FACTORY CONSTRUCTION FOR THE PRODUCTION OF FERROSILICIUM IN GORNJI VAKUF - USKOPLJE

MINISTRY OF ECONOMY, CENTRAL BOSNIA CANTON

Travnik, september 2013
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INTRODUCTION

The construction project of manufacturing plant and production of alloys (ferrosilicon, ferromagnesium and silicon-metal) on the location of "Batuški lug" in the municipality of Gornji Vakuf - Uskoplje, whose site location would consist of two electric-arc furnaces, which have a designed power of a total of 48 MVA (2 X 24 MVA) and associated infrastructure (storage of raw materials, facilities for washing and crushing quartz, quartz plant for transport to the dispenser, plant transport coke plant, a freight timber, a facility for the delivery of raw materials for the production feromagnesium, softening plant for process water, warehouse finished products, etc.), and the wardrobe and the bathroom for employees, restaurant facility and management facility.

Plant and equipment for the production of alloys (ferrosilicon, ferromagnesium and silicon-metal) is planned to be built on the site of the industrial zone "Batuški lug" in the municipality of Gornji Vakuf - Uskoplje. Industrial-commercial zone "Batuški lug" extends to 48.1 hectares. In the need to extend the area of the plant, free plots are available and they extend over the area of over 50 hectares. This area is characterized as a stable ground, flat terrain with a slight slope. Estimated value of the land in the zone is 7 KM / m². Because of its location and connections with major cities zone "Batuški lug" is attractive for both domestic and foreign investors.
LOCATION

Municipality of Gornji Vakuf-Uskoplje is located in the central part of the south-western Bosnia and Herzegovina in the upper region of the river Vrbas and its position creates the possibility to connect and to be in the proximity of other major cities. Also as a great advantage of the municipality is the fact that this area is a transit area for the major transportation between the regions of Dalmatia and Central Bosnia. Strategic strength is a high percentage of student’s attendance, and we're the fifth municipality out of the 12 municipalities in the canton with the percentage of students in the total population of 1.70%. Gornji Vakuf-Uskoplje has a long industrial tradition which makes this municipality as an attractive location for investments, for local and foreign investors.

The main road M16.2 passes through the municipality region, with this the municipality is connected with significant road route Zagreb - Banja Luka - Mostar - Dubrovnik. Construction of the regional road R-439 is almost to be finished, which will enable Gornji Vakuf - Uskoplje to be associated with municipality of Novi Travnik and the central part of the Central Bosnia Canton. There are still 12 km to the finish and categorized (highway). Gornji Vakuf-Uskoplje has invested huge funds in the reconstruction (asphalt) of local and non-categorized roads and city streets. Distance from the municipal center to the individual locations on the M 16.2 is:

- Bugojno 18 km,
- Donji Vakuf 30 km,
- Jajce 63 km,
- Travnik 70 km,
- Zenica 106 km,
- Banja Luka 140 km,
- Bosanske Gradiška 186 km,
- Okućani (autoput) 202 km,
- Jablanica 56 km,
- Mostar 102 km,
- Sarajevo 156 km.
## Road communication

<table>
<thead>
<tr>
<th>Distance from regional road</th>
<th>Distance from railroad</th>
<th>Distance from the airport</th>
<th>Distance from the sea port</th>
<th>Distance from municipality centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2 km</td>
<td>60 km (Jablanica)</td>
<td>110 km (Mostar)</td>
<td>184 km (Luka Ploče)</td>
<td>1 km</td>
</tr>
</tbody>
</table>
INFORMATION ABOUT THE PROJECT

The investment project foresees investment in new plant construction of an electric arc furnace for the production of ferroalloys power of a total of 48 MVA (2 x 24 MVA) at the Municipality of Gornji Vakuf-Uskoplje and its associated facilities:

- land
- facilities
- electric arc furnace for reduction

I – The facility
The facility will be constructed in a steel frame filled with bricks and covered (roof) of trapezoidal sheets.
The facility would have an area of 2250 m2 and would consists of:
  a) hall furnace operation - 1,000 m2,
  b) metal spout halls - 720 m2
  c) production facilities for the preparation - 530 m2

*Value of the property: ................................................................. ......................... € 720,000*

II – The electric reduction furnace with the power a total of 48 MW (2 x 24 MVA)
- Transformers (three-phase and single phase)
- The main pneumatic switch
- Equipment for furnace
- Equipment for monitoring the production process

*Value of equipment ................................................................. ......................... € 4,600,000*

III - The facility for crushing, grading of finished products and the filtered separation of dust during crushing and laboratories, micronisation and briquetting

*Value.................................................................................................................. € 1,740,000*
IV – Gas filtering system for flue gases on electric arc furnace
*Value*: € 2,750,000

V - Works on the installation of furnace
*Value*: € 325,000

VI – Land for the location, project supervision, permits and required approvals
*Value*: € 200,000

**TOTAL INVESTMENTS VALUE**: € 10,335,000
NUMBER OF EMPLOYEES

The plan is designed to have a factory working 24 hours a day in four shifts. For this project it is necessary to employ around 100 people.

Qualification structure of employees

<table>
<thead>
<tr>
<th>No.</th>
<th>Education</th>
<th>Number of employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>VSS</td>
<td>9</td>
</tr>
<tr>
<td>2.</td>
<td>VKV</td>
<td>11</td>
</tr>
<tr>
<td>3.</td>
<td>SSS</td>
<td>8</td>
</tr>
<tr>
<td>4.</td>
<td>KV</td>
<td>51</td>
</tr>
<tr>
<td>5.</td>
<td>NK</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

PRODUCT AND SERVICES

The investment program includes the production of ferro-alloys for the metal industry, primarily for steel mills, iron foundries, as well as plants for the production of aluminum. The main product is the production of ferrosilicon 75% (FeSi 75%), which is mostly used in plants for the production of steel and comes in a variety of grits 0-110 mm packed in big bags (BIG BAG) weighing about 1 ton.
MATERIAL INPUTS

The investment program includes the provision of the following inputs for the production of ferroalloys:
- Quartz mining
- Wood chips
- Lignite
- Petroleum coke
- Coal
- Iron filings
- Electrode mass
- Electricity

All inputs are available on the domestic market except coal and electrode mass that would be imported.

Quartz ore would be procured from the open pit "Smrčevice" from Gornji Vakuf-Uskoplje. Ore deposits are located in the high mountain area. Defined geological reserves of quartzite amounts are estimated at over 8 million tons. Legal rights to exploitation these deposits has the company "Smrčevice" from Gornji Vakuf-Uskoplje.
Quartz raw materials would be procured as prepared raw material for the production of ferrosilicon and silicon-metal (crushed), classified into fractions and washed out (proper cleanliness).

**Chemical composition of quartz**

<table>
<thead>
<tr>
<th>Components</th>
<th>SiO₂</th>
<th>Al₂O₃</th>
<th>Fe₂O₃</th>
<th>CaO</th>
<th>MgO</th>
<th>TiO₂</th>
<th>S</th>
<th>P</th>
<th>Mu</th>
<th>Gz</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>97,11</td>
<td>1,31</td>
<td>0,7</td>
<td>0,17</td>
<td>0,04</td>
<td>0,03</td>
<td>0,06</td>
<td>0,11</td>
<td>0,02</td>
<td>0,72</td>
</tr>
</tbody>
</table>
Wood chips are made entirely of hardwood mass (beech, hornbeam, etc.) or from sawmill waste and is used as additional input in the alloys production process. It is planned to supply the wood chips from the local market in the vicinity of the plant and it would not be produced within the facilities.

Lignite would be procured from the nearby lignite mine „Gračanica“ in Gornji Vakuf – Uskoplje, as a product which will be used in the feroosilicium production process and other alloys, without prior preparation.

Lignite mine Gračanica
Metallurgical coke will be transported from the coke plant in Zenica or Lukavac in trucks in a technological granulation (prepared for production).

Iron shavings and mill scale (cunder) will be procured from suppliers in the region as prepared material.

**CAPACITY**

With the realization of this project production of ferrosilicium would be achieved in the amount of cca 80 tons per day, which is 29,000 tons per year.
MARKET ANALYSIS

The production of ferroalloys already exists on the domestic market, its located in the town of Jajce, it produces the silicon metals and such products are only for exports, the constant need for such products is present on the domestic market as well since its a product related to the local natural resources, such production increases the energy consumption.

Currently ferrosilicon is not produced in the local markets, but in the surrounding regions such production is present in a small amount in the Slovenia and Macedonia.

The current market situation is very in favor, because the demand for ferrosilicon is extremely high on markets, domestic and the international markets.

Parts of the production could be realized on the domestic marker, primarily at the plant in Zenica, also in the existing iron foundries in Banja Luka and Tuzla.

Implementing the project and its production we expect to generate revenue of around € 40 million and its entirely on the foreign market.

Implementation of this investment program would offer customers a new product, and it would specifically target on making contacts with potential buyers in the markets of Italy, Austria and the countries of the Western Balkans. Contact should be made directly or through an intermediary house.

DYNAMICS OF REALISATION

The project could be realized within 12-18 months.
ECONOMIC AND FINANCIAL ANALYSIS

INVESTMENTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Investment value (€ - EUR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FACILITIES</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>The building area 2250 m²</td>
<td>720.000</td>
</tr>
<tr>
<td>2</td>
<td>Equipment and machinery</td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Furnace and equipment for production</td>
<td>4.600.000</td>
</tr>
<tr>
<td></td>
<td>monitoring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Installation work</td>
<td>325.000</td>
</tr>
<tr>
<td></td>
<td>Building for crushing, sorting and grading</td>
<td>1.740.000</td>
</tr>
<tr>
<td></td>
<td>Gas filtering system on electric arc furnace</td>
<td>2.750.000</td>
</tr>
<tr>
<td></td>
<td>Land, supervision, permits</td>
<td>200.000</td>
</tr>
<tr>
<td></td>
<td>TOTAL:</td>
<td>10.335.000</td>
</tr>
</tbody>
</table>

OPERATING EXPENSES

<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Monthly (KM)</th>
<th>No. of months</th>
<th>Annualy (KM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CONSUMABLES AND ENERGY</td>
<td>2.937.500</td>
<td>12</td>
<td>35.250.000</td>
</tr>
<tr>
<td>2</td>
<td>DEPRECIATION</td>
<td>79,167</td>
<td>12</td>
<td>950.000</td>
</tr>
<tr>
<td>3</td>
<td>WAGES</td>
<td>200.000</td>
<td>12</td>
<td>2,400.000</td>
</tr>
<tr>
<td>4</td>
<td>INDIRECT COSTS</td>
<td>375.000</td>
<td>12</td>
<td>4,500.000</td>
</tr>
<tr>
<td></td>
<td>TOTAL:</td>
<td></td>
<td></td>
<td>43.100.000</td>
</tr>
</tbody>
</table>
TOTAL REVENUE

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of the product</th>
<th>Measurement units</th>
<th>Quantity</th>
<th>Price (KM/t)</th>
<th>Amount (KM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FeSI 75%</td>
<td>t</td>
<td>29.000</td>
<td>2.738.16</td>
<td>79.406.698</td>
</tr>
</tbody>
</table>

TOTAL: 79.406.698

INCOME STATEMENT

<table>
<thead>
<tr>
<th>SUCCESS BALANCE SHEET</th>
<th>AMOUNT (KM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.TOTAL REVENUE</td>
<td>79.406.698</td>
</tr>
<tr>
<td>2.TOTAL EXPENDITURE</td>
<td>43.100.000</td>
</tr>
<tr>
<td>3.PROFIT</td>
<td>36.306.698</td>
</tr>
<tr>
<td>4.INCOME TAX</td>
<td></td>
</tr>
<tr>
<td>5.NETO PROFIT</td>
<td>36.306.698</td>
</tr>
</tbody>
</table>

CONCLUSION

Investment project provided by this program is fully financially viable, and it opens the possibility to open 100 new jobs. With its realization positive effects of foreign currency operations could be achieved in approximate amount of € 40,000,000, since the entire production would be oriented on export.