

DETAILED PROJECT REPORT
ON
IMPROVED HANDLING/STORAGE OF PET COKE IN MEDIUM
UNITS
(JODHPUR LIMESTONE CLUSTER)



Bureau of Energy Efficiency (BEE)

Prepared By



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**IMPROVED HANDLING/STORAGE OF PET COKE FOR
MEDIUM UNITS**

JODHPUR LIMESTONE CLUSTER

BEE, 2011

Detailed Project Report on Pet coke handling and storage to avoid fuel wastage (Medium size)
units

Limestone SME Cluster, Jodhpur (Rajasthan) (India)

New Delhi: Bureau of Energy Efficiency

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We have received very encouraging feedback for the BEE SME Program in various SME Clusters. Therefore, it was decided to bring out the DPR for the benefits of SMEs. We sincerely thank the officials of BEE, Executing Agencies and ISTSL for all the support and cooperation extended for preparation of the DPR. We gracefully acknowledge the diligent efforts and commitments of all those who have contributed in preparation of the DPR.

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List of Abbreviations

BEE	Bureau of Energy Efficiency
SME	Small and Medium Enterprises
DPR	Detailed Project Report
GHG	Green House Gases
NG	Natural Gas
CDM	Clean Development Mechanism
DSCR	Debt Service Coverage Ratio
NPV	Net Present Value
IRR	Internal Rate of Return
ROI	Return on Investment
WHR	Waste Heat Recovery
SCM	Standard Cubic Meter
MT	Metric Tonne
SIDBI	Small Industries Development Bank of India

EXECUTIVE SUMMARY

CII – AVANTHA Centre for Competitiveness for SMEs, one of the Centre of Excellence of Confederation of Indian Industry (CII) is executing BEE - SME Program in Jodhpur Lime Stone Cluster, supported by Bureau of Energy Efficiency (BEE) with an overall objective of improving the energy efficiency in cluster units.

Jodhpur Lime Stone cluster is one of the largest Lime clusters in India; accordingly this cluster was chosen for energy efficiency improvements by implementing energy efficient measures / technologies, so as to facilitate maximum replication in other Lime Stone units in India.

The main energy forms used in the cluster units are Pet coke and grid electricity. In Lime Stone units, pet coke bill is about 80% of total plant energy bill and rest is of electricity. Pet coke is used as fuel in kiln for getting quick lime from raw lime stone.

The limestone industry in Jodhpur region stocks the pet coke to avoid the uncertainties related to unavailability and transportation of fuel. Hence industry has to deal with disadvantages associated with stocking of pet coke i.e. build up inventory, space constraints, deterioration in quality of fuel, potential fire hazards and carpet loss of fuel.

It was observed that pet coke is stored in open space on ground, which leads to substantial volume of carpet loss of fuel. For a large scale unit with an annual production of about 7,500 MT of quick lime per year an yearly saving of about 1% (i.e. Rs.0.95(Lakh)/Annum) in cost of pet coke can be achieved by avoiding carpet losses of per coke.

This DPR studies in detail the proposal for proper handling and storage of pet coke to avoid fuel wastage for a typical medium size unit.

The total investment, debt equity ratio for financing the project, monetary savings, Internal rate of return (IRR), Net present value (NPV), Return on investment (ROI) etc for implementing insulation over kiln is furnished in Table below.

Template: Financials for BEE projects		
Name of Project	Replacement of Old and Inefficient motors	
	Units	Value
Project Cost	Rs(Lakhs)	1.5
Saving Potential	Rs(Lakhs) per year	10.95
IRR	%	36.0
NPV	Rs(Lakhs)	1.03
ROI	%	161
Simple payback period	Months	19

The projected profitability and cash flow statements indicate that the project implementation will be financially viable and technically feasible.

ABOUT BEE'S SME PROGRAM

Bureau of Energy Efficiency (BEE) is implementing a BEE-SME Programme to improve the energy performance in 25 selected SMEs clusters. Jodhpur Lime Stone 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:

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.

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 of energy efficiency projects in the clusters

Implementation of Energy Efficiency Measures

To implement the technology up gradation projects in 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.

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.

1.0 INTRODUCTION

1.1 Brief Introduction about Cluster

Jodhpur SME Cluster is one of the largest Lime stone clusters in India, which is famous for manufacturing of hydrated lime. Jodhpur limestone cluster is well connected by rail, road and air ways. The nearest airport is at Jodhpur, which is 15 KM from Jodhpur by road.

There are approximately 100 lime stone units in this cluster which are engaged in manufacturing of hydrated lime.

Table1.1: Details of Energy Consumption at Jodhpur Cluster

S.No	Type of fuel	Unit	Value	Contribution in Equivalent Energy Term (%)
1	Pet coke	MT/year	1200	75
2	Electricity	kWh/year	120000	25

Energy Usage Pattern

Average monthly electricity consumption in lime stone units ranges from 1 lakh to 2 lakh kWh depending on the size of the plant. In thermal energy, solid fuel pet coke is used in kiln in all plants. Solid fuel consumption (Petcock) in kiln varies from 500 MT/ year to 2500 MT / year of hydrated lime production. On an average 3 MT of Pet coke is used to get 15 MT of quick lime.

Classification of Units

The Lime stone cluster units can be categorized into following four types based on production capacity

- 1) Large Scale Units
- 2) Medium Scale Units
- 3) Small Scale Units

Production wise Unit Breakup

Jodhpur Lime Stone cluster can be broken into three categories viz. small, medium and large size unit. Table 1.2 shows that production wise breakup of Lime stone cluster.

Table 1.2 Production wise Unit breakups

Type of Unit	Number of units	Production range (MT)
Small Scale unit	10-15	Less than 5000
Medium Scale Unit	65-70	5000-15000
Large Scale Unit	2-5	More than 15000

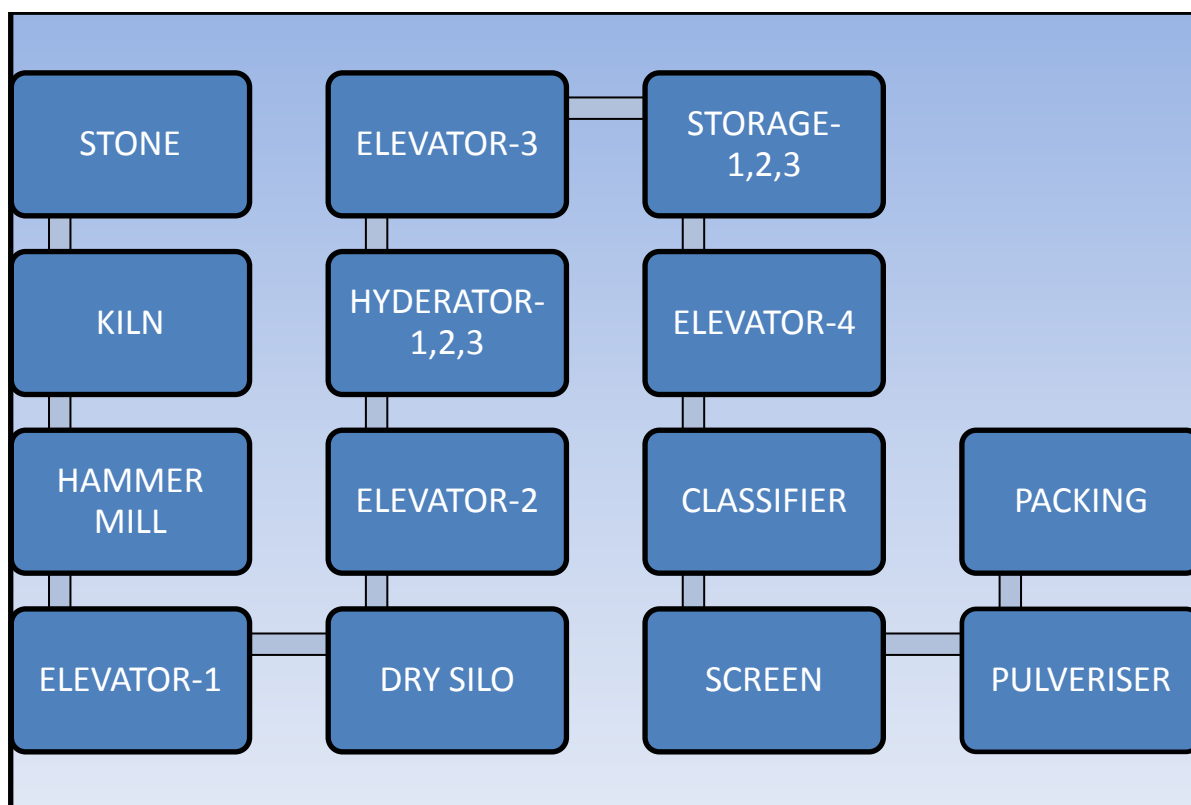
Two types of products are manufactured in Jodhpur SME cluster are as shown in Table 1.3 below.

Table 1.3 Products Manufactured

S.No	Type of Product	Units
1	Hydrated Lime	50-55
2	Quick Lime	10-15

Production Process of Hydrated lime

Figure 1.1 Process Flow Diagram of Hydrated Lime



Hydrated Lime Production

In lime stone industry kiln is major consumer of energy. Conventionally it is done in direct flame to fire the products. Kiln is batch type kiln, where raw material is fed from top side and at bottom after 12-13 hrs finished product (quick lime) is taken out.

Raw product undergoes loading section, combustion zone, cooling zone and then under loading section. Material movement is by gravity. Kiln is constructed with refractory and insulating bricks. Lime Stone cluster units in Jodhpur region producing large quantity of quick lime and hydrated lime.

Lime stone cluster in Jodhpur is spread across a large number of small companies, each company comprises of about 1 to 5 number of production units. Capacity of company varies from 15TPD to about 75TPD.

A Kiln is major energy consumer in the process of Hydrated lime production. Each kiln in the cluster is about 35 feet long, and its internal diameter is 8.5 feet to 10 feet. The kiln lining is made of refractory material bricks, and in between the refractory material bricks and the fire brick, there is a layer of high strength heat insulating yellow sand.

1.2 Energy Performance in Existing Situation

1.2.1 Average Production

Annual production in typical unit in Jodhpur Lime Stone cluster is given in Table 1.4 below:

Table 1.4 Annual productions from a typical unit

Type of Unit	Number of units	Production range (MT)
Small Scale unit	10-15	Less than 5000
Medium Scale Unit	65-70	5000-15000
Large Scale Unit	2-5	More than 15000

Energy consumption (both electrical and thermal) in a typical lime stone plant for different types of products is given in Table 1.5.

Table 1.5: Annual Energy Consumption for Kilns

Type of Kiln	Energy type Used	Running Hrs/Day	Production Capacity	Fuel Consumption/Day	Specific Energy Consumption/Ton Quicklime	Specific Energy Consumption in Rupees
Vertical Shaft	Pet Coke	Continuous	15T Quicklime Lime/ day	2.5-3.0 MT Pet coke	0.2 MT Pet coke/T Quicklime	Rs 1.44/Kg of Quick lime

For production of hydrated lime, apart from pet coke electricity energy is also used. Mainly Electricity is used for running hydrator, hammer, Classifier, elevators, blowers, rollers & conveyers of the kiln etc.

Table 1.6 Specific Energy Consumption for Crushing & Hydration motors

Type of process	Energy type Used	Running Hrs/Day	Production Capacity	Electricity Consumption	Specific Energy Consumption/Ton Hydrated Lime	Specific Energy Consumption in Rupees
Crushing & Hydration	Electricity	8 to 10	18T Hydrated Lime/ day	250 -270 KWh	14-16 Kwh	Rs 75.0

1.2.2 Specific Energy Consumption

Pet coke consumption in Kiln is in the range of 2.5 – 3.0 Tonnes to produce around 15 Tonnes of quick lime. So, based on the lime output from Kiln, Specific energy consumption is coming around 0.2 Tonnes of Reliance pet coke (@ 7400 Kcal/kg)/T of quick lime produced.

Specific energy consumption of Lime stone units depends upon the production capacity & their corresponding power consumption. Units of Jodhpur are having Specific energy consumption for electrical motors are in range of 14-16 kWh/MT of hydrated lime produced.

1.3 Proposed Technology/Equipment

1.3.1 Description of existing Technology/situation

In Lime Stone units, pet coke bill is about 80% of total plant energy bill and rest is of electricity. Pet coke is used as fuel in kiln for getting quick lime from raw lime stone. Kiln is mainly used for baking of the raw lime stone. Inside temperature at firing zone of kiln is maintained at 1000 to 1200^o C.

The limestone industry in Jodhpur region stocks the pet coke to avoid the uncertainties related to unavailability and transportation of fuel. Hence industry has to deal with disadvantages associated with stocking of pet coke i.e. build up inventory, space constraints, deterioration in quality of fuel, potential fire hazards and carpet loss of fuel.

It was observed that pet coke is stored in open space on ground, which leads to substantial volume of carpet loss of fuel. Under current situation large scale unit with an annual production of 12,000 to 15,000 MT of quick lime per year are incurring an yearly loss of about 2 to 3% (i.e. Rs.4.0(Lakhs)/Annum) on the cost of pet coke .

1.3.2 Role in Process

Pet coke is used as fuel in kiln for extracting quick lime from raw lime stone .Role of Kiln is to bake the lime stone, to get quick lime products and deliver the finished products. Final quality of product depends on the firing temperature and cycle time of kiln. In kiln, final moisture is removed and heating at higher temperature imparts strength to the quick lime.

1.4 Benchmarking for Existing Specific Energy Consumption

Pet coke is a major fuel in lime stone industry in Jodhpur region. To avoid the uncertainties related to unavailability and transportation of fuel a large quantity of pet coke is stored in open atmosphere. Storage of pet coke in open leads to losses due to oxidation, wind and carpet losses. A 1% oxidation of coal has the same effect as 1% ash in coal, wind losses may account for 0.5 to 1.0 % of the total loss. Carpet losses may account for 1.5 to 2.0 % of total losses.

Specific energy consumption of Lime stone units depends upon the production capacity & their corresponding power consumption. Units of Jodhpur are having Specific energy consumption in range of 14-16 kWh/MT of hydrated lime produced.

A unit wise financial estimation of losses due to carpet loss of pet coke and specific energy consumption of a sample lime stone unit is described in annexure-1

1.4.1 Operating efficiency Analysis

With implementation of proposed recommendation there will be a reduction of pet coke loss by 1.0 to 1.5 % of the total pet coke consumed.

1.5 Barriers in Adoption of Product Technology/Equipment

1.5.1 Technological Barrier

- In Jodhpur Lime Stone cluster, overall technical understanding on lime stone manufacturing is good and rapidly increasing, however awareness and information about the new and emerging energy efficiency technologies available in market is less.
- In this cluster there is lack of leadership to take up the energy efficiency projects.
- The majority of the limestone plant owners are only concern about their production instead on efficiency improvement.
- Dependence on local equipment suppliers for uninterrupted after sales service

1.5.2 Financial Barrier

- Implementation of the proposed project activity requires considerable investment of 1.5 lakhs, which is a significant investment and not commonly seen in the cluster for energy efficiency.
- The majority of the unit owners are of the view that it makes business sense for them to invest in enhancing production capacity rather than making investment in energy efficiency.

- The unit owners in the cluster are wary of approaching banks for financial assistance due to their old perception that getting loan sanctioned from Banks involves lot of paper work / documentation and needs collateral security.

1.5.3 Skilled Manpower

In Jodhpur Lime Stone cluster, the availability of skilled manpower is one of the limitations, this issue gets further aggravated due to more number of lime stone units as compared to the availability of skilled manpower.

2.0 PROPOSED TECHNOLOGY

2.1 Detailed Description of Technology

2.1.1 Description of Technology

The main energy forms used in the cluster units are Pet coke and grid electricity. In Lime Stone units, pet coke bill is about 80% of total plant energy bill and rest is of electricity. Pet coke is used as fuel in kiln for getting quick lime from raw lime stone.

The limestone industry in Jodhpur region stocks the pet coke to avoid the uncertainties related to unavailability and transportation of fuel. Hence industry has to deal with disadvantages associated with stocking of pet coke i.e. build up inventory, space constraints, deterioration in quality of fuel, potential fire hazards and carpet loss of fuel.

It was observed that pet coke is stored in open space on ground, which leads to substantial volume of carpet loss of fuel. For a large scale unit with an annual production of about 7,500 MT of quick lime per year an yearly saving of about 1% (i.e. Rs.0.95(Lakhs)/Annum) in cost of pet coke can be achieved by avoiding carpet losses of per coke.

The measures that will help in reducing the carpet losses are as follows:

- 1: Preparing a hard ground for pet coke to be stacked upon.
- 2: Preparing standard storage bays out of concrete and brick. In process Industry, modes of pet coke handling range from manual to conveyor systems.
- 3: It would be advisable to minimize the handling of coal so that further generation of fines and segregation effects are reduced.

2.1.2 Suitability of Existing Technology

At present Limestone industry in Jodhpur region is stocking the pet coke in open space, due to this they have to face disadvantages related to fuel storage in open.

After implementing the proposed system for pet coke handling. Lime stone industry can avoid losses due to open storage of pet coke and hence can save substantial amount of cost on fuel.

This technology has been selected for the following reasons:

- It reduces the pet coke loss due to oxidation, wind and carpet losses.
- This will avoid deterioration in quality of fuel due to oxidation.
- This will avoid potential fire hazards.
- Technology is easily available and proven.

2.1.3 Superiority over Existing Technology

After implementation of the proposed system for pet coke handling, the Lime stone industry can avoid losses due to open storage of pet coke and hence can save substantial amount of cost on fuel. Thus it improves performance of existing system.

2.1.4 Availability of Technology

Service providers of this project are available at Jodhpur itself. Even many of the vendors are trying to personally visit the units to tell the unit owners about the savings achieved by proper handling and storage of pet coke.

2.1.5 Source of Technology

This Technology is already used in many of the industries and savings have been already achieved. This technology is very common and easy to implement. It reduces the fuel loss and hence improves the specific energy consumption of the unit.

2.1.6 Terms and Conditions in Sales of Equipment/ Technology

There are no complicated terms and conditions for the implementation of technology.

2.1.7 Process down Time during Implementation

Processes break down not required.

2.1.8 Life Cycle Assessment

Life cycle of this proposed insulation improvement project is about 12 to 15 years provided it periodic repair and maintenance work are carried over by the plant O&M team.

2.1.9 Suitable Unit for Implementation of Proposed Technology

In Jodhpur, there are around 100 Lime stone units. All the units with pet coke storage in open can go for this project.

3.0 ECONOMIC BENEFITS FROM PROPOSED EQUIPMENT

3.1 Technical Benefits

3.1.1 Fuel Saving

Energy & Monetary savings because reduction in fuel loss due to carpet losses in a typical lime stone cluster with production capacity of about 7,500 MT per year are presented in this chapter. A typical unit with above mentioned capacity will have a saving potential of about Rs.0.95 (Lakhs)/Annum in the cost of pet coke.

3.1.2 Electricity Saving

No electricity savings are considered in the proposed technology because it is not reducing the electricity consumption in the kiln.

3.1.3 Improvement in Product Quality

Product quality achieved would be same as the present quality. It does not have any impact in improving the quality of the product. However it improves the overall specific energy consumption of the unit.

3.1.4 Increase in Production

The proposed technology does not contribute to any improvement in production.

3.1.5 Reduction in Raw Material Consumption

Raw material in the form of fuel (Per coke) consumption will be reduced by 1% after the implementation of the proposed project.

3.1.6 Reduction in Other Losses

Implementation of this project will have no substantial effect on other loss reduction.

3.2 Monetary Benefits

Annual monetary savings due to proper fuel handling and storage is 0.95 lakh per year. Energy & monetary benefit analysis for the proposal are shown in Table 3.1 below:

Table 3.1 Energy and Monetary Benefit due to Project Implementation

S.No.	Particulars	Unit	Existing situation	Proposed situation
1	Production capacity of facility	MT/year	5000 to 12000	5000 to 12000
2	Saving in pet coke loss	%	-	1%
3	Cost of Pet coke	Rs/MT	7000	
	Specific cost of pet coke for per unit of production	Rs/MT of production	1280	
4	Monetary Saving	Rs (lakh/year)	-	0.95

3.3 Social Benefits

3.3.1 Improvement in Working Environment in the Plant

Implementation of this project will result in the loss in pet coke due to oxidation, wind and carpet loss hence improving working environment.

3.3.2 Improvement in Workers Skill

The working skills of persons will definitely improve with improvement in working conditions.

3.4 Environmental Benefits

3.4.1 Reduction in Flue Gas Generation

Implementation of this project will have no effect on reduction in flue gas generation.

3.4.2 Reduction in GHG Emission

Implementation of this project will have no effect on reduction in flue gas generation.

4.0 IMPLEMENTATION OF PROPOSED EQUIPMENT

4.1 Cost of Equipment Implementation

4.1.1 Equipments Cost

Cost of project is about 1.5 Lakhs. This includes the EPC cost.

4.1.2 Erection & Commissioning and other Miscellaneous Cost

Erection & commissioning cost is 0.125 Lakh which includes services, manpower cost work, etc, Lakh and other misc. cost is 0.125 Lakh.

Table 4.1 Details of Proposed Equipment Installation Cost

S.No	Description	Units	Values
1	Material cost	(Lakhs)	1.25
2	Erection and Commissioning cost	(Lakhs)	0.125
3	Miscellaneous Cost	(Lakhs)	0.125
4	Total cost	(Lakhs)	1.5

4.2 Arrangements of Funds

4.2.1 Entrepreneur's Contribution

Entrepreneur will contribute 25% of the total project cost which is 0.375 lakh.

4.2.2 Loan Amount

Remaining 75% cost of the proposed project will be funded by bank which is 1.125 lakh.

4.2.3 Terms & Conditions of Loan

The interest rate is considered at 10% which is SIDBI's rate of interest for energy efficient projects. The loan tenure is 5 years excluding the moratorium period of 6 months from the date of first disbursement of loan.

4.3 Financial Indicators

4.3.1 Cash Flow Analysis

Profitability and cash flow statements have been worked out for a period of 5 years. The financials have been worked out on the basis of certain reasonable assumptions, which are outlined below.

The project is expected to achieve monetary savings of Rs. 0.95 lakh per annum.

- The Repair and Maintenance cost is estimated at 5% of cost of total project with 5% increase in every year as escalations.
- Interest on term loan is estimated at 10%.
- Depreciation is provided as per the rates provided in the companies act.

Based on the above assumptions, profitability and cash flow statements have been prepared and calculated in Annexure-4.

4.3.2 Simple Payback Period

The total project cost of the proposed technology is 1.5 lakhs and monetary savings due to reduction in fuel consumption is Rs.0.95 lakh hence, the simple payback period works out to be 1.6 years.

4.3.3 Net Present Value (NPV)

The Net present value of the investment at 12% works out to be 1.03 Lakhs

4.3.4 Internal Rate of Return (IRR)

The after tax Internal Rate of Return of the project works out to be 36%. 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 161%.

Table 4.2 Financial Indicators of Proposed Technology

S. No	Description	Units	Values
1	Simple Payback	Months	19
2	NPV	Rs. In Lakh	1.03
3	IRR	%	36
4	ROI	%	161

4.4 Sensitivity Analysis in Realistic, Pessimistic and Optimistic Scenarios

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

- **Optimistic scenario (Increase in fuel savings by 5%)**

- **Pessimistic scenario (Decrease in fuel savings by 5%)**

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

Table 4.3 Sensitivity Analysis on Fuel Saving

Scenario	Monetary Benefit(Rs Lakh/year)	IRR (%)	NPV(in Lakh)	NPV
Pessimistic	0.9	33.4	0.89	20
Base	0.95	36.9	1.03	19
Optimistic	1.0	40.4	1.12	18

4.5 Procurement and Implementation Schedule

Procurement and implementation schedule required for implementation of this technology is about 6 weeks and 4-5 weeks required as a process break down. Details of procurement and

Implementation schedules are shown in Table 4.4 below and in Annexure 6 also.

Table 4.4 Procurement and Implementation Schedule

S. No.	Activities	Weeks					
		1	2	3	4	5	6
1	Identification of Pet coke wastage due to wind and carpet loss.	■					
2	Planning and material order for construction		■				
3	Procurement		■	■			
4	Construction and storage				■	■	■

ANNEXURES

Annexure -1: Energy audit data used for baseline establishment

Financial loss due to Carpet loss of Pet coke			
Specific pet coke cost(Rs/MT)			1280
Unit	Capacity (MT/Year)	Loss of fuel due to carpet loss.	Financial loss(Rs Lakhs /Year)
Large	12000-15000	1.5%	2.304
Medium	5000-12000	1.5%	1.44
Small	Up to 5000	1.5%	0.768

Specific Energy Consumption of a sample Lime stone units

Type of Kiln	Energy type Used	Running Hrs/Day	Production Capacity	Fuel Consumption/Day	Specific Energy Consumption/Ton Quicklime	Specific Energy Consumption in Rupees
Vertical Shaft	Pet Coke	Continuous	15T Quicklime Lime/ day	2.5-3.0 MT Pet coke	0.2 MT Pet coke/T Quicklime	Rs 1.44/Kg of Quick lime

Annexure -3: Detailed Technology Assessment Report

Savings by avoiding Carpet loss for Pet coke			
Specific pet coke cost(Rs/MT)			1280
Unit	Capacity (MT/Year)	Saving (%)	Financial loss(Rs Lakhs /Year)
Large	12000	1%	1.5
Medium	7500	1%	0.95
Small	4000	1%	0.5

Annexure -4: Detailed Financial Calculations & Analysis

Assumptions		
Commercial Inputs	Units	Value
Required Investment(cost of Equipment+ EPC cost+ Misc. cost)	Rs(Lakhs)	1.80
O&M cost (5% of equipment cost)	Rs(Lakhs)	0.075
Acceleration in O&M cost per year	%	5%
Debt/Equity ratio		3 to1
Debt component of Investment	75%	1.35
Equity component of investment	25%	0.45
Interest on term loan	%	10%
Loan tenure	Years	4
Moratorium period	Months	6
Depreciation rate (Companies act)	%	5.28%
Depreciation rate (IT act)	%	80%
Income tax rate	%	33.99%

PROFITABILITY & IRR Calculations						
Particulars/ Years		1	2	3	4	5
Revenue						
Total saving	Rs(Lakhs)	0.95	0.95	0.95	0.95	0.95
Expenditure						
O&M Expenditure	Rs(Lakhs)	0.08	0.08	0.08	0.09	0.09
Interest on term loan	Rs(Lakhs)	0.13	0.10	0.06	0.02	0.00
Book depreciation	Rs(Lakhs)	0.08	0.08	0.07	0.07	0.06
Total expenses		0.29	0.26	0.22	0.18	0.15
PBT	Rs(Lakhs)	0.66	0.69	0.73	0.77	0.80
Tax		0.00	0.26	0.27	0.28	0.29
PAT		0.66	0.44	0.47	0.49	0.51

Cash Flow Statement						
		1	2	3	4	5
PAT		0.66	0.44	0.47	0.49	0.51
Add: Depreciation		0.08	0.08	0.07	0.07	0.06
Add: Interest		0.13	0.10	0.06	0.02	0.00
Net cash In flow		0.88	0.61	0.60	0.58	0.57
Net cash out flow		-1.80				
Net cash flow		-0.93	0.61	0.60	0.58	0.57
	-1.8	0.88	0.61	0.60	0.58	0.57
IRR	26%					
NPV	0.71					
ROI	132.9%					

Cash statement						
		1	2	3	4	5
Source						
Equity	0.45					
Loan	1.35					
PAT		0.66	0.44	0.47	0.49	0.51
Depreciation		0.08	0.08	0.07	0.07	0.06
Total	1.80	0.74	0.51	0.54	0.56	0.57
Application						
Capital expenditure	1.8					
Loan repayment		0.13	0.10	0.06	0.02	0.00
Total	1.8	0.13	0.10	0.06	0.02	0.00
Net surplus	0.00	0.61	0.41	0.47	0.53	0.57
Add: Opening balance	0		0.61	1.02	1.50	2.03
Closing balance	0	0.61	1.02	1.50	2.03	2.60

Tax calculation						
		1	2	3	4	5
PBT	Rs(Lakhs)	0.66	0.69	0.73	0.77	0.80
ADD: Book depreciation		0.08	0.08	0.07	0.07	0.06
SUB: IT Depreciation		1.20	0.02	0.02	0.01	0.01
PBT&D		-0.46	0.75	0.79	0.82	0.85
Tax		0.00	0.26	0.27	0.28	0.29

Loan payment schedule							
YEARS	QUARTERS	BALANCE AT THE BEGINNING OF QUARTER	QUARTER INTEREST	QUARTER'S PRINCIPAL PAYMENT	BALANCE AT THE END OF QUARTER	ANNUAL PRINCIPAL PAYMENT	ANNUAL INTEREST PAYMENT
1	1	1.35	0.03	0.00	1.35	0.19	0.13
	2	1.35	0.03	0.00	1.35		
	3	1.35	0.03	0.10	1.25		
	4	1.25	0.03	0.10	1.16		
2	1	1.16	0.03	0.10	1.06	0.39	0.10
	2	1.06	0.03	0.10	0.96		
	3	0.96	0.02	0.10	0.87		
	4	0.87	0.02	0.10	0.77		
3	1	0.77	0.02	0.10	0.68	0.39	0.06
	2	0.68	0.02	0.10	0.58		
	3	0.58	0.01	0.10	0.48		
	4	0.48	0.01	0.10	0.39		
4	1	0.39	0.01	0.10	0.29	0.39	0.02
	2	0.29	0.01	0.10	0.19		
	3	0.19	0.00	0.10	0.10		
	4	0.10	0.00	0.10	0.00		

Depreciation schedule						
Depreciation as per companies act	1	2	3	4	5	
Value of machine at the beginning of year	1.50	1.42	1.35	1.27	1.21	
Depreciation	0.08	0.08	0.07	0.07	0.06	
Net value at the end of year	1.42	1.35	1.27	1.21	1.14	
Depreciation as per IT act	1	2	3	4	5	
Value of machine at the beginning of year	1.50	0.30	0.28	0.27	0.25	
Depreciation	1.20	0.02	0.02	0.01	0.01	
Net value at the end of year	0.30	0.28	0.27	0.25	0.24	

Annexure -5: Procurement and Implementation Schedule

S. No.	Activities	Weeks					
		1	2	3	4	5	6
1	Identification of Pet coke wastage due to wind and carpet loss.						
2	Planning and material order for construction						
3	Procurement						
4	Construction and storage						

Annexure -6: Break-up of Process down Time

Processes break down not required

Annexure -7: Details of Technology Service Providers

S.No	Name of Company	Contact person	Contact Details	Address
1	Sark Enterprises	Mr.R.K.Goel	+91-9829020271	B-10,Agarwal Colony

Annexure -8: Details of quotation for fuel handling and storage

Sark Enterptises

Contractors and suppliers

B-10, Agarwal colony

Ratanada,

Jodhpur.

Mob-98290-20271

Date- 2/8/11

Reff-

Dear Sir,

We are pleased to introduce our self as an contractor to you , we are in this line of work for last 20 yrs.

We have served in state govt. in hotels and presently working with private construction companies for last 5 yrs.

Our moto to serve better.

Details of our quotation are as follows.

Thanking you and waiting to serve you.

R K Goyal

Prop. Sark Enterprises.

S.No.	Description	Unit	Rate (RS)
1	Excavation in loose soil	c/mt	110
2	PCC in foundation in 1:5:10	c/mt	950
3	Random rouble rough stone masonry in foundation in 1:8 sand cement ratio.	c/mt	3200
4	Corse stone masonry in supper structure in 1:8 cement ratio.	c/mt	4200
5	Brick masonry in supper structure in 1:6 cement ratio.	c/mt	3800
6	Cement Plaster 10mm thick in 1:6 ratio	Sq/mt	210
7	Shuttering for RCC	Sq/mt	310
8	Providing and laying RCC in roof ,lintal with sand cement and gritt in 1:1.5:3	c/mt	4500
9	Plain flooring with sand cement and neet punning.	Sq/mt	65
10	Pointing for stone masonry in grey cement plain.	Sq/mt	350

Annexure 8

To be submitted by Indian company/firm
Seeking financial assistance under
TIFAC-SIDBI Revolving Fund for Technology Innovation

सृजन (SRIJAN)
Application Format

PART A: Brief about the Unit

1.1 Particulars of company / firm

1	Name	
2	Constitution	
3	Year of incorporation / commencement of operations	
4	Address of registered office and site of operations	
5	Main Promoter(s) / contact details	

1.2 Particulars of Promoters

Name (age)	Educational/ Professional qualification	No of years of professional experience	No of years of entrepre- neurial experience	Stake in the firm / company (%)

1.3 Present line of business and Technology / product successfully developed by the entity in the past:

1.4 Technology know-how Partner (name, designation with educational and professional background, affiliation address, telephone, fax, e-mail etc.):

PART B: Technical Information

2 Project title:

2.1 Background:

2.2 Project objectives :

2.3 Major Targets :

2.4 Process / Products proposed to be developed under the project along with specifications etc.:

2.5 Technology development/demonstration in Product/Process

Technology development:

(i) Process:

(ii) Product:

2.5.1 Detailed technology description:

2.6 What is the specialty / novelty / uniqueness / innovation about the technology:

2.7 Work already carried out for proof of concept / technology validation:

2.8 Whether the technology has been already patented. If yes, provide the details:

2.9 Process flow-charts / schematic diagram etc.:

2.10 Raw materials and their availability:

2.11 Comparative advantages / disadvantages over the conventional/ emerging technologies and brief comments on competitions / challenges:

2.12 Techno-economics, cost benefit analysis and demand statistics in next 2/3 years:

2.13 Environmental Impact, if any:

2.14 Work Plan:

2.14.1 Project Duration (in months):

2.14.2 Time schedule indicating important activities/milestones & duration (*bar-chart*):

2.15 Deliverables of the project:

2.16 List of existing facilities already available for the proposed project (land, building, machinery, software, manpower, utilities etc.)

PART C: Financial information

3.1 Total Project Cost:

Project head	Area / Qty./ Specifications/ Capacity	Company/Firm Contribution (Lakh)	Contribution from Fund (Lakh)	Total Cost (Lakh)
Cost of construction / augmentation of factory shed for the project				
Technology Know-how fee / patent / licensing				
Equipment / Machinery / Utilities				
Consumables / Raw Materials				
Equipment for Testing & Evaluation / Quality Control				
Manpower Salaries				
Marketing related expenses				
Working Capital Margin				

Others (pl specify)				
Contingency				
Total				

3.2 Means of Finance:

Means of finance	Amount (` lakh)
Additional Share capital	
Unsecured loans from	
SIDBI Assistance	
Assistance sought from the Fund	
Others (pl specify)	
Total	

3.3 Detailed Break-up of following Heads of Project Cost with equipment details (in tabular form):

- 3.3.1 Capital Equipment / plants & machinery
- 3.3.2 Testing & Laboratory Equipment
- 3.3.3 Manpower Salaries
- 3.3.4 Consumables/Raw Materials

3.4 What makes the technology different from existing ones and advantage in terms of business opportunities?

3.5 Whether this proposal has been submitted to any other agency for funding support (if yes, give details)

3.6 Financial performance: In case of existing entity, brief business highlights given below
(Pl. enclose last FY audited accounts with auditors report).

(` Lakhs)

Particular	FY	FY	Particular	FY	FY
Revenue			Share Capital (promoters)		
EBDITA			Share capital (others)*		
Profit After Tax (PAT)			Net worth/ Accumulated losses		
Initial/ product dev expenses not written off			Bank term loans		
Net Profit Margin (%)			Unsec loans – promoters		
Debt Equity Ratio (DER)			Unsec loans – others		
			Bank borrowings –WC		

*please provide details

3.7 Credit/ Banking facilities from SIDBI / other banks/ FIs/ PE or VC or Angel investors in respect of customer (` Lakh)

PE/ VC/ Angel inv/ Bank, branch	Facility	Sanc amt	Outstanding

3.7.1 Whether any over dues in any banking credit facilities by the applicant enterprise/ associate concerns in past 2 years.

3.7.2 Whether any of the accounts of the enterprise/ associate concern classified as NPA/ any restructuring done during past 3 years or any OTS done ever.

3.7.3 Whether any default in promoters' personal/ consumer loans/credit card payments, etc.

3.8 Tentative Business projections (in Lakh)

Particular	First Year		Second Year		Third year		Fourth year	
	H1	H2	H1	H2	H1	H2	H1	H2
Sales								
PAT								

4. Key strengths and risk factors

5. Any other relevant information

DECLARATION

I/We certify that all information furnished by me/ us above and in the appendix/annexures/ statements and other papers enclosed is true; I/we have no borrowing arrangements for the unit with any bank / FI except as indicated in the application; that there are no overdues / statutory dues/government enquiry/proceedings/prosecution against the unit/associate concerns/ promoters/directors except as indicated in the preliminary information; that no legal action has been/ is being taken against the unit/associate concerns/promoters/directors; that I/ we shall furnish all other information that may be required by SIDBI in connection with my/our application and I/ We have no objection to your furnishing the information submitted by me/ us to any agency as you may deem fit in connection with consideration of the assistance. We have no objection to SIDBI/ its representatives making suitable enquiries while considering the application.

Place:

Signature

Date:

Name & Designation with Seal

Annexure I

Details of Associate Concerns

Name , Address & products manufactured	Existing since	Name & Address of existing Banker (s)	Facilities Enjoyed	Share holding of the main promoter(s) of applicant unit

Annexure II

Particulars of machinery proposed for the project

Name of machinery, (model / specification)	Name of manufacturer, contact person, e-mail address telephone no	Lead time for delivery Of machinery	Invoice price (for Indigenous machinery) / CIF price (for imported) (Rs. lakh)	Purpose /use of machine.	Basis of selection of supplier	Remarks reg. After Sale Service etc.
Coal handling Improvement	Attached Doc.	1 Month	As in quotation	To Improve energy Efficiency	Techno-commercial competitiveness.	

Annexure III

Details of Misc. Assets / equipment Proposed

S.No.	Name of item	Supplier	Cost (Rs. lakh)	Purpose/ use of MFA	Remarks

Annexure IV

Profitability projections for the unit/company as whole:

S. No.	Items	Actuals for previous years	Y1	Y2	Y3	Y4	Y5	Total
1	Total income		0.58	0.58	0.58	0.58	0.58	2.9
2	Raw material							
	Power and fuel							
	Wages and salaries							
	Selling expenses							
	Other expenses		0.065	0.068	0.072	0.075	0.079	0.359
	Total cost		0.065	0.068	0.072	0.075	0.079	0.359
3	Profit before depreciation, interest and taxes (PBDIT)		0.515	0.512	0.508	0.505	0.501	2.541
4	Interest on term loan		0.1	0.08	0.05	0.02	0.00	0.25
5	Interest on working capital		-	-	-	-	-	
6	Interest on unsecured land		-	-	-	-	-	
7	Depreciation		0.0686	0.065	0.061	0.058	0.055	0.3076
8	PBT		0.346	0.37	0.399	0.428	0.446	1.989

9	Tax		0	0.143	0.152	0.161	0.166	0.622
10	PAT		0.346	0.227	0.247	0.267	0.279	1.366
11	Dividends/ withdrawal							
12	Cash accruals		0.4146	0.292	0.308	0.325	0.334	1.6736
13	Debt service coverage ratio		2.4	1.2	1.25	0.26	0.24	
	Av. DSCR	1.07						

Annexure V

CHECK LIST of documents to be

Submitted along with the application

S. No	Documents	Y/N	Reasons for Non-Submission
1	SSI Regn. / CA certificate certifying SSI status.		
2	Certified copies of Memorandum & Articles of association / Partnership Deed.		
3	Audited financial results for the last three years of Applicant unit.		
4	Copies of lease deed / sale deed on which the unit is situated.		
5	Copies of sanction letters from commercial banks/ FIs which have sanctioned assistance to the unit.		
6	NOC from pollution control board/consent letter, if applicable.		
7	IT Returns/Assessment orders/Sales tax returns of the Applicant Unit/ promoters/directors for 2years.		
8	List of existing plant and machinery.		
9	Competitive quotations for machines and Misc.fixed assets proposed to be acquired under the scheme.		
10	Duly signed latest net worth statements of promoters/directors & guarantors in SIDBI format;In case of guarantors please furnish, Name, Age,Father's/Husband's name, residential address.Details of similar guarantee, if any, given to other institutions.		
11	2 sets of photographs along with signatures of all promoters/directors/guarantors duly certified by a Bank or Gazetted Officer.		
12	Audited financial results for last three years for each associate concerns. If applicable.		
13	Copy of title deed of collateral security and valuation report.		



Bureau of Energy Efficiency (BEE)

(Ministry of Power, Government of India)

4th Floor, Sewa Bhawan, R. K. Puram, New Delhi – 110066



Confederation of Indian Industry

CII – AVANTHA Centre for Competitiveness

Block No.3, Dakshin Marg

Sector 31-A, Chandigarh - 160030



India SME Technology Services Ltd

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