has been estimated to around 700 in the village. The local language is Marathi. The major occupation is farming, which is rain dependent. There are 100 families with land holding of about 5-10 acres, 20 families with 15 acres and 50 families with less than 5 acre of land. 30 - 35 families do not have land.



The major source of cooking fuel is forest wood. Only 50 families have LPG connection but they too mainly depend on forest wood for cooking as LPG is not regularly available. The village is surrounded by several valleys with two forts in vicinity, Purandar and Vajragad.

## 6 SURVEY AND ANALYSIS

Scitech Park in collaboration with Sakal Media group has surveyed and identified the following challenges:

- 1. No provision of clean safe drinking water.
- 2. Yield from the land is low due to dependency on rain water and shortage of labour.
- Forest wood being major fuel source leads to health problems among women and children.
- 4. Utilization of available natural resources.
- 5. Lack of Quality Education in Panawadi Schools.

Efforts are being taken to address the above issues by the following

- Mapping of natural resources using Geographic Information System (GIS)
- Improving women and child health through strategic technology interventions.
- Introduction of digital technology to enhance the quality of education.
- Leveraging various agencies, NGOs and corporate for overall socio economic development.
- Imparting skill and entrepreneurship to boost the capacities of the local youth to exploit economic opportunities availed through different interventions.
- Creation of new avenues of revenue generation like Adventure sports, Agri and Eco tourism, Cultivation of Medicinal plants, semi-processing as well as value addition to the products.

Scitech Park is committed towards ensuring overall development of Panawadi and is working towards achieving the following goals by Year 2018.

- Healthy and safe environment
- Arrest outward migration of population
- Revenue of minimum Rs. 1 Crore i.e. USD 1,56,250 per annum to the 'Grampanchayat' (local Government body).
- Ensuring income opportunities for the local population with the earning potential of about Rs.8000/- per month (USD 125)

## **7** KILLER IN THE KITCHEN

WHO studies have shown that Indoor Air pollution; the main cause of which is wood based conventional stoves; which is claiming 500000 lives every year in India out of which 80% are women & children.

In Panawadi like the rest of rural India majority of villagers cook on a two brick stove (earthen burner). About 50 households have LPG connections but they also end up using the wood based stoves almost 70% of the time due to erratic supply of LPG cylinders to the region.



Several studies have proven beyond doubt that the smoke emitted by these wood burning stoves have many health damaging pollutants including particulate matter (PM), carbon monoxide (CO), sulfur oxides, nitrogen oxides, aldehydes, benzenes, and polyaromatic hydrocarbon compounds. These pollutants mainly affect the lungs by causing inflammation, reduce ciliary's clearance and impaired immune response. Concentration of PM10 averaged over 24 hour periods were in the range 300 to 3000 mg/m3 and even more. Environmental Protection Agency's annual air pollution standard for PM10 is 50 mg/m3. During cooking women and young children spend most time in the kitchen and near the fire, much higher levels of PM10 have been recorded up to 30,000 mg/m3 or more.

## 8 PROPOSED PROJECT INTERVENTION

Smoke less stoves and Biomass Pelleting(smokeless fuel) Manufacturing Plant.

#### 8.1 Smokeless Stoves

Smokeless stoves use Forced draft technology developed and manufactured by an incubatee company of Scitech Park. These stoves ensure efficient air fuel ratio enabling maximum combustion of the fuel used. The air flow is regulated by a controller switch similar to that of LPG stoves which helps to variate the intensity of the flame. These stoves use biomass pellets for combustion. These pellets are manufactured by utilizing locally available agriculture bi products and residues. A medium sized biomass pellet manufacturing facility will ensure uninterrupted supply of fuel to these stoves.

The smokeless stoves are available in various sizes. We are proposing to provide 0.7kg smokeless stove for domestic use and 6kg smokeless stove for semi commercial use.

<b>Technical Specification</b>	Domestic Smokeless Stove	Semi Commercial Smokeless Stove		
Fuel Capacity	700 gm	6kg		
Operational duration full flame	1 hour	1 hour		
Dower Course	Battery Operated	Battery Operated		
Power Source	Lead Acid Batteries	Lead Acid Batteries		
Gross Weight	4.3 kg	42 kg		
Battery Type	6V, 4.5Ah. Charging on Mains supply	12V, 7.2Ah Charging on Mains supply		
Burner Load Capacity	20 kg	100kg		
Dimension(mm)	270 x 240 x 200	595 x 465 x 518		
Efficiency	about 33%	about 40%		
Recharge Duration	6 hr	6 hr		

Domestic Use - for a house of 4-8 people





The advantages of using a Smokeless Stove for cooking are:

- Conservation of firewood
- Provides smoke free hygienic cooking atmosphere
- Reduction in health hazards
- Reduction in cooking time
- Helps avoid deforestation

#### 8.2 Biomass Pellet Manufacturing Plant

We propose to set up a biomass pellet manufacturing plant to process the locally available agricultural bi products and residues into biomass pellets which could be used as fuels for the smokeless stoves in and around the village. The 10HP pelletiser unit along with 7.5HP shredder has a capacity of 750kg per day.

Due to the unreliable supply of grid power we propose to augment the manufacturing facility with a solar wind hybrid power plant.

## 8.3 Source of Raw Material

Village Panawadi has total agricultural area of about 800 hectares out of which 100 hectares is under cultivation and rest is mainly used to grow grass; some part of which is used as fodder for cattles. There is also availability of agricultural residues in terms of paddy straw, grasses; un-consumed fodder by cattle after agricultural waste. The proposed intervention plans to use this agricultural residue and grass by densifying them in the form of pellets. Science and Technology Park through its incubated start ups has developed the technology for the same.



## 9 PROOF OF PROJECT SUCCESS

Use of biomass pellet and biomass stoves will make around 190 houses smoke and pollution free thereby preventing chronic respiratory diseases in women and children. Panawadi village mainly depends on the forest wood for the cooking fuel. Use of biomass pellets would reduce the pressure on the forest wood and facilitate healthy

growth of tree species.

Reduced indoor air pollution will reduce the health issues resulting into extra productive time for women, which can be utilized for new livelihood and revenue generation activities thereby a better life style.

The agriculture waste which is burnt every year can be utilized along with forest residue and grass to make biomass pellets which will reduce the pressure on forest wood and also reduce the indoor pollution.

Production of biomass pellets itself is a revenue generating activity and an entrepreneurship opportunity for the youth from Panawadi village to start their own small start ups leading to employment generation.

## **10 INVESTMENT**

The estimates of capital cost. Annual manufacturing expense and sales revenue presented in this section are based on data/information available with Scitech Park for similar projects.

### 10.1 Capital Cost:

The capital cost in this case consist of the cost of setting up the biomass pellet manufacturing facility, a captive solar wind hybrid power generation unit and smokeless stoves which would be distributed in all the households in the village along with two semi commercial smokeless stoves. The capital cost also includes the cost of providing electrical wiring to the main village households to harness the additional power generated by the Captive Solar Wind Hybrid Power Unit.

The estimated cost of the project works out to be INR. 6,315,986 i.e. USD 98,687 which is detailed in Table.10.2.

The project is estimated to give a gross margin of INR 539,178 i.e. USD 8,425 and an

ROI OF 9% as mentioned in the summary table no. 10.1 and detailed in table no.10.5 further breakup is mentioned in **Annexure 2**.

Table No. 10.1 - Summary Estimate of Capital Cost

Particulars	Cost INR	Cost USD
Biomass Pellet Manufacturing Plant + Smokeless Stoves	2,241,625	35,025
Solar Hybrid Power Plant	3,423,600	53,494
Other fixed Investment	350,000	5,469
Interest on Capital	0	0
Working Capital	0	0
Management Expenses	300,761	4,699
Total Estimated Capital Expenditure	6,315,986	98,687
Annual Manufacturing Cost	1,587,222	24,800
Gross Margin	539,178	8,425
Return on Investment	9%	

## **Basis of Estimate:**

**Land Acquisition:** The land for the proposed Biomass Pellet manufacturing unit would be provided by the local governing body hence no projection of acquisition cost is being made.

**Plant Setup:** We have considered a built up area of 1000sq.ft out of which 600sq.ft would be for processing unit and remaining 400sq.ft would be utilized for storage of raw material and finished goods.

**Equipment & Utilities:** The estimated cost of equipments i.e shredder and palletizing machine are based on the assumption that these will be sourced from the incubatee companies of Scitech Park. The costs are based on install and commission basis and detailed working has been given in the table no.10.2.

**Smokeless Stoves:** While we will be providing domestic smokeless stoves having fuel capacity of 0.7kg to all the households in the village, 2 semi commercial smokeless stoves will also be provided with fuel capacity 1 kg for community use on rental basis.

**Solar Wind Hybrid Power Plant:** We intend to set up a captive solar wind hybrid power plant in sync with our vision to make optimum use of renewable energy. Along with providing green power to the Biomass Pelleting Plant a portion of it would also be used

for electrification of the village. The cost towards the electrification has also been considered appropriately in the capital cost. The detailed technical specification of the unit are specified in **Annexure - 3** 

Plant Cost	Cost INR	Cost USD	Remarks
Land acquisition	0	0	Provided by Local Body
Civil construction	500,000	7,813	@ 500 per sqft for 1000 sqft
Plant & machinery	718,125	11,221	
Solar-Wind Hybrid Power Plant	3,423,600	53,494	
Other fixed Investments	350,000	5,469	
Smokeless chullas (stoves)	1,023,500	15,992	
Interest on Capital	0	0	Funding from Rotary
Working Capital	0	0	Funding from Rotary
Management Expenses	300,761	4,699	
Total estimated capital cost	6,315,986	98,687	

### Table No. 10.2 - Detail Estimate of Capital Cost

**Annual Manufacturing Cost:** The annual manufacturing cost in the first year of stabilized operation at rated capacity level has been worked out under the following heads:

**Raw material:** The annual raw material cost has been computed taking into account the capacity of the plant and the market value of grass and agricultural residue which is the primary source of raw material.

**Power:** The power cost has been considered at the prevailing rates for the planned capacity production of 750 kgs per day.

**Labour:** the labour cost has been considered for 1 plant operators and 2 helpers working in one shift operation for 6 days a week.

Packaging cost and insurance premium had also been vectored in the detailed breakup mentioned in table no.10.3.

Particulars	Cost INR	Cost USD
Raw material	936,000	14,625
Power	93,600	1,463
Labour	351,000	5,484
Packing cost	117,000	1,828
Insurance premium year 1	14,040	219
Managament Expense @ 5%	75,582	1,181
Total	1,587,222	24,800

### Table No. 10.3 - Annual Manufacturing Cost

**Annual Sales Realization:** The annual sales realization at planned capacity has been arrived at considering differential pricing. While the domestic sale has been proposed at a nominal price, the commercial sale will take place at competitive price in line with prevailing market dynamics.

Rental revenues for the semi commercial smokeless stoves have been worked out at a very conservative estimate both on duration and price.

The detailed working has been given in table no.10.4

Sale of Products	Kgs	cost per	Cost INR	Cost
		KG		020
Sale for domestic use	136800	7	957,600	14,963
Sale for Commercial use	95400	12	1,144,800	17,888
Subtotal A	232200	19	2,102,400	32,850
Rental Revenue	Days pa	cost per	Cost INR	Cost
		day		USD
Machine 1	24	500	12,000	188
Machine 2	24	500	12,000	188
Subtotal B	48	1,000	24,000	375
Total A + B			2,126,400	33,225

## Table No. 10.4 Annual Sales Realization

**Return on Investment:** While the tangible return on investment is based on the estimated capital cost and the annual revenues and realization the ROI is estimated at 9% as detailed in table no.10.5.

The intangible ROI and benefits are also highlighted in table no. 10.6

## Table No. 10.5 - Return on Investment

Particulars	Cost INR	Cost USD
Annual Projected Revenues	2,126,400	33,225
Less Annual Operating Expenses	1,587,222	24,800
Gross Margin	539,178	8,425
Capital Investment	6,315,986	98,687
Return on Investment	9%	0

Impact	Direct benefits	Indirect benefits		
Reduction of emission in Kitchen	<ul> <li>Better health of the women and small children</li> <li>Reduction in Indoor Air Pollution</li> <li>Hygienic cooking environment</li> <li>Reduction in the medical expenses for treatment of chronic respiratory diseases</li> </ul>	<ul> <li>Better health and hygiene leading to better productivity of all the family members</li> <li>Increase in per capita income leading to improved quality of life</li> </ul>		
Reduction in use of wood for fuel	<ul> <li>Reduced pressure on natural resource like forest</li> <li>Availability of time for the womenfolk for their families</li> </ul>	<ul> <li>Afforestation leading to better environment</li> <li>Increase in the variety of tree species</li> <li>Participation of women in the economic contribution in the family</li> </ul>		
Usage of biomass pellets	<ul> <li>Employment opportunities for the local youth and women self help groups</li> </ul>	<ul> <li>Value addition to agricultural residue leading to income source</li> </ul>		

## **11 INTANGIBLE BENEFITS OF THE PROGRAM**

## **12 SENSITIVITY ANALYSIS**

While we have considered all possible scenarios of operation in regular mode there are possibilities which can alter the projections:

- 1. Availability/Increase in cost of raw material
- 2. Sale Price

# Working Note on Sensitivity Analysis

	Domestic		Commercial		Total	
Particulars		INR	INR	INR	INR	INR
Sales Price per kg		7.00		12.00		
Less: Total Variable Cost Per Kg						
Material	4.50		4.50			
Labour	-		-			
Other Variable Expenses	0.40	4.90	0.40	4.90		
Contribution Per Kg		2.10		7.10		
Total Annual Production (in Kgs)	59%	136 800	/11%	95 /00	100%	232 200
Total Contribution (in INP)	3370	297.290	41/0	677 240	10070	064 620
Average Contribution per kg (in		207,200		677,340		904,020
INR)						4.15
Less: Fixed Cost						
Wages - Workers					180,000	
Salary - Plant Operator					168.000	
Insurance Charges					14.040	362.040
Net Cash Profit					,	602 580
Break Even Point (BEP) (in Kgs)						002,000
(with ratio 59:41)		51,344		35,805		87,149
Break Even Point (BEP) (in Kgs)				-		
Only Domestic		172,400				
Break Even Point (BEP) (in Kgs)						
Only Commercial				50,992		
Break Even Point (BEP) (in Kgs) in						
Our Case		136,800		10,530		
Break Even Point (BEP) (in INR) in						
Our Case		287,280		74,760		362,040
Margin of Safety (MoS) in General		05 456		50 505		445 054
Case		85,450		59,595		145,051
						602,580
Margin of Safety (MoS) in Our				40.005		
Case		-		49,065		
in Conoral Case		62 170/		62 17%		
Sensitivity towards commercial		02.47%		02.47%		
Sales in our case		_		51 43%		
Sensitivity towards Raw Material				02140/0		
in our case						57.67%

## **13 REVIEWS & AUDIT**

We understand that regular audits and reviews are important to ensure program deliverables. And hence propose a following types of audits and reviews to ensure that our program objectives and met.

#### 13.1 Regular Audit

There will be quarterly pre-scheduled audit which can be done by a 2 members' team consisting of representatives of Rotary and Scitech Park. This audit will use random survey method along with checking of the raw material consumption & sale records of biomass pellets.

#### 13.2 Surprise Audit

There will be surprised unannounced audit conducted by a member of Scitech Park which will involve random checking of all parameters of the program. We propose to conduct at least 1 audit per quarter.

The primary focus of both the audits will be to ensure the following:

- Regular production and distribution of adequate quantities of biomass pellets to the villagers.
- Effective use of biomass Pelleting machine to produce biomass pellets and sell it to village households and other nearby areas.
- Machine working and upkeep of the biomass pellet manufacturing unit, raw material storage and handling, pellet storage etc.

## **14 CONTINGENCY PLANNING**

- If there is any audit findings indicate of deviation from agreed distribution model then the following steps will be taken immediately to ensure course correction in line with the plan
- Increase the frequency of unannounced audits
- Discuss and finalize action plan with the local governing body members
- Change the operating parties

## **15 PAYMENT TERMS**

The above project will be initiated post receipt of approval and receipt of project mobilization advance 25% of the total project cost. The balance against the project updates inline with project implementation schedule detailed in **Annexure 1.** 

# Annexure – 1: Project tracking and review

	Month											
Activity	1	2	3	4	5	6	7	8	9	10	11	12
Feasibility Study & Site Finalization												
Procurement Plant & Machinery for biomass plant												
Installation and commissioning of biomass plant												
Procurement Plant & Machinery for hybrid plant												
Installation and commissioning of Hybrid plant												
Procurement of Stoves												
distribution of stoves & operational Training												
Project handover to Local Body												
Project Monitoring & Review												
* 1st Month starts from the day of approval of the project and relea	se of	func	ls									

		Cost INR	Cost	Remarks
	Plant Cost		USD	
Α	Land acquisition	0	0	Provided by Local Body
	Subtotal A	0	0	bouy
В	Civil Work and Shed @ 500 per sqft for 1000	500,000		
	sqft		7,813	
	Subtotal B	500,000	7,813	
С	Machinery			
	Shredder	175,000	2,734	
	VAT (12.5%)	21,875	342	
	Pellet Machine	362,000	5,656	
	VAT (12.5%)	45,250	707	
	Installation and comissioning incl of 1 year	100,000		
	warranty		1,563	
	Service tax (14%)	14,000	219	
	Subtotal C	718,125	11,221	
D	Alternative Power Plant			
	Solar-Wind Hybrid Power Plant	3,000,000	46,875	
	VAT 5%	150,000	2,344	
	Installation and comissioning incl of 1 year	240,000		
	warranty		3,750	
	Service tax (14%)	33,600	525	
	Subtotal D	3,423,600	53,494	
E	Other fixed Investments			
	Pre-operating expenses	50,000	781	
	Electerical wiring in village			for 1 hybrid powered
				lamp in each
		300,000	4,688	household
	Subtotal E	350,000	5,469	
F	Stoves			
	Domestic stoves 190 @5000	950,000	14,844	Incusive of Taxes
	Semi Commercial stove 2 @ 36750	73,500	1,148	Incusive of Taxes
	Subtotal F	1,023,500	15,992	
G	Interest on Capital	0	0	
Н	Working Capital	0	0	
I	Management Expenses	300,761	4,699	
	Total A+B+C+D+E+F+G+H+I	6,315,986	98,687	

# Annexure – 2: Detailed Estimate of Capital Cost

# Annexure – 3: Technical Specification of Solar Wind Hybrid Power Plant

Sr. No.	Particulars	Capacity
1	Mono/Crystalline Solar Panels	10 KW
2	Wind Turbine horizontal axis	5 KW
3	On-grind inverter	10KVA
4	Origin supply controller	1 No.
5	Batteries (Lead Acetate) 10 No.	500 AH
6	Fabrication for installation, LED lamps for household emergency lighting, switches, cabling etc	