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# Pre-Feasibility Study

## Coal Washing Plant



### Small and Medium Enterprises Development Authority

#### Ministry of Industries & Production

#### Government of Pakistan

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## 1 DISCLAIMER

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## 2 EXECUTIVE SUMMARY

**Coal Washing Plant** is proposed to be located at

### **Balochistan:**

Quetta, Loralai, Mach, Sibi, Harnai, Duki, Khost, Sharig, Harnai, Sor Range/Degari, Kingri, Musakhel, Abegum, Pir Ismail Ziarat, Chamalong, Maikhter, Hub, etc.

### **Punjab:**

Lahore, Faisalabad, Multan, Gujranwala, Eastern Salt Range, Central Salt Range, Makerwal, D.G.Khan, etc.

### **Sindh:**

Lakhra, Sonda, Thatta, Jherruck, Thar, Haji Coal and others

Product include **Coal Briquettes**

Capacity; Installed capacity **10,800 Tons** and initial utilization **8,100 Tons, 75%**

Total Cost Estimates is **Rs. 36,788,367** with fixed investment **Rs. 33,636,080** and working capital **Rs. 3,152,288**.

Given the cost assumptions IRR and payback are **32 %** and **3.88 years** respectively

The most critical considerations or factors for success of the project are:

- Most significant consideration
  - Large deposits of Coal in the country.
  - Availability of large variety of mineral mix.
  - Availability of hard working & low-cost labor.
  - Increasing inland trends towards use of Coal Briquettes.
  - Large and established world markets.
  - Improved technological changes available.
- Equally important factor
  - Emphasizing on excellent services to its customers such as standardized products and timely order fulfillment.
  - New machinery should be purchased in order to increase the efficiency and lower the maintenance cost.

Refurbished standardized machinery is also recommended.

Adapt to the rapid, social, economic and technological changes.

Hiring of well-trained / experienced staff will add in the efficiency of the facility.

### 3 INTRODUCTION TO SMEDA

The Small and Medium Enterprises Development Authority (SMEDA) was established in October 1998 with an objective to provide fresh impetus to the economy through development of Small and Medium Enterprises (SMEs).

With a mission "to assist in employment generation and value addition to the national income, through development of the SME sector, by helping increase the number, scale and competitiveness of SMEs", SMEDA has carried out 'sectoral research' to identify policy, access to finance, business development services, strategic initiatives and institutional collaboration and networking initiatives.

Preparation and dissemination of prefeasibility studies in key areas of investment has been a successful hallmark of SME facilitation by SMEDA.

Concurrent to the prefeasibility studies, a broad spectrum of business development services is also offered to the SMEs by SMEDA. These services include identification of experts and consultants and delivery of need based capacity building programs of different types in addition to business guidance through help desk services.

### 4 PURPOSE OF THE DOCUMENT

The objective of the pre-feasibility study is primarily to facilitate potential entrepreneurs in project identification for investment. The project pre-feasibility may form the basis of an important investment decision and in order to serve this objective, the document/study covers various aspects of project concept development, start-up, and production, marketing, finance and business management.

The purpose of this document is to facilitate potential investors in **Coal Washing Plant** by providing them with a general understanding of the business with the intention of supporting potential investors in crucial investment decisions.

The need to come up with pre-feasibility reports for undocumented or minimally documented sectors attains greater imminence as the research that precedes such reports reveal certain thumb rules; best practices developed by existing enterprises by trial and error, and certain industrial norms that become a guiding source regarding various aspects of business set-up and its successful management.

Apart from carefully studying the whole document one must consider critical aspects provided later on, which form basis of any Investment Decision.

## 5 BRIEF DESCRIPTION OF PROJECT & PRODUCT

This project envisages production of Coal Briquettes which is having a very bright prospect in Poultry Farms, Northern Areas for Space Heating, Refugees Camps, Restaurants & Hotels for B.B.Q., Armed Forces, Rural Areas, Blast Furnaces and Boilers.

Pakistan is facing severe crises in terms of electricity, natural gas and liquid fuel during the last few decades. Coal provides a good opportunity to overcome all of these crises. The utilization of raw indigenous coal cannot be used due to its hazards effects on environmental health. A technique has been developed to minimize these effects. Coal briquetting technology proposed by the prefeasibility has the capability to reduce Nitrogen Oxides (NOx), Sulphur Oxides (Sox), and oxides of carbon during the burning of indigenous coal. Therefore, coal briquettes are also known as environmental safe fuel. The proposed business has higher return on investment and a steady growth of business is expected with the industrialist having some prior experience or education in the related field of business. This pre-feasibility encompasses essential information regarding various aspects of starting the production of Coal Briquettes.

Coal briquettes have long been produced as a means of using up 'small coal', the finely broken coal inevitably produced during the mining process. Otherwise this is difficult to burn as it is both hard to arrange adequate airflow through a fire of these small pieces, also it tended to be drawn up and out of the chimney by the draught, giving visible black smoke.

The first briquettes were known as culm and were hand-moulded with a little wet clay as a binder. These could be difficult to burn efficiently, as the unburned clay produced a large ash content, blocking airflow through a grate.

With Victorian developments in engineering, particularly the hydraulic press, it became possible to produce machine-made briquettes with minimal binder content. A tar or pitch binder was used, obtained first from gas making and later from petrochemical sources. These binders burned away completely, making it a low-ash fuel. A proprietary brand of briquettes from the South Wales coalfield was Phurnacite, developed by Powell Duffryn. These were intended to emulate a high-quality anthracite coal, such as that from the Cynheidre measures. This involved blending a mixture of coals from different grades and colliery sources. Phurnacite used the following mix:

Bituminous coal, 25%  
Steam coal, 45%  
Dry steam coal, 22%  
Pitch, 8%

Early briquettes were large and brick-shaped. They could be stacked, or even built into walls. Phurnacite briquettes later adopted a squared oval shape. This regular

shape packed well as a good firebed, with plentiful airflow. They are also easy to mechanically feed, allowing the development of automatically controlled heating boilers that could run for days without human intervention

### **How is Coal Briquettes made?**

Coal preparation/briquetting is the removal of undesirable material from the run-of-mine (ROM) coal by employing separation processes which are able to differentiate between the physical and surface properties of coal and the impurities. Through proper coal preparation, a uniform product is achieved.

Typical steps in coal preparation include:

- Crushing
- Screening into different size factions
- Physical, chemical or mechanical processing to remove undesired impurities
- Dewatering
- Thermal drying
- Blending
- Agglomeration
- Briquetting

With coal preparation, raw coal is cleaned using different physical processes, with or without any chemical reagents, to get a product which can be sold in the market. Coal preparation process starts with crushing and screening of freshly mined coal, which removes some of the non-coal material. Washing is actually the process of separation of non-coal materials. Washing or cleaning of coal represents the most important step of coal preparation. Coal is washed in order to decrease the ash content and thus producing three different streams of products: clean coal, middlings and rejects. The raw run-of-mine (ROM) coal requires some selective qualitative and quantitative analysis to determine the most suitable operating condition for cleaning of coal to obtain the desired quality.

Reasons for cleaning coal are to:

- Remove inorganic material (ash) – thus reducing ash handling in coal plants
- Increase the heating value of coal
- Reduce the transportation cost per unit weight of coal
- Meet customers' specifications

There are four basic types of operations used when cleaning the coal:



**Comminution**

This is the stage where coal lumps are converted into small manageable sizes so that they can be processed by different equipment.

**Sizing**

The separation of coal into products characterized by differences in size. This can be accomplished by screening or by classifying. Generally, the medium used is water.

**Concentration**

Once coal is classified into different size fractions, each size fraction is subjected to different unit operations for cleaning. These processes divide coal into the following three categories:

- Clean coal – having ash content approximately 7 – 9%
- Middlings – having ash content approximately 25 – 30%
- Rejects – having ash content approximately 65 – 70%

**Dewatering**

Coal preparation is carried out in water and much moisture is added into the system. The total moisture content of the final coal product is a major quality control factor and the removal of moisture from both the coarse and the fine coal are serious technical issues.

After the above four operations there comes briquetting.

**Briquetting**

This process consists in manufacturing compact briquettes from coal dust or slack by pressure, such coal must contain 5 to 12% of water and high bitumen or resin content. Considerable attention has, in recent years, been devoted to the briquetting of coal with or without binder and presses that would give these results with a reasonable pressure have been designed.

**What is a Binder or Binding Agent?**

A binding agent is the element responsible to hold together fine particles, naturally the coal fines will not stay together, even if compressed at high pressure. It is necessary to have an agent acting similarly to glue to keep the fine particles of dust together. The variety of binder is nearly endless, varying from vegetal, to mineral or animal sources, as well as fossil and polymer source. The one used in briquetting plant can be a mix between Fossil and polymer products.

**Why coal preparation is so important:**

- Remove extraneous, non-combustible material
- Ash reduction
- Lower particulates
- Reduced ash handling at power station

- Sulfur reduction
- Carbon emission reduction
- Reduced transportation costs per unit of heat
- Guaranteed consistent heat value
- Improved plant efficiency

The efficiency of a coal preparation plant has a major impact on the profitability of a mining operation.

### **ADVANTAGES OF COAL BRIQUETTES:**

Coal briquettes are slow and steady burning fuel. These are produced from Pakistani lignite.

Briquettes are economical and environment friendly fuel. Raw materials required for the production of this fuel are locally available.

- Utilization of waste fine coal
- Non-spontaneous combustion
- Environment friendly fuel
- Adjustable combustion properties
- Desired size and shape
- Substitution / Alternate of other fuel sources (Solving energy problems for rural areas)

### **IGNITION METHOD FOR DOMESTIC USE**

1. Stoves are available in market of 9 kg, 6 kg and 3 kg capacity to ignite the briquettes.
2. Keep the stove outside the room in open place at the time of ignition.
3. 6-9 kg briquettes are placed in the stove, some small pieces of wood be kept on it.
4. Some amount of kerosene oil to sprinkle over them.
5. Fire the briquettes and supply air with hand fan.
6. Approximately after 10-15 minutes the coal briquettes will start burning without smoke and it will burn for 6-8 hours.
7. Do not keep the burning stove in close room for safety, ventilation is necessary.
8. After complete burning water can be used to extinguish coal briquettes.

### **Uses of Coal Briquettes:**

Coal Briquettes which is having a very bright prospect in

- Poultry Farms,
- Northern Areas for Space Heating,
- Refugees Camps,
- Restaurants & Hotels for B.B.Q.,
- Armed Forces,

- Rural Areas,
- Blast Furnaces,
- Boilers.

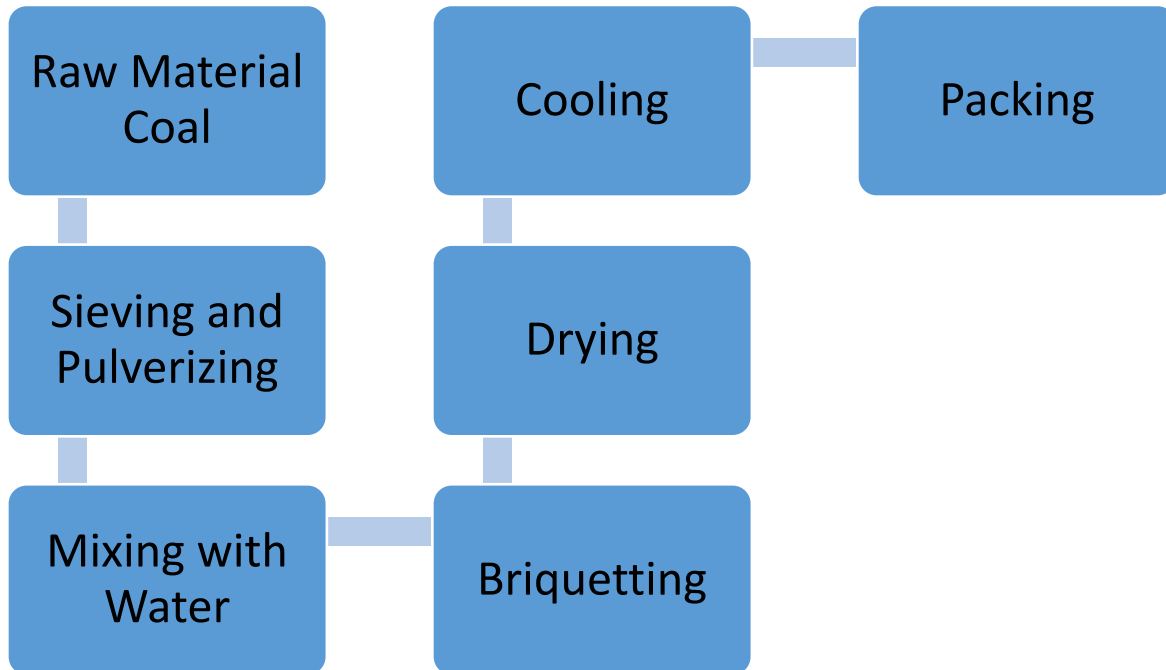
#### COMPARISON OF COAL BRIQUETTES WITH OTHER FUEL

S. NO.	PARAMETERS STUDIED	RAW COAL	COAL BRIQUETTE	FIRE WOOD	NATURAL GAS
1.	O <sub>2</sub> /%	26.89	18.52	20.73	17.79
2.	CO/ppm	1918	903	2,387	238
3.	CO <sub>2</sub> /%	4.04	1.43	1.02	0.00
4.	NO/ppm	220	01	9	8
5.	NOx/ppm	245	01	9	8
6.	SO <sub>2</sub> /ppm	385	14	55	5
7.	Calorific Value / Btu/lb	8,000	9,540	6,000	21307

Following key parameters must be addressed as per pre-feasibility study under preparation

- **Technology:** This proposed unit with modern processing and production machines including Feed Hoper, Sizing Unit, Coal Washing Mechanical jig, Product Dewatering, Twin Shaft Mixer, Horizontal Vibrating Screen, Batch Mixer, Solos, Screw Conveyor, Belt Conveyor and Briquetting Machine, etc.
- **Location:** The unit would be located in or near an area where the raw material is available easily like Quetta, Mach, Abegum, Harnai, Loralai Duki Khost, Shahrag, Swat, Peshawar, Bostan, Hub, Lakhra, Thar or Lahore and Karachi or any other site where raw material can be transported easily.
- **Product:** The unit would produce Coal Briquettes for industrial, commercial and residential uses.
- **Target Market:** In addition to local markets in Karachi, Lahore, Rawalpindi, Quetta, Peshawar, and Islamabad an enormous export market for the Pakistani Coal Briquettes exists in Afghanistan, Middle East, India, and China etc.
- **Employment Generation:** The proposed project will provide direct employment to 11 people. Financial analysis shows the unit shall be profitable from the very first year of operation.

## 5.1 Production Process Flow



## 5.2 Manufacturing Process:

Duff is formed through the washing process of coal. Through the several stages of preparing the coal, the fines are created which then need to be removed from the final product. In general, 10 to 17 percent of fines are generated in these processes. These fines are then gathered in dumps. The principle of briquetting can then be applied to the dumped duff.

The fines from these dumps are made up in majority by coal fines as well as a smaller proportion of ash. Generally speaking, the fines have 25% moisture content.

The initial process will differ according to the coal fines ash content. If the fines have a low ash content they will be put straight through to screening. If there is a high ash content the fines are first put through a Spiral plant.

The objective of a spiral plant is to create a better quality product by way of centrifugally separating the coal particles from the other components of the duff such as crystal, sand and stone. By reducing the quantity of the unwanted components in the duff, you raise the ratio of fixed carbon per ton of duff. This

means there is less ash, therefore a higher CV value equaling a better quality product.

Simply stated, improved quality = improved grade = higher selling price.

The process is fairly simple: the wet fines and ash come from the washing plant in a form that is more like sludge as opposed to a dust. More water is added to get the sludge more liquid. If the sludge is more liquid it will be more reactive to centrifugation.

The liquefied sludge is then pumped into a tower which separates, using gravity, the different elements. The heavier elements are removed first, stones, gravel, etc. The medium elements follow, water, etc. This leaves only the coal fines inside the tower.

In perfect conditions, the spiral plant would make it possible to have fines containing zero percent ash.

The fines are now ready to go through the screening process.

This process ensures that no big stones get into the press. We limit the size of the dust to what the binder and the press can handle.

At the exit of the washing plant, the coal fines have a surface moist content of 25% (it is pretty much liquid as the coal do not capture water); once it has been left draining for a while it reduce its surface moist to something in the region of 15%, (which is roughly the same as when the product comes out of the spiral plant). To be briquetted, we need to have between 8 and 10 % surface moist content (less it will not bind, more it will make some patty on the roller).

To bring the moisture content to the required levels, we use a big dryer. The dryer blows warm air onto the fines till the moisture is reduced to the desirable levels.

Should the dryer dry the coal below the 8% threshold, we can always add water at a later stage, but should we not dry the fines enough, then this could create a serious problem.

Once the fines have been screened they need to be mixed with the binding agent. The binding agent is like glue, it gets applied to each\ particle of coal-dust. This is done by mixing the fines with the binder inside a ribbon mixer.

The ribbon mixer works on batches, this allows us to check the moist content of the fines before each mix. This allows quicker batch operation and flexibility in production.

Buffer storage is a stage in a process that allows for a continuous operational flow following the buffer regardless of the process happening before the buffer.

I.e. if the mixers prepare the mixture by batches and need to be stopped for a certain period of time (i.e. maintenance), this will not stop the briquetting presses from operating.

This work on a similar principle as a water retention dam. Regardless of the rain fall or the volume of river water delivered to the dam, the water supply after the dam wall does not stop.

Once the fines have been mixed with the binding agent, the fines are then fed through two rollers. These two rollers move in opposite directions and compress the fines into briquettes at around 2000 Psi (around 140 Bars). The fines pass through the rollers for a fraction of a second but the combination of binder, pressure and shape of fines create a perfect formed coal briquette.

The briquette is strong enough to be handled but will not stand a front end loader handling yet. It still needs to be cured.

The objective of curing is to let the binder harden inside the briquette so it reaches the required strength. There are two ways to cure a briquette, either using a cold curing system or warm curing system. The size of the briquette, the physical requirements as well as percentage of binder used are the factors influencing the curing time. In some instance, heat can be applied to speed up the process (acting as a catalyst), this is only needed if time and storage space is limited.

### 5.3 Installed And Operational Capacities

The total installed capacity of the project is 10,800 Tons of Coal Briquettes along with assumed operational capacity of 75% during the first year of operations i.e. 8,100 Tons of Coal Briquettes. A gradual increase of 3% in production capacity per annum.

## 6 CRITICAL FACTORS

Coal Briquettes have a wide range of application, not only in energy sector but also in the manufacturing of cement and other industries using boiler for steam generation. Certain critical factors involved during the production process of coal briquettes are:

- Availability of skilled labor.
- Awareness about the environmental issues related to the combustion of solid fuels.
- Higher return on investment and a steady growth of business is closely associated with regular training and capacity building of the entrepreneur and employees.
- Prior experience and related / education in the related field of business.

## 7 GEOGRAPHICAL POTENTIAL FOR INVESTMENT

It is suitable to establish the production unit Quetta, Swat, Hub, Khuzdar, Loralai Bostan, Peshawar, Lahore and Karachi. However such a unit could be established in other parts of the country provided the main conditions are fulfilled such as Availability of coal and coal dust and man power availability, accessibility to markets, and reasonable demand & usage of Coal Briquettes.

## 8 POTENTIAL TARGET CUSTOMERS / MARKETS

Due to current energy crises of electricity, natural gas and liquid fuel the proposed solid fuel (Coal Briquettes) may be utilized in industries all over the country where low temperature combustion is required.

Coal Briquettes may effectively be utilized as a domestic fuel in rural areas. Cement industries and boilers are the main targeted areas of the product.

## 9 PROJECT COST SUMMARY

### 9.1 Project Economics

All the figures in this financial model have been calculated for estimated sales of Rs. 118.8 million in the year one. The capacity utilization during year one is worked out at 75% with 3% increase in subsequent years up to the maximum capacity utilization of 95%.

The following table shows internal rate of return, payback period and net present value of the proposed venture.

**Table 1: Project Economics**

Description	Details
Internal Rate of Return (IRR)	32%
Payback Period (yrs.)	3.88
Net Present Value (Rs.)	42,840,282

## 9.2 Project Financing

Following table provides details of the equity required and variables related to bank loan;

**Table 2: Project Financing**

Description	Details
Total Equity (50%)	Rs. 18,394,184
Bank Loan (50%)	Rs. 18,394,184
Markup to the Borrower (%age / annum)	14%
Tenure of the Loan (Years)	5 Years

## 9.3 Project Cost

Following fixed and working capital requirements have been identified for operations of the proposed business.

**Table 3: Project Cost**

Description	Amount Rs.
<b>Capital Cost</b>	
Land	6,159,999
Building / Infrastructure	11,939,387
Plant and Machinery	14,064,500
Furniture & Fixture	256,500
Office Equipment	577,500
Pre-operating Cost	638,163
<b>Total Capital Cost</b>	<b>33,636,080</b>
<b>Working Capital</b>	
Equipment Spare Parts Inventory	92,813
Raw Material Inventory	1,856,250
Up-front Insurance Payments	703,225
Cash	500,000
<b>Total Working Capital</b>	<b>3,152,288</b>
<b>Total Project Cost</b>	<b>36,788,367</b>



## 9.4 Space Requirement

The space requirement for the proposed **Coal Washing Plant** is estimated considering various facilities including management office, production hall, storage, open space, etc. Details of space requirement and cost related to land & building is given below;

**Table 4: Space Requirement**

Description	Estimated Area (Sqft)	Unit Cost (Rs.)	Total Cost (Rs.)
Management Office	400	1,450	580,000
Working Shed Area	5,000	892	4,459,387
Raw Materail Shed	4,000	850	3,400,000
Cafeteria	200	1,000	200,000
Finished Goods Store	2,000	1,000	2,000,000
Drive way / Pavement	40,000	50	1,000,000
Grounds	40,000	30	300,000
<b>Total</b>	<b>41,600</b>		<b>11,939,387</b>

## 9.5 Machinery & Equipment Requirement

Plant, machinery and equipment for the proposed project are stated below.

**Table 5: Machinery & Equipment**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Coal Washing Plant	1	8,000,000	8,000,000
Coal Briquetting Plant	1	600,000	600,000
Loader	1	1,500,000	1,500,000
Generator	1	800,000	800,000
Tube Well	1	800,000	800,000
Installation	1	150,000	150,000
Total machinery cost			11,850,000
GST 17%		0.17	
Total			13,864,500
Transportation charges	1	200,000	200,000
<b>Total</b>			<b>14,064,500</b>

## 9.6 Furniture & Fixtures Requirement

Details of the furniture and fixture required for the project are given below;

**Table 6: Furniture & Fixture**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Tables	2	6,000	12,000
Executive Chairs	2	5,000	10,000
Visitors Chairs	7	3,500	24,500
Carpeting	400	300	120,000
Air Conditioners (2 ton Split)	1	90,000	90,000
<b>Total</b>			<b>256,500</b>

## 9.7 Office Equipment Requirement

Following office equipment will be required for **Coal Washing Plant**;

**Table 7: Office Equipment**

Description	Quantity	Unit Cost (Rs.)	Total Cost (Rs.)
Computer Server	1	125,000	125,000
Laptop	1	50,000	50,000
Printer	1	20,000	20,000
Telephone Exchange	1	150,000	150,000
Telephone Sets	5	2,500	12,500
Photo Copier	1	200,000	200,000
<b>Total</b>			<b>577,500</b>

## 9.8 Human Resource Requirement

In order to run operations of **Coal Washing Plant** smoothly, details of human resources required along with number of employees and monthly salary are recommended as under;

**Table 8: Human Resource Requirement**

Description	No. of Employees	Monthly Salary per person (Rs.)
CEO/ Manager	1	50,000
Supervisor	1	35,000
Accountant cum Receptionist	1	22,000
Salesman	2	22,000
Skilled Worker	2	22,000
Loading Worker	2	18,000
Security Guard	2	18,000
<b>Total</b>	<b>11</b>	<b>267,000</b>

### 9.9 Utilities and other costs

An essential cost to be borne by the project is the cost of electricity and gas. The electricity expenses are estimated to be around Rs. 2,084,148 / year. Furthermore, promotional expense being essential for marketing of **Coal Washing Plant** is estimated as 1% of administrative / Cost of Sales expenses.

### 9.10 Revenue Generation

Based on the capacity utilization of 75% for Coal Briquettes Sales revenue during the first year of operations is estimated as under;

**Table 9: Revenue Generation – Year 1**

Description	No. of Tons Produced (No.)	Finished Goods Inventory (No.)	Units available for Sale (No.)	Sale Price / unit (Rs.)	Sales Revenue (Rs.)
Coal Briquettes	8,100	675	7,425	14,950	111,003,750

## 10 CONTACT DETAILS

In order to facilitate potential investors, contact details of private sector Service Providers relevant to the proposed project be given.

### 10.1 Machinery Suppliers

Name of Supplier	Address	Phone	Fax	E-mail	Website
Turchmir Engineering (services) Comapny	Nawab Chowk, Bagrian Road, Town ship, Lahore	042-35113377	042-35123388	info@turchmir.pk	www.turchmir.pk

### 10.2 Raw Material Suppliers

Name of Supplier	Address	Phone	Fax	E-mail	Website
Qayum Durrani	Quetta	0300-3865567			
Abdul Qayyum	Quetta				
Muhammad Asif	Quetta	0300-3802692 0331-8930225			

### 10.3 Technical Experts / Consultants

Name of Expert/ Organization	Address	Phone	Fax	E-mail	Website
Fuel Research Center	University Road, Karachi, Pakistan	021-99261963			www.pcsir.gov.pk

## 11 USEFUL WEB LINKS

<b>Small &amp; Medium Enterprises Development Authority (SMEDA)</b>	<a href="http://www.smeda.org.pk">www.smeda.org.pk</a>
<b>Government of Pakistan</b>	<a href="http://www.pakistan.gov.pk">www.pakistan.gov.pk</a>
<b>Ministry of Industries &amp; Production</b>	<a href="http://www.moip.gov.pk">www.moip.gov.pk</a>
<b>Ministry of Education, Training &amp; Standards in Higher Education</b>	<a href="http://moptt.gov.pk">http://moptt.gov.pk</a>
<b>Government of Punjab</b>	<a href="http://www.punjab.gov.pk">www.punjab.gov.pk</a>
<b>Government of Sindh</b>	<a href="http://www.sindh.gov.pk">www.sindh.gov.pk</a>
<b>Government of Khyber Pakhtunkhwa</b>	<a href="http://www.khyberpakhtunkhwa.gov.pk">www.khyberpakhtunkhwa.gov.pk</a>
<b>Government of Balochistan</b>	<a href="http://www.balochistan.gov.pk">www.balochistan.gov.pk</a>
<b>Government of Gilgit Baltistan</b>	<a href="http://www.gilgitbaltistan.gov.pk">www.gilgitbaltistan.gov.pk</a>
<b>Government of Azad Jamu Kashmir</b>	<a href="http://www.ajk.gov.pk">www.ajk.gov.pk</a>
<b>Trade Development Authority of Pakistan (TDAP)</b>	<a href="http://www.tdap.gov.pk">www.tdap.gov.pk</a>
<b>Security Commission of Pakistan (SECP)</b>	<a href="http://www.secp.gov.pk">www.secp.gov.pk</a>
<b>Federation of Pakistan Chambers of Commerce and Industry (FPCCI)</b>	<a href="http://www.fpcci.com.pk">www.fpcci.com.pk</a>
<b>State Bank of Pakistan (SBP)</b>	<a href="http://www.sbp.org.pk">www.sbp.org.pk</a>
<b>Punjab Small Industries Corporation</b>	<a href="http://www.psic.gop.pk">www.psic.gop.pk</a>
<b>Sindh Small Industries Corporation</b>	<a href="http://www.ssic.gos.pk">www.ssic.gos.pk</a>
<b>Pakistan Horticulture Development and Export Company (PHDEC)</b>	<a href="http://www.phdec.org.pk">www.phdec.org.pk</a>
<b>Punjab Vocational Training Council (PVTC)</b>	<a href="http://www.pvtc.gop.pk">www.pvtc.gop.pk</a>
<b>Technical Education and Vocational Training Authority (TEVTA)</b>	<a href="http://www.tevta.org">www.tevta.org</a>
<b>Pakistan Readymade Garment Technical Training Institute</b>	<a href="http://www.prgmea.org/prgtti/">www.prgmea.org/prgtti/</a>
<b>Pakistan Council of Scientific and Industrial Research (PCSIR).</b>	<a href="http://www.pcsir.gov.pk">http://www.pcsir.gov.pk</a>
<b>Punjab Industrial Estates (PIE)</b>	<a href="http://www.pie.com.pk">www.pie.com.pk</a>
<b>Faisalabad Industrial Estate Development and Management Company (FIEDMC)</b>	<a href="http://www.fiedmc.com.pk">www.fiedmc.com.pk</a>

## 12 ANNEXURES

## 12.1 Income Statement

Statement Summaries										SMEDA
Income Statement										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Rs. in actuals Year 10
Revenue	111,003,750	138,088,665	157,758,530	179,981,480	205,071,436	233,379,568	265,298,612	298,383,470	328,798,657	361,678,522
Cost of goods sold	93,562,898	116,027,972	132,390,270	150,864,741	171,710,199	195,216,098	221,706,073	249,200,114	274,587,054	302,038,102
Gross Profit	17,440,852	22,060,693	25,368,260	29,116,739	33,361,237	38,163,470	43,592,539	49,183,357	54,211,603	59,640,420
<i>General administration &amp; selling expenses</i>										
Administration expense	2,006,400	2,201,746	2,416,111	2,651,347	2,909,486	3,192,758	3,503,609	3,844,725	4,219,053	4,629,826
Rental expense	-	-	-	-	-	-	-	-	-	-
Utilities expense	2,084,148	2,292,562	2,521,819	2,774,000	3,051,400	3,356,540	3,692,194	4,061,414	4,467,555	4,914,311
Travelling & Comm. expense (phone, fax, etc.)	18,240	20,016	21,965	24,103	26,450	29,025	31,851	34,952	38,355	42,089
Office vehicles running expense	-	-	-	-	-	-	-	-	-	-
Office expenses (stationary, etc.)	18,240	20,016	21,965	24,103	26,450	29,025	31,851	34,952	38,355	42,089
Promotional expense	1,110,038	1,380,887	1,577,585	1,799,815	2,050,714	2,333,796	2,652,986	2,983,835	3,287,987	3,616,785
Insurance expense	703,225	632,903	562,580	492,258	421,935	351,613	281,290	210,968	140,645	70,323
Professional fees (legal, audit, etc.)	555,019	690,443	788,793	899,907	1,025,357	1,166,898	1,326,493	1,491,917	1,643,993	1,808,393
Depreciation expense	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819
Amortization expense	127,639	127,639	127,639	127,639	127,639	-	-	-	-	-
Property tax expense	-	-	-	-	-	-	-	-	-	-
Miscellaneous expense	-	-	-	-	-	-	-	-	-	-
Subtotal	8,709,767	9,453,031	10,125,275	10,879,991	11,726,251	12,546,473	13,607,094	14,749,582	15,922,763	17,210,635
Operating Income	8,731,086	12,607,662	15,242,985	18,236,748	21,634,986	25,616,996	29,985,445	34,433,774	38,288,841	42,429,785
Other income	-	-	-	-	-	-	-	-	-	-
Gain / (loss) on sale of assets	-	-	-	-	-	-	-	-	-	-
Earnings Before Interest & Taxes	8,731,086	12,607,662	15,242,985	18,236,748	21,634,986	25,616,996	29,985,445	34,433,774	38,288,841	42,429,785
Interest expense	2,442,458	2,178,442	2,035,807	1,871,870	1,683,451	1,466,893	1,217,993	931,923	603,130	225,234
Earnings Before Tax	6,288,627	10,429,220	13,207,178	16,364,878	19,951,535	24,150,103	28,767,452	33,501,852	37,685,711	42,204,551
Tax	2,012,361	3,337,351	4,226,297	5,236,761	6,384,491	7,728,033	9,205,585	10,720,593	12,059,427	13,505,456
<b>NET PROFIT/(LOSS) AFTER TAX</b>	<b>4,276,267</b>	<b>7,091,870</b>	<b>8,980,881</b>	<b>11,128,117</b>	<b>13,567,044</b>	<b>16,422,070</b>	<b>19,561,867</b>	<b>22,781,259</b>	<b>25,626,283</b>	<b>28,699,095</b>
Balance brought forward	-	4,276,267	8,526,102	13,130,238	18,193,766	23,820,607	30,182,008	37,307,907	45,066,874	53,019,868
Total profit available for appropriation	4,276,267	11,368,137	17,506,984	24,258,354	31,760,810	40,242,678	49,743,875	60,089,166	70,693,158	81,718,963
Dividend	-	2,842,034	4,376,746	6,064,589	7,940,202	10,060,669	12,435,969	15,022,291	17,673,289	20,429,741
Balance carried forward	4,276,267	8,526,102	13,130,238	18,193,766	23,820,607	30,182,008	37,307,907	45,066,874	53,019,868	61,289,222

## 12.2 Balance Sheet

Statement Summaries											SMEDA
Balance Sheet											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Rs. in actuals Year 10
<b>Assets</b>											
<i>Current assets</i>											
Cash & Bank	500,000	520,065	5,775,233	9,779,661	13,984,172	18,210,832	21,954,476	25,794,275	29,711,473	33,159,506	52,355,387
Accounts receivable	-	4,561,798	5,118,337	6,079,052	6,939,863	7,912,046	9,009,267	10,246,812	11,582,509	12,887,304	14,187,887
Finished goods inventory	-	8,505,718	9,700,088	11,066,679	12,609,590	14,350,420	16,313,323	18,525,305	20,803,173	22,882,254	25,169,842
Equipment spare part inventory	92,813	121,232	145,425	174,207	208,416	249,045	297,262	351,050	406,175	469,132	-
Raw material inventory	1,856,250	2,540,093	3,192,104	4,005,942	5,020,821	6,285,286	7,859,409	9,723,494	11,786,106	14,261,188	-
Pre-paid annual land lease	-	-	-	-	-	-	-	-	-	-	-
Pre-paid building rent	-	-	-	-	-	-	-	-	-	-	-
Pre-paid lease interest	-	-	-	-	-	-	-	-	-	-	-
Pre-paid insurance	703,225	632,903	562,580	492,258	421,935	351,613	281,290	210,968	140,645	70,323	-
<b>Total Current Assets</b>	<b>3,152,288</b>	<b>16,881,808</b>	<b>24,493,767</b>	<b>31,597,798</b>	<b>39,184,797</b>	<b>47,359,242</b>	<b>55,715,028</b>	<b>64,851,904</b>	<b>74,430,080</b>	<b>83,729,707</b>	<b>91,713,116</b>
<i>Fixed assets</i>											
Land	6,159,999	6,159,999	6,159,999	6,159,999	6,159,999	6,159,999	6,159,999	6,159,999	6,159,999	6,159,999	6,159,999
Building/Infrastructure	11,939,387	11,342,417	10,745,448	10,148,479	9,551,509	8,954,540	8,357,571	7,760,601	7,163,632	6,566,663	5,969,693
Machinery & equipment	14,064,500	12,658,050	11,251,600	9,845,150	8,438,700	7,032,250	5,625,800	4,219,350	2,812,900	1,406,450	-
Furniture & fixtures	256,500	230,850	205,200	179,550	153,900	128,250	102,600	76,950	51,300	25,650	-
Office vehicles	-	-	-	-	-	-	-	-	-	-	-
Office equipment	577,500	519,750	462,000	404,250	346,500	288,750	231,000	173,250	115,500	57,750	-
<b>Total Fixed Assets</b>	<b>32,997,886</b>	<b>30,911,067</b>	<b>28,824,247</b>	<b>26,737,428</b>	<b>24,650,609</b>	<b>22,563,789</b>	<b>20,476,970</b>	<b>18,390,151</b>	<b>16,303,331</b>	<b>14,216,512</b>	<b>12,129,693</b>
<i>Intangible assets</i>											
Pre-operation costs	638,194	510,555	382,916	255,277	127,639	-	-	-	-	-	-
Legal, licensing, & training costs	-	-	-	-	-	-	-	-	-	-	-
<b>Total Intangible Assets</b>	<b>638,194</b>	<b>510,555</b>	<b>382,916</b>	<b>255,277</b>	<b>127,639</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>TOTAL ASSETS</b>	<b>36,788,367</b>	<b>48,303,430</b>	<b>53,700,931</b>	<b>58,590,504</b>	<b>63,963,045</b>	<b>69,923,031</b>	<b>76,191,998</b>	<b>83,242,055</b>	<b>90,733,412</b>	<b>97,946,219</b>	<b>103,842,808</b>
<b>Liabilities &amp; Shareholders' Equity</b>											
<i>Current liabilities</i>											
Accounts payable	-	7,633,568	9,498,364	10,881,529	12,452,204	14,235,431	16,259,700	18,549,462	20,933,525	23,173,805	24,159,403
Export re-finance facility	-	-	-	-	-	-	-	-	-	-	-
Short term debt	-	-	-	-	-	-	-	-	-	-	-
<b>Other liabilities</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Total Current Liabilities</b>	<b>-</b>	<b>7,633,568</b>	<b>9,498,364</b>	<b>10,881,529</b>	<b>12,452,204</b>	<b>14,235,431</b>	<b>16,259,700</b>	<b>18,549,462</b>	<b>20,933,525</b>	<b>23,173,805</b>	<b>24,159,403</b>
<i>Other liabilities</i>											
Lease payable	-	-	-	-	-	-	-	-	-	-	-
Deferred tax	-	2,012,361	2,250,320	2,250,320	2,250,320	2,250,320	1,800,256	1,350,192	900,128	450,064	0
<b>Long term debt</b>	<b>18,394,184</b>	<b>15,987,051</b>	<b>15,031,960</b>	<b>13,934,234</b>	<b>12,672,572</b>	<b>11,222,490</b>	<b>9,555,850</b>	<b>7,640,311</b>	<b>5,438,701</b>	<b>2,908,298</b>	<b>-</b>
<b>Total Long Term Liabilities</b>	<b>18,394,184</b>	<b>17,999,412</b>	<b>17,282,280</b>	<b>16,184,554</b>	<b>14,922,892</b>	<b>13,472,810</b>	<b>11,356,106</b>	<b>8,990,503</b>	<b>6,338,829</b>	<b>3,358,362</b>	<b>0</b>
<i>Shareholders' equity</i>											
Paid-up capital	18,394,184	18,394,184	18,394,184	18,394,184	18,394,184	18,394,184	18,394,184	18,394,184	18,394,184	18,394,184	18,394,184
Retained earnings	-	4,276,267	8,526,102	13,130,238	18,193,766	23,820,607	30,182,008	37,307,907	45,066,874	53,019,868	61,289,222
<b>Total Equity</b>	<b>18,394,184</b>	<b>22,670,450</b>	<b>26,920,286</b>	<b>31,524,421</b>	<b>36,587,949</b>	<b>42,214,791</b>	<b>48,576,192</b>	<b>55,702,090</b>	<b>63,461,058</b>	<b>71,414,052</b>	<b>79,683,406</b>
<b>TOTAL CAPITAL AND LIABILITY</b>	<b>36,788,367</b>	<b>48,303,430</b>	<b>53,700,931</b>	<b>58,590,504</b>	<b>63,963,045</b>	<b>69,923,031</b>	<b>76,191,998</b>	<b>83,242,055</b>	<b>90,733,412</b>	<b>97,946,219</b>	<b>103,842,808</b>
<i>Note: Total assets value will differ from project cost due to first installment of leases paid at the start of year 0</i>											

## 12.3 Cash Flow Statement

Statement Summaries											SMEDA
Cash Flow Statement											
	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	Rs. in actuals										
<i>Operating activities</i>											
Net profit	-	4,276,267	7,091,870	8,980,881	11,128,117	13,567,044	16,422,070	19,561,867	22,781,259	25,626,283	28,699,095
Add: depreciation expense	-	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819	2,086,819
amortization expense	-	127,639	127,639	127,639	127,639	127,639	-	-	-	-	-
Deferred income tax	-	2,012,361	237,959	-	-	-	(450,064)	(450,064)	(450,064)	(450,064)	(450,064)
Accounts receivable	-	(4,561,798)	(556,539)	(960,715)	(860,811)	(972,183)	(1,097,221)	(1,237,545)	(1,335,697)	(1,304,795)	(1,300,583)
Finished good inventory	-	(8,505,718)	(1,194,370)	(1,366,591)	(1,542,911)	(1,740,830)	(1,962,903)	(2,211,982)	(2,277,868)	(2,079,082)	(2,287,587)
Equipment inventory	(92,813)	(28,419)	(24,194)	(28,781)	(34,209)	(40,629)	(48,217)	(53,788)	(55,125)	(62,957)	469,132
Raw material inventory	(1,856,250)	(683,843)	(652,012)	(813,838)	(1,014,879)	(1,264,466)	(1,574,123)	(1,864,085)	(2,062,611)	(2,475,082)	14,261,188
Pre-paid building rent	-	-	-	-	-	-	-	-	-	-	-
Pre-paid lease interest	-	-	-	-	-	-	-	-	-	-	-
Advance insurance premium	(703,225)	70,323	70,323	70,323	70,323	70,323	70,323	70,323	70,323	70,323	70,323
Accounts payable	-	7,633,568	1,864,797	1,383,164	1,570,675	1,783,227	2,024,270	2,289,762	2,384,063	2,240,280	985,598
Other liabilities	-	-	-	-	-	-	-	-	-	-	-
Cash provided by operations	(2,652,288)	2,427,198	9,052,292	9,478,901	11,530,762	13,616,944	15,470,954	18,191,307	21,141,099	23,651,725	42,533,920
<i>Financing activities</i>											
Change in long term debt	18,394,184	(2,407,133)	(955,091)	(1,097,726)	(1,261,663)	(1,450,082)	(1,666,640)	(1,915,539)	(2,201,610)	(2,530,403)	(2,908,298)
Change in short term debt	-	-	-	-	-	-	-	-	-	-	-
Change in export re-finance facility	-	-	-	-	-	-	-	-	-	-	-
Add: land lease expense	-	-	-	-	-	-	-	-	-	-	-
Land lease payment	-	-	-	-	-	-	-	-	-	-	-
Change in lease financing	-	-	-	-	-	-	-	-	-	-	-
Issuance of shares	18,394,184	-	-	-	-	-	-	-	-	-	-
Purchase of (treasury) shares	-	-	-	-	-	-	-	-	-	-	-
Cash provided by / (used for) financ	36,788,367	(2,407,133)	(955,091)	(1,097,726)	(1,261,663)	(1,450,082)	(1,666,640)	(1,915,539)	(2,201,610)	(2,530,403)	(2,908,298)
<i>Investing activities</i>											
Capital expenditure	(33,636,080)	-	-	-	-	-	-	-	-	-	-
Acquisitions	-	-	-	-	-	-	-	-	-	-	-
Cash (used for) / provided by invest	(33,636,080)	-	-	-	-	-	-	-	-	-	-
<b>NET CASH</b>	<b>500,000</b>	<b>20,065</b>	<b>8,097,201</b>	<b>8,381,175</b>	<b>10,269,099</b>	<b>12,166,862</b>	<b>13,804,314</b>	<b>16,275,768</b>	<b>18,939,489</b>	<b>21,121,322</b>	<b>39,625,622</b>
Cash balance brought forward		500,000	520,065	5,775,233	9,779,661	13,984,172	18,210,832	21,954,476	25,794,275	29,711,473	33,159,506
Cash available for appropriation	500,000	520,065	8,617,267	14,156,407	20,048,760	26,151,034	32,015,146	38,230,244	44,733,765	50,832,795	72,785,127
Dividend	-	-	2,842,034	4,376,746	6,064,589	7,940,202	10,060,669	12,435,969	15,022,291	17,673,289	20,429,741
Cash carried forward	500,000	520,065	5,775,233	9,779,661	13,984,172	18,210,832	21,954,476	25,794,275	29,711,473	33,159,506	52,355,387



## 13 KEY ASSUMPTIONS

### 13.1 Operating Assumptions

Description	Details
Days operational per month	22.5
Days operational per year	270

### 13.2 Production Assumptions

Description	Details
Maximum Capacity Utilization	95%
Total Production of tons per day	40
Total Production of tons per month	900
Total Production of the unit per year (100%)	10,800

### 13.3 Economy Related Assumptions

Description	Details
Electricity price growth rate	10%
Wage growth rate	10%
Sales price growth rate	10%

### 13.4 Cash Flow Assumptions

Description	Details
Accounts Receivable cycle (in days)	15
Accounts payable cycle (in days)	30