Financial and Economic Analysis of Banko Coal Liquefaction

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Abstract

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1. INTRODUCTION
Coal Liquefaction Program in Indonesia has been conducted since early 1994 through research cooperation between the Indonesia and the Japan governments. The main goal of the project is to investigate the feasibility of the technology to be commercialised in Indonesia using Indonesian brown coals. Quite a number of Indonesian brown coals have been tested and evaluated, and majority have shown very good results, technically and economically. Last finding shows, however, that economy of the project becomes less attractive due to the significant increases in Banko coal ash content and price. As a result, synthetic oil product price also increases by approximately USD2/barrel. To make the project more attractive economically, the following feasibility study is then conducted in different plant location, i.e. coastal area such as Berau and Arutmin.

The economy of the plant was evaluated quite comprehensively in the previous feasibility study, unfortunately does not include the evaluation of the total investment of the plant, IRR, NPV, Payback Period, and profitability of the project in terms of its ability to repay the debt(s) and dividend as scheduled. Such evaluation is very important for decision makers and those potential investors to justify the attractiveness of the project.

This paper presents the results of financial and macro economic impact assessment of Banko coal liquefaction commercial plant to be installed in Tanjung Enim, South Sumatra with total capacity 12,000 t/d dry-ash free coal (daf).

2. TOTAL PROJECT COSTS AND STRUCTURE OF FINANCING
The total project cost for coal liquefaction plant, 12,000t/d input capacity, is calculated based on two major cost components namely:

- **Fixed investment**, which includes all expenses to procure land to accommodate the plant, and construction of the plant, purchases of all machineries and equipments, technology, project commissioning etc.
- **Initial working capital**, is funds needed to operate the plant at its first year of commercial production (in this case year 2011).

The Total Fixed Investment Costs is the sum of land cost (USD3), construction cost (USD2,521), and commissioning (USD100), equals to USD 2,624 million. Utilizing the F/S
schedule of annual investment as guidance, the annual budget of plant construction will be roughly as follows (Table-1).

Table-1 Annual Budget of Plant construction

<table>
<thead>
<tr>
<th>Year</th>
<th>(USD Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>126</td>
</tr>
<tr>
<td>2008</td>
<td>428</td>
</tr>
<tr>
<td>2009</td>
<td>1,310</td>
</tr>
<tr>
<td>2010</td>
<td>657</td>
</tr>
</tbody>
</table>

The initial working capital of the Liquefaction plant is calculated based on the following criteria.

- Inventories:
  - Stock of feed coal, 2 weeks of the 2011 production requirement,
  - Stock of chemicals, 2 months of the 2011 production requirement,
  - Stock of catalyst, 2 months of the 2011 production requirement,
  - Stock of finished good, 1 month of the 2011 production requirement.
- Account receivables, are calculated on 2 months of the 2011 net sales,
- Cash in hand and in bank, 10% of stocks and account receivables of the 2011,
- Account payable, 1 month of chemicals and catalyst purchase requirements of 2011

The total initial working capital equals to stocks of feed coal, chemicals, catalyst, finished product plus account receivables, plus cash in hand and bank, minus account payables. Based on the above assumption, the amount of the coal liquefaction plant’s initial working capital is USD 169 million.

The total project costs of the plant will be USD 2,793 million consists of USD 2,624 million fixed investment and USD 169 million initial working capital.

The annual investment budget

The plant’s construction period will be 4 years, commencing from 2007. The annual investment budget during the construction period is shown in Table-2.

Table-2 The annual investment budget

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>3</td>
<td>126</td>
<td>1,310</td>
<td>657</td>
</tr>
<tr>
<td>Construction Cost</td>
<td>31</td>
<td>428</td>
<td>104</td>
<td>169</td>
</tr>
<tr>
<td>Commissioning</td>
<td>321</td>
<td>983</td>
<td>327</td>
<td>926</td>
</tr>
<tr>
<td>Initial Working Capital</td>
<td>107</td>
<td>100</td>
<td>656</td>
<td>230</td>
</tr>
<tr>
<td>Total</td>
<td>321</td>
<td>1,310</td>
<td>926</td>
<td></td>
</tr>
</tbody>
</table>

The structure of project financing.

It is assumed that debt/equity ratio of 75/25 will be applied in financing the proposed project. The Structure of Project Financing is presented in Table-3.

Table-3 The Structure of Project Financing

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loan</td>
<td>95</td>
<td>31</td>
<td>321</td>
<td>983</td>
</tr>
<tr>
<td>Equity</td>
<td>3</td>
<td>107</td>
<td>327</td>
<td>165</td>
</tr>
<tr>
<td>Land</td>
<td>95</td>
<td>34</td>
<td>321</td>
<td>983</td>
</tr>
<tr>
<td>Construction</td>
<td>107</td>
<td>327</td>
<td>696</td>
<td>230</td>
</tr>
<tr>
<td>Commissioning</td>
<td>321</td>
<td>107</td>
<td>107</td>
<td>656</td>
</tr>
<tr>
<td>Int.Working Cap.</td>
<td>983</td>
<td>327</td>
<td>696</td>
<td>230</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
<td>34</td>
<td>321</td>
<td>983</td>
</tr>
</tbody>
</table>

The debt financing.

A 20 years offshore loan(s), including 4 years grace period, is expected to finance the construction costs and a part of initial working capital.

In addition, USD 100 million one-year term loan (with option to be renewed at the end of loan period) is required to finance the plant’s commissioning cost. This loan will bear 5% interest rate per annum. The total of 20 years term loan will be USD 2,095 million. The following loan’s term and conditions are assumed.

The 20 years term loan

- Interest rate 7% per annum (fixed);
- Commitment fee maximum ¼% per annum,
- Loan withdrawals will be in accordance to the project’s annual investment budget,
- Loan instalments will be made by six monthly or annually following grace period at the same amount of repayments,
- The project will serve as the main loan collateral.
The one-year loan

- Interest rate 5% per annum (fixed),
- Loan withdrawal will be in accordance to the project’s annual investment budget,
- The project will serve as the main collateral.

The product’s annual sales of the proposed coal liquefaction plant are expected to gradually increase throughout its operating period. It increases from USD 639 million in 2011 to USD 1,459 million in 2035.

3. PROFITABILITY OF THE PLANT

The Role of Profit

The most commonly used basis of Investment appraisal has been centred upon expressing the most likely level of the proposed project’s profitability. Profit has certain important roles for both, the project, the investor(s) and the lender(s). Profit after tax to be earned by the project during its economic or technical life serves as one of the two internal sources to finance the following expenses:

- To repay the debt(s) which are borrowed to finance construction and operation of the project,
- To pay the dividend,
- To replace the obsolete parts of the project,
- To extend the project as and when its proved favourable,
- To improve the employee’s social welfares.

The second internal source to finance the above expenses is depreciation allowance. In project feasibility study the amount of both profit after tax and depreciation allowance can be found in the projected profit and loss account.

In financial management terminology profit after tax plus depreciation allowance are known as “net cash flow (NCF)”. Net cash flow is used as one of the major inputs to assess the project’s profitability. In general the higher the project’s profit after tax, the stronger the project’s capacity to fulfil the five financial functions above.

4. PROJECTED ANNUAL SALES, 2011-2035

The following table-4 shows the projected annual sales from 2011 – 2035.

4.1. Profit after tax

The projected total annual costs of the liquefied plant are categorized into two major groups namely:

1. Cost of good sold. These variable costs category reflects those costs, which are directly related to level of production/sales. It includes costs of operation funds, feed coal, fuel coal, chemical, catalyst, industrial water and plant administration expenses.

2. Operating expenses are fixed and reflect the costs, which are not subject to changes as level of production/sales varies. This cost category includes salaries, depreciation, repair & maintenance, insurance premium, property tax, general administration expenses, stationary and interest of short and long term debts.

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales (USD Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>639</td>
</tr>
<tr>
<td>2012</td>
<td>661</td>
</tr>
<tr>
<td>2013</td>
<td>684</td>
</tr>
<tr>
<td>2014</td>
<td>708</td>
</tr>
<tr>
<td>2015</td>
<td>733</td>
</tr>
<tr>
<td>2016</td>
<td>759</td>
</tr>
<tr>
<td>2017</td>
<td>785</td>
</tr>
<tr>
<td>2018</td>
<td>813</td>
</tr>
<tr>
<td>2019</td>
<td>841</td>
</tr>
<tr>
<td>2020</td>
<td>871</td>
</tr>
<tr>
<td>2021</td>
<td>901</td>
</tr>
<tr>
<td>2022</td>
<td>933</td>
</tr>
<tr>
<td>2023</td>
<td>965</td>
</tr>
<tr>
<td>2024</td>
<td>999</td>
</tr>
<tr>
<td>2025</td>
<td>1,034</td>
</tr>
<tr>
<td>2026</td>
<td>1,070</td>
</tr>
<tr>
<td>2027</td>
<td>1,108</td>
</tr>
<tr>
<td>2028</td>
<td>1,147</td>
</tr>
<tr>
<td>2029</td>
<td>1,187</td>
</tr>
<tr>
<td>2030</td>
<td>1,228</td>
</tr>
<tr>
<td>2031</td>
<td>1,271</td>
</tr>
<tr>
<td>2032</td>
<td>1,316</td>
</tr>
<tr>
<td>2033</td>
<td>1,362</td>
</tr>
<tr>
<td>2034</td>
<td>1,409</td>
</tr>
<tr>
<td>2035</td>
<td>1,459</td>
</tr>
<tr>
<td>2036</td>
<td>--</td>
</tr>
</tbody>
</table>

Profit after tax.

The projected profit and loss account indicates that the project will incur loss from 2011-2014. Total annual loss in 2011 will be USD 178 million and will decrease to USD 7 million in 2014. Following those years the project will continuously earn profit. Total profit after tax in 2015 will be USD 11 million and gradually increase to USD 512 million in 2035. Total cumulative profit after tax (net after losses deduction) the project will earn during its operating life will be USD 4,427 million. This amount of profit will be sufficient to repay the debts, at the same time provide reasonable amount of dividend for the project’s owners.

4.2. Profitability of the Proposed Coal Liquefaction Plant

To appraise the coal liquefaction plant’s level of profitability three internationally accepted assessment criteria are applied, namely:

1. Payback period. The analysis result shows that the proposed project payback period will be 15 years and 24 days. Compared to the 25 years of the expected
operation period of the project, the payback period sound reasonable.

2. **Net present value (NPV).** A 5% discount factor (which is the short term loan interest to be paid by the project) is applied to calculate the present value of the project’s cumulative NCF. It is found that the proposed coal liquefaction plant’s NPV is USD 506 million, which is a positive amount. This is another indication that from financial point of view the project is reasonably sound for capital investment purposes.

3. **Internal rate of return (IRR).**
   The IRR is calculated based on the assumption of total annual sales, the profit after tax and depreciation allowance. The salvage value of the project is USD 172 million. Plant depreciation is USD 131 million per annum, from year 2011 to 2030. Whether 6.21% IRR as the rate of return is sufficient, will depend on the standard rate of return the prospective investor(s) have in their mind. Nevertheless it is noteworthy that the IRR is only slightly above the average cost of capital the project has to pay, i.e. \( \frac{1}{2} \times (5\% + 7\%) = 6\% \) short and long term loan’s interest.

5. **PROSPECT OF PROJECT’S FINANCIAL LIQUIDITY**
   The focus of assessment on the future prospect of the project financial liquidity gears to the evaluation of as whether during its operating life the project has sufficient cash to finance its business operation, at the same time repay the debt(s), pay the dividend and replace part(s) of the project which are obsolete. The major input for the assessment of the project’s financial liquidity is the projected cash-flow statement during its operation period.
   The annual cash inflows are calculated based on the annual sales and the assumption of two months credit sales. Therefore total annual cash inflow from product’s sales every year is 10/12 of total annual sales. The balances are in form of account receivables (A/R) and will be received as cash inflows in the next following years.
   The plant will incur cash deficit of USD 62 million in 2013 due to the repayment of the USD 100 million short-term loan. Furthermore it will incur cash deficit of USD 25 million in 2014. Following those years the annual cash balances will be surpluses. Total cumulative cash ending balance in 2035 (at the end of the project operation period) will around USD 5,672 million.

6. **MACRO ECONOMIC BENEFITS**
   The Banko coal liquefied plant will create the following macro economic benefits:

   **Foreign Exchanges Saving**
   The gross total foreign exchange contribution (in form of sales of coal crude oil and the secondary products) by the project from 2011-2035 will be USD 24,883 million. Out of those sales the project need to spend USD 2,621 million to import the plant machineries, equipments, technology and plant commissioning services. In addition it has to pay the term loan interest at USD 1,432 million.
   Subsequently the net foreign exchange saving during the project operation period will be USD 24,883 million – (USD 2,621 million + USD 1,432 million) = USD 20,830 million.
   Total deficit balance of oil production and consumption per annum is estimated to increase from 1 million barrels in 2004 to 274 million barrels in 2020. To recover those deficits Indonesia has to import. At USD 22/barrel minimum world oil price of oil imports from 2004 – 2020 will be approximately USD 16,984 million (>Rp 151 trillion)

   **The Corporate Tax**
   The project will create income for the central and provincial government in form of corporate tax. Total corporate tax to be collected from the project during its operating period will be USD 1,889 million. In addition the government will be able to collect value added tax (VAT) from the products sales.

   **Utilization of Natural Resources**
   Total feed coal consumed by the project (for 12,000 ton/ day plant capacity) will be around 12,260,000 tons per annum. Cost of feed coal is USD 12.00/ton (for simplicity 3.5% feed coal price escalation is neglected). The average total value of coal to feed the plant will be approximately USD 147 million per annum. On the other hand the average end products sales per annum from 2011-2035 will be around USD 1,036 million.
   The average value added from feed coal to coal crude oil created by the project will be around USD 889 million per annum. Total feed coal value added during the entire plant’s operating period will be approximately USD 22,225 million.
New Employment Opportunities
Like any other new projects, Banko coal liquefaction plant will create new employment opportunities both directly as well as its multiplier effects. The new employment opportunities will exist during the plant’s construction as well in its commercial production.

For current Indonesia economic slump and during the near future increasing labour forces seeking for jobs, new employment opportunity is considered to be important for both the province and national economy.

Better Climate for Investment
The implementation of this project investment will no doubt improve current and the near future investment climate. It will serve as a proved for foreign direct and domestic investors as well as foreign lenders that Indonesia remains a favourable place for capital investment. Beside, the project investment itself will create investment multiplier effects. One among the most important of side investment which arise as the effect of the liquefaction plant will be the establishment of new oil distribution facilities throughout the country. The operation of the oil distribution facilities itself will no doubt create new employment opportunities.

Multiplier Effect of the Project
Coal Liquefaction plant will consume around 12 million ton and 30 million ton raw coal/year for 12,000ton/day and 30,000ton/ day plant capacity. This will drastically increase PTBA’s current production capacity, far exceed the current production capacity of KPC in Kutai (15–17 million ton/year), one of five biggest mining companies in Indonesia. Just for comparison, recent study on “KPC economic impact on the GRDP (Gross Regional Domestic Product) of East Kutai regency” conducted by the University of Indonesia suggests that there is a very significant multiplier effect created by KPC to the region. About 74-85% of East Kutai regency’s total GRDP, is mainly a contribution of coal mining operations, with KPC as the main source. From Rp 3542.5 billion and Rp 3600.6 billion (total GRDP) of Kutai Regency in 1998 and 2000, KPC contribution has reached to Rp. 2894 billion (USD 325 million) and Rp. 2561 billion (USD 288 million) respectively. Although nation wise mining industry contribution is small, but locally it is quite significant. According to data, at the national level, the mining industry’s contribution to GDP is around 3%. While at local level it is 10 times as much. That is why Coordinating Minister for Economy and Trade, Dorodjatun Kuntorojakti in his working meeting with the House Commission III and IV recently stated that it would be impossible for the government to develop Eastern Indonesia without the presence of mining industry. The evidence of this is the emergence of Sangatta in East Kalimantan, Soroako in South-East Sulawesi and Timika in Papua. One can conclude that Muara Enim Regency will also enjoy at least the same situation with Kutai Regency from the development of Banko coal liquefaction plant and mining industry in the region.

The study also indicates that KPC’s operation had brought about 71,000 New Employment Opportunities, including almost 7000 directly employed by the company and its contractor. In 2000, their total earning amounted to Rp 986.62 billion (USD 110 million)

Future Contribution to Community Development
Development of Banko coal liquefaction plant and mining industry as well will give significant impact to local community. Some regions like Kutai and Berau have received so much benefit from several mining companies operated in those regions in a form of “community development” program. KPC, for example has spent Rp 10.5 billion in 2001 for community development programs: training for local businessmen, and farmers, supplying seeds, fertilizer and pesticides; loan/credit for SMEs; donation to hospital, scholarship for students/teachers, infrastructure and housing for underprivileged tribes.

7. CONCLUSION AND PROPOSED STRATEGY TO REALIZE THE PROJECT IN INDONESIA

7.1. Conclusion
Production of syn-fuel from coal can be one possible solution in helping the government to supply the demand of oil and prevent Indonesia from being the net oil importer.

Coal Liquefied Oil has the capacity to save the country’s foreign exchange which is used to import petroleum products. Data from Pertamina indicates that the size of petroleum products market to be substituted by coal liquefied oil in 2010 will be around 84 million barrels, equal to USD 3.696 million.

Compared to the 25 years of the expected operation period of the project, 15-year payback period is sound reasonable.

Using 5% discount factor, it is found that the proposed coal liquefaction plant’s NPV is USD
506 million, which is a positive amount. This is another indication that from financial point of view the project is reasonably sound for capital investment purposes.

The IRR is 6.21%. Whether this is sufficient, will depend on the standard rate of return the prospective investor(s) have in their mind. Nevertheless it is noteworthy that the IRR is only slightly above the average cost of capital the project has to pay. i.e $\frac{1}{2}(5\% + 7\%) = 6\%$ short and long term loan's interest.

The project has sufficient cash to finance its business operation, at the same time repay the debt(s), pay the dividend and replace part(s) of the project, which are already obsolete.

The gross total foreign exchange contribution by the project from 2011-2035 will be USD 24,883 million, with the net foreign exchange saving of USD 20,830 million.

Total corporate tax to be collected from the project during its operating period will be USD 1,889 million. In addition the government will be able to collect value added tax (VAT) from the sales of the products.

The average total value of coal to feed the plant will be approximately USD 147 million per annum. On the other hand the average end products sales per annum from 2011-2035 will be around USD 1,036 million.

The average value added from feed coal to coal crude oil created by the project will be around USD 889 million per annum. Total feed coal value added during the entire plant's operating period will be approximately USD 22,225 million.

Like any other new projects, Banko coal liquefaction plant will create new employment opportunities both directly and indirectly. The new employment opportunities exist during construction of the plant and commercial production.

The implementation of this project investment will no doubt improve current and the near future investment climate. Beside, the project investment itself will create investment multiplier effects.

7.2. Proposed Strategy to Realize the Project in Indonesia

The government of Indonesia considers coal liquefaction project as a National Project, therefore full support will be given to it. Upon the completion of the coastal case F/S, further similar financial assessment will be conducted, and should be followed by detail design of 3,000 t/d or 6,000 t/d demonstration plant as the first unit of commercial plant. Parallel to this, there are many other important factors should be carefully planned during this stage (preparation of project implementation), among others are: the prospective investor(s) and management of the company, product’s marketing strategy especially with regard to pricing and long term sales, assurance of of raw material supply, contract with reliable buyer(s), total investment required, structure of the project financing, debt/equity ratio, etc.

The project requires sufficient and long-term supply of coal. In this case a long-term mutual benefit purchase contract of coal need to be arranged with reliable coal mining company (ies)

A long term contract with buyer(s) also need to be acquired long before the project implementation begin. This condition required preventing the project from getting difficulties in marketing its product right from the time when commercial production begin.

Coal Liquefaction is a new business, there are not many companies and lending institutions have complete product know-how and business experiences. Therefore, an intensive and deep search of investors, domestic and foreign, should be conducted.

Judging from the magnitude of the total investment required, the realisation of Coal Liquefaction commercial plant cannot be fully given to private sectors, but both governments too, Indonesia (central and regional) and Japan. Without governments participation, the project may never been commercialised.

Supports from the government of Indonesia can be in the form of tax holiday, and tariff reduction (e.g. 5-7%) from 13.5% levies that must be paid by coal mining company. This is possible because from the 13.5% levies collected, only 1.5% is for Value Added Tax, 5-7% is for royalty, and the rest (5-7%) is for the development fund and coal inventory for the benefit of the Department of Energy and Mineral Resources.

The local government should also give strong support to the project by improving infrastructure condition surrounding the plant location.

The government of Japan could assist the Indonesian side to obtain the Japanese
Environment Yen Credit facility. This loan facility is considered to be a soft loan with an interest of 0.75% per annum. Maximum term of the loan will be 35 years with maximum grace period 10 years. If the project can successfully receive this loan, the future prospect of the project's financial condition will be even better. This is because cost of term loan interest will be lower and at the same time the amount of annual loan instalments will be smaller.

A consortium, consists of Indonesian private companies (potential investors), should be established. This body will responsible for commercializing coal liquefaction in Indonesia.

REFERENCES


