REPLACEMENT OF CONES POLISHERS WITH WHITENER (1.0 TPH)

GANJAM RICE MILLS CLUSTER

BEE, 2010
Detailed Project Report on Replacement of Cone Polishers with Whiteners 1 TPH
Rice Mill SME Cluster, Ganjam, Orissa (India)
New Delhi: Bureau of Energy Efficiency;
Detail Project Report No.: **Ganjam/Ricemills/PC/01**

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Zenith Energy Services Private Ltd.

Hyderabad

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Lists of Abbreviations

- BEE - Bureau of Energy Efficiency
- DPR - Detailed Project Report
- DSCR - Debt Service Coverage Ratio
- GHG - Green House Gases
- HP - Horse Power
- IRR - Internal Rate of Return
- MoP - Ministry of Power
- MSME - Micro Small and Medium Enterprises
- NPV - Net Present Value
- ROI - Return On Investment
- MoMSME - Ministry of Micro Small and Medium Enterprises
- SIDBI - Small Industrial Development Bank of India
- TPH - Ton Per Hour

EXECUTIVE SUMMARY

Zenith Energy Services Pvt. Ltd is executing BEE-SME program in Ganjam Rice Mills Cluster, supported by Bureau of Energy Efficiency (BEE) with an overall objective of improving the energy efficiency in cluster units.

Paddy is one of the major crops cultivated in the eastern states especially in the state of Orissa. The Rice comes out of milling of paddy. Hence rice milling is an important activity in the state. There are about 250 rice mills in Ganjam rice mills cluster covering Berhampur, Hinjilicut, Bhanjanagar, and Ganjam areas. The major Energy forms used in the cluster is electricity. Electricity is used for driving the prime movers of elevators, Chaluni, separator, paddy cleaners, Rubber Sheller, and whiteners/cones, drives and for lighting. The cost of energy as a percentage of end product cost (Rice) cost varies anywhere between of 1% to 1.5%.

White rice is produced from brown rice by removing the bran layer and the germ in the cone polishers. The bran layer is removed from the kernel by applying friction to the grain surface either by rubbing the grains against an abrasive surface or against each. The rice produced in cone polishers have low polish and quality of the rice is also poor. Further, the yield of rice is also low due to old and inferior design of the cone polishers. The market price for rice produced in the cone polishers is also low than the rice produced in the latest whiteners available in the market. The demand for rice produced in cone polishers is also low due to low quality of rice other.

The latest and modified whitener is newly designed and development product by improving rice polisher, mainly used in whitening the unpolished rice. Rice produce by new whitener machine will have better quality than cone polisher and good. The machine can process various kinds of rice to desired whiteness, with excellent technical and economical effect.

Based on the detailed studies carried out in various rice mills, it is observed that the rice produced in whiteners has better market price and is about ` 10 to ` 15 per quintal than the rice produced in cone polishers. Hence, for a typical rice mill having cone polishers and having 1.0 TPH paddy processing capacity, the monetary benefit is estimated at ` 1.40 lakh per annum for annual production of 14000 quintals of rice.

The DPR highlights the details of the study conducted for assessing the potential for installation of new whitener in place of existing cone polisher machine in various units of the cluster, possible energy savings and its monetary benefit, availability of the

technologies/design, local service providers, technical features and proposed equipment specifications, various barriers in implementation, environmental aspects, estimated GHG reductions, capital cost, financial analysis, and schedule of Project Implementation.

This bankable DPR also found eligible for subsidy scheme of MoMSME for "Technology and Quality Upgradation Support to Micro, Small and Medium Enterprises" under "National Manufacturing and Competitiveness Programme". The key indicators of the DPR including the Project cost, debt equity ratio, monetary benefit and other necessary parameters are given in table:

S.No	Particular	Unit	Value
1	Project cost	` (In lakh)	2.18
2	Rice production	Quintal/annum	14000
3	Monetary benefit	` (In lakh)	1.40
4	Debit equity ratio	Ratio	3:1
5	Simple payback period	Years	1.56
6	NPV	` (In lakh)	3.02
7	IRR	%age	46.49
8	ROI	%age	27.26
9	DSCR	Ratio	2.57
10	Process down time	Days	6
11	CO_2 reduction	Ton /year	Nil

The projected profitability and cash flow statements indicate that the project implementation of improved design whitener by the present inefficient cone polisher in the cluster units will be financially viable and technically feasible solution for the cluster.

ABOUT BEE'S SME PROGRAM

Bureau of Energy Efficiency (BEE) is implementing a BEE-SME Programme to improve the energy performance in 29 selected SMEs clusters. Ganjam Rice Mills Cluster is one of them. The BEE's SME Programme intends to enhance the energy efficiency awareness by funding/subsidizing need based studies in SME clusters and giving energy conservation recommendations. For addressing the specific problems of these SMEs and enhancing energy efficiency in the clusters, BEE will be focusing on energy efficiency, energy conservation and technology up-gradation through studies and pilot projects in these SMEs clusters.

Major activities in the BEE -SME program are furnished below:

Activity 1: Energy use and technology audit

The energy use technology studies would provide information on technology status, best operating practices, gaps in skills and knowledge on energy conservation opportunities, energy saving potential and new energy efficient technologies, etc for each of the sub sector in SMEs.

Activity 2: Capacity building of stake holders in cluster on energy efficiency

In most of the cases SME entrepreneurs are dependent on the locally available technologies, service providers for various reasons. To address this issue BEE has also undertaken capacity building of local service providers and entrepreneurs/ Managers of SMEs on energy efficiency improvement in their units as well as clusters. The local service providers will be trained in order to be able to provide the local services in setting up of energy efficiency projects in the clusters

Activity 3: Implementation of energy efficiency measures

To implement the technology up-gradation project in the clusters, BEE has proposed to prepare the technology based detailed project reports (DPRs) for a minimum of five technologies in three capacities for each technology.

Activity 4: Facilitation of innovative financing mechanisms for implementation of energy efficiency projects

The objective of this activity is to facilitate the uptake of energy efficiency measures through innovative financing mechanisms without creating market distortion

1 INTRODUCTION

1.1 Brief Introduction about cluster

Paddy is one of the major crops cultivated in the eastern states especially in the state of Orissa. The Rice comes out of milling of paddy. Hence rice milling is an important activity in the state. There are about 250 rice mills in Ganjam rice mills cluster covering Berhampur, Hinjilicut, Bhanjanagar, and Ganjam areas. The major Energy forms used in the cluster is grid electricity. Electricity is used for driving the prime movers of elevators, Chaluni, separator, paddy cleaners, Rubber Sheller, and whiteners/cones, drives and for lighting. The cost of energy as a percentage of end product cost (Rice) cost varies anywhere between 1% and 1.5%.

1.1.1 Production process

Pre-Cleaner/ Paddy Cleaner

Paddy cleaner is a most essential equipment in a rice mill and separates all the impurities like dust, straw, sand, clay and heavy particles of even and uneven sizes from paddy before the paddy is processed. The clean paddy sent to the rubber roll sheller to process further. The advantages with the paddy cleaner are it increases the life of rubber rollers and the percentage of oil in bran.

The function of the dust blower is to remove the dust from paddy through the pipeline connected to the paddy cleaner. This equipment is recommended for installation in conventional rice mills, also to get the same advantages as of modern rice mills. If this are not removed prior to shelling the efficiency of the rubber Sheller and the milling recovery is reduced.

The pre-cleaners separate three groups of materials:

- The first separation is done by scalping or removing the objects that are larger than the grain. Either a flat oscillating screen or a rotary drum screen that allows the grain to pass through but retains straw.
- The second separation retains the grains but allows broken grains, small stones and weed seeds to pass through. Aspirator is installed to remove the dust and light empty grains

Rubber Sheller

The objective of a hulling/de husking operation is to remove the husk from the paddy grain with a minimum of damage to the bran layer and, if possible, without breaking the brown rice grain. Since, the structure of the paddy grain makes it necessary to apply friction to the grain surface to remove the husk; it leads to breaking of some of the rice.

The paddy is fed into the center of the machine through a small hopper. A vertically adjustable cylindrical sleeve regulates the capacity and equal distribution of the paddy over the entire surface of the rotating disc, paddy is forced between the two discs (rubber sheller)and as a result of pressure and friction most of the paddy is de husked (hulled), where husk and brown rice are separated.

Separator

The output from the huller is a mixture of brown rice, husk, broken paddy etc. The huller aspirator removes the lighter material such as husk, bran and very small broken rice. The remainder passes onto the paddy separator where the unshelled paddy rice is separated from the brown rice. The amount of paddy present depends on the efficiency of the husker, and normally less than 10%. Paddy separators work by making use of the differences in specific gravity, buoyancy, and size between paddy and brown rice. Paddy rice has a lower specific gravity, higher buoyancy, and is physically bigger, longer and wider than brown rice

The compartment type of paddy separator uses the difference in specific gravity and the buoyancy to separate paddy and brown rice. When paddy and brown rice move over an inclined plane, they move at different speeds depending on their specific gravity, their shape and contact area, smoothness of inclined surface and the co-efficient of sliding friction. Brown grains are smaller, heavier, rounder, and smoother and will slide faster than paddy grains. The processing capacity of the compartment separator is dependent on the compartment area. For a 1.0 ton/hr capacity rice mill, a 45-compartment separator made up of 15 compartments on each of three decks is used.

Whitening and Polishing

In the process of whitening, the skin and bran layer of the brown rice are removed. During polishing of the whitened rice, the bran particles still sticking to the surface of the rice are removed and the surface of the rice is slightly polished to give it a glazed appearance. For further whitening if required as per the market demand or for export market, the polished rice is further processed in the silky machine for additional polishing.

Rice grader

After polishing, the white rice is separated into head rice and, large and small broken rice by a sifter. Head rice is normally classified as kernels, which are 75-80% or more of a whole kernel. The sifter is made up of a series of oscillating or cylindrical screens through which the rice passes. The output from the bottom screen is the very fine broken tips and is called the “brewers”.

Elevators

The elevator used at different stages of rice milling for transferring paddy, brown rice and white rice during the milling process

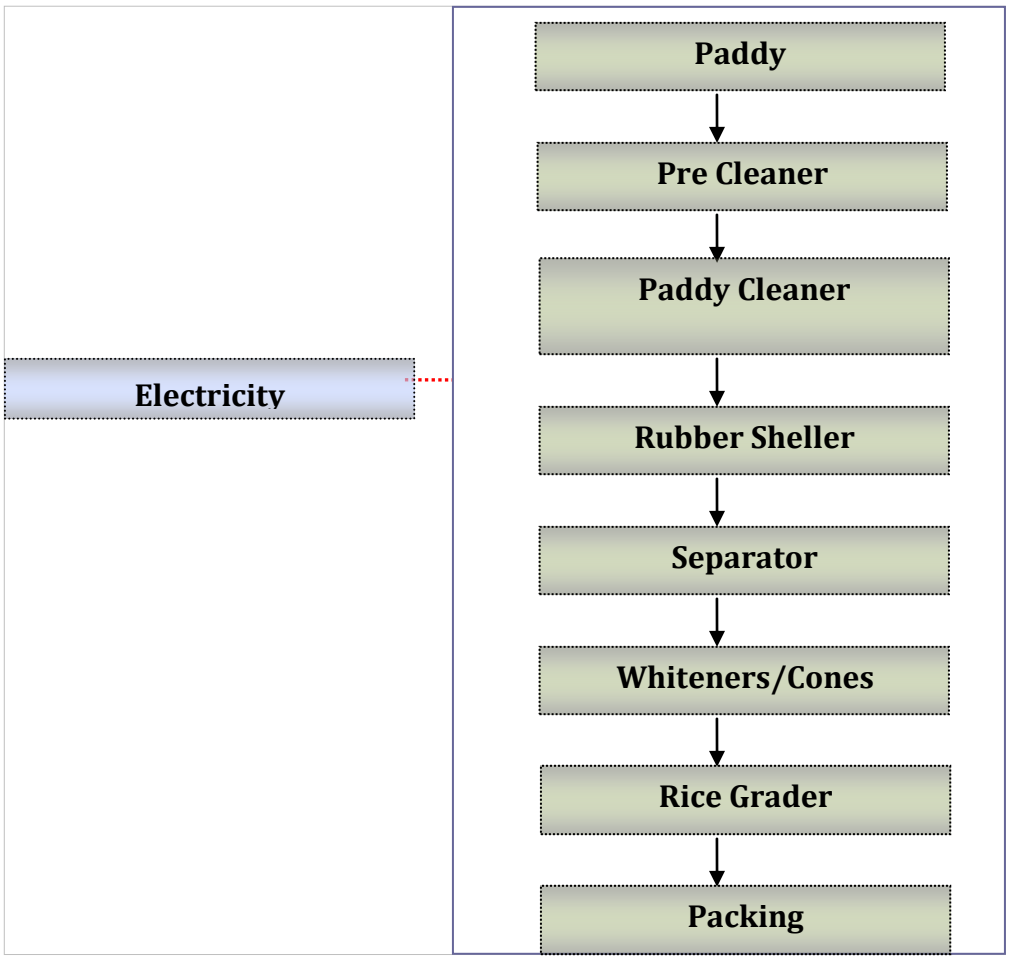


Figure 1.1: General Process Flowchart of a rice mill is furnished below.

1.2 Energy performance in existing situation

1.2.1 Electricity consumption of a typical unit in the cluster

The main source of energy for a typical rice milling unit in the cluster is electricity and is used for driving the prime movers of common drive shaft motor and in individual drive system like elevators, Chaluni, separator, paddy cleaners, Rubber Sheller, and whiteners/cones, drives and for lighting. The energy consumption of a typical rice production unit in the cluster having old and inefficient design cone polisher of 1.0 TPH paddy processing capacity is furnished in Table 1.1 below:

Table 1.1: Energy consumption of a typical unit (M/s Kothari Rice Mill)

S.No.	Details	Unit	Value
1	Electricity Consumption	MWh/annum	28
2	Production (Rice)	tonne/annum	2000

1.2.2 Average production by a typical unit in the cluster

The average production in a year in a typical rice production unit is 2000 tonne per annum.

1.2.3 Specific Energy Consumption

The major source of energy for paddy processing is electricity and the specific electricity consumption per ton of paddy processing for a typical unit of 1.0 TPH is furnished in Table 1.2 below:

Table 1.2: Specific energy consumption for a typical unit (M/s Kothari Rice Mill)

S. No.	Type of energy	Units	Specific Energy Consumption
1	Electricity	kWh/ton of production	14

1.3 Existing technology/equipment

1.3.1 Description of existing technology

More than 60% of the rice mills are old more than 15 years and these industries has installed old cone polishers. The rice mills have either one or two cones and are driven by separate motors or common drive shaft system. The present cone polishers has the following disadvantages w.r.t. quality, and productivity

- Low polishing or whitening due to abrasive polishing and hence low price for the finished rice in the market
- Low yield of rice per ton of paddy processing than the whiteners
- Needs regular polishing of the wheels and high maintenance costs
- Low quality and less market demand for the cone polisher rice

The existing cone polisher's technical specifications and operating parameters are furnished in Table 1.3 below:

Table 1.3 Existing Whitener Specifications

S.No	Details	Whitener
1	Make	Local make and no name plate details
2	Year	
3	Processing Capacity	1 TPH
4	Power Consumption	---
5	No. of hours of operation	8 hours

1.3.2 Its role in the whole process

White rice is produced from brown rice by removing the bran layer and the germ in the cone polishers. The bran layer is removed from the kernel by applying friction to the grain surface either by rubbing the grains against an abrasive surface or against each other. The amount of bran removed is normally between 8-10% of the total paddy weight but this will vary according to the variety and degree of whiteness required. The process used to whiten brown rice can be classified as either abrasive. Either one or two cone polishers are installed depending on the requirement of polishing and paddy processing capacity.

1.4 Establishing the baseline for the equipment to be changed

1.4.1 Design and operating parameters

The rice produced in cone polishers will have low polish and quality of the rice is also poor. Further, the yield of rice is also low due to old and inferior design of the cone polishers. The market price for rice produced in the cone polishers is also low than the rice produced in the latest whiteners available in the market. The demand for rice produced in cone polishers is also low due to low quality of rice.

Based on the detailed discussions had various rice mill owners, it is observed about ` 10 to ` 15 per quintal for the rice has more for the rice produced in latest whiteners than rice produced in cone polishers. The cone polishers are operated for about 8 hours to 10 hours in a day. The annual paddy processing in cone polishers is 2000 tons.

1.4.2 Paddy processing capacity, actual production and rice cost

The paddy processing capacity, actual production and rice cost produced in cone polishers of three typical units having 1.0 TPH paddy processing capacity are furnished below in table 1.4 below:

Table 1.4 Power consumption of three typical units in Whiteners

S. No	*Name of the unit*	*Production capacity (TPH)*	*Actual Production per annum (tons)*	*Rice cost per kg*
1	Kothari Rice Mill	1.0	2000	28.00 (fine rice)
2	Ambika Rice Mill	1.0	1680	28.00 (fine rice)
3	Jagnath Rice Mill	1.0	1680	18.00 (FCI Levy)

1.4.2 Quality, Yield and Productivity of the existing system

The detailed technology audit studies had been undertaken in various units of the cluster to evaluate the quality of rice, yield, and market price of rice produced in the cone polisher's w.r.t. polishing of rice in latest whiteners available in the market. Based on the studies undertaken, the cone polishers installed in cluster units are very old and the quality of rice produced is low and hence low market price for the product i.e., further, the rice yield per ton of paddy processing is also compared with latest whiteners and hence more generation of broken rice and monetary loss to the unit owners.. Only very few units are replaced the cone polishers with whitener.

1.5 Barriers for adoption of new and energy efficient technology / equipment

1.5.1 Technological Barriers

No major technical barriers identified for replacing cone polishers.

1.5.2 Financial Barrier

The replacement of cone polishers with new whiteners requires high initial investment. Hence, many of the owners don't show interest for implementation. Though, the rice mill

owners are aware of the quality, yield, and market price for rice produced in whiteners due to low financial strength of rice mill owners, the whiteners could not be taken up.

Energy Efficiency Financing Schemes such as SIDBI's, if focused on the cluster, will play a catalytic role in implementation of identified energy conservation projects & technologies.

The cluster has significant potential for implementing the whiteners by replacing cone polishers.

1.5.3 Skilled manpower

Not applicable

1.5.4 Other barrier(s)

No any other barriers

2. EQUIPMENT OPTION FOR ENERGY EFFICIENCY IMPROVEMENT

2.1 Detailed description of technology/equipment selected

2.1.1 Description of technology

The project activity is replacement of cone polishers with new whiteners for improving the rice polishing for better price for the rice.

The latest and modified whitener is newly designed and development product by improving rice polisher, mainly used in whitening the unpolished rice, meanwhile, by means of air blowing, the chaff will be blown off. The rice polisher features low mill pressure, low crushed rice rate, high rice output, small percentage of bran, the rice whiteness is improved quality and good. The machine can process various kinds of rice to desired whiteness, with excellent technical and economical effect. It's suitable for the rice mill with 1 ton per hour capacity.

Construction features:

- To use groovy emery rolls milling the rice, to use special wear-resistant roll of elasticity.
- By special design, it is not easy choking bran, suitable for high oil percentage in bran.
- Adopt rubber kicking rice roller, the crushed rice rate is lower and output is high
- According to the cargo rice, customer can combined two emery roller jet rice polisher and one iron roller jet rice polisher to get the desired whiteness.
- Each machine with a blowing motor, increase the effect of suction bran and lower the rice temperature.
- The machine is small in sizes, easy and safe to operate, and simple to maintain.

Considering the above facts and improving quality, high yield etc, it is suggested to install improved design Whitener.

2.1.2 Technology /Equipment specifications

The detailed specifications of the whitener are furnished in Table 2.1below:

Table 2.1: Proposed Whitener Specifications

S. No.	Parameter	Details
1	Make	Baba Make
2	Capacity	1.0 T/hr
3	Motor	15 HP (1no)
4	Voltage	415 V/50 Hz

2.1.3 Justification of the technology selected & Suitability

As discussed above, the cone polishers installed in the rice mills are very old. The rice produced in cone polishers is of low quality and hence low price for the product. Further, the yield of rice per ton of paddy is low and generation of broken rice is high leading to monetary loss to the rice mill owner. The cone polishers use abrasive wheels and requires regular maintenance of the cones. The latest rice polishers available in the market produce high quality rice and has good market price for the rice produced in the whiteners. Based on above facts, the cone polishers can be replaced with latest whiteners/glazers for producing quality rice for getting premium price for the rice in the market. The capacity of the whitener is similar to the existing paddy processing capacity of the cone polishers.

2.1.4 Superiority over existing technology/equipment

The following are the superior features of whiteners

1. Quality rice
2. More yield per ton of paddy processing
3. More market for the rice produced in whiteners due to fine finish of rice
4. Improved production and reduction in broken rice
5. Low operation and maintenance cost

2.1.5 Availability of the proposed technology/equipment

The suppliers are available at Hyderabad, Kakinada and Visakhapatnam. The details of the suppliers is provided in Annexure 6

2.1.6 Source of technology/equipment for the project

The source of the technology is indigenous and is locally available.

2.1.7 Service/technology providers

Details of service providers had been furnished in Annexure 6.

2.1.8 Terms of sales of the suppliers, etc.

The terms and conditions of the equipment supplier for supply of the whiteners are furnished below:

Terms & Conditions:

- 40% advance and balance payment against delivery of the materials
- Transportation and insurance is extra and is in the scope of the client
- 12 months guarantee from the date of delivery of the materials

2.1.9 Process down time during implementation

The process down time for installation whiteners is considered at one week for dismantling the cone polishers and installation of new whiteners, motors and drives, providing electrical connections to the motor, cable laying, panels and starter installation etc.

2.2 Life cycle assessment and risks analysis

The life of the Whitener is considered at 20 years. There is no risk involved as the whitener is successfully in operation in the rice mills.

2.3 Suitable unit/plant size for the identified equipment

The whitener is selected based on the existing capacity of the cone polishers and capacity can be extend upto 25% more.

3. ECONOMIC BENEFITS OF NEW ENERGY EFFICIENT TECHNOLOGY

3.1 Technical benefits

3.1.1 Fuel Saving

No fuel saving is envisaged due to proposed technology.

3.1.2 Electricity savings

The main objective of project activity is to improve the quality of the rice. As far as electricity is concern, electricity consumption in existing cone polisher and in proposed whitener machine is approximately same therefore, no electricity saving is possible.

3.1.2 Improvement in product quality

The product quality will improve to certain extent due to improved design of new whitener machine for polishing of rice.

3.1.3 Increase in production

The new whiteners will give more production than the cone polishers and also the yield per ton of paddy processing improves due to improved design and broken rice also reduces. Hence there may be considerable improvement in the production for the same duration of operation of polishers.

3.1.4 Reduction in raw material consumption

Raw material consumption will be same.

3.1.5 Reduction in other losses

There is no significant reduction of other losses.

3.2 Monetary benefits

The whiteners will improve the quality of rice and hence more price in the market. Based on the detailed studies carried out in various rice mills, it is observed that the rice produced in whiteners has better market price and is about ` 10 to ` 15 per quintal than the rice produced in cone polishers. Hence, for a typical rice mill having cone polishers and production capacity of 1.0 TPH paddy processing capacity, the monetary benefit is estimated at ` 1.40 lakh per annum for annual production of 14000 quintals of rice. Details of monetary saving are given in Annexure 2.

3.3 Social benefits

3.3.1 Improvement in working environment in the plant

As Installation of new whiteners will reduce the dust generation due to better control and hence working environment may improve.

3.3.2 Improvement in skill set of workers

The technology selected for the implementation is new and latest technology. The technology implemented will create awareness among the workforce and improves skills of the workers.

3.4 Environmental benefits

3.4.1 Reduction in effluent generation

Not applicable.

3.4.2 Reduction in GHG emission such as CO2, NOx, etc

No impact on GHG emission reduction.

3.4.3 Reduction in other emissions like SOx

No significant impact on SOx emissions.

4. INSTALLATION OF NEW ENERGY EFFICIENT EQUIPMENT

4.1 Cost of equipment implementation

4.1.1 Cost of equipments

The total cost for New whitener is estimated at ` 1.43 lakh including taxes as per the quotation provided Annexure 6.

4.1.2 Other costs

Cost included in cabling modification and commissioning is ` 0.75 lakh. Detail of project cost is furnished in Table 4.1 below:

Table 4.1: Project cost

S.No	Particular	Unit	Value
1	Whitener	` in lakh	1.43
2	Cabling, Shaft , Modifications, Commissioning etc	` in lakh	0.05
3	Total Investment	` in lakh	2.18

4.2 Arrangement of funds

4.2.1 Entrepreneur's contribution

The entrepreneur's contribution is 25% of total project cost, which works out at ` 0.54 lakh.

4.2.2 Loan amount

The term loan is 75% of the total project cost, which is ` 1.43 lakh.

4.2.3 Terms & conditions of loan

The interest rate is considered at 10.0% which is prevailing interest rate of SIDBI for energy efficiency related projects. The loan tenure is 5 years and the moratorium period is 6 months.

4.3 Financial indicators

4.3.1 Cash flow analysis

Considering the above discussed assumptions, the net cash accruals starting with ` 1.06 lakh in the first year operation and increases to ` 5.26 lakh at the end of eighth year.

4.3.2 Simple payback period

The total project cost of the proposed technology is ` 2.18 lakh and monetary savings due to reduction in electricity consumption is ` 1.40 lakh and the simple payback period work out to be 1.56 years.

4.3.3 Net Present Value (NPV)

The Net present value of the investment at 10.0% interest rate works out to be ` 3.02 lakh.

4.3.4 Internal rate of return (IRR)

The after tax Internal Rate of Return of the project works out to be 46.49%. Thus the project is financially viable.

4.3.5 Return on investment (ROI)

The average return on investment of the project activity works out at 27.26%.

4.4 Sensitivity analysis in realistic, pessimistic and optimistic scenarios

A sensitivity analysis has been worked out to ascertain how the project financials would behave in different situations like there is an increase in power savings or decrease. For the purpose of sensitive analysis, two scenarios are considered are.

- Increase in power savings by 5%
- Decrease in power savings by 5%

In each scenario, other inputs are assumed as constant. The financial indicators in each of the above situation are indicated along with standard indicators.

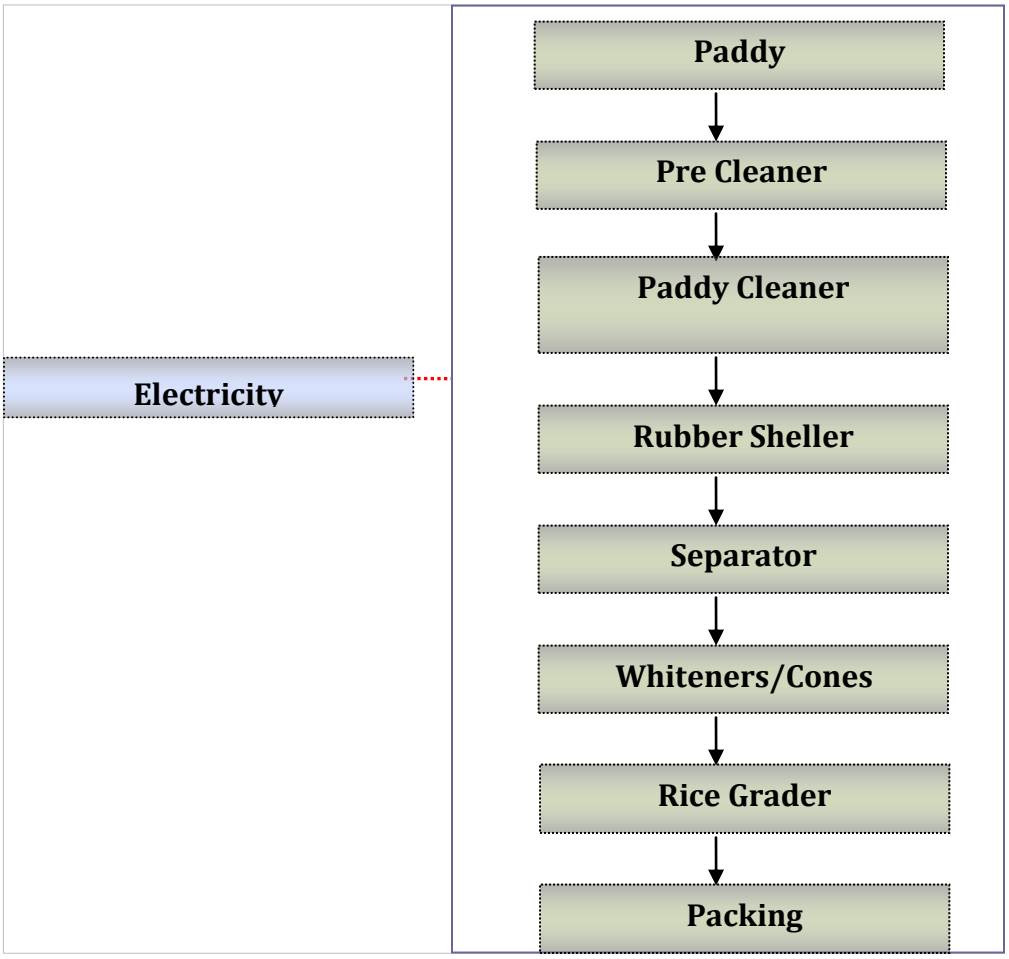
Table 4.2: Sensitivity analysis

Particulars	*IRR* %	*NPV* ` in lakh	*ROI* %	*DSCR*
Normal	46.49	3.02	27.26	2.57
5% increase in power savings	49.50	3.29	27.42	2.70
5% decrease in power savings	43.47	2.75	27.08	2.44

4.5 Procurement and implementation schedule

The project is expected to be completed in 4 weeks from the date of release of purchase order. The detailed schedule of project implementation is furnished in Annexure 4.

Annexure 1: Process flow diagram



Annexure 2: Detailed Technology Assessment Report

S.No.	Particulars	Unit	Value
1	Annual Paddy processing capacity	tons/annum	2000
2	Quantity of rice produced per annum	tons/annum	1400
3	Quantity of rice produced per annum	Quintals/annum	14000
4	Rice cost produced in cone polishers	` / quintal	2800
5	Rice cost produced in whiteners (least price)	` / quintal	2810
6	Monetary saving due to quality improvement	` / quintal	10
7	Monetary savings per annum	`(In lakh)	1.40
8	Investment required for new whiteners and motors	`(In lakh)	2.18
9	Payback period	Years	1.56

Annexure 3: Detailed Financial Calculations & Analysis

Assumption

Name of the Technology	**Whitener**		
Rated Capacity	**1 TPH**		
Details	***Unit***	***Value***	***Basis***
Installed Capacity	TPH	1.00	
Annual production	Quintal/Annum	14000	Feasibility Study
Proposed Investment			
Equipment cost	` (in lakh)	1.43	
Cabling, Civil works and Modification	` (in lakh)	0.75	
Total Investment	` (in lakh)	2.18	
Financing pattern			
Own Funds (Equity)	` (in lakh)	0.54	
Loan Funds (Term Loan)	` (in lakh)	1.63	
Loan Tenure	years	5	Assumed
Moratorium Period	Months	6	Assumed
Repayment Period	Months	66	Assumed
Interest Rate	%age	10.00%	SIDBI Lending rate
Estimation of Costs			
O & M Costs	% on Plant & Equip	4.00	Feasibility Study
Annual Escalation	%age	5.00	Feasibility Study
Estimation of Revenue			
Savings due to quality improvement	`/Quintal	10	
Production per annum	Quintal/Annum	14000	
St. line Depn.	%age	5.28	Indian Companies Act
IT Depreciation	%age	80.00	Income Tax Rules
Income Tax	%age	33.99	Income Tax

Estimation of Interest on Term Loan

` (in lakh)

Years	***Opening Balance***	***Repayment***	***Closing Balance***	***Interest***
1	1.63	0.06	1.57	0.19
2	1.57	0.12	1.45	0.15
3	1.45	0.24	1.21	0.13
4	1.21	0.36	0.85	0.11
5	0.85	0.54	0.31	0.06
6	0.31	0.31	0.00	0.01
		1.63		

WDV Depreciation **` (in lakh)**

Particulars / years	***1***	***2***
Plant and Machinery		
Cost	2.18	0.44
Depreciation	1.74	0.35
WDV	0.44	0.09

Projected Profitability **` (in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***
Fuel savings	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Total Revenue (A)	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Expenses								
O & M Expenses	0.09	0.09	0.10	0.10	0.11	0.11	0.12	0.12
Total Expenses (B)	0.09	0.09	0.10	0.10	0.11	0.11	0.12	0.12
PBDIT (A)-(B)	1.31	1.31	1.30	1.30	1.29	1.29	1.28	1.28
Interest	0.19	0.15	0.13	0.11	0.06	0.01	-	-
PBDT	1.12	1.16	1.17	1.19	1.23	1.28	1.28	1.28
Depreciation	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
PBT	1.01	1.04	1.06	1.08	1.12	1.16	1.17	1.16
Income tax	-	0.27	0.40	0.41	0.42	0.43	0.44	0.43
Profit after tax (PAT)	1.01	0.77	0.66	0.67	0.70	0.73	0.73	0.73

Computation of Tax **` (in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***
Profit before tax	1.01	1.04	1.06	1.08	1.12	1.16	1.17	1.16
Add: Book depreciation	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Less: WDV depreciation	1.74	0.35	-	-	-	-	-	-
Taxable profit	(0.62)	0.81	1.17	1.19	1.23	1.28	1.28	1.28
Income Tax	-	0.27	0.40	0.41	0.42	0.43	0.44	0.43

Projected Balance Sheet **` (in lakh)**

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***
Liabilities								
Share Capital (D)	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
Reserves & Surplus (E)	1.01	1.78	2.43	3.10	3.80	4.53	5.27	5.99
Term Loans (F)	1.57	1.45	1.21	0.85	0.31	0.00	0.00	0.00
Total Liabilities (D)+(E)+(F)	3.12	3.77	4.19	4.50	4.66	5.08	5.81	6.54

Assets	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Gross Fixed Assets	2.18	2.18	2.18	2.18	2.18	2.18	2.18	2.18
Less Accm. Depreciation	0.11	0.23	0.34	0.46	0.57	0.69	0.80	0.92
Net Fixed Assets	2.06	1.95	1.83	1.72	1.60	1.49	1.37	1.26
Cash & Bank Balance	1.06	1.83	2.36	2.78	3.06	3.59	4.44	5.28
TOTAL ASSETS	3.12	3.77	4.19	4.50	4.66	5.08	5.81	6.54
Net Worth	1.55	2.32	2.98	3.65	4.35	5.08	5.81	6.54
Debt Equity Ratio	2.89	2.67	2.23	1.57	0.57	0.00	0.00	0.00

Projected Cash Flow

` (in lakh)

Particulars / Years	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Sources									
Share Capital	0.54	-	-	-	-	-	-	-	-
Term Loan	1.63								
Profit After tax		1.01	0.77	0.66	0.67	0.70	0.73	0.73	0.73
Depreciation		0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Total Sources	2.18	1.12	0.88	0.77	0.79	0.81	0.84	0.85	0.84
Application									
Capital Expenditure	2.18								
Repayment Of Loan	-	0.06	0.12	0.24	0.36	0.54	0.31	-	-
Total Application	2.18	0.06	0.12	0.24	0.36	0.54	0.31	-	-
Net Surplus	-	1.06	0.76	0.53	0.43	0.27	0.53	0.85	0.84
Add: Opening Balance	-	-	1.06	1.83	2.36	2.78	3.06	3.59	4.44
Closing Balance	-	1.06	1.83	2.36	2.78	3.06	3.59	4.44	5.28

IRR

` (in lakh)

Particulars / months	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Profit after Tax		1.01	0.77	0.66	0.67	0.70	0.73	0.73	0.73
Depreciation		0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Interest on Term Loan		0.19	0.15	0.13	0.11	0.06	0.01	-	-
Cash outflow	(2.18)	-	-	-	-	-	-	-	-
Net Cash flow	(2.18)	1.31	1.03	0.91	0.89	0.88	0.85	0.85	0.84
IRR	46.49%								
NPV	3.02								

Break Even Point **` (in lakh)**

Particulars / Years	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
Variable Expenses								
Oper. & Maintenance Exp (75%)	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.09
Sub Total*(G)*	0.07	0.07	0.07	0.08	0.08	0.08	0.09	0.09
Fixed Expenses								
Oper. & Maintenance Exp (25%)	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03
Interest on Term Loan	0.19	0.15	0.13	0.11	0.06	0.01	0.00	0.00
Depreciation *(H)*	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Sub Total (I)	0.33	0.29	0.27	0.25	0.20	0.15	0.14	0.15
Sales (J)	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
Contribution (K)	1.33	1.33	1.33	1.32	1.32	1.32	1.31	1.31
Break Even Point (L= G/I)	24.44%	21.73%	20.56%	18.71%	15.40%	11.54%	10.97%	11.12%
Cash Break Even {(I)-(H)}	15.83%	13.11%	11.91%	10.04%	6.71%	2.82%	2.22%	2.34%
Break Even Sales (J)*(L)	0.34	0.30	0.29	0.26	0.22	0.16	0.15	0.16

Return on Investment

` (in lakh)

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***Total***
Net Profit Before Taxes	1.01	1.04	1.06	1.08	1.12	1.16	1.17	1.16	8.80
Net Worth	1.55	2.32	2.98	3.65	4.35	5.08	5.81	6.54	32.27
									27.26%

Debt Service Coverage Ratio

` (in lakh)

Particulars / Years	***1***	***2***	***3***	***4***	***5***	***6***	***7***	***8***	***Total***
Cash Inflow									
Profit after Tax	1.01	0.77	0.66	0.67	0.70	0.73	0.73	0.73	4.53
Depreciation	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.69
Interest on Term Loan	0.19	0.15	0.13	0.11	0.06	0.01	0.00	0.00	0.65
Total (M)	1.31	1.03	0.91	0.89	0.88	0.85	0.85	0.84	5.88

DEBT

Interest on Term Loan	0.19	0.15	0.13	0.11	0.06	0.01	0.00	0.00	0.65
Repayment of Term Loan	0.06	0.12	0.24	0.36	0.54	0.31	0.00	0.00	1.63
Total (N)	0.25	0.27	0.37	0.47	0.60	0.32	0.00	0.00	2.28
	5.26	3.81	2.42	1.91	1.45	2.67	0.00	0.00	2.57
Average DSCR (M/N)	2.57								

Annexure 4: Details of procurement and Implementation plan

Project Implementation Schedule

S. No	Activity	Weeks			
		1	2	3	4
1	Placement of Orders for whitener				
2	Supply of whitener				
3	Installation of whitener and motor				
4	Trial runs				

Process down time

S. No	Activity	Weeks			
		1	2	3	4
1	Dismantling of the existing cone polisher				
2	Supply of new whitener motor				
3	Installation of the whitener and connections				
4	Trial runs				

The process down time is considered for one week.

Annexure 5: Details of technology/equipment and service providers

Equipment details	*Source of technology*	*Service/technology providers*
Whitener	Indigenous	Baba Auto Mechanical works Plot no c-12/b, IDA, Uppal, Hyderabad
Whitener	Indigenous	Sree Srinivasa Enterprises 5-5-76/F-8, 1st Floor, Srinivasa Commercial Complex, Ranigunj, Secunderabad

Annexure 6: Quotations or Techno-Commercial Bids

Baba Auto Mechanical Works

Plot no: c-12/b, IDA, Uppal, Hyderabad-500 039

30 years of Excellence in customer satisfaction

TIN: 28790212598 Wednesday, November 24, 2010

NAME : ZENITH ENERGY SERVICES PVT LTD

VILLAGE : HYDERABAD

DISTRICT :

COUNTRY : ANDHRAPRADESH.

PHONE : 9502688948

We thank you for enquiry and have pleasure on Quoting as follows. We trust the same meets with you approval and look forward to receive your valued order.

QUOTATION/ PERFORMA INVOICE-AP-212

S.No.	DESCRIPTION	POWER	AMOUNT
	Sri Laxmi paddy milling machinery 1ton capacity per hour on paddy		Indian Rupees
1.	PADDY CLEANER	2HP, 1440 RPM	60000=00
2.	6" RUBBERSHELLER	5HP, 1440RPM	45000=00
3.	DE- HUSK ASPIRATOR		30000=00
4.	PADDY SEPARATOR- 3 TRAY	2HP, 960 RPM	95000=00
5.	RICE WHITENER- 4 STONE	15HP, 960RPMFLANGE	125000=00
6.	BRAN PROCESSING SYSTEM	2HP,1440RPM	40000=00
7.	SIEVE ASPERATOR	2HP, 1440 RPM	40000=00
8.	DOUBLE ELEVATOR (3 HEIGHTS)	1HPx3NO1440RM	144000=00
	TOTAL		**579000=00**
	VAT @	4%	**23560**
	TOTAL		**602160=00**

NOTE: THE ABOVE MENTIONED MACHINERY ARE WITHOUT ELECTRICAL MOTORS AND PANEL BOARD

NOTE: ERECTION CHARGES EXTRA WILL BE CHARGED, TRANSPORT AND TRANSIT INSURANCE EXTRA

Customer's signature *For Baba Auto Mechanical Works*

Authorized Signature

Manufacturers of *Sri Laxmi* Brand Modern Rice mill machinery
FIND US: www.srilaxmiengineers.com , www.babaauto.com, Email:babaautomechanicalworks@gmail.com
Contact us: +91-40-27207565(0ff phone & Fax), +91-9440050172, +91-9246150172(mobile)
OUR BANKERS: BANK OF INDIA, AZAMABAD BRANCH, CC A/C NO: 862630100033001
STATE BANK OF INDIA, RAMANTHAPUR BRANCH, CURRENT A/C NO: 30281208834

Baba Auto Mechanical Works

Plot no: c-12/b, IDA, Uppal, Hyderabad-500 039

REQUIRED MOTORS:-

PADDY CLEANER	2HP,960 RPM
PADDY PRE CLEANER	2HP ,1440 RPM
PNEUMATIC RUBBER SHELLER	10 HP, 1440 RPM
HUSK ASPERATOR	3 HP 1440 RPM
PADDY SEPARATOR	2 HP, 960 RPM
RICE WHITENER	25 HP, 960RPM (FLANGE)
GLAZE MASTER	20HP, 960RPM
AIR LOCK SYSTEM (ELECTRICAL MOTORS ARE SUPPLIED FOR AIR LOCK SYSTEM)	10HP, 2800, 1 HP ROTARY VALVE, 2HP, 1440RPM
100x5 PLAIN SIFTER (ELECTRIC MOTORS FOR PLAIN SIFTER ARE SUPPLIED)	1.5HP, 1440RPM,1 HP 2800 RPM
6"DOUBLE ELEVATORS	4nos x1HP, 1440 RPM
6"SINGLE ELEVATOR	1HP, 1440 RPM
AIR COMPRESSOR(10 KG PRESSURE)	2HP 1440 RPM

Note: 2 HP BLOWERS SUPPLIED WITH THE MACHINERY APART FROM THE ABOVE LIST

GENERAL TERMS AND CONDITIONS

THE PRICE	The confirmation of price is exclusive of electrical, packing, forwarding. Transit insurance, transportation, erection & trial run etc.
TAXES & DUTIES	TIN / CST Excise and other Govt. Levies Extra as applicable at the time of Delivery
FIRM ORDER	(a) The price confirmation is valid for the Firm order only (b) 40 % of the value as advance is treated as firm order; payment should be made in the form of demand draft of cheque only (c) in case, if the customer fails to pay 40% within in two weeks from the date of order the price confirmed is not valid and the rates will be applicable as the time at the time of delivery
DELIVERY ('X' GODOWN)	Delivery will be effective within 2 to 3 weeks from the date of receipt of full payment (a) For inter state transaction, 'C' Forms should be arranged (b) Customer should arrange their TIN / CST Registration certificate for effective delivery (c) Company is not responsible for the delay in delivery schedule effect by natural calamities strikes lock – outs, shortage of raw materials and power – cuts etc.
TERMS & PAYMENT	Balance payment should be arranged before the delivery of the machinery.
RISK IN TRANSIT	Company is not responsible for the loss or damage of goods of their documents in transit.
CANCELLATION NOTE	Orders once placed will not be cancelled, ALL THE LEGAL MATTERS ARE SUBJECT TO HYDERAABAD JURISDICTION ONLY

I / We accept all the above terms & conditions

Customer's signature

For Baba Auto Mechanical Works

Authorized signature

Manufacturers of *Sri Laxmi* Brand Modern Rice mill machinery
FIND US: www.srilaxmiengineers.com , www.babaauto.com, Email:babaautomechanicalworks@gmail.com
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