OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

FAIR USE POLICY

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

20605

Distr.
RESTRICTED

FMD/R.7
28 March 1994

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

BANKABLE FEASIBILITY STUDY FOR THE ERECTION OF A SECOND GENERATION INTEGRATED STEEL MILL IN WEST OR EAST JAVA

US/INS/91/183

INDONESIA

Report of the evaluation mission*

Prepared by
the United Nations Industrial Development Organization

* This document has not been edited.

V.94-22013

TABLE OF CONTENTS

LIST OF TABLES, BOXES AND FIGURES

Exchange Rate in March 1994 : 1 US $ = 2,110 Rupiah

LIST OF ACRONYMS

ASEAN	Association of South East Asian Nations
AFTA	Asean Free Trade Area
BF	Blast furnace
BOP	Balance of payments
BSO	Backstopping Officer
CRM	Cold rolling mill
CRS	Cold rolled steel
CTA	Chief Technical Advisor
DR	Direct reduction
DSR	Debt service ratio
EAF	Electric Arc Furnace
ERR	Economic rate of return
FDI	Foreign direct investment
FY	Fiscal year
GDP	Gross domestic product
GOA	Government of Austria
GOI	Government of Indonesia
HRD	Hot rolling mill
IDF	Industrial Development Fund
IRD	Industrial research and development
IRR	Internal rate of return
NPV	Net present value
OVI	Objevtively verifiable indicators
PAD	Project Allotment Document
PD	Project document
PTKS	PT Krakatau Steel
ROE	Return on equity
SEA	South East Asia
SGSM	Second generation steel mill
tpy	Tons per year
TRM	Tripartite Review Meeting
UNIDO	United Nations Industrial Development Organization
WRM	Wire rod mill

EXECUTIVE SUMMARY

(1) Overall Project Evaluation

The primary function of the project was direct support. It started operations in February 1992 and has been completed in March 1994 with the submission of the Final Report to and acceptance by the Government of Indonesia (GOI). The project's main objective was to assist the GOI to determine an optimal technological and locational alternative, optimal from the financial (commercial), economic and environmental point of view, and to enable the investor(s) and other parties concerned to decide as to whether and how to implement the second generation integrated steel mill project (SGSM).

The project design was ambitious in the sense that one main and critical element of the feasibility study involved the assessment of an emerging/clean technology for which excess to proprietor knowledge was a prerequisite.

The project document's design was fully satisfactory. The problem which was to be addressed is clearly stated and objectives, inputs, activities and outputs were systematically and appropriately interconnected. An overall workplan and implementation schedule was attached to the document. Likewise were job-descriptions, which followed the UNIDO standard format. Project risks were identified.

The quality, timeliness and adequacy of inputs delivered by UNIDO is beyond doubt. The project's strategy and institutional arrangement for overall project management were sound, and corrective action was taken timely when needed (replacement of one expert and substitution for another, suitable action at critical junctions in the cooperation with the proprietor of the emerging technology). Project monitoring and backstopping has been fully satisfactory.

Overall, the project has been implemented within the originally planned time horizon. Original fears on the Indonesian side that the project may be a technology supplier driven marketing tool to promote a not yet fully proven (emerging technology) has been turned into confidence in and reliance on the approach and professionality of the project team and UNIDO. The Indonesian side has taken ownership of the project and the project results have been and will be used by Indonesian decision takers.

Key factors of success in the opinion of the evaluation mission have been :

- a clear problem understanding and formulation
- a sound project strategy, including a suitable institutional arrangement for project implementation and clear output oriented project management responsibilities
- the availability of sufficient funds and time in relation to the tasks to be undertaken
- the availability of top expertise
- the high level and full cooperation of the Indonesian Counterpart Organization
- the application and adherence to a standardized and acknowledged approach to feasibility studies (UNIDO model).

The project has achieved fully its immediate objectives. When assessing the project's overall performance it has to be stated that it has achieved more than expected. It has contributed to a rationale and objective decision on the second generation steel mill and will make, if and when the project is finally implemented, a considerable contribution to the industrial development objectives of Indonesia, including improved environmental protection and the use of indigeneous coal resources.

(2) Project Results And Recommendations

After review by the Indonesian National Project Steering Committee of the five technological and six locational alternatives presented in the Interim Report, the Indonesian side requested the study team to base the final bankable feasibility study on the COREX - BOF technological route and the Cilegon factory site.

While it is not the purpose of an in-depth evaluation to repeat in every detail the results and recommendations of the study, the following key parameters are noteworthy in the context of this evaluation.

The bankable feasibility study covered all components as required by the UNIDO standard format. A thorough market analysis revealed that steel making capacity build-up should be in the order of magnitude of some 1.5 million tons per year to meet the domestic demand after the year 2000. In general, it was recommended that capacity build-up should be conservative and geared to supply primarily domestic market needs.

Given the technological and locational choice selected by the GOI, total investment was estimated to be US $ 1,671 million, which would generate an internal rate of return of 9.73 % based on a mean hot rolled coil price of US $ 359 per ton. This compares relatively favorably with prevailing margins in the steel industry. The IRR should be attractive also for private investors if one considers that the current real interest gain on bank deposits is in the order of 7 %.

The sensitivty analyses reveals that the IRR and payback period react strongest to changes in the sales price of hot rolled coil, but also to changes in the operating costs (efficiency) and capacity utilization.

The project has also a considerable positive macroeconomic impact. The economic rate of return is about 12.0 % and the net foreign exchange effect over the 15 years planning horizon amount to some accumulated US $ 4.25 billion.

The input output price assumptions underlying the above calculation results are realistic and on the conservative side.

These and related key features of the SGSM project are summarized in the project summary sheet below.

(3) Follow Up

However, there remain essential areas in which the GOI may wish to draw on neutral and impartial assistance. Based on the field interviews with the GOI and other interested parties, potential areas for such assistance would be :

- in the area of steel sector policy formulation
- in the area of financing the SGSM, and
- in the area of technology assessment of thin slab casting.

Some details on the possible scope of assistance in these areas are provided in chapter V./A of this evaluation report.

PROJECT SUMMARY SHEET

	US$ million
Investment:	**1,671**
Main plant components	986
Integration facilities oxygen- lime plant	298
Infrastructure and other expenses	387
Local origin 40% of total investment	
Finance:	**Debt/equity: 60/40**
Loans	*994*
Foreign loan A (suppliers credit 7 % p a)	751
Foreign loan B (commercial 9 % p a)	100
Domestic loan (commercial 17 % p a)	143
Equity	*677*
Domestic (private)	270
Domestic (state owned)	137
Foreign	270

Annual Sales at Full Capacity (1.55 mnt/a HRC): **US$ 598.46 million/year**

Internal Rate of Return:

With current low HRC prices on world market the base case assumed a mean HRC price of US$ 359/t	IRR = 9 73 %
Long term statistical mean value of calculated import prices was US$ 430/t	IRR = 14 13 %

Economic Rate of Return:

Base case (mean HRC price US$ 359/t)	12 0 %
Statistical (mean HRC price US$ 430/t)	16 4 %

Net Foreign Exchange Effect:

With a calculated HRC mean price of US$ 359 over the project period of 15 years the accumulated net foreign exchange effect (import substitution minus net foreign exchange flow) will be	US$ 4.25 billion
With a calculated mean price of US$ 430 the net foreign exchange effect will be	US$ 5.70 billion

Proposed Basic Project Strategy:

To aim at quality and price leadership in the sector of high quality flat products mainly for domestic markets (it has to satisfy Indonesia's flat steel demand after the year 2000) and seek export possibilities for HRC with higher value added

Selected Risks		**and Risk Management:**
Full capacity utilization	☞	Capacity of project based on prudent demand projection
Drop of international HRC prices	☞	Introduction of temporary countervailing duty
Safe supply of raw materials	☞	Most important suppliers as equity investors
Delay in project implementation	☞	Careful planning and monitoring of implementation

INTRODUCTION

1. Indonesia's state-owned steel making enterprise "PT Krakatau Steel" (PTKS) is the only integrated steel making complex in the ASEAN member states. The complex came on stream some 19 years ago in 1975. PTKS is located about 110 km northwest of Jakarta in Cilegon on the Sunda Strait.

2. The integrated complex comprises a steel plant based on the direct reduction/electric arc furnace technological route, a hot rolling mill (HRM), a cold rolling mill (CRM) and a wire rod mill (WRM).

3. PTKS has recently completed two upgrading projects with a reported total investment volume of US $ 282 million. One project was geared towards the modernization of the iron sponge plant (increase the metal content, reduce the consumption of natural gas and increase the capacity per module from 500,000 to 675,000 tons per year) The second project involved the establishment of a second steel slab plant with a rated production capacity of 800,000 tons per year.

4. However, since the late 1980s, the Government of Indonesia (GOI) is investigating possibilities for the establishment of a second generation integrated steel mill (SGSM) to meet the increasing domestic demand and, if at all possible, export to the regional markets. Within this context two competing interest groups have been lobbying with the GOI for the supply of the SGMS. One group representing basically Japanese interests, is suggesting to establish the SGSM based on the BF-BOF technological path.

5. The second group, representing interests of the Austrian based "Voest-Alpine" group approached the GOI in early 1990 and volunteered to undertake a study investigating the feasibility of employing their COREX technology ("emerging technology") for the SGSM. After review of this offer by the Indonesian and Austrian Governments, it was mutually decided that the proposed feasibility study should be carried out through a neutral and impartial source not reflecting any supplier interests.

6. UNIDO agreed to fulfill that impartial function and to implement project US/INS/91/183, "Bankable Feasibility Study for the Erection of a Second Generation Steel Mill in West or East Java". The project has been financed through a special purpose contribution by the Government of Austria to UNIDO's Industrial Development Fund (IDF) facility.

7. Project US/INS/91/183, comprising a total project budget of US $ 1,879,190, (including UNIDO program support cost) commenced operations in February 1992 and was completed as scheduled in March 1994 with the submission of the Final Report to the GOI.

8. In line with UNIDO standard procedures and requirements for projects over and above a certain project budget, an in-depth evaluation exercise was build into the project document. The present document constitutes the report of this exercise, the detailed terms-of-reference for which are attached to this document as Annex I.

9. The evaluation took place over the period March 1 to March 25, 1994. A field visit to Indonesia was undertaken from March 1 to March 14 and some 21 interviews were carried out with Government offices, potential private sector participants, manufacturers and international financing institutions. A comprehensive list of persons and institutions interviewed is contained in Annex II of this document.

10. The evaluation team comprised of Mr. K.D. Schneider, consultant, representing UNIDO.

11. The mission wishes to thank all officials and individuals met for their active support and candid expression of views. The views and opinions expressed and recommendations made in this document, however, are the sole responsibility of the evaluation team and are not necessarily shared by the recipient country, the donor and/or UNIDO. The recommendations made need their consent for actual implementation.

I. PROJECT CONCEPT AND DESIGN

A. The Project's Overall Policy, Economic And Institutional Context

A.1 Economic Performance And Basic Policies

12. Indonesia, with a total population of some 178.2 million in 1990, is categorized as belonging to the group of "low-income economies". However, while she was twenty five years ago with a per capita income of US $ 50 one of the poorest countries in the world, Indonesia's per capita income reached US $ 650 in 1992. The "Gross Domestic Product's -GDP " growth rate averaged almost 7 % over the period 1967 to 1991, a growth performance that ranks among the ten fastest in the world and on par with that of the dynamic East Asian economies. If per capita income continues to rise at the same real growth rate of some 4.5 % annually, Indonesia would be joining the group of middle income countries at the turn to the next century.

13. Up to date, Indonesia has managed to pursue successfully an industrialization process, which is reflected in the structural change of the composition of GDP. The share of the agricultural sector in GDP has since 1967 steadily declined, while the country has achieved in the same time rice self-sufficiency in the mid 1980s. Over the past decade, the sector's share in GDP declined from 24.1 % in 1981 to some 18.5 % in 1991. Likewise, the relative importance of the mining & quarrying sector declined from a share of 22.8 % in 1981 to some 15.6 % in 1991.

14. The industrial sector has increased its relative importance from a share in GDP of 17.6 % in 1981 to 26.7 % in 1991. This structural change was mainly carried by manufacturing activities, the share of which in GDP increased from 11.0 % in 1981 to 19.9 % in 1991. That Indonesia has achieved to establish an industrial base is reflected in the fact that the major source for this structural transition have been non-oil related manufacturing activities. Their share in GDP increased from 8.4 % in 1981 to 15.5 % in 1991, the balance of 2.6 % and 4.5 %, respectively, being accounted for by oil (oil refining and LNG) related manufacturing activities.

15. The growth performance (in real terms, 1983 constant price basis) of major GDP sectors over the period 1981 to 1991 reveals that the industrial sector and within this sector the manufacturing subsector have been the "engine of growth". Real GDP growth over the reference period averaged 5.6 %, while that for industry recorded 10.0 % and that for manufacturing some 12.2 % (with oil related activities) or 11.5 % without oil related manufacturing activities. Real growth performance of the agricultural sector averaged 2.8 % and that of services 6.7 % over the same period.

NOTE :

Part A of this chapter is mainly based on the following documents : (1) Indonesia - Sustaining Development; The World Bank, Washington ,D.C., 1994; (2) Indonesia - Growth, Infrastructure and Human Resources, The World Bank, Report No. 10470-IND; Washington, D.C., May 1992; (3) Prospects Of Industrial Development In Indonesia; Final Report of the Industry Analysis Project; Ministry of Industry, Jakarta, 1991; (4) World Development Report 1992; Development And The Environment; The World Bank, Washington, D.C., 1992

16. A sensitivity test employing weighted real growth rates indicates that Indonesia's GDP growth performance has been and will continue to be highly sensitive to the growth performance in the services (mainly trade, transport & communication) and industrial sectors. Within the industrial sector itself, growth of manufacturing activities carries the strongest impact. Given Indonesia's current factor endowment and mix, a 2.2 % real growth in the services sector will result in 1.0 % real GDP growth. This interrelationship is 2.5 % for industrial and/or 2.8 % for manufacturing sector growth.

17. Indonesia's current account in the balance of payments (BoP) has been in deficit since 1978 with the exception of the fiscal years (FY) 1979/80 and 1980/81. Indonesia is an oil exporting country and the BoP's current account position is, therefore, highly sensitive to movements in the international oil and gas price. Over the period 1978 to 1993, covering some 15 FY, the average annual current account deficit has been in the order of - 2.4 billion US $ with an increasing trend since the beginning of the 1990s. Since the second half of the 1980s the Government of Indonesia (GOI) is implementing measures to boost non oil exports and reduce the country's dependency on oil exports and revenues.

18. Total exports in FY 1978/79 accounted for about 8.0 billion US $ out of which some 50.2 % resulted from the export of oil and LNG. In FY 1992/93 total export value amounted to some 25.7 billion US $ out of which only 15 % accounted for oil and LNG exports. The success of Indonesia's strategy and policies in this regard is illustrated by the relative shift in the structure of non-oil exports. Over the eight years period 1984 to 1992, for example, the value of agricultural and mineral exports increased by a factor of 2. The export value of manufactured products, however, increased by a factor of 6, mainly carried by exports of textiles and other manufactured goods.

19. The agricultural sector remains the main source of employment for Indonesia's growing labor force. Its relative importance is, however, declining. In 1971 the agricultural sector employed 64.2 % of the country's 41.3 million large labor force, while the manufacturing sector employed some 2.7 million people equivalent to 6.5 % of the total. In 1990 the agricultural sector employed 35.5 million people, equivalent to 50.1 % of the total labor force. The manufacturing sector accounted in the same year for 11.6 % of the 70.8 million strong labor force, equivalent to 8.2 million people.

20. Since the "New Order" Government came to power in the second half of the 1960s, Indonesia has managed to control inflation and keep the inflation rate at about or somewhat below 10 % per year. Since the mid 1980s the GOI has also implemented measures to liberalize the investment climate mainly with a view to attract more foreign direct investment (FDI). Approved foreign investments have increased dramatically in the second half of the 1980s. Total approved FDI over the period 1981 to 1986 amounted to about 8.2 billion US $. Over the subsequent years 1987 to 1992 total approved FDI amounted to about 38.4 billion US $ showing a clear increasing annualized trend. About 63.4 % of that total is FDI in the manufacturing sector.

21. Indonesia's external debts have increased considerably over the period 1981 to 1992, from some 26.95 billion US $ in 1981 (basis total debt outstanding, including undisbursed) to about 70.91 billion US $ in 1992. However, in spite of severe external shocks in the mid-1980s, including the collapse of oil prices, the rise in international interest rates and the depreciation of the US dollar, Indonesia has serviced its debt without requiring rescheduling at a time, when many oil-exporting countries encountered serious debt difficulties. Despite its large debt, Indonesia retains access to voluntary market finance . The debt service ratio (DSR), which stood at about 36 % during the years 1987 to 1989 has been brought down to about 30 % in 1992.

22. Since the early 1980s, the GOI has employed the exchange rate mechanism to counter macroeconomic imbalances and keep Indonesia's exports competitive. The exchange rate to the US $ stood in 1979 at US $ 1 = Rp. 623. In 1983 and 1986 the Rupiah was drastically devalued to Rp. 970 and Rp. 1,644 to the US dollar, respectively. The value of the Rupiah is determined against a basket of currencies in a floating approach. In October 1993 the exchange rate stood at Rp. 2,107 against 1 US $.

23. Indonesia's achievements in the social and human resource development fields are likewise impressive. The number of people living below the poverty line has been brought down to about 27 million people, equivalent to 15 % of the population. The life expectancy at birth has been increased from 41 years (1960) to 62 years in 1990. The adult illiteracy rate has been reduced from 61 % in 1960 to 23 % in 1990. The infant mortality rate has been reduced , primary and secondary enrollment ratios have increased considerably.

24. April 1994 marks the starting date of Indonesia's new 5 years development plan REPELITA VI as well as the new 25 years perspective plan. REPELITA VI covers the period 1994/95 to 1998/99, while the perspective plan goes up to the year 2020. The main objectives of REPELITA VI are :

- to achieve high growth in industry in terms of value added, employment creation and export with a view to make the industrial sector the "engine of growth" for the national economy

- to broaden the depth of the industrial structure through increased technology capabilities and optimal utilization of resources

- to increase the industrial competitiveness and reduce the dependency on imports

- to develop small and medium industries (SMIs), including rural industries

- to develop industrial locations in other regions of Indonesia, including Eastern Indonesia.

25. For achieving the above mentioned goals the GOI has established the following basic policies :

- to promote the development of an internationally and market oriented industry in particular resource-based industries using advanced technology, high skill and manpower intensive industries and technology intensive industries

- to promote the development of industry through the accelerated acquisition of technology

- to promote the market mechanism with the "enabling environment"/business climate as main actor

- to promote industrial growth with equality.

26. REPELITA VI further identifies development programs in support of the above policy objective-instrument mix. These programs are divided into two major groups, namely main and supporting programs. The main programs include promoting the development of home industries, SMIs, promoting the development of an indigenous industrial technology base and managing the industrial structure. Supporting programs are geared towards environmental pollution control, the development of industrial information, education, training, industrial extension and industrial research and development (IRD). A brief listing of both programs is provided in the following box 1.

BOX 1 : SUMMARY LISTING OF DEVELOPMENT PROGRAMS UNDER REPELITA VI : 1994/95 TO 1998/99

A. MAIN PROGRAMS

a. Supporting SMIs and home industry
   1) Development of Human Resource Industry (HRD)
   2) Development of home and rural industries
   3) Development of SMIs
   4) Development of an institutional support system for SMIs

b. Development of industrial technology base
   1) Development of product and manufacturing
   2) Development of industrial engineering and design
   3) Development of environment friendly technology
   4) Technology transfer and dissemination
   5) Standardization, certification and accreditation

c. Programs for the management of the industrial structure
   1) Expansion and/or strengthening of
      (a) agro-based industry
      (b) industrial processing of mining products
      (c) strategic oriented industry

   2) Development of export oriented industry
   3) Industrial human resource development
   4) Development of Industrial Organization
   5) Extension of industrial dissemination

B. SUPPORTING PROGRAMS

a) Program on environmental pollution control
b) Program on Development of industrial information
c) Program on education, training and industrial extension
d) Program on industrial research and development

SOURCE : Unofficial translation of parts of REPELITA VI by UNIDO office, Jakarta.

27. Indonesia has achieved significant economic progress over the last 25 years: continued strong growth, resilience to major external shocks, implementation of substantial structural reforms that diversified the economy, expanding the role of the private sector and reducing the reliance on oil, considerable reduction of poverty and a start on improving environmental management. A strong economic foundation has been laid and brought the country to a new threshold of development. However, the transition to a higher level of development will be associated with fundamental structural shifts and changes in the nature of the policy agenda.

28. The single most important key issue for entry into the 21st century will be that of sustaining development for a growing population that is likely to reach a level of about 209 million people in the year 2000 and some 275 million by the year 2025. Key challenges which currently occupy Indonesian policy makers are :

- to increase domestic resource mobilization and manage carefully external financing in view of the country's high external debts
- to bring down the currently high real interest rates
- to remove the strains from the financial system
- to promote further private sector involvement and increase productivity and efficiency

- to promote equity and reduce regional imbalances.

The following table 1 provides a summary overview as seen by the World Bank on the major policy areas and objectives which will have to be addressed by Indonesian policy makers in the years to come. Table 2 gives a brief overview on Indonesia's past macroeconomic performance and provides some projections. The projections are based on World Bank estimates.

A.2 The International, Regional And National Steel Sector

29. The development of the Indonesian steel sector will have to be seen and interpreted within the context of continuing globalization of production, trade and consumption, that is national industries will have to be (increasingly) import competitive. Assuming that overall global trends continue in the same direction, future trends in the world steel market will show a similar picture like in the past decade. The may be summarized as follows :

- relatively stable supply relations between OECD member countries
- increasing interdependencies between developing and OECD countries
- EC exports of low value added steel products are likely to decline further with imports into the EC of that product range increasing
- the steel sectors in the former USSR and Eastern Europe may, as a result of current restructuring exercises, emerge as a competitor for exports into the industrialized world.

30. The most far reaching regional event for the steel sector in general and the project under consideration has been the creation of the "ASEAN Free Trade Area" (AFTA) AFTA will be established within 15 years, effective January 1, 1993. The GOI has already reacted to this development by lowering import tariffs to a 10 % level and removing all surcharges on steel imports. Tariffs are likely to be reduced further to 5 % before the year 2005.

31. The Asia Pacific region is considered the single most important source of growth in terms of steel capacity build up and trade. Steel production in the region accounted in 1990 for about 32 % of the world's total (some 770 million tones). Japan, South-Korea and China are the regions three largest producers, followed by Taiwan, Australia and India. Steel output in the ASEAN countries (Brunei, Indonesia, Malaysia, Philippines, Singapore and Thailand) was at a 4.7 million tons level in 1990, equivalent to about 1.9 % of the Asian-Pacific Region's total or some 0.6 % of the world's total in that very year.

32. Indonesia is among the ASEAN member states the largest steel maker and the second largest in South East Asia (SEA) after Taiwan. Indonesia, Thailand and Malaysia have ambitions to become middle sized players (relative to other countries in the AFTA and possibly APEC regions) in the steel sector. It is expected that in terms of production capacity Indonesia will rank first in 1995 with a raw steel output of about 5.6 million tons per year (tpy) and that Thailand will be overtaken by Malaysia (3.2 million tpy forecasted) and the Philippines (2.2 million tpy forecasted). However, ASEAN countries are expected to remain a net importer of steel well into the next century.

TABLE 1 : SUMMARY OVERVIEW ON POLICY CHALLENGES AND OBJECTIVES AS SEEN BY THE WORLD BANK

REQUIRED POLICY AGENDA	: THE CHALLENGES
GROWTH POLICY	1) Promote growth with stability 2) Maintain balanced macroeconomic environment 3) Support structural transformation 4) Support shift in public-private sector roles 5) Promote Transition from quantity to quanlity
EQUITY POLICY	1) Continue to reduce poverty 2) Ensure widespread regional participation in development 3) Promote broad-based private sector growth
ENVIRONMENT POLICY	1) Support efficient use and conservation of Indonesia's natural resources 2) Take measures to protect the water resources 3) Take measures to control deforestation, land degredation and loss of biodiversity 4) Control air and water pollution and hazardous waste disposal 5) Provide better sanitation, solid waste disposal

SOURCE Indonesia - Sustaining Development, The World Bank, Washington, D C 1993

REQUIRED POLICY OBJECTIVES

a) Keep the current account deficit on a downward course, reduce it to about 2 % of GNP
b) Carefully manage the external debt
c) Sustain non-oil GDP growth of about 6-7 % p.a.
d) Rise the overall investment rate from about 2 % in 1992 to about 25.5 % towards the end of the decade
e) Increase the national savings rate from about 20 % in1992 to some 23.5 % towards the end of the decade
f) Balance and coordinate the use of fiscal, monetary and exchange rate policies
g) Allocate public savings to priority investments, guided by a sound set of priorities
h) Restore strong momentum to the structural reform program and focus on markets and domestic and external sources of competition
i) Continue trade reform by eliminating all non-tariff barriers (NTBs) and reducing tariffs
j) Deregulate domestic trade by dismantling trading monopolies
k) Reform domestic pricing policies
l) Continue liberalizing the investment regulations for both domestic and foreign investment
m) Promote more flexible and efficient factor markets (land market, technology market, labor market)
n) Develop up-to-date commercial, credit and contract laws, standards for accounting, auditing and financial disclosure
o) Provide incentives to protect environment
p) Improve the efficiency and quality of investment, in particular that of public investment (systematic evaluation of project proposals)
q) The composition of investment should emphasize complementarity in private-public investment, with public investment focused on infrastructure and human resource development
r) Increase effectiveness and efficiency of expenditures on poverty alleviation and raise expenditure on environmental protection
s) Accelerate public enterprise reform and improve public sector management

TABLE 2 : PAST AND PROJECTED KEY ECONOMIC INDICATORS [UNIT : percent]

INDICATOR	PAST			ESTIMATED				PROJECTED	
	1978-83	1983-87	1988-89	1990	1991	1992	1993	1994-95	1995-2000
[Average real growth rates, %]									
Gross Domestic Product	6.5	5.0	6.6	7.1	6.6	5.8	6.3	5.7	6.0
Non-oil	7.0	5.7	7.8	6.9	6.3	7.5	6.7	6.9	7.0
Non-oil exports	10.5	12.2	17.8	2.8	24.3	26.6	10.4	9.3	8.6
Fixed investment	10.7	-3.7	11.9	14.6	6.0	5.0	7.0	7.2	7.6
Private	9.1	0.9	10.7	16.2	3.0	3.7	7.6	7.9	8.0
[Macroeconomic balances, %]									
Current Account/GNP	-7.8	-2.5	-1.9	-3.4	-3.8	-2.4	-2.2	-2.0	-2.0
Overall public sector balance/GDP	-4.8	-2.7	-2.1	0.3	-1.1	-1.4	-0.6	0.4	0.2
MLT debt service/exports	16.8	34.8	35.8	29.7	31.6	30.0	29.7	25.5	17.6
[Structure of the economy, %]									
Non-oil exports/total exports	23.0	51.9	61.1	55.0	64.0	70.5	n.a.	n.a.	n.a.
Non-oil revenue/ total revenue	35.6	56.5	58.9	57.0	62.3	66.0	n.a.	n.a.	n.a.
Non-oil manufacturing/GDP	9.9	12.8	13.9	14.9	15.4	16.0	16.6	18.0	22.2
Private fixed investment/ total fixed investment	52.1	60.6	58.7	59.1	57.7	57.0	57.0	57.6	58.1

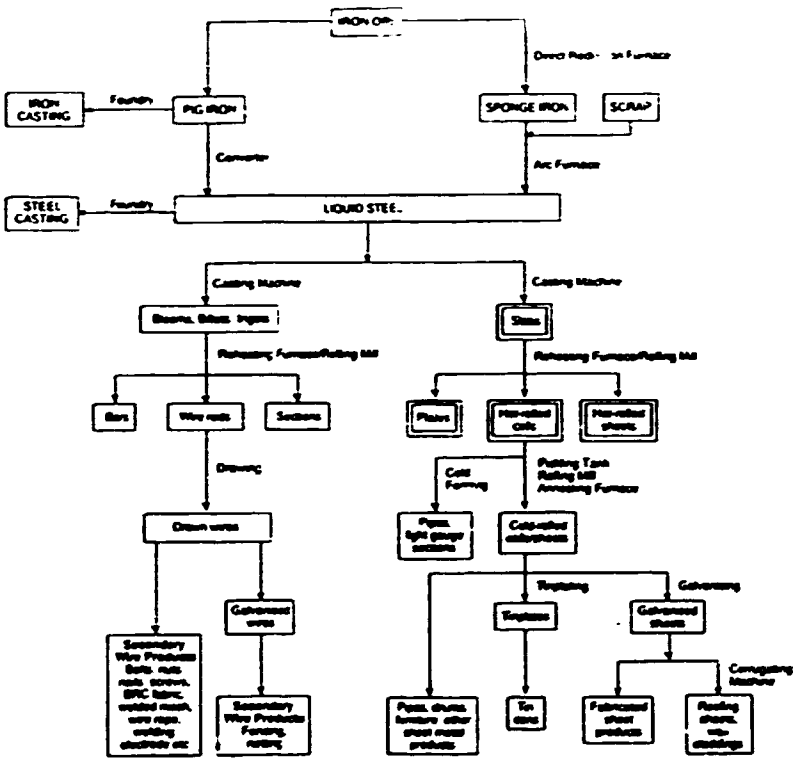
SOURCE Indonesia - Sustaining Development, The World Bank, Washington, D.C. 1993, tables 1.1 and 2.6 on pages 4 and 46, respectively

NOTE : n.a. = not available.

33. Indonesia's state-owned steel making enterprise "PT Krakatau Steel ' (PTKS) remains the only integrated steel making complex in the ASEAN member states. The complex came on stream some 19 years ago in 1975. The plant comprises a steel plant based on the direct reduction/electric arc furnace technological route, a hot rolling mill, a cold rolling mill and a wire rod mill. The plant's sponge iron facilities have been modernized recently and a second steel slap plant with a rated capacity of 800,000 tons per year has been established. *)

34. Figure 1 below provides in stylized form an outline of the interrelationships in the iron and steel industry.

FIGURE 1 : OUTLINE OF INTERRELATIONSHIPS IN THE IRON AND STEEL INDUSTRY



*) Installed capacities after the recently concluded modernization are (status 1994) : sponge iron 2.3 million tpy; slab steel plant 2.0 million tpy, billet steel plant 0.54 million tpy, hot rolled mill 2.3 million tpy, cold rolled mill 0.85 million tpy and wire rod mill 0.27 million tpy.

35. There are some 160 iron and steel industry establishments throughout Indonesia (1990 base) and domestic hot rolled steel production in 1992 reached 3.024 million tpy, out of which 40 % were produced by privately owned small and medium size non integrated producers and the balance by PTKS. The production program mix of the privately owned establishments is concentrated on bars and rods. Since domestic demand exceeds production, the balance of steel is imported.

36. The structure of those estimated 160 establishments is dominated by 1 integrated and 15 semi-integrated steel works (PTKS being the only integrated establishment) and some 15 re-rollers (hot rolling only). Table 3 provides a summary of installed capacities and production levels by major product groups in 1991.

37. According to REPELITA VI, the GOI plans to build up capacities as follows :

- to increase billet production from about 2.376 million tpy to 2.860 million tpy over the planning period. The planned increase implies an average annual growth rate of 3.8 % per year over the five years planning period

- to increase slab production from 1.050 million tpy to 1.560 million tpy. This increase implies an average annual growth rate of 8.2 % over the REPELITA VI period

- to increase HRC production from 1.700 million tpy to 2.410 million tpy. This increase implies an average annual growth rate of 7.2 %

- to increase CRS production from 466.5 million tpy to 660.0 million tpy. Underlying this increase is an average annual growth rate of 7.2 % over the REPELITA VI planning period.

38. It is the intention and wish of the GOI that the private and public sectors play distinct roles in the development of the Indonesian steel sector. Major policy objectives are that PTKS will concentrate investments in the capital intensive upstream steel making sector and the production of flat products, while the private sector will be encouraged to invest in the long product sector and the down stream steel industry.

A.3 The Institutional Set-up

39. Two Ministries play an important direct role in the intended development of the Indonesian iron and steel sector, namely :

- the Ministry of Industry, Directorate General for Machine, Basic Metal And Electronic Industries. The Ministry of Industry is responsible for 1) the formulation of steel sector policies and, 2) the operational and technical aspects of PTKS. The Ministry is furthermore consulted by the Investment Board BKPM when applications are filed by domestic and/or foreign investors for projects in this sector

- the Agency for the Assessment and Application of Technology (BPPT). This agency which has the status of a Ministry, hosts the "Agency for Strategic Industries" (BPIS), which is responsible for all state -owned strategic industries, including PTKS.

An important role is also played by the "National Development Planning Agency" (BAPPENAS), the opinion of which carries a strong weight in defining and selecting priority criteria for the implementation of public sector investment projects.

TABLE 3 : STEEL PRODUCTION CAPACITIES, PRODUCTION LEVELS AND EXPECTED EXPANSION PROJECTS (STATUS 1991) [UNIT : 1,000 tpy; %]

TYPE	NUMBER OF ESTABLISHMENTS	PRIMARY CAST PRODUCTS	HOT ROLLED PRODUCTS	REMARKS
INTEGRATED STEEL PLANT	1 PTKS	FLAT PRODUCTS (SLABS) Capacity : 1,030 tpy Production : 964 tpy NON-FLAT PRODUCTS (BILLETS) Capacity : 540 tpy Production : 574 tpy	HOT ROLLED COIL (HRC) Capacity : 1,300 tpy Production : 1,100 NON-FLAT PRODUCTS (BAR,WIRE) Capacity : 510 tpy Production : 354 tpy	Capacity utilization for primary cast products in 1991 : 98 % Capacity utilization for HRC: in 1991 about 80.3 %
SEMI-INTEGRATED STEEL WORKS	15 Establishments Locational distribution : 6 in Jakarta 3 in East Java 2 in West Java 1 in Central Java 2 in North Sumatra 1 in South Sulawesi	FLAT PRODUCTS (SLABS) No installed capacity NON-FLAT PRODUCTS (BILLETS) Capacity : 3,159 tpy Production : 1,642 tpy	HOT ROLLED COIL (HRC) No capacity installed NON-FLAT PRODUCTS (BAR,WIRE) Capacity : 2,136 tpy Production : 1,069 tpy	Capacity utilization for non-flat products : 52.0 % Capacity utilization for HRC non-flat products : 50.0 %
RE-ROLLERS HOT ROLLING ONLY	15 Establishments	NOT APPLICABLE	FLAT PRODUCTS Capacity : 440 tpy Production : 92 tpy NON-FLAT PRODUCTS Capacity : 638 tpy Production : 422 tpy	Capacity utilization for flat products :about 21 % Capacity utilization for non-flat products : about 66 %

SOURCE Bankable Feasibility Study for the Erection of a Second Generation Integrated Steel Mill in West or East Java, Final Report, table 3.4, pages 3/8 and 3/9

40. The state-owned steel maker PTKS has been classified by the GOI as belonging to the strategic industries. Strategic industries are defined as follows :

- "The term strategic industry refers to industries which play an important role in the national defense and security, and also the industries that assume the responsibility as the backbone of the national industrial growth."

41. There are currently ten state-owned enterprises which are categorized as strategic industries. The following box 2 provides a listing of these enterprises and identifies their major production program mix.

BOX 2 : INDONESIA'S STRATEGIC INDUSTRIES

COMPANY NAME	PRODUCTION PROGRAM MIX
1) KRAKATAU STEEL (PTKS)	Sponge iron, steel slab, HRC, CRC, steel billet, structural steel, steel wire, rods
2) BARATA INDONESIA	Heavy machinery, construction, iron & steel castings, installation, engineering
3)BOMA, BISMA, INDRA	Combustion engines, generators, construction plates, factory & agricultural equipment, factory engineering
4)INKA	Rolling stock, trailers, containers, cranes, vehicle construction
5)DAHANA	Dynamites and other industrial explosives (for construction & mining)
6)INTI	Telecommunication equipment
7) IPTN	Aircraft, helicopters, weapon systems
8) LEN INDUSTRY	Electronics products
9) PAL INDONESIA	Ship building, steam turbines and boiler, steel construction,
10) PINDAD	Weapon and munitions, air brake system, forging and casting products, deck machinery

SOURCE: Agency for Strategic Industries

B. Project Background, Justification And Rationale

42. As has been observed above, the Indonesian steel sector is classified as one of the country's strategic industries. The GOI has over the past years not only undertaken

measures to upgrade the performance of PTKS and modernize part of the company's facilities, but several studies have been undertaken and/or are being undertaken investigating strategic options at steel sector level, the future market situation and the operations of PTKS itself. Major studies are :

- a steel sector master plan undertaken in the late 1980s by British Steel
- a market study undertaken by Arthur D, Little in the early 1990's
- a pre-feasibility study undertaken in 1992 by Itochu Corporation and Japan Asia Investment Company, Ltd. on the second generation integrated steel mill
- a optimization study for PTKS undertaken by B.Allen. This study is currently being finalized, and
- the UNIDO Second Generation Steel Mill (SGSM) study, which was undertaken by UNIDO and completed in March 1994.

43. Since the GOI pursues the SGSM project, there have been two major competing groups of hardware and technology suppliers which advocate the most appropriate project for the SGSM. They are :

- a Japanese interest group, which suggests that the SGSM be build employing the well proven technological route of a blast furnace (BF -BOF) route. The pre-feasibility study undertaken by Itochu corporation investigates this option
- an Austrian interest group, which has approached the GOI in early 1990 with a view to advocate the newly developed COREX technology for Indonesia' SGSM.

44. In fact the supplier of that new process technology, the Austrian Voest-Alpine,, suggested to the GOI to undertake at their own expense a feasibility study which would investigate the intended SGSM project with the assumption the new integrated mill will be based on the new COREX technology. This proposal was reviewed by both, the Indonesian and Austrian Governments, which suggested to undertake that study under the umbrella of an impartial and neutral body.

45. UNIDO was approached in this matter and agreed to implement said study.. Financing was provided by the Government of Austria (GOA) through UNIDO's Industrial Development Fund (IDF). The provision of financing was subject to one conditionality, that is that tendering for project execution would be limited to Austrian (national) consultancy companies.

46. The final terms-of-reference for the study were formulated by UNIDO/FEAS and particular emphasize was placed on identifying an optimal feasible alternative under techno-economic, environmental and energy conservation considerations with primary attention to be paid to the choice of technology and factory site/location.

47. The project's justification is embedded in the following needs on the Indonesian side :

- the intended SGSM project is a "mega project" *) in a critical sector. Hence, there is a strong need to base decisions on a comprehensive and objective feasibility investigation. Decision takers in the GOI don't have the capacity and capabilty to undertake such an exercise

---

*) In the Indonesian context "mega projects" are defined as those involving a total investment of over US $ 500 million.

- general global trends and the Indonesian development policy require that environmentally friendly process technologies are selected, in particular in steel manufacturing , which has a strong environmental impact

- the decision on the SGSM involves a critical decision on the most appropriate technological path. The BF-BOF process is a proven technology, but its minimal operational size is between 2.5 to 3.0 million tpy and it was unclear, whether this capacity build-up could be absorbed in the domestic and regional markets. In addition, the BF-BOF route requires a coke and sinter plant, both of which have strong negative environmental impacts

- the proposed COREX technology path, on the other hand, is an emerging clean(er) technology, which is employed on a commercial basis in only one enterprise, the ISCOR factory in South Africa. A second COREX unit is currently under construction at the South Korean steel works POSCO. It is understandable in view of this situation that technological and commercial viability of this process technology remain subject to further questioning and scrutiny.

48. The lead time of projects in this category is some 1.5 to 3 years. Steel making capacity buiid-up is likely to be needed in the second half of the 1990s. Hence, the completion of the study under consideration comes timely.

C. Analysis And Assessment of the Project Document

C.1 The Problem and the Approach

49. The project's function is "direct support". The project document (PD) is structured along UN/UNIDO standards. Paragraph 1 in part B "Project justification" identifies the core problem as quoted :

" The problem is to assess several investment alternatives, and to evaluate financial, economic and environmental impacts in order to determine the optimal feasible alternative, recommended for implementation."

50. The project document requires that particular attention be paid to the following issues and aspects :

- the choice of technology. In this context clean technology should be given priority

- the location/site of the new integrated steel mill

- the environmental impact stemming from construction and operations of the new mill

- the aspects of energy conservation

- the impact on the economy of Indonesia (backward and forward linkage effects).

51. The approach taken by the subject project covers the aspects of overall project implementation, organization and management and the methodological approach chosen for the feasibility study itself. For carrying out the tasks individual international and national experts were recruited and sub-contractors selected by UNIDO to cover the following fields of expertise :

- One project coordinator
- One senior industrial engineer (engineering design and technology assessment expert)
- Two market analysts, marketing experts, supported in phase 2 by a local market assessment expert
- One expert on environmental aspects
- One financial and economic expert (Associated expert)
- One national project coordinator (industrial economist/financial analyst , later substituted for).

52. Four subcontracts were covered, namely :

- technology design for steel making and casting/rolling (for the pre-feasibility study/Interim Report)
- basic technological design (materials and process flow), basic plant lay-outs (for the feasibility study/ Final Report)
- marketing research and data assessment (at Indonesian level)
- laboratory testing of ore and coal.

53. In order to ensure that the activities are properly supervised and the outputs coordinated and integrated into the required feasibility study format (see below), the project was to be jointly managed by UNIDO's backstopping officer (BSO, UNIDO/ FEAS) and the recruited project coordinator.

54. Project implementation has been split into two principal phases, namely :

1) PHASE 1 : up to the Interim Report(s), total estimated duration of 7 to 8 calendar months after project start-up. The Interim Report was to provide the decision basis for Indonesian decision takers on the choice of technology and location

2) PHASE 2 : up to the Final Report(s), with a total estimated duration of 6 calendar months. The Final Report was provide the feasibility investigation for the alternative, selected an basis of the Interim Report.

55. The methodology and concept to be followed during both phases of project implementation was that of UNIDO's standard as outlined in the UNIDO "Manual for the Preparation of Industrial Feasibility Studies" (2nd. ed. 1991) and all calculation were to be undertaken employing UNIDO's COMFAR computerized feasibility analysis model.

C.2 Objectives, Indicators And Major Assumptions

56. Part C. of the project document identifies the project's development objective in a more implicit than explicit fashion. It is accepted by the project's designers that the GOI has designated the steel industry as a strategic industry and that the development of the steel sector is a necessity, given Indonesia's current stage of development and given her national aspirations.

57. Under such circumstances, the project's development objective may be defined (in the words of the evaluation mission) as a necessary step for contributing to the country's sustainable growth by strengthening her industrial base. The project contributes also to environmental and energy conservation considerations through the identification of an ecologically feasible technological route.

58. Part D. of the project document states the immediate objectives as follows :

"The project (feasibility study) shall determine an optimal technological and locational alternative, optimal from the financial (commercial), economic (including but not limited to techno-economics) and environmental point of view, and to enable the investor(s) and other parties concerned to decide as to whether and how to implement the second generation steel mill project."

59. Objectively verifiable indicators (OVI) are not identified in the project document. However, obvious OVIs are the timely submission of the Interim and Final Reports in the required formats and in line with the subject areas to be covered. One critical build-in OVI is after completion of phase 1 , that is the submission of the Interim Report, which was to form the basis for the Indonesian decision takers to select one out of the five alternative technological routes and locational sites for the final feasibility calculation.

60. The project reflects explicit and implicit assumptions. Explicit assumptions as identified in the project document are as summarized below :

- it is assumed that the Indonesian economy and its demand for steel will grow at rates significantly faster than those in the mature developed world well into the next century

- that a 5 per cent annual growth rate is a reasonable trend line for long-term planning of steel production requirements over the period 1995 to 2005. Thus, Indonesia will need to double its steel making capacity in the decade after 1995.

61. Implicit assumptions underlying project design and implementation are :

- that the final decision on the SMGM will be guided by and made on basis of the results and recommendations made in the project's feasibility study

- that the SGSM will have to compete and be competitive against other planned and pipeline mega projects (see also chapter III)

- that the GOI is in a position to obtain the desired share of public sector financing

- that the decision on the selected technology and location/site taken by the Indonesian side after review of the Interim Report will not be revised

- that private sector participation in project financing and implementation can be secured timely and adequately

- that financing from international financing institutions can be secured (see chapter III).

The implicit assumptions on technology route and factory site, private sector participation and securing of financing are critical assumptions for eventual successful implementation of the SGSM (see also chapter III).

C.3 Beneficiaries

62. The project's beneficiaries comprises three groups, namely :

- the Government of Indonesia (primary target group)
- potential investors and financing institutions, and
- general project sponsors.

63. The project document summarizes the target beneficiaries as follows :

"The detailed analysis and evaluation of the technological and locational options, and the determination of an optimal alternative will allow the Government of Indonesia to assure that the investment project will make optimal use of scarce resources and will be fully in line with defined industrial development policies. Investors and financing institutions will benefit from the detailed assessment when appraising the investment and providing finance."

C.4 Workplan

64. A general workplan/implementation schedule in form of a bar-chart is attached to the project document in annex I. The workplan identifies the project's 19 major activity blocks with their estimated total duration, sequencing, starting and completion dates. Reporting requirements are identified as well as the project's critical stages.

II. PROJECT IMPLEMENTATION

A. Delivery of Inputs

A.1 UNIDO Inputs

65. Table 4 summarizes the project's original budget as well as the budget situation according to the latest available project allotment document (PAD), which is dated 14 March 1994. The original project budget of US $ 1,603,000 (excluding the UNIDO program support cost component) was distributed over inputs as follows : 44.5 % for the project personnel component; 53.3 % for subcontracts 0.6 % for expendable equipment and about 1.5 % for sundry expenses. The project did not cover any training and/or non-expendable equipment components.

66. The project was reviewed by the PRC meeting on 11 December 1991 and signed by UNIDO on 12 December 1991. The original project duration was estimated at 18 calendar months that is 1.5 years implementation time. However, unforeseen circumstances resulted in :

- an increase in the budget from US $ 1,603,000 to US $ 1,673,000 (an increase of some 4.4 %) which became necessary due to some minor shifts required in three areas of expertise (see also paragraph 68. below), and

- a delay in overall project implementation caused by difficulties in recruiting the national project coordinator, which was substituted for by an international expert, and a delay of almost six months caused by the Indonesian side after receipt of the Interim Report. This delay has been due to the Indonesian internal decision finding process and procedure.

67. The project commenced operations in February 1992 and overall project inputs were delivered in accordance with the established workplan and implementation schedule. The project is on schedule, taking into account the delay caused by the Indonesian side. The Final Report(s) have been presented to and accepted by the GOI in March 1994 and the project will be completed by April 1994.

68. Some shifts in allocation of project resources were necessitated when it became clear that no national project coordinator with the required qualifications would be found in time (original budget line 17-01). Instead an international/associated expert (financial analyst/economist) was recruited with a total input of 11.5 M/M. Furthermore, the market analyst position was enlarged by adding a steel market specialist. These changes have resulted in minor shifts in the distribution of the budget over inputs as follows : the total project personnel component was increased from 44.5 % in the original budget to 50.1 % in the revised/increased budget. The subcontract component was slightly reduced from 53.3 of the original to 48.8 % of the revised budget.

69. Underlying the recruitment of the experts were job-descriptions attached to the original project document and prepared in line with UNIDO standard requirements.

70. A "Project Performance Evaluation Report" (PPER) has been prepared and finalized in November 1993. The implementation status of the project's major activity blocks has been reviewed against this document.

TABLE 4: PROJECT BUDGET AND DISTRIBUTION OF BUDGET OVER INPUTS

BUDGET LINE	ITEM	ORIGINAL BUDGET 1991	DISTRIBUTION (in % of total budget)	LATEST REVISION March 1994	DISTRIBUTION (in % of total budget)	REMAINING BUDGET 1994
	(UNIT)	[US $]			[US $]	[US $]
BL11-01	Project Coordinator	247,500 18.0M/M	15.4	295,554 26.5M/M	17.7	35,000 3.8M/M
BL11-02	Senior Industrial Engineer	165,000 12.0M/M	10.3	141,852 12.0M/M	8.5	0
BL11-03	Market Analyst	68,750 5.0M/M	4.3	41,511 3.0M/M	2.5	0
BL11-04	Expert on Environmental Aspects	96,250 7.0M/M	6.0	40,820 3.0M/M	2.4	0
BL11-05	Steel Market Analyst *)	0 0M/M	0.0	31,622 3.0M/M	1.9	0
BL11-06	Energy Conservation *)	0 0M/M	0.0	0 0M/M	0.0	0
BL11-07	Financial Analyst/Economist *)	0 0M/M	0.0	68,575 11.5M/M	4.1	0
BL11-08	Short-term Consultants *)	0 0M/M	0.0	5,454 1.0M/M	0.3	0
BL-11-99	SUB-TOTAL INTERNATIONAL EXPERTS	577,500 42.0M/M	36.0	625,368 60.0M/M	37.4	35,000 3.8M/M
BL13-00	Administrative Support	0 0M/M	0.0	18,281	1.1	5,000
BL15-00	Project Travel	77,900	4.9	121,498	7.3	15,355
BL16-00	Other Personnel Costs	21,100	1.3	77,000	4.6	34,309
BL17-01	National Project Coordinator	37,500 15.0M/M	2.3	0 0M/M	0.0	
BL19-99	TOTAL PERSONNEL COMPONENT	714,000 57.0M/M	44.5	837,443 60.0M/M	50.1	89,664 3.8M/M
BL21-00	Subcontracts	854,450	53.3	816,077	48.8	0
BL29-00	TOTAL SUBCONTRACTS	854,450	53.3	816,077	48.8	0
BL41-00	Expendable equipment	10,400	0.6	1,960	0.1	1,000
BL49-99	TOTAL EQUIPMENT COMPONENT	10,400	0.6	1,960	0.1	1,000
BL51-00	Sundries	24,150	1.5	17,520	1.0	12,136
BL99-99	PROJECT TOTAL	1,603,000 57.0M/M	100.0	1,673,000 60.0M/M	100.0	102,800

71. A Tripartite Review Meeting (TRM) was planned to take place during the presentation of the Final Report(s) in March 1994. However, the donor of project funds, the Austrian Government, did not find it necessary to participate in such an exercise, because of their high familiarity with the project and its achievements. The TRM was canceled in light of this situation.

A.2 Government Inputs

72. Successful implementation of the project depended crucially on receiving strong and active support from the Indonesian Counterpart side, that is in principle the Ministry of Industry, Directorate General for Base Metal, Machinery And Electronics. Such support refers to :

- a counterpart team, which comprises members of high enough level to decide after the Interim Report on (a) choice of technology, and (b) factory location/site
- the provision of data as needed for the feasibility study, in particular company related (and therefore sensitive data) on PTKS, sector and market related data, maps, soil data, topographic maps, other studies and so on
- the provision of samples of raw materials and coal for testing.

73. Required Government Inputs are described in detail in Part E, (a) of the project document. No other Government inputs in cash or in kind were required under the terms of the project document.

74. According to the Project Coordinator/CTA the project experienced difficulties in the beginning in securing full cooperation and access to important data from the Indonesian side. This was due to the fact that the initial perception on the Indonesian side may have been that the UNIDO executed project was actually a "marketing tool" employed by the technology supplier. It has to be pointed out, however, that the project managed very successfully to overcome that initial perception due to :

- the impartial management by UNIDO of overall project direction and implementation, and
- the deliberate and consistent coordination and cooperation with the Indonesian side, undertaken by the project's CTA, not only taking the Indonesian wishes into full account, but also adjusting project elements, where and when required by them.

B. Activities

75. All project activities as they refer to outputs 1 and 2 as specified in the project document have been implemented in time.

76. The following activity blocks have been implemented as inputs into output 1 (Interim Report) :

- determination and description of technology assessment criteria

- assessment of output from subcontractor (five alternative technological routes) on basic lay-outs and process flow sheets
- assessment of energy resources
- basic technology assessment
- supervision of subcontractor's technology design
- evaluation of alternative technological routes
- collection of local environmental data
- preliminary environmental impact assessment
- steel market investigation and analysis of market data
- primary field investigation (questionnaire) and evaluation of survey results
- preliminary financial and economic analyses.

77. During phase 1 of the project the following subcontract activities have been carried out in line with the established implementation schedule :

- technology design for five technological alternatives. This subcontract, which involves access to proprietor knowledge, was awarded to CONSORTIUM AUSTROPLAN - VAI
- laboratory analysis and evaluation of coal samples. This subcontract was awarded to E.C.V. Austria
- local data collection for the market survey. This subcontract was awarded to the well established Indonesian market research firm P.T. DATACONSULT.

78. The Interim Report prepared the basis for the Indonesian side to select one out of the five alternative technological routes and six potential sites for the SGSM. This decision, which was made after a six months delay, resulted in selecting the COREX technological route and the CILEGON site (factory location of PTKS) for the preparation of the final bankable feasibility study.

79. Activities during phases 1 and 2 followed the overall structure of feasibility investigations in accordance with the UNIDO manual. Hence, the following activity blocks were carried out during phase 2 of the project :

- in the area of marketing analysis and market concept : development of a marketing concept based on both, the results of the market research and the proposed production program mix and planned capacity build-up, estimation of sales revenues and marketing costs
- in the area of raw materials, energy and factory supplies : identification of requirements, including specific consumption figures, availability of raw materials, energy and utilities, projections of costs of raw materials and supplies
- in the area of location, site and environment : based on the selected site at PT Krakatau Industrial Estate Cilegon (the locational analysis was already covered in detail in the Interim Report) emissions from the SGSM are estimated, current levels of pollution are identified, the regulatory environment was investigated and conclusions formulated and recommendations made as regards necessary environmental protection measures

- in the area of engineering and technology : covering a general route description based on the selected COREX technology (smelting, steel making, thin slab casting, hot strip rolling), calculation of production time, basic plant lay-out and conceptional design of main plant units

- in the area of organization and overhead costs : covering general aspects of organizational structure and strategy, possible company structures, recommendation of an organizational structure and estimation of overhead costs

- in the area of human resources : covering an estimation of personnel requirements, recruitment and training as well as a training program outline

- in the area of project implementation scheduling and budgeting : scheduling and budgeting in line with UNIDO standard requirements

- in the area of financial analysis and investment appraisal : identification of general assumptions, estimation of sales, projections of operating costs, identification of financial structure, identification of the cost-structure, projected net income statement and balance sheet, cash flow analysis, NPV and IRR, analyses of uncertainty and risk employing a sensitivity and break even approach

- in the area of socio-economic evaluation : identification of major assumptions, in particular as they refer to shadow rates, ERR, assessment of value added generated, assessment of foreign exchange effect, assessment of employment effects and assessment of indirect effects and linkages.

80. Three further activities were carried out by the project during phase 2, which were in addition to the original terms-of reference for the study. They refer to :

- a qualitative comparison of the investment cost, operating cost and IRR and return on equity (ROE) between the BF-BOF (for 2.5 million tpy capacity) and COREX - BOF technological routes. This comparison was requested by the Indonesian side and has been included in the executive summary of the Final Report

- an additional chapter 12 in the Final Report on possible cooperation strategies between the existing PTKS and the proposed SGSM.

- preliminary investigations and contacts with international and national potential investors with a view to exploring their interest in financing and/or participating in the SGSM. These activities were carried out by the CTA in Indonesia and through a mission by the BSO (UNIDO/FEAS) to Hongkong, Singapore and Jakarta at the end of 1993 (Back to office mission report, UNIDO/ITPD/IS/FEAS, dated 06 January 1994).

C. Project Management, Monitoring And Backstopping

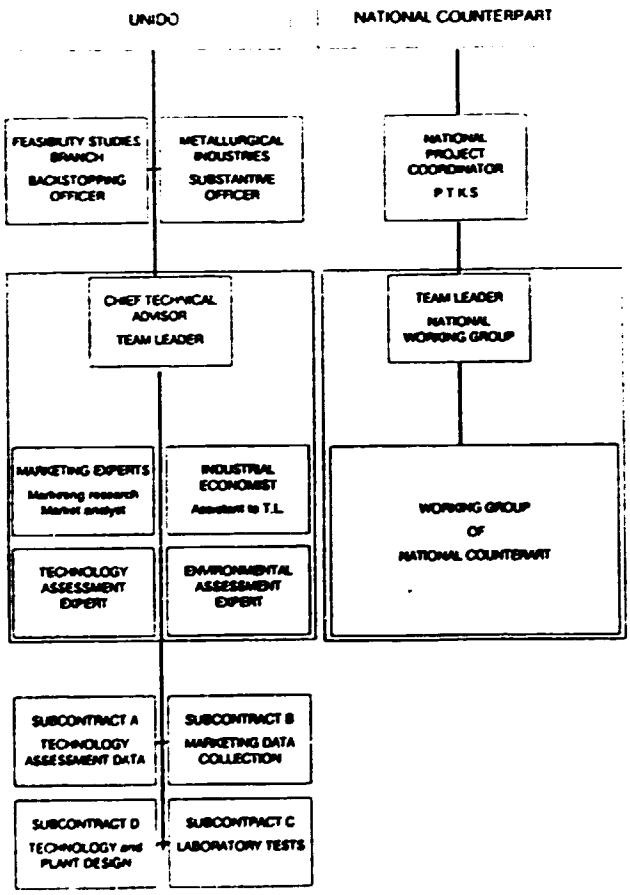
81. Efficient project management, monitoring and backstopping is one key element in the successful implementation of a feasibility study of that scope and size. Critical elements have been :

- to ensure continued cooperation and supply of reliable data from the source of technological proprietor knowledge

- to coordinate in a timely and suitable fashion the various inputs from subcontractors and other sources
- to maintain impartiality in judgment
- to overcome initial perceptions on the Indonesian side that the project was supplier driven
- to integrate Indonesian decision takers into project implementation and monitoring in a way that would allow them to call for corrections, if and when necessary.

82. It is the considered opinion of the evaluation mission that the above tasks were achieved successfully by the project. Evidence for this judgment are not only the timely implementation of the project and the outputs produced (see chapter III) but also the fact that the Indonesian side has, after initial problems, taken ownership of the project. As envisaged in the organizational set-up for the project as depicted in the following figure 2, a high level national working group/steering committee was formed, which guided the project at its critical stages.

FIGURE 2 : ORGANIZATIONAL SET-UP FOR PROJECT US/INS/91/183



83. A list of the members of the national working group/steering committee is attached as annex III to this document.

84. The fact that no suitable national project coordinator could be recruited timely may have proven rather an asset than a liability.

85. During phase 1 of the project, UNIDO could also rely on the services of a steel specialist in UNIDO/MI. The services of this officer proved to be very instrumental in the initial discussion with the Indonesian side on problems related to proven and emerging technologies in steel making. This support was not available during phase 2, because of the restructuring and streamlining of UNIDO's operations.

86. One critical issue to be pointed out here is the general availability and accessibility (distribution matrix and channels) of the reports prepared under the project. In cases in which such strong commercial and national interests are involved, UNIDO should take more measures to safeguard the interests of its client. UNIDO may wish in sensitive cases as is the one under consideration to number project reports and strictly control their distribution.

87. The evaluation mission was informed by UNIDO/OSG/EVAL before commencement of the mission that all reports prepared to that date would be available at UNIDO's office in Jakarta. However, with the exception of the IR, Main Text, copies of other documents could not be traced.

III. PROJECT RESULTS AND ACHIEVEMENT OF OBJECTIVES

A. PROJECT OUTPUTS AND RESULTS

88. In accordance with the project document, the project has resulted in two principal outputs, namely :

OUTPUT 1

- an Interim Report (IR), finalized and distributed in November 1992 and comprising four volumes :

  Interim Report : Main Text
  Interim Report : Annex 1 : Market Study
  Interim Report : Annex 2 :Description of Technical Routes (Parts A and B)
  Interim Report : Annex 3 :Preliminary Environmental Impact Assessment

OUTPUT 2

- a Final Report (FR), finalized and distributed in February 1994 and comprising likewise four volumes, namely :

  Final Report : Main Text
  Final Report : Annex 1 : Engineering And Technology Design
  Final Report : Annex 2 : Environmental Impact Assessment
  Final Report : Annex 3 : Techno-Economic Elaborations.

89. In addition an Inception Report(IC/R) was prepared which was to summarize the outcome, findings and recommendations resulting from the project's inception mission to Indonesia (16 February to 4 March 1992). This report does not need to be discussed further here.

90. Likewise and additionally preliminary talks were held with potential private investors in Indonesia, Hongkong, Singapore and international financing institutions. The results are presented and discussed further below.

91. The core task of the Interim Report (OUTPUT 1) was to provide the Indonesian side with a study at pre-feasibility level, which would serve as a basis for deciding on which technological route and location/site to base the final feasibility study. The overall structure of the IR follows generally accepted UNIDO standards and does not need to be further elaborated on.

92. It is commonly observed that the future of the steel industry is driven by R & D efforts to improve process technology towards :

- production units of smaller size (range from 0.5 to 1.5 million tpy)
- higher flexibility in production
- lower production/unit costs
- higher product quality, and
- widening of the raw material base.

93. The IR presents five technological routes for the production of some 1.64 million tpy liquid steel, equivalent to about 1.55 million tpy HRC. The alternatives are presented with their main modules and technical consumption figures (raw materials, energy, consumables). Selection criteria of technological choice are identified and the alternatives have been appraised and ranked from, inter alia, a financial and economic point of view.

94. The assessment of location and site has been undertaken for six alternative sites, namely :

- Bontang, East Kalimantan
- Cilegon, West Java
- Medan, North Sumatra
- Surabaya, East Java
- Ujung Pandang, Sulawesi
- Pare Pare, Sulawesi.

95. Based on an appraisal of fulfilling infrastructural key requirements for the five technological routes, the IR comes to the conclusion that the only site meeting the stipulated criteria is Cilegon. Cilegon is therefore recommended as the location for the SGSM project.

96. Based on the recommendations of the IR, the GOI decided to base the bankable feasibility study/ Final Report on the COREX-BOF technological route and Cilegon as the factory site.

97. The core task task during phase 2 of the project was to prepare a Bankable Feasibility study for the technological route and factory site selected by the Indonesian site and with a production capacity of 1.55 million tpy hot rolled coil. Furthermore, upon the request of the Indonesian side, implications of a production capacity of 2.5 million tpy for two technical alternatives, blast furnace and direct smelting, were assessed.

98. Overall, the bankable feasibility study meets all expectations on the technical, market, financial, economic and environmental sides in terms of structure, comprehensivness and completeness and precision. The study provides a very sound basis to be used as a tool by Indonesian decision takers to promote this mega project with either international and/or private investors.

99. The overall approach underlying the calculation is conservative and prudent and input - output price assumptions are realistic. The results of the calculations are based on market prices, that is zero subsidies. Major results and features are :

- the fundamental strategy for the SGSM is based on the fact that the project will come on stream in an increasingly competitive market with increasing import pressure. Hence, it is recommended to aim at high quality flat products to supply primarily the domestic market
- the market study has established the fact that the domestic market will not be large enough to absorb a capacity build-up of 2.5 million tpy as was the impression and intention of the Indonesian side before. The undertaken demand/supply balances for the year 2000 suggest to install a flat hot rolled steel capacity of 1.55 million tpy with a production program mix concentrating on hot rolled flat products as against hot rolled wide strip of ordinary steel

- the assessment of the different technological routes employing a comprehensive set of evaluation criteria demonstrate the COREX - BOF and DR - EAF to be the best choices, with COREX - BOF slightly ahead.

100. Total initial investment for the SGSM at planned capacity is about US $ 1.67 billion. On the financing side a sound debt - equity ratio of 60 : 40 is assumed. The opportunity cost estimations for loan capital are realistic.

101. The sensitivity analyses is comprehensive. Not surprising, the IRR and PBP are strongly sensitive to the sales price, efficiency of operations (operating cost) and capacity utilization. Under the assumption of an average sales price of US $ 359 per ton, the IRR is 9.73 % and the PBP 6 years. The IRR is very reasonable given the fact that

- margins in steel making are traditionally not very impressive
- steel making is a strategic sector, that is the IRR can only be one among other criteria
- real interest rates on deposits in Indonesia are at a 7 % level, with a likelihood to decline.

102. The ERR is some 12 % . In addition the project would generate over its planning horizon of 15 years a net foreign exchange effect of some US $ 4.25 billion.

103. Project risks and risk management features are identified. They refer to :

- efficiency of plant operations and capacity utilization levels
- a longer lasting decrease of international prices, including dumping prices
- supply of local raw materials (in particular coal), and
- delays in overall project implementation.

B. Immediate Objectives

104. The project was to provide Indonesian decision takers in the Ministry of Industry with a bankable feasibility study on the SGSM which should be based on an investment project design optimal from the financial (commercial), economic, technological, locational and environmental points of view.

105. The immediate objective was not only fully met, but additional tasks were undertaken to provide the Indonesian side with a complete and comprehensive set of feasibility assumptions and computations, which should enable them, in principle, to amend the study using various "what if " scenarios. Such "what if scenarios" refer in principle to sub-optimal technological and site/location choices.

106. The project's primary function was direct support to the Ministry of Industry and National Counterpart Organization/Steering Committee. The project has served this function fully, enabling these bodies not only to finally decide on how and when to proceed with the SGSM but also to use the documents for promotional measures among private international and national investors as well as international finance institutions.

C. Development Objective

107. The development objective of the project is in line with national strategies and priorities for the industrial sector, in particular strengthening the countries industrial base. The project has contributed to rationale and objective decision taking in mega projects of national dimension, the use of indigenous resources (coal) and environmental protection. If the proposed technological route as proposed is selected, the project would also have made an indirect contribution to upgrading the country technology base and manpower skills.

D. Relations to Other Projects

108 There have been no direct relations with other projects in the past. Major studies in Indonesia's steel sector and or on PTKS have been or are in the process of being finalized. The two more important efforts are the steel sector master plan undertaken in the late 1980s by British Steel and the optimization study for PTKS undertaken by Booze Allen & Hamilton.

109. It became clear, however, during the discussions with the Indonesian side and other interested parties during the field survey that urgent needs remain for assistance. They are identified in part F below.

E. Sustainability

110. In view of the nature of the project, its contribution to environmental protection is an element of primary concern as regards sustainability. Furthermore, in view of the high level of quality and depth of the project's outputs it is reasonable to assume that the project's results will be used at various levels on the Indonesian side to increase institutional capacity in the field of steel sector planning, steel sector project appraisal and feasibility considerations.

111. Both project outputs could serve as samples on the need for and usefulness of properly undertaken feasibility studies.

F. Remaining Issues And Outlook

112. The feasibility study has provided the basis on which a final decision for this investment project can be taken and potential investors approached. Given the lead times of 1 to 2 years for securing financing and the estimated construction time of 3.5 years for the SGSM, Indonesia has not very much time to loose to address the following issues :

- decide on a basic steel sector policy for the coming 15 to 20 years, covering such issues as strategic positioning of the country within ASEAN/AFTA and possibly APEC

- defining more clearly the roles of the public and private sectors in steel making
- improving the efficiency and profitability of PTKS and deciding on the (partial) privatization
- given a market oriented enabling environment, deciding on the most desirable corporate ownership structure for the SGSM, including any relations with PTKS and synergetic effects resulting from this relation
- deciding on and passing any legislation needed to fend off steel imports at dumping prices
- deciding on special incentives, if at all needed, to foster the development of the downstream industry.

IV. CONCLUSIONS

113. The project design is ambitious in the sense that one main and critical element of the feasibility study to be undertaken involved the assessment of an emerging technology for which full excess to proprietor knowledge is a prerequisite. This potential constraint was, however, overcome mainly due to UNIDO's/FEAS courage and resolve to take, at critical junctions, the necessary steps to ensure that vital cooperation and information would be forthcoming.

114. The project document went through UNIDO's project review committee and was approved in December 1991. The project's primary function has been clearly identified as "direct support" and the project document is well structured. The problem to be addressed is clearly stated and objectives, inputs, activities and outputs are systematically and appropriately interconnected. An overall workplan and implementation schedule is attached to the document. Likewise are job descriptions, which follow the UNIDO standard format. Project risks are stated.

115. The project has more than achieved its stated objectives. Both principle outputs, the Interim Report and the Final Report/Bankable Feasibility study provide a sound basis on which the GOI can base its further decisions for the second generation steel mill. Initial fears on the Indonesian side that the project may be a marketing tool to sell them a not yet fully proven technology (emerging technology) turned into confidence in and reliance on the approach and professionality of the project team and UNIDO.

116. During both phases of project implementation, the Indonesian Counterpart Organization was fully involved in project monitoring . The Interim Report was presented and discussed in December 1992. A further clarification meeting for phase 2 was held in February 1993. The Draft Final Report (DFR) was presented and discussed in December 1993. Some adjustments requested by the Indonesian side were to include a sensitivity test on export gas and a longer learning curve were included into the Final Report.

117. Key factors of success (KFS) have been :

- a clear problem identification
- the project's strategy and institutional arrangements for overall project management.. UNIDO/FEAS has assumed prime management function with the project's CTA having an office at the premises of UNIDO/FEAS. This has shortened communications ways and facilitated quick decision taking, as and when required
- UNIDO/FEAS resolve to act decisively, when things went into the wrong direction
- the availability of sufficient funds (total project volume of US $ 1,673,000) and time in relation to the task to be undertaken
- the availability of top expertise.
- the high level and full cooperation of the Indonesian Counterpart organization.
- the application and adherence to a standardized and acknowledged approach to feasibility studies (UNIDO model).

118. The project comes timely, since the GOI will have to make a final decision on the SGSM before 1995. Overall project implementation has stayed within the planned time frame. The delay of some 6 months after the distribution of the Interim Report, which required the GOI to decide on the location/site and technological route to be applied in the final feasibility, had been caused by the Indonesian side. This is not surprising for people familiar with the Indonesian decision taking style, but overall a minor factor.

119. Project inputs were delivered timely and adequately. Some minor problems occurred in the recruitment of the national coordinator, for the position of which no suitable candidate could be found in the short time span given after project commencement. However, in this case and in the case of one unsuitable expert, corrective action was taken.

120. Assessing the project's overall performance it has to be stated that the project has achieved more than expected. It is being appreciated by the Indonesian side, which has taken ownership of the project and is using it as a basis for their internal decision taking process. It has potentially contributed to a rationale and objective decision on the SGSM and will make, if finally implemented, a considerable contribution to the industrial development objectives of the country, including improved environmental protection.

V. RECOMMENDATIONS

A. Related to the Project and Possible Follow-up

121. The project under evaluation has been completed as of March 1994 with the submission to and acceptance by the GOI of the Final Report. It is also reasonable to assume that :

- the GOI will decide within the coming 1 to 2 years on how to proceed with the SGSM, and that
- input output price estimations underlying the feasibility study may need only minor adjustments at a later point in time during this period.

122. However, as has been observed in chapter III/F, there remain essential areas in which the GOI may wish to draw on neutral and impartial assistance. Based on the interviews with the GOI and other interested parties, potential areas for such assistance would be (but not necessarily be limited to) :

- **ASSISTANCE PACKAGE 1 IN THE AREA OF STEEL SECTOR POLICY**

- The basic objective of this package would be to assist the GOI in formulating a steel sector policy needed for the orderly development of Indonesia's steel sector.

  It is proposed to cover, but not be limited to the following areas : (1) country strategy for the coming 15 to 20 years; (2) private and public sector roles, including general desirable and needed ownership structure in the steel sector (holding versus privatization concept of PTKS and so on), (3) relationship of PTKS and SGSM (ownership and management structure, fine tuning of production program mixes and so on), (4) identification of synergetic effects resulting from the defined relationship between PTKS and SGSM, (5) defining the incentive structure for the steel sector, if any special incentives complementary to the existing ones are deemed necessary, (6) assistance in defining the legislative and monitoring requirements to prevent imports at dumping prices . The needed input in terms of expertise, time and money should be decided after further fine tuning of the TOR for such an exercise. In view of the urgency (time constraint on the Indonesian side for final decision), this potential project should have short-term and high priority .

- **ASSISTANCE PACKAGE 2 IN THE AREA OF FINANCING THE SGSM**

- The basic objective of this package would be to assist the GOI in securing financing for the SGSM from private (national and international) sector sources as well as international financing institutions.

  To secure financing for the SGSM from the above principle sources is the next required step in the implementation of the SGSM project. This package could cover, but not necessarily be limited to : (1) design of various financing schemes and identification of an optimal solution, optimal from a sector strategy , a financial (terms & conditions) and marketing point of view, (2) identification of risks and risk management options for the alternative selected, (3) identification of and preliminary

discussions with potential investors up to the negotiation stage (clearing the ground), (4) investigation of the financial and managerial capacities and capabilities of potential investors, including a risk assessment. In view of the sensitive nature of these topics, this could only be undertaken by a firm/person which enjoys the highest confidence on the Indonesian side.

- **ASSISTANCE PACKAGE 3 : TECHNOLOGY ASSESSMENT OF THIN SLAB CASTING**

- The objective of the project would be to undertake a technology assessment of the three currently competing thin slap casting processes, including a study tour for the Indonesian side to selected companies using one of these processes in commercial operations.

B. General Recommendations

123. The evaluation of the subject project has shown that the application of a standardized and well proven "feasibility study format" is a strong asset in the execution of projects of that nature. It is recommended to give UNIDO/FEAS the lead role (supervisory management role) in such projects executed by UNIDO.

124. The FEAS unit's support is already essential in the preparatory phase of "feasibility" study projects, when the TOR are determined and the resources known. Given these parameters, it can and should be determined at which level (opportunity study, pre-feasibility or full feasibility study) the project can realistically be carried out.

VI. LESSONS LEARNED

125. This evaluation has shown one more time that it is essential to undertake a proper analysis of the problem which the project is supposed to address, and have a clear and consistent project concept and strategy with clear project management responsibilities, which are result/output oriented. Eventually, it is the quality of the output which counts, while the way to achieve such output may be shifted in line with changing project circumstances.

126. The project under evaluation is an interesting case, in which UNIDO succeeded in playing, inter alia, an impartial and neutral intermediary between the supplier of an "emerging " technology and a recipient Government, which was not sure whether this technology could actually meet their technological, commercial and economic needs.

127. UNIDO may wish to consider broadening its role as "intermediary" in such assignments, in which choice of technology is one of the key elements.

128. While the current successful experience is no guarantee for future successes in similar projects, UNIDO has the key ingredients at her disposal :

- an acknowledged standard, which needs to be applied across the board
- enough "in-house" expertise
- access to an international market, where expertise in all industrial sectors and subsectors can be bought.

It is for UNIDO to decide, on a case-by-case basis, on when and how to employ these advantages in the most efficient manner and in pursuit of her mandate.

ANNEX I

TERMS OF REFERENCE

IN-DEPTH EVALUATION MISSION

US/INS/91/183

BANKABLE FEASIBILITY STUDY FOR THE ERECTION OF A SECOND GENERATION STEEL MILL IN WEST OR EAST JAVA

Terms of Reference

I. Introduction

Purpose of the project

The project (feasibility study) shall determine an optimal technological and locational alternative, from the financial (commercial), technical, economic and environmental points of view, and to enable prospective investor(s) and other parties, particularly the Indonesian Government, concerned to decide as to whether and how to implement the second generation steel mill project in Indonesia.

Background of the project

In recognizing governmental overall development strategy which places emphasis on structural diversification of domestic industries, where the country has strong comparative advantages, inter alia, resource-based industries (using e.g. oil and natural gas resources, minerals and skill intensive industries), the need for investigating through a techno-economic feasibility study for the erection of a second steel mill was determined by the Government of Indonesia.

The proposed feasibility study will determine the optimal feasible alternative on an overall consideration of the techno-economic, environmental and energy conservation viewpoints with particular attention given to the choice of technology and location. Due to considerable impact on the economy as a whole, on the environment and on energy consumption in particular, the feasibility study will also include an assessment of economic costs and benefits.

The importance of steel as a major industrial commodity has prompted the Government to classify the steel industry as a strategic industry. The feasibility study is needed urgently, as the investment project will be essential for the development of the steel sector in the decade after 1995. The major policy of the Government in the development of the steel industry is to encourage the private sector to invest in steel making, as well as in downstream steel products.

It is projected that by 1995 the infrastructure, such as highways, railroads and communication facilities, linking Cilegon to Jakarta and other industrial centres of Java, will be significantly improved, making this location attractive for further expansion of steel making and finishing facilities. Although Cilegon was considered to be a good location for the second generation integrated steel mill, the Ministry of Industry would like to also study an alternative in East Java or in the outer islands.

Problems addressed by the project (as per project document)

The project was to provide an assessment to several investment alternatives and to evaluate financial, economic and environmental impacts in order to determine the optimal feasible alternative for implementation. Apart from development strategy considerations (macro economic aspects), particularly the choice of technology (from a number of pre-selected technologies) and of the location of the new steel mill complex requires a assessment of various investment alternatives. In particular, the aspects of so-called "clean technology" should be analyzed. The new steel mill complex will also have a considerable environmental impact, especially due to emissions stemming from implementation (construction), steel production and the considerably large volume of material inputs and finished products to be transported. As steel production and processing are relatively energy intensive, the aspects of energy conservation and saving are also considered decisive for the design of the project.

Expected end-of-project situation (as per project document)

Upon successful completion of the feasibility study, the strategic options for the development of the domestic steel industry will have been identified and assessed from the national economic point of view. Furthermore, the economic, ecological and financial impacts of various steel making technology routes will be appraised, and the new steel mill will be designed for the technology fitting best the national development policies.

The completed feasibility study will provide all significant information concerning the economic, ecological, financial, commercial and technical feasibility of the investment project (integrated second generation steel mill), as required by decision-makers on governmental level, as well as by investors (including potential joint venture partners), and financing institutions (national and foreign). UNIDO is expected to contribute by conducting the feasibility study, applying its feasibility studies methodology and drawing on its expertise in the related study fields.

II. Evaluation

The purpose of the evaluation is to assess the overall achievements of the project, assess and identify factors which have facilitated project achievements, ascertain the relevance and effectiveness of the project, assess the impact and effect generated by the project; what follow-up actions were initiated and what lessons can be drawn at operational, organizational and policy levels. The results of the findings of the evaluation would be useful to the donor, UNIDO and the recipient country in determining future course of action to obtain optimum results, including follow-up, if any is required.

Scope, purpose and methods of the evaluation

The primary purposes of the in-depth evaluation are:

(a) To assess the achievement of the study against the objective and expected results (outputs) of the project;
(b) To identify and assess factors which facilitated or impeded project progress;
(c) To examine the extent to which the results of the project in terms of the study conducted contribute to sound investment decisions and to determine the significance of such investments, for employment, economic growth and environmental concerns.

The evaluation will include a review of the following:

ORIGIN

(i) UNIDO project identification and screening procedures followed;
(ii) Were the studies requested by the Ministry, enterprises, associations or financing organizations?
(iii) What was the extent of participation by the recipient country's institutions in drafting the project document?
(iv) How did the project fit into national sector or sub-sector plans?
(v) Was any relevant macro-economic policy framework considered?
(vi) Were the project concept, design and institutional arrangements appropriate?
(vii) How did the project fit against concerns on environmental problems and natural resources management?

MECHANISM OF APPROVAL

(i) Approval process (approval procedures and criteria);
(ii) Time required for approval by UNIDO and by the Government of Austria.

EXECUTION OF STUDIES

(i) Usual duration; delays in implementation;
(ii) Who implemented the study? Subcontracts, individual experts, were national capabilities used?
(iii) How was the study presented to decision-makers - meetings - presentations?
(iv) What basic strategies emerged from the activities carried out under the project implementation? Were they in line with Government policies and desired development approaches?

QUALITY OF STUDIES

(i) Scope (e.g. was the feasibility study adequate, in particular the financial analysis)?
(ii) Quality and extent of the technological choice study;
(iii) Quality and extent of market analysis;
(iv) Was an economic (cost-benefit) analysis done?
(v) How complete was the identification of sources of finance and financial planning?
(vi) Did the study take into consideration and review environmental concerns/impact?
(vii) In view that steel production and processing is relatively energy intensive, were aspects of energy conservation and savings assessed in the feasibility study?

FOLLOW-UP TO PROJECT

(i) Has the project resulted in a report that will enable the project sponsors to take investment decision?
(ii) How are the results of the study assessed and appraised by parties concerned and how are the resulting conclusions/recommendations being utilized/considered?
(iii) What has been done to follow-up the report?
(iv) What follow-up support and/or activities are called for to ensure the optimal use of project's recommendations?
(v) What conclusions can be drawn in terms of project relevance, performance and success?

LESSONS LEARNED

What are the main positive and negative lessons that can be learned from the experience under the project, in particular with respect to:

(i) Sustainable development - local participation (sustainability) and environmental concerns;
(ii) Development of the sector or sub-sector concerned at the policy, programme and project level?

III. Composition of the team

The evaluation team will be composed of the following:

- one nominee of UNIDO
- one nominee of the Government of Indonesia.

The Government of Austria was requested to participate in the evaluation but declined, in order to ensure maximum indpendence of the exercise.

Qualifications: The team should possess a combination of expertise on evaluation experience and on feasibility studies with special emphasis on steel industry. The team members are expected to be an independent body who have played no role in the design, implementation and monitoring of the project.

IV. Consultations in the field

The mission will maintain close liaison with the resident representative of the country visited, the concerned Government/private organizations and associations, local UNIDO staff and the project's national and international staff.

Although the mission should feel free to discuss with the authorities concerned all matters relevant to its assignment, it is not authorized to make any comments or commitments on behalf of the donor country or UNIDO.

V. Time table and report of the evaluation

♦ The mission will undertake a field assignment to Indonesia, during which it will review project files and interview relevant officials responsible for the programme. This will be complemented by interviews at UNIDO HQ by the UNIDO nominee.

♦ The mission will make a presentation to the Government of Indonesia on its initial conclusions and recommendations.

♦ The UNIDO representative will carry out desk work at UNIDO HQ to review project documentation and project reports, finalize the evaluation report and make a presentation at UNIDO HQ.

♦ The mission is expected to visit the project site and establish close contacts with the target group and end-users.

♦ The Government nominee is expected to contribute to and assist the UNIDO nominee in fulfilling his duties and responsibilities. The Government nominee does not need to come to UNIDO HQ to finalize the report, as most of the report will be compiled in the field and to save additional charges to the project budget.

♦ The UNIDO nominee will be responsible for the preparation of the evaluation report according to the UNIDO format, as stipulated in the Director-General's bulletin UNIDO/DG/B.106.

Proposed schedule: 28 February to 21 March 1994,
of which field trip in Indonesia from 28 to 14 March 1994

c/usinstor

ANNEX II

LIST OF PERSONS MET AND INSTITUTIONS INTERVIEWED

LIST OF PERSONS MET AND ORGANIZATIONS INTERVIEWED

Wednesday, March 2, 1994

Mr. A. Nahruddin; Senior Programme Officer; UNIDO, Jakarta

Dipl.Ing. H. Peer; Chief Technical Adviser; project US/INS/91/183

Mr. F. Bujang; Director of Technology; PT Krakatau Steel

Dr. A. List; Counsellor; Autrian Embassy, Jakarta

Thursday, March 3, 1994

Mr. Effendi Sudarsono, Director of Basic Metal Industry, Directorate General For Machinery, Basic Metal And Electronics Industry, Ministry of Industry, Jakarta

Ir. E. Dahlan, Head of Sub Director for Production Development, Directorate General Of Machinery And BAsic Metal Industry, Directorate For Basic Metal Industry, Ministry of Industry, Jakarta

Mrs. Ainsjah Taufik, Director for International Relations, Ministry of Industry, Jakarta

Friday, March 4, 1994

Mr. B.P. Banka, Executive Director, PT ISPAT INDO, Jakarta

Saturday, March 5, 1994

Mr. F.Z. Vicente, Country Director, UNIDO, Jakarta

Monday, March 7, 1994

Dr. Dipo Alam, Head of Bureau for Industry and Mining, National Development Planning Agency (BAPPENAS), Jakarta

Mr. Effendi Sudarsono, Director of Basic Metal Industry, Directorate General For Machinery, Basic Metal And Electronics Industry, Ministry of Industry, Jakarta

Mr. Soeparno Prawiroadiredjo, Director General, Directorate General For Machinery, Basic Metal And Electronics Industry, Ministry of Industry, Jakarta

Tuesday, March 8, 1994

Mr. B.Hidayat, Act. Director, Engineering and Processing Industry, Agency for the Assessment and Application of Technology (BPPT), Jakarta

Ir. A. Hendarto, Deputy for Industrial Assessment, Metallurgist, Agency for the Assessment and Application of Technology (BPPT), Jakarta

Dr.Ing. M. Opperer, Technical Advisor to the Board, BAKRIE, Jakarta

Ing.A.F. Soeriawidjaja, Chief Executive Officer, SAW-Pipe Mill Project, Bangka Island, BAKRIE, Jakarta

Wednesday, March 9, 1994

Mr. O. Scharrer, Managing Director, VAI ASIA, Jakarta

Mr. Suthad Setboonsarng, Director, Economic Research Bureau, ASEAN Secretariat, Jakarta

Mr. Oscar De Bruyn Kops, Senior Operations Officer, The World Bank Representative Office, Jakarta

Mr. A.H. David, Chief of Mission, International Finance Corporation (IFC), Representative Office Jakarta

Thursday, March 10, 1994

Dr. A. List, Counsellor, Austrian Embassy, Jakarta

Mr. F.Z. Vicente, UNIDO Country Director, Jakarta [Debriefing Meeting]
Mr. A. Nahruddin, Senior Programme Officer, UNIDO, Jakarta [Debriefing Meeting]

Mr. Y. Shibusawa, Chief Representative, NKK Corporation, Jakarta

Friday, March 11, 1994

Mr. Effendi Sudarsono, Director of Basic Metal Industry, Directorate General For Machinery, Basic Metal And Electronics Industry, Ministry of Industry, Jakarta, [Debriefing Meeting]

A N N E X III

LIST OF MEMBERS OF THE INDONESIAN STEERING COMMITTEE

Menteri Perindustrian Republik Indonesia

SURAT KEPUTUSAN MENTERI PERINDUSTRIAN

NOMOR : 200/M/SK/11/1992

T E N T A N G

PEMBENTUKAN TEAM PENGARAH (STEERING COMMITTEE)
BANKABLE FEASIBILITY STUDY FOR THE ERECTION OF
A SECOND GENERATION STEEL MILL IN WEST OR EAST JAVA

MENTERI PERINDUSTRIAN

Menimbang:

a. bahwa dalam rangka Bankable Feasibility Study for The Erection of a Second Generation Steel Mill in West or East Java, yang akan dilakukan oleh konsultan dari UNIDO, maka dipandang perlu membentuk Team Pengarah (Steering Committee) yang akan mengarahkan, mengkoordinasikan dan mengawasi pelaksanaan study tersebut;
b. bahwa untuk itu perlu dikeluarkan Surat Keputusan.

Mengingat:

1. Undang-Undang No. 9 Tahun 1969 tentang Bentuk-bentuk Perusahaan Negara;
2. Undang-Undang No.5 Tahun 1984 tentang Perindustrian;
3. Peraturan Pemerintah No. 12 Tahun 1969 tentang Perusahaan Perseroan (Persero);
4. Keputusan Presiden Republik Indonesia No.44 Tahun 1974 tentang Pokok-pokok Organisasi Departemen;
5. Keputusan Presiden Republik Indonesia No.15 Tahun 1984 jo No. 47 Tahun 1988 tentang Susunan Organisasi Departemen;
6. Keputusan Presiden Republik Indonesia No.29 Tahun 1984 tentang Pelaksanaan Anggaran Pendapatan dan Belanja Negara;
7. Keputusan Presiden Republik Indonesia No.64/M tahun 1988 tentang Pembentukan Kabinet Pembangunan V;
8. Surat Keputusan Menteri Perindustrian No.228/M/SK/6/1984 jo No. 13/M/SK/2/1991 tentang Organisasi dan Tata Kerja Departemen Perindustrian.

M E M U T U S K A N

Menetapkan

PERTAMA: Membentuk Team Pengarah (Steering Committee) Bankable Feasibility Study for The Erection of a Second Generation Steel Mill in West or East Java, yang dilaksanakan oleh konsultan UNIDO yang selanjutnya disebut Team dengan susunan keanggotaan sebagaimana tercantum dalam Lampiran Surat Keputusan ini.

KEDUA : Team bertugas mengarahkan, mengkoordinasikan dan mengawasi pelaksanaan study tersebut dalam diktum PERTAMA.

KETIGA : Jika dianggap perlu Team dapat mengangkat tenaga-tenaga pembantu demi kelancaran tugasnya.

KEEMPAT : Team harus menyelesaikan tugasnya paling lambat 1 (satu) tahun sejak ditetapkannya Surat Keputusan ini.

KELIMA : Dalam melaksanakan tugasnya Team bertanggung jawab dan berkewajiban menyampaikan laporan secara periodik kepada Menteri Perindustrian.

: Semua biaya yang diperlukan dibebankan pada PT. Krakatau Steel.

: Surat Keputusan ini mulai berlaku pada tanggal ditetapkan.

Ditetapkan di : J A K A R T A
Pada Tanggal : 23 Nopember 1992

MENTERI PERINDUSTRIAN

I R T A R T O

SALINAN Surat Keputusan ini disampaikan kepada :

1. Menteri Negara Perencanaan Pembangunan Nasional/ Ketua BAPPENAS;
2. Menteri Keuangan;
3. Menteri Muda Perindustrian;
4. Ketua Badan Pengelola Industri Strategis;
5. Ketua Badan Pengkajian dan Penerapan Teknologi;
6. Gubernur Bank Indonesia;
7. Sekretaris Jenderal, Inspektur Jenderal, Para Direktur Jenderal dan Kepala Badan Penelitian dan Pengembangan Industri di Lingkungan Dep. Perindustrian;
8. PT. Krakatau Steel;
9. Yang Bersangkutan;
10. Pertinggal.

LAMPIRAN SURAT KEPUTUSAN
MENTERI PERINDUSTRIAN
NOMOR : 200/M/SK/11/1992
TANGGAL : 23 Nopember 1992

SUSUNAN ANGGOTA TEAM PENGARAH (STEERING COMMITTEE) DARI
BANKABLE FEASIBILITY STUDY FOR THE ERECTION OF
A SECOND GENERATION STEEL MILL IN WEST OR EAST JAVA

1. Ir. SOEPARNO PRAWIROADIREDJO : Direktur Jenderal Industri Mesin Logam Dasar dan Elektronika sebagai Ketua merangkap Anggota;
2. Ir. SOETORO MANGOENSOEWARGO : Koordinator Direktur PT. Krakatau Steel sebagai Wakil Ketua merangkap Anggota;
3. Ir. EFFENDI SUDARSONO : Direktur Industri Logam Dasar Ditjen IMLDE sebagai Sekretaris merangkap Anggota;
4. Ir. EMAN YOGASARA : Staf ahli Menteri Perindustrian Bidang Hubungan Regional dan Internasional sebagai Anggota;
5. Wakil dari BAPPENAS : Sebagai Anggota;
6. Wakil dari Ditjen. Moneter Dep. Keuangan : Sebagai Anggota;
7. Wakil dari BPIS : Sebagai Anggota;
8. Wakil dari BPPT : Sebagai Anggota;
9. Wakil dari Bank Indonesia : Sebagai Anggota;
10. Wakil dari Ditjen. Pertambangan Umum Dep. Pertambangan dan Energi : Sebagai Anggota;
11. Kepala Biro Kerjasama Luar Negeri Dep. Perindustrian : Sebagai Anggota;
12. Kepala Biro Hukum dan Organisasi Dep. Perindustrian : Sebagai Anggota;
13. Direktur Perencanaan PT. Krakatau Steel : Sebagai Anggota;
14. Direktur Keuangan PT. Krakatau Steel : Sebagai Anggota;
15. Direktur Teknologi PT. Krakatau Steel : Sebagai Anggota;
16. Kasubdit Pengembangan Program Dit. Industri Logam Dasar Ditjen IMLDE : Sebagai Anggota;
17. Kasubdit Bina Produksi Dit Industri Logam Dasar Ditjen IMLDE : Sebagai Anggota;

MENTERI PERINDUSTRIAN

ttd

HARTARTO