CHEMONICS

INTERNATIONAL
CONSULTING
DIVISION

PD-AAX-453

Project Profile

CNPIP
CENTRE NATIONAL DE PROMOTION DES INVESTISSEMENTS PRIVES

Investment Opportunities in the Construction Materials Industry in Guinea

Prepared under the
Guinea Private Agribusiness
Preparation Project

Project No. PIO/T-0212-3-40001
Contract No. LAC-0212-C-00-5014-00

Prepared by Tamara Duggleby, Chemonics International, March, 1987

2000 M St., N.W.
Suite 200
Washington, D.C. 20036

(202) 466-5340
Cable: CHEMONICS, Wash., D.C.
ITT Telex: 440361 CHNC UI

PROJECT FILE

INVESTMENT OPPORTUNITIES IN THE CONSTRUCTION MATERIALS INDUSTRY IN GUINEA

MARCH 1987

TABLE OF CONTENTS

		Page
1.	INTRODUCTION AND BACKGROUND	1
	1.1 Introduction	1
	1.2 Guinean Demographics	1
	1.3 Natural Resource Base	1
	1.4 Economic Development and Reform	2
	1.5 Details of the Current Policy Environment	3
	1.6 Current Status of the Construction Materials Industry	8
	1.7 Projected Impact of Policy Changes on the Construction Materials Industry	9
2.	SUPPLY AND DEMAND FOR BUILDING MATERIALS	10
	2.1 Sources of Data	10
	2.2 Emphasis on Rural Development in Building Materials	12
	2.3 Demand for Construction Materials	14
	2.4 Building Materials Market: The Housing Market	24
	2.5 Building Materials Supply Systems in Guinea	28
	2.6 Supply of Building Materials in Guinea	30
3.	INVESTMENT OPPORTUNITY: A BRICKMAKING PROJECT	41
	3.1 Project Concept	41
	3.2 Operational Plan	43
	3.3 Marketing Plan	46
	3.4 Investment Structure	52
	3.5 Pro Forma Costs, Revenues and Cashflow	52
	3.6 Financial Analysis	61
	3.7 Recommendations for Project Development	62

APPENDICES

A.	State Owned Building Materials Industries	64
B.	Projected Annual Market Growth for Construction Materials in Guinea	70
C.	Methodology Used to Develop Annual Market Growth Factors for Building Materials	71
D.	Cost Per Square Meter of Wall of Various Bricks	72

LIST OF TABLES

Table I	Guinea Brick-Making Project	54
Table II	Capital Equipment and Costs	55
Table III	Annual Revenues	56
Table IV	Personnel Costs	58
Table V	Cash Flow	60

FIGURE

Schematic Layout of Brick/Block Production Facility	44a

FOREWORD

This review and profile of joint venture investment opportunities in the Guinean construction materials industry was carried out under the USAID-financed Guinea Agribusiness Promotion Project and the technical assistance contract between USAID and Chemonics International Consulting Division. The work was conducted during February and March, 1987, in Conakry and surrounding rural areas.

The Chemonics team consisted of a construction materials specialist, assisted by staff of the Centre National de Promotion des Investissements Privés (CNPIP), Guinea's National Investment Promotion Office. The specialist spent 30 days in Guinea, visiting local building materials industries, artisanal production centers, public agencies and private construction companies as consumers of building materials, and retail and wholesale outlets.

This profile is one of a series of investment profiles prepared by Chemonics in conjunction with CNPIP. To collect the information to prepare this profile, the team utilized questionnaires specially adapted to the type of business -- construction companies, retail/wholesale outlets for building materials, and production industries.

These profiles are collectively supported by relevant background information pertaining to the investment climate in Guinea, the Investment Code and the nature of investment financing available. These topics are therefore not discussed in detail in this report, unless significant changes have occurred since the background information was prepared.

In order to identify potential sub-sectors for investment and development, the study team sought to gain a clearer understanding of market trends (current and projected), building materials sources, price levels and availability, and constraints facing the Guinean private sector in producing and Marketing construction materials. Market findings and constraints in supplying materials in this market are presented in the sectoral analysis that follows in section 2. In section 3, the study team has identified specific types of materials for which local production could be justified, and a profile is presented of an opportunity for American or other foreign investors over the next year to 18 months.

This profile is not intended to serve as a detailed feasibility study or business plan. It indicates the possible viability of an attractive investment opportunity. Potential investors would be expected to undertake a more detailed investigation prior to making an investment.

1. INTRODUCTION AND BACKGROUND

1.1 Introduction

The primary objective of this report is to present a study of the Guinean construction materials industry, indicating the market for, sources, prices and availability of basic building materials, and identifying sectors that might be attractive to joint venture private investment. In the course of conducting the study, the Chemonics team found that, given the supply and demand distortions created by a predominantly parastatal industrial sector, and the rudimentary nature of the privatization program for state-owned building materials industries, it is too early to recommend the establishment of new, large-scale manufacturing units to provide construction materials for the local market.

The Chemonics team did identify a business opportunity, however, in the production and sales of durable, locally adapted bricks made from compacted local soil. This business opportunity is profiled in sufficient detail in section 3 to attract the interest of potential investors. The importation and servicing of machinery is closely tied to the brick-making venture and represents an interesting joint venture opportunity as well.

1.2 Guinean Demographics

The Republic of Guinea covers approximately 246,000 square kilometers and had an estimated population of 5.8 million inhabitants in 1985. The rural population is estimated at 4 million and the urban at 1.8 million, of whom approximately 800,000 live in the capital city of Conakry. The population is expected to grow to 7.25 million by 1995, 4.7 million rural and 2.5 million urban, with 1.2 million in Conakry.

For administrative purposes, the country is subdivided into eight provinces, comprising a total of thirty subprefectures, of which three make up the province of Conakry. The country is also divided into four regions and the population is divided among these regions in the following manner:

- Maritime Guinea - 32%
- Middle Guinea - 27%
- Upper Guinea - 20%
- The Forest Region - 20%

1.3 Natural Resource Base

Guinea is one of the most resource-rich countries in the developing world and is endowed with considerable potential to provide the raw material for the manufacture of many

industrial and consumer products, including a range of minerals that are essential to producing the intermediate materials from which construction materials are manufactured.

Yet, at the present time, many of the basic consumables required for the country's economic growth are imported from Europe and other African countries, because of the relatively low level of development of mineral and natural resources within Guinea. In the construction materials sector, intermediate materials for basic products like cement, corrugated iron roofing, aluminum and iron doors, and windowframes, are imported by the Guinean construction sector, even when the raw material is produced abundantly in country.

The prime example is aluminum roofing materials manufacture. Guinea is the world's second richest country in bauxite deposits, and large quantities of the mineral are mined and converted in country into alumina. Because of the lack of a smelter, however, the nation's alumina production is exported to countries including France and Cameroon, where alumina is converted into rolling sheets and re-exported to Guinea, for corrugating and cutting of finished roofing sheets by the state-run factory SOGUIFAB. Aluminum and galvanized sheet roofing rank second in terms of total demand for material for formal sector construction in Guinea, after cement.

1.4 Economic Development and Reform

Under the administration of President Lansana Conté, which took over in April 1984 following the death of President Sekou Touré, the Government of the Republic of Guinea is encouraging the development of the private sector to produce and market intermediate and finished products using its own natural resources. With the assistance of the World Bank, AID and other donors, the government is implementing a comprehensive economic reform program aimed at attracting private sector investment in agriculture and industry, at the same time increasing the efficiency of existing industries that remain partially state-owned.

The reform process actually started before 1984 with the lifting of restrictions on the import of raw and processed inputs by private Guineans. It continued in late 1985 with the adoption of a broad-scale restructuring program for the predominantly public industrial sector, financed by the World Bank, and aimed at substantial divestiture to the private sector of 47 state-operated industries, or liquidation, if economically advisable. Included in the industrial reform program are ten (10) construction materials factories: eight (8) existing industries to be partially or wholly divested of state interest, and two (2) state-owned building materials industries in the

process of liquidation, as noted in appendix A, due to problems with management and supply of raw materials.

Thus at the present time, the Guinean economy is undergoing a period of accelerated growth and change, moving from a system of state-controlled factories in all areas, including assembly and marketing of building materials, artificially low pricing, and lack of import protection for local products, to a production-based economy driven largely by privately run industries and mixed companies, benefitting from private capital and management expertise. The combined effects of privatization, fiscal and monetary policy reform, and recent removal of barriers to private importation of basic inputs, have stimulated an upturn in the economy which extends to all production sectors, including construction.

1.5 Details of The Current Policy Environment

Potential investors must be well informed about the current policy environment in Guinea. Information can be obtained from several sources, including the recent Investment Climate Assessment update available through CNPIP, Chemonics in Washington, or the Embassy of Guinea. Here we provide a few key points, with special reference to the construction materials industry.

As noted, Guinea is a country undergoing significant economic change, and the policy framework in which an investor must operate is still in the developmental stage. This applies to the newly rewritten investment code, and to the application of investment review procedures by the government. Furthermore, the specific applications of policies relating to personnel matters, land control, capital use, and other investor actions are not fully spelled out, but will evolve as the newly established codes and procedures are used in the process of investment negotiation and implementation.

1.5.1 The Investment Code

One of the most often mentioned problems in interviews held with private sector individuals has been the lack of a clearly defined set of actions for the government and investors, regarding investment code protections for investors. In the prior investment code, enacted in 1984, there were some serious omissions regarding the rights of foreign and other investors.

Recognizing these shortcomings, the government has drafted a revised code, which is as yet a working document. Examination of the document by the Chemonics team indicated a significant shift away from bureaucratic double checks on

investors, particularly regarding the freedom to transfer capital in convertible currency to the country of their choice. Subject to compliance with currency regulations, companies investing capital in Guinea would be guaranteed the right to transfer income from the investment and the proceeds of liquidation. (Refer to Guinea Investment Code, January 3, 1987 revision, article 3.)

On a practical level, regarding takeover of factories in the state construction materials sector, the Chemonics team considers that even with a substantially revised code, negotiations with the government will be difficult and timeconsuming. The process can be frustrated by delays or changes in direction at any point in the process. This fact was recently demonstrated when a large French company wishing to purchase the state-controlled granite quarry reached the final days of negotiations before signing the convention, to find that the government wished to restructure substantially the agreement for a private sector takeover. Through the intervention of the French government in Paris, the agreement was signed intact within two weeks of the requested turnaround.

These experiences result from a situation where there are as yet no fixed rights and duties for the investor, the government, and the business community. The possibility of prolonged and changeable negotiations underscores the importance of securing and working with a partner established in country, or in a position to exert influence in a country that is still very much feeling its way in private sector development.

1.5.2 Land Ownership and Control

Land ownership is another significant concern to Guinean and foreign investors. An investor can hold title to buildings, equipment and appurtenances, but cannot acquire private ownership of land. Under the Touré regime private ownership was abolished, and it has not yet been restored. Discussions with government officials and with private companies that have threshed out the issue of land tenure indicate that in most cases companies can achieve a "droit de construction" or agreement to construct the business and its installations on the land, governed by a separate agreement from that of the convention.

Whereas the government has been encouraging private investors to participate in ventures that require land ownership, with assurances that problems resulting from state ownership of land will be resolved to everyone's satisfaction, there is no surety that the state will not take action to alter the company's land use rights. Until this issue is satisfactorily

resolved with a clear legal directive establishing property rights, the state owns the property under one's building.

This is a factor to be given due consideration in an investment decision. Lack of land control has created a serious obstacle for companies seeking to finance local capital costs of a new or expanding business through local commercial banks.

1.5.3 Labor Laws

Labor and employee relations in Guinea continue to be governed by labor laws enacted during the Touré administration, which are largely favorable to the employee. Regulations are especially favorable as regards conditions of termination and severance pay. Discussions with private companies operating in Guinea indicate that in matters of hiring and firing, government regulations are more stringently applied to mixed companies, or those in which the government is a partner with one or more private sector interests, than to wholly private companies. But they could constitute a problem for fully private firms as well.

The Guinean Investment Code (revision of January 3, 1987) addresses the issue by stating under "Freedom of Establishment" that "subject to compliance with the laws and regulations, any business duly established in Guinea is free to determine and conduct its marketing and production policies as well as its personnel hiring and firing policies." (Refer to article 2). For conducting day-to-day personnel actions, there is, however, no clear and readily available set of rules concerning actions to be taken by the government and companies under specific circumstances.

A sampling of managers of private companies with no government interest, interviewed during the study, indicated that they enjoy reasonable freedom to hire and fire for incompetence, malfaisance or other reason. Basic salaries are set by the government. Any supplemental benefits including staple food rations and transport are set by the company.

In a mixed company, where the private entity is truly in business in partnership with the government, management is expected to follow a "counterpart" policy in hiring. A company in the process of being established or expanded will be assigned a coordinator from the appropriate ministry and will be presented with a list of eligible Guineans to hire in the principal skilled job categories. It is up to the company to sort out the candidates and to select in each category a Guinean who will serve as counterpart to the person chosen by the expatriate partner. This generally occurs in top management and in such

positions as accountant, director of technical engineering, security, and equipment maintenance.

In practice, the mixed company is reportedly obliged to hire the Guinean whom the government as partner recommends. Government-set salaries must be used, as well as government-set rations for basic food and household staples and transportation allowances. In mixed companies, the industry is also expected to provide a significant amount of training for Guinean counterparts.

1.5.4 The Guinean Legal System

Another factor in doing business is the state of the Guinean legal system. Under the French, Guinea had a legal system modeled heavily on the Napoleonic Code. This system was dismantled by the Touré administration. At the present time, the country is working with World Bank technical assistance to reinstitute its past legal system. The process is in the early stages and will take time. The formative nature of this system also underlines the importance of having an investment partner firmly installed in country and capable of working within local regulations.

1.5.5 Taxation of Private Business in Guinea

Taxation is another area where the rules are undergoing significant change. The 1966 tax law provides for a 33 percent tax on company profits and miscellaneous other taxes on salaries, sales and dividends. Numerous special exemptions exist. They have not always been applied uniformly, and the investor is advised to seek special guidance on what the tax situation is for a given entity.

The January 1987 revision of the Investment Code identifies a number of types of businesses that will receive consideration, including tax advantages, under special treatment plans. Among these are businesses that develop, by processing, local natural resources and raw materials in Guinea, including minerals and forestry businesses that reclaim reserves. Among the tax advantages for businesses approved for one or more preferential plans will be relief from import duties and taxes on capital goods necessary to start the business. (See the Investment Code for details).

1.5.6 Foreign Exchange and Devaluation

Access to foreign exchange remains a very important factor in doing business, as the country will continue to rely upon significant imports of raw materials and inputs over the short to medium term. The weekly currency auction has greatly

simplified the process for companies making regular purchases from offshore suppliers, in that they can now do so using the foreign exchange application system through the banks.

The January 1987 changes in Central Bank policy governing foreign exchange utilization require that the applying purchaser must provide 100% cover in Guinea francs. This may be deposited in cash with the bank handling the purchase of foreign exchange, or the requirement can be met with a combination of 50% cover and an irrevocable letter of credit issued by the bank.

In addition, devaluation will clearly have significant impact upon investors in the building materials industry, although the precise effect of exchange rate fluctuation under the new monetary standard, the Guinea franc, cannot be determined at this time. A key factor would be Guinea's eventual entry into the French franc zone, or the Union Monétaire Ouest Africaine, officially tying the currency to a hard currency, the French franc. At the time of this study, it is not clear that Guinea will enter the franc zone before the end of 1988, and entry could be delayed even beyond that time, as the country attempts to implement basic monetary and fiscal reforms as part of World Bank and IMF restructuring programs.

This means that the potential offshore investor entering the market in the interim will be basing his projections upon income and cost factors influenced significantly by the parallel market. At this writing, the official exchange rate is G.Fr. 410 to $1. The parallel market rate is fluctuating between G.Fr. 480 and 500, and it is the general opinion of the business community that the rate will continue to climb this year. For the purposes of this study, the current exchange rate is used, G.Fr. 410 to $1, with a variance of (+-10%), in order to determine investment sensitivity.

1.5.7 Lack of Import Protection on Certain Products

Opening importation of most products and inputs to the Guinean private sector without appropriate import protection for certain high volume goods produced in country has created a situation where several products in the building materials sector simply cannot compete with cheaper imported materials. This is especially evident in cement. The government will eventually have to decide what local production it should reasonably support, and arrange its tax, import duty and incentive structure to provide that support. At present, the situation is somewhat chaotic.

1.5.8 Basic Services to Business in Guinea

While development of Guinea's infrastructure is moving ahead at a reasonable pace, the country's basic services are presently inadequate to serve the needs of private business. The electric power system suffers from frequent outages and voltage spikes, creating the necessity for private companies and many institutions to maintain individual generators. Roads leading from Conakry to most parts of the interior are in a state of advanced decay, but are about to undergo substantial rebuilding and resurfacing under the World-Bank-financed "Projet Routier." Telephone service functions randomly, and significant delays are required for overseas calls. Businesses wishing to establish investments in Guinea should factor into the investment additional costs of providing supplementary service, over the next two to three years.

The Port of Conakry has become increasingly congested, resulting in delays and added costs for demurrage and handling of freight. The port facility itself offers very little warehousing space, and none of the local warehousing is bonded. As a result, importing builders and merchants typically experience losses of from 12 to 15% of total value of shipment through port thefts. These must be factored into the contingency costs for an investment relying heavily on imports. Conversations held by the Chemonics team with several private companies and embassy economic attaches indicate that investors should factor into their cost projections a contingency of one half to one percent of the total investment cost, to cover these costs and miscellaneous costs of expediting the investment approval process.

1.6 Current Status of the Construction Materials Industry

Against the background of this changing policy environment, it is important to the potential investor to understand both the current status of the building materials industry and the projected impact of policy reform on that industry over the near and long term.

A comprehensive sectoral survey carried out by the Chemonics team in February 1987, indicated that a number of basic building materials have, until recently, been mixed or assembled from imported inputs and marketed in country. These products include cement in bulk and in bags, corrugated aluminum sheet roofing, door and window frames (aluminum and iron), iron security gates, paint, wood panels, wood framing, and related building materials. These materials have been produced for local consumption in the 10 factories noted earlier as state-run, majority or wholly state-owned, and in the process of privatization or liquidation.

As with most of Guinea's state-owned manufacturing sector, these construction materials factories have been producing at an average of less than 15% capacity and have been incurring heavy losses. Losses have resulted largely from inefficient management, consistent lack of raw materials and intermediate inputs, and in the case of cement and sheet roofing, lack of import protection.

When the government embarked upon its program of privatization and liquidation of state-owned enterprises in December 1985, forty-seven state-owned enterprises were categorized for action, ranging from category 1, "liquidation," through category 2, "temporary cessation until private purchase," category 3, "reorientation," and category 4, "maintenance of the enterprise with partial state interest and an infusion of outside private capital and management."

The majority of the state-owned and operated construction materials industries (8 of 10) have, in effect, been closed and have ceased production awaiting private sale (category 2), or are on maintenance of basic systems awaiting a significant infusion of private capital and management (category 4). None of the eight industries is regularly manufacturing materials. Two produce material sporadically when raw materials are available (SOPROCIMENT and SOGUIFAB aluminum assembly).

Offers have been received by the government for six of the eight factories awaiting private sale or infusion of private capital and management, and negotiations are underway with private firms to purchase or to create a mixed company with government interest. Two industries (Briqueterie de Koboya and Usine de Panneaux de Seredon) are in the process of liquidation, due to management problems and/or product transport problems.

Appendix A provides summaries of each type of manufacture, and its current operating management and operating status.

1.7 Projected Impact of Policy Changes on the Construction Materials Industry

Discussions held by the Chemonics team with existing building materials industries, private construction companies, and local importers and suppliers of construction materials indicate that the market is already responding to the policy changes described with a gradual increase in construction of commercial buildings and small residential properties. Major public construction projects are commencing in roads resurfacing and rehabilitation, and port and bridge renovation, to be co-financed by the World Bank, the African Development Bank, other

multilateral agencies, and the Government of Guinea. These projects will improve infrastructure and services to industry and will create further demand for basic road construction materials.

Recent import and production figures, and the most reliable private sector projections, indicate that the market for construction materials can be expected to grow at an annual rate of 3 to 4% in the years 1987 through 1991, increasing to 7 to 8% from 1992 through 1996, and climbing to a projected annual growth rate of 10% in 1997 through the year 2000. These growth rates are utilized in this study to estimate annual demand for each category of building materials. The methodology employed in arriving at these rates is given in appendix C.

As building activity resumes after a long period of stagnation, and per capita incomes begin to rise, the market will move to higher quality construction products. This trend is already evident in several new businesses and expansions underway in the Guinean building materials sector, notably in aluminum and galvanized roofing materials.

After 1988, building industry expansion could provide alternatives for outside investors to fuse their capital and management skills with expatriate and Guinean partners already established in Guinea in the development or expansion of higher value added manufacture of basic building materials. This investment approach is recommended and deemed necessary in the pursuit of any investment opportunity in Guinea, to enable an offshore investor to become established on the ground in a market where the requirements for investment are just being developed.

2. SUPPLY AND DEMAND FOR BUILDING MATERIALS

In this section, we cover in detail the supply and demand for selected construction materials in Guinea. The objective is to consider a wide variety of construction materials as candidates for local production under the new economic conditions, and, therefore, as potential investment opportunities. Although only a few such opportunities are immediately evident, Chemonics believes that the information contained herein is useful in and of itself.

2.1 Sources of Data

Extensive discussions held by the Chemonics team with Guinean public and private sector officials indicate that the base of reliable information on production and marketing of construction materials is limited. This applies to information on production and sales in both the formal and informal sectors.

Available public information on import activity in the sector is limited largely to tabulated annual records of the imports of basic building products, prepared by the Port Autonome of Conakry, and similar tabulations by the Central Bank. Information on production and sale of materials by local industries is available in records kept from 1985 onward by the presently state-owned building materials industries, most of which are idle and some of which still maintain records. Other sources are recent records of private importers who handle construction materials, and recent orders of building materials by private construction firms in Guinea and from sources abroad.

Documentation of recent production, profit, and loss among existing state-owned building materials industries has been compiled largely from two studies by the United Nations Industrial Development Organization (UNIDO) in 1980, and an industrial sector restructuring study by the Industrial Development Institute (IDI) for the World Bank in 1985. The UNIDO studies deal primarily with performance of Guinean industries in building materials fabrication using local granites, slate, and other natural resources. Production and marketing figures focus on documented performance of state-run units operating in 1980 and do not necessarily reflect supply and demand, or the private marketing of materials.

The more recent IDI study provides estimated production, sales, and profit (or loss) data for each of the state-owned and managed construction materials industries, now largely inactive. For selected industries, alternative development and financial strategies are presented, with pre-feasibility-level production and financial projections. These are reportedly being used to assist in negotiations to privatize these industries as part of the overall economic reform program.

The historical analyses presented are based upon records and financial reconstructions of records of statal operations, and therefore do not reflect market production, cost, and pricing factors. The projected restructuring alternatives are reportedly based upon available information on production and sales of these factories in previous years, recent, recorded imports, and discussions of supply and demand factors with producers and users of construction materials in and around Conakry.

In preparing this study, the Chemonics team collected and analyzed the very limited data available on production, importation, and marketing of construction materials from ministries, port officials, and state industries in the course of privatization or liquidation. Site visits were made to five of the ten industries, and discussions were held to the extent

possible with the remainder of the ten, with public officials and/or private purchasers who were considering acquisition.

The team held similar discussions with a number of local private companies producing, importing, and using construction materials in local building projects. These discussions included one or more interviews with the management of eight private construction companies (Guinean and expatriate) involved in residential, commercial and public works construction. The team also worked with a sampling of three medium-scale Guinean importers of construction materials serving the local building market and smaller retailers. To the extent possible, team members traced the market chain through to the small retail outlets selling limited quantities of materials, often at a greatly marked-up price, and to the roadside producers of basic construction materials.

Market, cost and price factors and other findings were cross-checked to the extent possible with economists at the International Monetary Fund (IMF), the World Bank, UNIDO, and the Central Bank of Guinea. Discussions were also held with the commercial banks, in each case expatriate-managed and largely backed with offshore capital, to identify financing costs and constraints to serving construction materials producers in the local market.

Using specially designed questionnaires for each type of production or commercial outlet, the team compiled and analyzed quantity, cost, pricing, and projected annual market data for each category of building materials studied. These figures were used to derive estimated current demand for the year 1987. Using the very limited available data on previous years' purchases and imports as growth indicators, and projections of market growth made by importers, construction companies and multilateral agencies, the team projected market growth (demand) to the year 2000.

Users of this report for investment purposes should therefore bear in mind that current and projected market figures are only rough estimates.

2.2 Emphasis on Rural Development in Building Materials

As noted earlier, an estimated 80% of the Guinean population is rural (4 of 5.8 million). As the country moves further into its economic reform program, with privatization of both its agricultural and industrial production, development of new rural industries will be stressed, assisting more and more of the rural population to meet basic needs through manufacture in place. The impact of these policies will be particularly strong on increased local building materials production (for example,

compacted bricks made from local soil for construction of housing and small commercial facilities).

Examination of available studies and discussions with the World Bank, United Nations Development Program (UNDP), and other development agencies indicate that the vast majority of rural Guineans partially or wholly build their own homes. In addition, during recent development of the upcoming UN-financed Sites and Services Program, designed to provide serviced housing plots, building materials loans, and housing construction for some 10,000 lower-income Guinean families, the local UNDP office found that as much as 70% of the material for construction of low to moderate-income houses (average one to two rooms) is made locally, predominantly by artisanal producers. Principal artisanal materials in urban areas and larger rural communities include bricks made by hand from cement and from sun-dried soil, and products of local businesses that purchase and cut or assemble sheet roofing (aluminum and galvanized), iron door and window frames, and rebars.

Observations of the Chemonics team in rural areas in the coastal region, and project development work of the Ministry of Housing and the UNDP in the interior, indicate that in general, housing of the lowest income groups is built entirely from local materials by family and village labor, paid in cash, in kind assistance, or barter. The staple materials are earthen bricks (not fired but handmade and sun-dried), local plant material for roofing (roseaux and other field grasses and reeds), and local wood for structural support.

In addressing the local construction materials market in Guinea, it is critical to understand that many Guineans at low and even moderate incomes prefer earthen bricks (of compacted soil) as the building material for the walls of their homes. This unstabilized (non-fired) brick is a commonly used type of brick, particularly in rural areas, because it is climatically adapted to both heat and humidity, keeping the home cool and dry during peak mid-day and afternoon heat.

This brick is one of the few types of material that can be produced in Guinea with present rural technology, given the fact that brick factories using a fired process are not accessible to most rural residents. Mobile machines that produce stabilized bricks, through high pressure compacting of local soils, have not as yet been introduced for general use in Guinea. Performance of machine-compacted bricks made from local soil, introduced in the late 1970's to construct a multi-story building in Conakry, has demonstrated that such material is durable and moisture-resistant, and reasonably well adapted to the humid climate and local conditions.

The market for locally made bricks, both machine-compacted and handmade, is immense, although unquantified. As noted, their use is in part a question of preference, utility, and affordability. In using this study to identify investment opportunities, foreign investors are advised to pay close attention to these preference factors.

2.3 Demand for Construction Materials

The major markets for construction materials today are the state and private construction companies, some of which are also state contractors. The major, immediate, large-scale demand is for road and other transportation-related programs. For example, at the present time, the Government of Guinea has, with IDA financing, undertaken a $6 million resurfacing of the road from Conakry to Mamou. This is part of a $14.1 million roads resurfacing project that will also resurface routes to Labé, Kissidougou, Dubreka and Forecariah, with financial participation by IDA, the African Development Bank and other multilaterals.

The balance of the work on the roads resurfacing project will be bid out this year for commencement in October 1987. Other IDA projects that are seeking co-financing include the Second Transport Project, which will underwrite extension of the Port Autonome, and rehabilitation of the nation's airports. The total financing for IDA transport projects planned and underway will amount to $111 million in committed financing (IDA and ADB), plus $32.5 million being sought through other donor agencies.

Leaving aside the transport projects, the Government of Guinea has very few public buildings in progress at this time. Those now under construction include the new military camp in Conakry, and the large-scale rehabilitation of the public stadium, just completed by a private company.

The construction market in Guinea is served by about 15 private companies. The average annual turnover among small to medium-scale construction companies, which are the majority, is $1 to 2.5 million. Interviews held by the Chemonics team indicated that at least eight of these companies depend upon government contracts for some portion of their work. Four companies reported doing most of their work under government contracts.

Because the government is relatively inactive, the construction companies are also short of work. As noted, the most evident growth trend is taking place in private construction of private homes and small- to medium-scale commercial buildings. It would appear that work on higher quality private homes and commercial buildings is being done mainly by the smaller-scale

construction firms in response to orders from private clients. This is expected to be an area for market growth over the next four to five years.

A second area with good potential is the market made up of individual families building a home or a small commercial property for a family-run business. During local discussions and market observation, the Chemonics team noted a good deal of small-scale building of this type. Informal talks with people building homes and small local suppliers indicated that the majority of these consumers buy their basic building materials (bricks, rebar, roofing sheets) from local small businesses, and hire necessary local labor to supplement their own. Thus there is a market for these building materials.

Another sub-market will open up for builders and materials suppliers selling to purchasers of low to moderate-income housing parcels and houses under the upcoming Sites and Services Program of the UNDP. As noted, a total of up to 10,000 parcels will be constructed and financed over a period of 8 to 9 years, in selected areas in and around Conakry. This could generate business for suppliers of fired or machine-made earthen bricks, cement, rebars, and iron and aluminum housing products.

According to import records of the Ministry of Commerce Exterior, a total value of G.Fr. 3,895 billion ($9.5 million) was imported in building materials in all categories in 1986, by the combined public and private sectors. In the absence of complete and accessible public records for each building materials category, current annual consumption of construction materials has been estimated in this study using available public records and responses of public and private importers and construction companies as to what they ordered in 1986, and what they could sell, if they had sufficient financial resources, during the next several years.

Discussion of the demand of the major individual construction materials follows.

2.3.1 Cement (Bagged and in Bulk)

The current annual demand for cement is estimated at about 170,000 MT, of which about 66% (114,000 tons) is required to satisfy the Conakry market and 33% (56,000) the interior. The supply of and price for cement sometimes fluctuate widely due to lack of a central marketing and distribution system, and the inability of the state-run cement factory (SOPROCIMENT) to meet local market demand.

In calendar 1986, according to Central Bank import records, a total of 132,000 MT tons of cement were imported at a landed

cost of $8,133,000 (average landed cost of $62 MT). The traffic department at Port Autonome recorded a 1986 cement import figure of 153,213 MT. Ministry of Commerce estimates indicate that about 80% of cement importing is done by the private sector, and 20% by the public sector, principally Batiport.

An estimated 37,500 MT (about 15% of capacity) was produced and sold by SOPROCIMENT to the state marketing company (Batiport), for resale to the private market at G.Fr. 22,000 MT ($54). Assuming that the Port Autonome import figure of 153,213 MT is accurate, this figure combined with estimated production for 1986 at SOPROCIMENT of 37,500 MT would bring cement sales in 1986 to an estimated 190,713 MT, somewhat higher than the above estimate of 170,000 MT.

If a current annual demand of 170,000 MT is assumed, and using the annual growth rates projected for this study, the annual demand for cement in the year 2000 would reach 427,800 MT. Actual demand would depend upon many factors, including population increase. advancement in roads and infrastructure construction, and the general pace of economic reform. Yearly projections for annual increase in demand for this product and others through the year 2000 are given in appendix B.

Given the reasonably limited annual market, and the significant constraints to delivering a local product competitive with imports, cement does not appear to offer attractive opportunities at this time for foreign investors. Given time and managerial freedom to pursue other production and marketing options, European interests currently negotiating with the government to purchase SOPROCIMENT could greatly increase the efficiency of the existing factory, and use its 250,000 MT capacity to serve the present market (170,000 MT) and even the needs of neighboring countries. If this happens in the near future, there would appear to be no market niche for another facility in production and marketing of cement.

2.3.2 Corrugated Roofing Material (Aluminum and Galvanized)

The majority of better residential and commercial buildings in Guinea use corrugated roofing sheets for durability and optimal water runoff. The material used includes galvanized roofing and some aluminozinc sheeting for commercial structures and higher quality residential construction, and aluminum sheeting for less expensive construction.

The estimated current annual demand for corrugated roofing is 12,000 MT of sheeting, or 2.5 to 3 million individual corrugated sheets, of average 2 meters by .90 meters (.39 gauge), selling at retail between G.Fr. 2000 and 2500 ($4.90 to $6.10) apiece. Prices depend upon the type and quality of material.

Estimates provided by public and private importers indicate that about 40% of the market is in Conakry, and 60% in the interior.

There is considerable local production of these products. Details are provided in the supply subsection below.

2.3.3 Rebars

The supporting structural material in most formal construction in Guinea is rebars. For several reasons, including the relatively small size of the market and the lack of an onshore smelter, Guinea has until this time been importing rebars. During the preparation of this study, a private company (Société Internationale Aluko de Guinea-SIAG) signed a convention permitting the construction of a rebar manufacturing facility on Kassa Island. The business plan reportedly calls for breaking up used tankers and other scrap iron for conversion to rebar and related materials. No projected capacity figures were available.

Limited import information from public and private companies importing rebars for construction or resale indicates that the current annual market is about 6,000 to 8,000 MT. Actual imports recorded by the Port Autonome for 1986 totalled 8,344 MT for the category rebar and steel. Of this, as much as 6,000 MT is estimated by the port to be rebar imports.

Precise estimates were difficult to develop because much of the rebar used in Guinea reportedly comes over the border from surrounding countries and is never formally recorded as an import. This is estimated to be as much as 25% of the market.

Small businesses assembling and reselling rebar in Conakry report buying rebar from the import agency (Batiport) at G.Fr. 1750 ($4.27) per 3-meter piece, and reselling assembled in columns at G.Fr. 4000 ($9.75). No reliable figures on total artisanal demand could be drawn from visits to this sub-sector.

The limited information available on formally recorded imports of rebars indicates that the market for this material is quite small, less than 8,000 MT per annum. At this level, the market demand will probably be satisfied with the advent of a medium-scale rebar processing facility at Kassa, and continued informal sector import of rebar from surrounding countries. There is no evident investment opportunity for an offshore investor in rebar manufacture at this time.

2.3.4 Bricks

As noted above, the majority of Guinean homes are built with brick. The two principal products used are cement

bricks and earthen bricks (fired or made by hand). The majority of rural homes are locally built using earthen bricks, often made by hand.

As previously noted, the market for brick material is large although not closely quantified. A recent market study was done by Sano and Fils, a Guinean company with foreign partners seeking to take over the closed state-owned Briqueterie de Kankan. The study projected a current market demand for 7.5 to 8 million fired clay bricks of average 15 cm thickness, based upon previous market penetration registered by this brickery and independent market research done as part of the study.

Using study results, the Sano company has projected an average selling price for their brick of G.Fr. 90 ($.22) (brick of 15 cm thickness). This will be the base for 1987 projected sales and is the price before transport. Their projections indicate that as much as 20% of sales will be to users in Conakry, including small construction companies and private individuals.

If their projections are accurate and if the annual rates of increase in demand used in the study are applied, the annual demand for fired clay bricks could grow to 18.9 million by the year 2000.

A significant amount of urban housing construction and home construction in the interior is done with cement brick. Much of this material is produced locally on open lots, sun-dried and re-sold to local small builders, shopowners and homebuilders. A sampling of local producers in and around Conakry indicated that a brick of 15 cm thickness is selling in Conakry for G.Fr. 150 each ($.37) and a brick of 10 cm. for G.Fr. 140 ($.34). At the time this study was prepared, there was insufficient information to estimate the annual market for this primarily artisanal production.

As noted in greater detail in the section on supply of building materials below, previous market and production experience of two state-owned brickeries (Briqueteries at Koboya and Kankan) indicated serious problems in consistently sourcing adequate clay material and transporting fired bricks over long distances to urban markets. There is no reason to believe that similar transport difficulties would not be faced by the company proposing to take over the closed Briqueterie de Kankan, in its efforts to serve the Conakry market from Kankan.

In any event, it would appear obvious that there is a large demand for various types of bricks in Guinea, a demand that, as noted below, is not very well satisfied at the moment.

2.3.5 Plaster

As part of the market inquiry vis-a-vis builders, the Chemonics team specifically sought to determine the use of and quantity in demand for plaster. Both private and public sector companies indicated that very little use is made of plaster. This appears to be the case because the soft, porous material is ill adapted to the humid climate and is also expensive. The most commonly used interior wall finish in low to medium quality residential construction in Guinea is a cement streak or veneer covered with a layer of whitewash and a medium-quality paint. In Senegal, where a phosphate plant is in place to process plaster, recent introduction of the material met with modest sales results, even though the plaster substitute was cheaper per unit used than local wall finishes. Thus the demand for plaster in Guinea is very low.

2.3.6 Paint

Few reliable figures are available on the demand for paint. While a local state-owned paint mixing plant (SIPECO) had been serving the medium-quality local market until its recent closure, production averaged only 12% to 15% of its capacity of 2500 MT per year, or about 300 to 375 MT per year.

Much of the better quality paint used by builders is imported by private importers and construction companies for specific jobs. The average medium- to large-sized construction company orders 10 to 50 MT per year. A composite estimate, based on the questionnaire responses of private sector companies to an inquiry about annual market size and rate of use by local builders, is an annual market between 2500 MT and 3000 MT per year.

There are wide variances in paint quality used. Very low quality paint is used for local building in moderate income areas, and higher quality paint is used for private and public commercial buildings. Assuming a present annual market of 2500 MT per year, after applying the annual increase factors in this study, the market in the year 2000 would be 6300 MT per year. At a current market of 3000 MT per year this figure would be 7600 MT per year in 2000.

2.3.7 Lumber and Other Wood Products

The demand for wood construction materials is difficult to estimate. The formal market for wood products is predominantly among 13 to 15 builders serving the Conakry area. Heretofore, they have imported wood products on special order according to the job. In December 1986, a medium-scale wood import and retailing company was established in Conakry under

the name Société Commerciale des Bois Tropicaux. Operating out of a large warehousing facility with cutting and trimming machinery, this French-run company offers local builders a variety of treated hardwood products imported from Gabon, at lower average prices per cubic meter than a sampling of prices of recent builder imports from France.

By way of price comparison, lumber that has previously been imported from France by local builders has been purchased at landed prices of G.Fr. 207,971 ($507) to G.Fr. 250,530 ($611) per cubic meter. The competing Société Commerciale des Bois Tropicaux now supplies builders lumber at an average price of G.Fr. 180,000 ($439) per cubic meter. Wood framing has been imported by local builders from France at an average price of G.Fr. 220,000 ($536) per cubic meter. The local company's pieces are now coming in at G.Fr. 160,000 ($390) per cubic meter. This material reportedly comes in at lower quality treatment for humidity than that found in some of the French imports.

Wooden doors are in some demand. Local builders can now import lower quality hollow core doors from France at an average delivered price of G.Fr. 11,884 ($28.90). Higher quality doors that are humidity-treated can be purchased through the Société Commerciale de Bois Tropicaux at between G.Fr. 17,300 ($42) and G.Fr. 18,480 ($45). Demand for wood products as a sub-category is difficult to estimate accurately, as builders' orders vary seasonally by the amount and size of the job, and there are no standard descriptions or specifications. Only the high end of the residential and commercial market seems to require wood trim and paneling.

The only clear estimate of the annual demand at the team's disposal was the average size order of Bois Tropicaux, an order for about 1,100 cubic meters of wood products every two months, or 6,600 cubic meters per year. An estimated 60% of the current order is for sawn lumber. If this private company maintains these ordering proportions, an estimated 3,960 cubic meters of lumber will be supplied to the market this year from this one in-country source, and about 2,640 cubic meters of wood framing and trim. Imports of carpenters' wood (planks) reported by the Port Autonome for 1986 totaled 1,938 MT.

No reliable information could be found on the sales of cut timber from the interior to local artisanal producers of lumber, who make up the other end of the market. Team visits to a sampling of these small roadside sawmills indicated that they purchase small quantities of cut timber from representatives of small private operations in the interior, who visit Conakry two to three times every two months. Orders are made based upon customer orders from small construction sites and individuals.

Within two to three weeks after an order is placed, the supplier transports by truck rough cut timber in 7 to 10-meter lengths to the site of the sawmill. Payment is made and the sawyer produces lumber to resell to his local customer, according to his specifications. Artisanal sawmills may cut and sell weekly lumber from as little as 20 meters of rough cut timber, or as much as 50, depending upon local orders and the availability of wood.

Given the wide fluctuations in builders' needs, and the fact that Guinea is only just beginning to import wood products, it was not feasible for the Chemonics team to estimate the annual market for these products beyond 1987. Significant changes in the degree and type of exploitation of Guinean wood will affect the size and character of this market.

At the present time, and given the current state of road maintenance between the forest zone and major urban centers, the hardwood sector does not appear to offer foreign investors potentially attractive investment opportunities. In another two years, when road rehabilitation projects are well underway, and construction market demand for hardwood products has had time to stabilize, wood products extraction and manufacture of wood framing and related building products could be an opportunity for offshore investors. The need for extensive treatment of Guinean hardwoods for humidity resistance injects a significant cost factor into competition with treated imports.

2.3.8 Aluminum Window and Door Frames

The market for this material is growing slowly in response to the gradual increase in demand for higher quality residential and commercial building construction. The current annual market is estimated at 5,000 to 5,500 units, based upon the rate of utilization and estimates provided by a sampling of five companies in construction and import-assembly of the units. Actual imports reported by a sampling of builders were 4,912 units for 1986. While quality varies by technology and country of origin, an average price for imports is $225 per window and $250 per door, at retail or delivered cost to the consumer. At least 70% of the demand is in Conakry.

If annual increase factors used in the study are applied, the market for these products in the year 2000 would be 12,600 pieces.

There is considerable local fabrication of these products in Guinea, described in detail in the supply section below.

2.3.9 Metal Doors and Windows

There is considerable demand for these products as well. During recent years iron windows, doors and related building materials have been assembled from imported metal bars, soldered and marketed locally by the Compagnie Métallique de Dixinn (CMD). Closed since December 1985, the state-run factory could not supply to the team accurate, recent production records. Discussions with the French building company SIMCO, which is negotiating to purchase CMD and restart it at an expanded production level, indicate that SIMCO is projecting annual production and sales of these framing materials in the amounts of 8[illegible]0 MT in 1987, moving to 1,344 MT in 1988, 2,419 MT in 1989, 3,144 MT in 1990, and 3,458 MT in 1991. It should be noted that these are only estimates, based upon re-equipment and new management of an existing hangar facility with sufficient capacity.

The company's 1987 projected unit prices are G.Fr. 53,300 ($130) for a metal window frame, and G.Fr. 65,600 ($160) for a metal door for a medium-quality residential structure, before transport. If SIMCO's 1988 projections of production and sales are used as a base, and the annual market growth factors used in this study are applied, the market for metal doors and windows could reach over 6,000 MT in the year 2000.

Given the present pace of growth in the construction market for metal framing, and the expanded capacity that will be built into the takeover of a formerly state-run industry, it appears that for the foreseeable future, the local market needs for these products will be largely filled by this assembly plant, supplemented by private importing of framing for construction jobs.

2.3.10 Tiles (Floor and Wall)

Discussions with builders and both public and private importers indicate a significant annual demand for ceramic and granite floor tiles in Guinean building. Granite floor and wall tiles have in the past been produced in Guinea by the state-owned SONACAG tile factory, using local rose, white and black granite. Closed since September 1986 because of management problems, the state-owned SONACOG has a total installed capacity to produce 3,000 square meters of tile per day. At closure, it was reportedly operating at about 15% capacity, or 450 square meters of tile per day, most of it marketed locally. Exports had never been exploited on a large scale.

With the shutdown of local production, Guinea is being supplied with imports, principally from France, Belgium, Italy, Spain. and Eastern Europe. Amounts imported vary widely, ranging

from annual orders of 10,000 square meters each of floor and wall tiles from one private general importer, to as low as 4,000 to 5,000 square meters total for another. The public importer Batiport records orders of 200,000 square meters of tile for 1986, for resale to the public at large. During several discussions with Batiport management, the team received the clear impression that the firm had overstocked for the period and was left with unsold inventory. These orders reportedly included ceramic as well as plastic tile.

Sales prices from local importers range from G.Fr. 2,660 ($6.48) to G.Fr. 4,500 ($10.97) per square meter of tile, depending upon the type and quality of primary material and the production process. The composite estimate of the Chemonics team, based on individual responses to the inquiry about estimated annual market, is that the current annual market for ceramic tile is probably 250,000 to 300,000 square meters. After application of the annual growth factors used in this study, the market in 2000 would reach 629,200 to 750,300 square meters.

A relatively undeveloped market area is first- and second-quality plastic tile. A sampling of experience related by local Guinean importers looking at the offshore supply market indicates that U.S. products are very competitive in price and quality with some European imports, in some cases meeting French first-quality with the second-quality American line, at comparable or slightly lower FOB prices. This market does not seem to have been well studied by the Guineans, but is an area which offshore suppliers might consider for sales and distribution of these products.

2.3.11 Marble

As indicated, Guinea can produce marble products with local raw material. Guinean marble is reportedly largely exploited at the artisanal level and has been difficult to extract and transport to existing industrial facilities at SONACOG (Maneah). A sampling of area building companies has indicated that there is a limited demand for marble, and it is principally for decorative flooring in higher quality commercial buildings. Marble has been used at SONACOG to manufacture floor and terrace tiles. No reliable data were available for estimating market demand for marble at this time.

2.3.12 Slate

The market for slate is very limited according to area building companies and is confined to terrace stones and decorative flooring in luxury commercial buildings. Guinea has in the past supplied its own slate, from a quarry in the northern

city of Labé. With the closing of that installation in 1984, due to problems with management and obsolete equipment, little but artisanal extraction is reportedly going on. Exploitation and transport are reportedly very expensive.

2.3.13 Builders Hardware and Fasteners

These building materials were studied by the team as one catagory, due to the similarity of the sources and marketing networks in Guinea. Virtually all hardware and fasteners (nails, screws, nuts and bolts) are imported. There are no hardware stores as such in Conakry. Hardware and fasteners import and sales are carried out by a very small number of import houses located in or near the Madina central market. These in turn seem to purchase higher quality hardware from the INDEX expatriate importer for resale.

Estimates received from several importers indicated that the market for fasteners is probably about $150,000 to $200,000 this year. Given wide variations in building activity from year to year, and the present, relatively low level of activity, the team could not provide a reliable basis for projection.

2.3.14 Gravel

Gravel, granite sand, sand and ballast material are provided by the SOMIAG quarry in Maneah. Formerly SONACAG, a state-owned and managed quarry, the company is now French-run as a mixed company (51% French and 49% Guinean). Builder-provided prices on gravel run on average G.Fr. 12,000 ($29) per cubic meter delivered, of which about G.Fr. 3,000 ($7.30) is transport. No reliable figures could be obtained to estimate annual market for this commodity, as much of the ordering is done informally by builders and sandlot cement block producers who bring trucks to the site and haul their purchase away.

2.4 Building Materials Market: The Housing Market

Recent studies conducted by the Ministère de l'Equipement et de l'Urbanisme, with the assistance of the UNDP, developed estimated needs for serviced housing plots for low to moderate-income families. These studies indicate a significant deficit of standard housing units for low-income people, served with potable water, electricity and sewer. In Conakry alone, the current deficit of low to moderate-cost housing (average of two to three rooms) is estimated at 40,000 units. This includes a cumulative deficit of 30,000 + units, with an annual addition of 5,000 incremental housing units needed in this area projected for 1985 and 1986. Working with estimates of annual auto-construction of homes in the bush, the UNDP set a working

estimate of 1,500 to 2,000 units needed annually in the interior, for 1985 through 1986, moving to 2,500 to 3,000 needed per year after 1987. These estimates are believed to address only a fraction of the need for minimum-standard, serviced housing.

UNDP study teams have estimated annual population growth in Conakry at 6 to 7%. At a present population of about 800,000, and an average household of 10, estimated growth is 48,000 to 56,000 persons per year (4,800 to 5,600 households). This growth is largely occurring as rural households and young people leave the interior and move to the cities for better opportunities, during a period when Guinea's agriculture has significantly declined.

In response to the growing deficit of decent housing for lower-income families, the UNDP has undertaken the Sites and Services Program to provide serviced parcels, building materials loans and opportunities to purchase ready-built houses suitable for expansion for some 10,000 households. The first geographical area to be served will be Conakry and environs. To be carried out during 1987 through 1996, the program has targeted three levels of building quality pegged to affordability. These are:

"Low standing" units, the first to be built and the priority category. These are units that will be built largely through auto-construction by lower-income families. An estimated 40% of the material used will be imported (cement, sheet roofing and any electric material), and 60% will be local (including earthen bricks, sand and gravel).

Construction costs have been estimated at G.Fr. 25,000 ($61) per square meter, including some local, non-family labor. The house built would be of two to three rooms, brick construction, at an estimated 40 sq. meters, depending upon average family size and the results of an intensive cost study now underway.

The unit would be self-built by families making generally less than G.Fr. 30,000 ($73) per month. It is anticipated that the bricks (if earthen) would generally be made by hand from unfired materials. An estimated 1,000 such houses would be constructed from 1987 through 1988. The annual goal thereafter will be 1,000 to 2,000 per year, depending upon the availability of multilateral agency and other financing.

"Medium standing housing", or that which is built to medium standards with significant paid labor, and with about 45% local material and 55% imports. These houses will offer on average 6 to 7 rooms, and material needs will include a larger demand for locally made bricks. Families purchasing this package

will be buying the serviced plot and a structure. Their average monthly incomes are estimated to average from G.Fr. 30.000 ($73) to G.Fr. 60,000 ($146).

These houses will be larger than the "low standing" houses, with as much as 80 square meters of living space. They will require higher quality construction materials. Purchasers of these units have been identified by UNDP technical staff as a possible market for compacted earthen bricks, fired or produced by machines on site through compaction and extrusion. The Ministère de l'Equipement et de l'Urbanisme indicates a strong priority for using local materials, and a strong interest in machine-compacted bricks made from local soil.

If this project component is found to be feasible, and sufficient financing can be arranged, the project could build for turn-key sale as many as 3,000 "medium standing" units over three years (1989 through 1991).

"Medium standing " units would be built at an estimated cost of G.Fr. 70,000 to 100,000 ($170 to $243) per square meter, or $13,600 to $19,440. Based upon UNDP preliminary estimates for basic materials required at this building standard, if the first 3,000 of these units were built over three years (1989 through 1991), the project could require the following:

For 3000 units at an average 80 square meters:

22 million bricks of the stabilized type
300,000 square meters of sheet roofing (avg. 2 x 1 meters)
20,000 windows and 23,000 doors

At average retail prices for each type of material (1987) adjusted to 1989 by a factor of 4% per year, the market created by the building of 3,000 of these units would generate the following sales, over three years, for local producers and suppliers:

22 million bricks at G.Fr. 162 (.40).....($869,200)
300,000 sq. m. roofing at G.Fr. 2500 ($6.10).. ($1,829,200)
20,000 windows at G.Fr. 53,300 ($130) .....($1,066,000)
23,000 doors at G.Fr. 65,600 ($160) .....($3,680,000)

<u>"Grand standing"</u> homes, or those of higher quality, which would be constructed in serviced parcels for purchase by families enjoying monthly incomes of G.Fr. 200,000 or more ($487). These would increase in size by an average of one to two bedrooms. These houses would be built at an estimated cost of G.Fr. 200,000 ($487) per square meter, and with an average home size of 120 square meters, a cost of about $58,000. This appears to be a high cost for a family with such an income, and, like the

"medium standing" homes, this project component is still under study by the UNDP and the Ministère de l'Equipement et de l'Urbanisme.

UNDP market research indicates that these better houses would be built primarily of cement bricks and would probably not create or constitute a significant market for compacted earthen bricks. No production numbers have been determined, as the component is still under study.

To formalize and render more cost efficient the production and sale of low to moderate income parcels and housing units, the Ministère de l'Equipement et de l'Urbanisme and the UNDP have developed proposals to create and finance two shelter-related institutions serving families that purchase and improve parcels of "low" and "medium" standing. The first institution to be established would be the Société de Logements à Prix Modéré (SOLOPRIMO), a mixed government and private company that would manage the processes of construction of parcels, provision of building materials loans to families building their own homes, and construction and sale or rent of constructed units of "medium standing."

This program will be financed by the UNDP and Habitat-Nairobi, with the primary objective of reaching and serving as many low to moderate-income families as possible with serviced and affordable housing options. The Government of Guinea is presently seeking private sector partners to launch this company.

The second facility, now under study, would serve as a shelter finance institution addressing a variety of housing-related needs. To be known as CREMONA (Crédit Immobilier National), the financing institution would gradually take over all financing functions for the sector, making loans for sale of housing parcels, for purchase of construction materials to allow lower-income families to construct a house, and for direct sale of turn-key houses. Like SOLOPRIMO, CREMONA would be created as a mixed company, with government and private sector partners.

By creating two specialized institutions, the Ministère de l'Equipement et de l'Urbanisme and UNDP would effectively separate the functions of developing shelter opportunities in collaboration with private construction contractors, and of financing these options. The objective is to develop a vehicle that can continuously address the needs of the low to moderate-income shelter sector, combining the skills and experience of the public and private sectors for maximum efficiency in the use of limited resources.

At this time, the Government of Guinea and UNDP are studying the market and structure for CREMONA. Discussions are

underway with financing sources to secure lines of credit for on lending to low and moderate-income purchasers. Potential financing agencies include the World Bank, the African Development Bank, and Habitat.

2.5 Building Materials Supply Systems in Guinea

The construction materials supply system is not formally organized, but operates through private and public purchases of materials. An estimated 70 to 80% of the materials supplied annually to Guinea are imported, despite the recent presence of 10 state-owned factories.

The primary consumers for building materials are private construction companies engaged in residential, commercial and public building construction, and private individuals. Both groups obtain their materials through a three-tiered system that includes import-export firms, local retailers, and the state building materials import company, Batiport.

The largest customers for bulk purchases of basic building products are the private construction companies, which place materials orders so they can carry out public and private building projects. When a private company needs an item in large quantity, where the quantity and the quality must be assured, the customer will order in bulk from a foreign supplier in Europe. He will shop the market for the best price he can get and stay with reliable suppliers.

In some cases, where a small to medium quantity of a material is needed, the builder will go to one of a handful of local Guinean importers who sell reasonably high-quality lines, including roofing sheets, ceramic tiles, sanitary fixtures and hardware. These wholesaler-retailers do not specialize in one or two lines, but order and resell a wide variety of products, including agricultural produce, according to what is bringing the best unit price at the time.

Therefore, the builder cannot always count on being able to get the quantity he needs through bulk buying at local import outlets. For the privilege of going through a local importer for moderate quantities of goods, the building company pays on the average a 30 to 35% mark-up on most specialty items, such as hardware, floor and wall tiles, and sanitary appliances. He generally will get a better price on cement than he would from a small retailer.

Occasionally, a builder or a small private user will buy a small, fill-in quantity of a building material from a very small retailer, often a roadside shop, or open air construction materials fabrication, in the case of cement or earthen bricks.

For the privilege of purchasing in small quantities from the retail sector, and particularly bulk items like cement, the purchaser will pay a mark-up of as much as 55 to 57% over the retail price from the public supplier, Batiport, and 30% over the local importers.

Cement is the basic building material that everyone buys and resells in the market when the price is good. Consequently, the price paid by the customer varies widely, according to supply and demand at any one time. For example, the company or private user buying from the public building materials importer Batiport will pay G.Fr. 22,000 ($53) per MT. He will occasionally be able to get this price through a private importer who has sourced at a price of G.Fr. 18,000 ($43). The local construction company ordering from Spain will pay a delivered (transport subsidized) price of G.Fr. 16,400 to 17,200 ($40 to $42) MT. The same quality cement coming from France or East Germany arrives at a landed cost of G.Fr. 18,400 to 19,600 ($45 to $48 MT), compared with a reported production price FOB from the local SOPROCIMENT factory of G.Fr. 31,980 ($78) MT. The customer buying from a small retailer will now pay G.Fr. 38,000 to 40,000 ($92 to $97). The glut of cement at the end of 1986 reportedly brought street prices for cement as low as G.Fr. 18,000 per metric ton ($43).

Discussions with local builders indicate that builders, as the larger consumers, are faced with almost constant variations in unit prices and supply in the most basic materials, notably cement and sheet roofing. There is no central source of inputs to regularize supply. Price goes up and down for these items according to the supply on the market. As illustrated, the most significant variations in price occur in cement. At the public level, there is no central statistics office that can track supply and demand, spot emerging deficits or surpluses, and move to help the private sector correct supply and demand distortions.

Several builders identified the need for a local <u>grossiste,</u> or wholesaler specialized in certain types of materials, who could buy in quantity, stock in quantity, and provide builders with short-term credit (3 months up to the full 8 months building cycle for a larger building). The absence of specialization in marketing and the lack of some means to track construction materials make the builder's job as a consumer of building products difficult and often time-consuming and also add to the consumer's cost.

Thus a potential investment opportunity exists for a foreign investor as a supplier of certain basic construction products that could be brought into Guinea at competitive prices and quality with lines supplied from Europe. In the course of

this study, several such opportunities have emerged, and they are discussed in section 3 and subsequently.

2.6 Supply of Building Materials in Guinea

This section presents the current state of supply for major building materials in Guinea and therefore completes the supply and demand picture. Most of the items discussed earlier under "demand" are also covered here; in some cases the information available is so limited that both demand and supply were covered in section 2.3.

As discussed in the introduction and background, until the December 1985 government order to close many state-run factories, some 10 local factories were producing building materials from imported inputs for consumption almost exclusively in Guinea. Guinea has installed factory capacity (in varying condition) to assemble or produce a variety of products, ranging from mixed concrete to finished floor tiles.

In its 1985 World Bank study on the status of Guinean state industries and possibilities for restructuring, IDI found that the construction materials industries were, like others, operating on the average at less than 15% capacity. Among the reasons cited were difficulties in securing primary inputs because of the scarcity of hard currency for imported raw materials, and fixed prices, discouraging local suppliers. Poor management and in some cases, poor maintenance contributed to poor performance. In three cases, equipment was obsolete as well.

Overall, Guinean building materials industries have supplied only a fraction of the total annual sales for very basic products (cement, sheet roofing, and mixed paint). They have, as a group, contributed little value added to the economy, in that nearly all have made heavy use of imported raw materials or components. The two exceptions seem to have been the SONACAG tile manufacturing factory, which in the past has produced medium to high-quality marble and granite tiles from 90% local marble, and the SOMIAG (former state-owned SONACAG) granite quarry.

As noted, throughout the previous administration, state-owned industries were given access to cheap foreign exchange at a greatly overvalued exchange rate. The removal of this privilege has made it difficult for these companies to compete without significant restructuring and realignment of production costs and pricing, and most are up for sale or partial privatization.

With the lifting of restrictions upon private import of basic material inputs, the government has made it possible for Guinean industries to access foreign markets. It has, at the

same time, handicapped the construction materials factories by making them dependent on the state marketing apparatus to purchase supplies and market the product. Good examples are cement and sheet roofing.

During this study, the Chemonics team talked with management from four of the eight idle state-owned building materials companies (cement, quarry tiles, paint, aluminum products), and met with the representatives of a private takeover of a fifth (CMD metal framing assembly). The results of these interviews follow and provide an overview as to how basic construction materials are manufactured in Guinea, and the costs and competitiveness of local production.

2.6.1 Cement

Cement is produced in Guinea largely from imported raw materials. Using imported clinker, gypsum and pouzzolan, the mixed company SOPROCIMENT operates a kiln for producing concrete mix, storing tanks, and a bagging facility. Opened in 1982 at an investment cost of $3.5 million, SOPROCIMENT is a mixed company (70% Government of Guinea, 30% Banque Islamique de Développement). The factory has an installed capacity of 250,000 MT per year, exceeding by at least 50,000 MT the country's present annual market for cement. The installation is located 36 km outside its principal market and delivery point for bagged and bulk cement, the capital city of Conakry.

Discussions with the management and local collaborators in the IDI World Bank study indicate that in "normal years" SOPROCIMENT has produced at only 22 and 25% capacity as a result of problems with management, lack of raw materials and spare parts, and difficulties in physically supplying the plant. The plant is located outside the city and is serviced by government trucks and trains that have to accommodate backhaul schedules and are sometimes non-functional because of the lack of spare parts. IDI's findings indicate that SOPROCIMENT had produced and marketed the following quantities in 1982 through 1984:

1982	54,400 MT	22%
1983	65,200 MT	26%
1984	57,200 MT	23%

At the time of these interviews, SOPROCIMENT reported that it was producing at less than 25% capacity (less than 60,000 MT annually), and was awaiting a new shipment of raw material to keep the kiln producing. The factory is now operating five days per week, at only one shift per day.

The biggest cause of low production has been lack of foreign exchange to pay for clinker and other raw inputs. In

1986, the plant was out of production for 5 months, dropping annual production to an estimated 37,500 MT, or 15% of capacity.

The cost of the primary input alone (clinker imported from Europe) is $38 to $40 MT. As noted, this is nearly as much as the price at which lower cost European cement imports arrive CIF Guinea. Foreign sourced cement is coming in at $40 to 42 MT (Spain). Other imported inputs are gypsum from Mauritania, and pouzzolan from Spain. Only sand, gravel and water are sourced in country. The resulting product is "dry process" Type I (normal) cement.

With its periodic work stoppages, SOPROCIMENT is producing at an estimated production cost of $78 to $80 per MT. All of the production is sold at this time to state-run Batiport, at G.Fr.20,200 ($49) MT, to be re-sold at a retail price of G.Fr.22,000 ($54). Obviously a major, unacceptable subsidy is involved.

In addition to the high input costs and lack of import protection, SOPROCIMENT is reportedly handicapped by overstaffing, with a high percentage of people unoccupied. Given its incapacity to compete with foreign imports, SOPROCIMENT cannot continue to function under the current operational plan. In government discussions with the Holder Bank-Suisse Group for possible takeover, several alternatives for restructuring were discussed, within the framework of a category 4 investment, i.e., an investment in a mixed company in which the government wants to retain some interest and management role.

One of the alternatives would be to invest another $2.5 million in the current factory to increase its capacity utilization through investment in parts, maintenance, and raw materials working capital. The company would mix and bag cement at a projected unit cost of $63.60 at 150,000 MT annual production. A second alternative as proposed by IDI would aim to reduce that unit cost to about $ 52.60 MT at 150,000 MT capacity, and $50.40 MT at full 250,000 MT capacity, through installation of a bulk import and sacking unit at the port. This would require an investment of $3 million for the equipment (floating silo or dock unit, working capital). It is not clear that adequate port facilities could be secured without significant difficulty. It should be noted that even at a production cost of $50 per MT, cement processed in Guinea would be uncompetitive with some imports.

2.6.2 Aluminum Roofing Sheets and Door-Window Frames

At present, an estimated 20% of the annual sales of sheet roofing results from production and marketing in Guinea of roofing sheets corrugated and cut from imported sheet

aluminum, by the state-run SOGUIFAB assembly factory. At its founding in 1965, SOGUIFAB was a mixed company. The partners were Alcoa and the Government of Guinea. After rationalization in 1973, and after Alcoa's supply contract to SOGUIFAB ran out in the early-to-mid 70's, the company began to experience a sporadic lack of supplies, a problem that plagues it today under the government-directed ordering system. Although the government is seeking to create a mixed company with private investors and management expertise, and although company management indicates the government is open to flexible negotiation on percentages of ownership, so far, there have reportedly been no takers for the operation. An American rolling steel mill has discussed a possible takeover of the hangar for manufacture of rebar and other rolling mill products.

SOGUIFAB produced and sold in 1986 some 769,000 units (average 2 meters x .90 meter roofing sheets), working with 99% imported materials. It is useful to look at the process whereby SOGUIFAB obtains the raw material to produce the sheets. Alumina is actually produced in Guinea at the French-run unit at Friguia and then shipped to Cameroon where the supplier company SOCATRAL transforms it into rolling aluminum sheets. Finally, SOGUIFAB purchases the rolling sheets from the supplier at G.Fr. 2,291 ($5.58) and resells to their principal market (Batiport) at G.Fr. 2,500 ($6.09) per cut and corrugated sheet, or a 9% markup.

SOGUIFAB's equipment is a single-line aluminum corrugating and cutting machine, with an original installed capacity of 6,000 MT per year. Like other state-owned operations, the company has experienced sporadic production stoppages, linked to the lack of raw materials and foreign exchange. As a result, production in 1985 reportedly dropped to 2,000 MT with a three-month work stoppage, and to only 400 MT in 1986. The sheet roofing line has been shut down since January 1987 awaiting sufficient foreign exchange cover for imported rolling sheets. Management wishes to be financed for six months orders, at 250 MT per month, or 3,000 MT annual production.

In addition to SOGUIFAB, a private aluminum products assembly plant, FAAG, has recently been established in Conakry and plans to install sufficient capacity to serve 70% to 80% of the current demand for higher quality galvanized and aluminozinc roofing sheets. It will have a double-line corrugating and cutting machine. Project annual capacity will be 1.75 to 2 million sheets. If the current demand is as estimated, 2.5 million sheets, the project might be on the right track. In any event, this plant should essentially cover the demand for this segment of the market.

With the advent of FAAG, SOGUIFAB plans to turn its attention to its second product line, assembly of imported

aluminum doors and windows. In 1986, SOGUIFAB ordered, assembled and sold an estimated 3,710 units of aluminum doors and windows from a Swiss exporter, at buying prices of G.Fr. 91,200 ($222) for the door unit, and G.Fr. 51,420 ($125) for the window. These units were resold for an average price of G.Fr. 144,766 ($353) for the door and G.Fr. 81,620 ($199) for the window, at an average markup of 37%.

There are problems with SOGUIFAB's new strategy, however. The company is facing competition for the limited aluminum door and window market from a private, expatriate importer who is bringing in higher quality units from Greece. These retail at an average price of $250 for the window and $250 to $300 for the door. Closer to home, the FAAG private fabricator has moved into assemblage and sale of similar quality units from France, at undisclosed selling prices.

2.6.3 Paint

Most paint used in Guinea is imported. There is one local paint manufacturer, SIPECO. SIPECO was formerly state-run and engaged in mixing interior paint from imported ingredients and packaging the product in imported 15 kg cans. Temporarily idled, awaiting the signature of a purchase agreement by the French company SOGIREF-ARTILIN, SIPECO has an installed capacity of 2,500 MT per year. Due to problems with obtaining consistent supplies of inputs through the state system, SIPECO reportedly hasn't achieved more than one-fifth its annual production plan, or more than about 540 MT per year (36,000 15-kg cans, 18% of the 1987 estimated annual market). All inouts are imported.

Paint is mixed and marketed in six colors, with German-supplied solvents, powders and oxides, and French-supplied pigments and cans. Discussions with medium to larger-scale construction companies indicate that the quality is mediocre, and that they generally don't purchase the local paint, relying on imports mainly from France.

Formerly restricted to sales to one client (SONIPE Maintenance Company), SIPECO must now sell directly to the market. Customers include very small builders and retailers, who buy at the factory-delivered unit price of G.Fr. 10,890 to 16,980 ($26 to $41) per 15 kg can, and resell at an average price of G.Fr. 17,000 ($42).

As noted, SIPECO faces competition from importers selling higher quality paint at comparable or better prices (G.Fr. 15,000 to 16,000, $37 to $39). With the advent of French management and better supply lines, SIPECO will probably capture a larger share of the market. At an estimated annual market of

2,500 to 3,000 MT per year, this factory and some inevitable imports should service this market for some years to come, in the absence of prohibitive tariffs or import bans.

2.6.4 Marble and Granite Tiles

Working with a base of nearly 100% locally-sourced materials until it closed in September 1986, the state-owned SONACAG tiles manufacturer at Maneah produced a variety of commercial quality tile products from marble, granite and slate. Uses have ranged from floor tiling to decorative terrace tiles and cemetery stones.

The factory has an installed capacity (with two production lines) of 3,000 square meters per day, or about 900,000 square meters per year (300 working days). Studies done by IDI on this factory indicate that, at closure, it was operating at about 15% capacity, or 135,000 square meters per year. Problems included poor management and low productivity. The factory also encountered problems in securing consistent supplies of black marble and slate, which are difficult to mine and transport to site.

No production costs or selling price information was available at the closed factory site. Negotiations for the private takeover of the SONACAG quarry that serves this factory were signed with the French company AUDEMAUD during the study. As yet, no private purchasers have been located for the tile manufacture. Technicians interviewed at the site indicated that there is a lack of technical knowledge concerning the production process. Highly skilled management would be needed to keep this high-quality, well-maintained Italian-manufactured equipment running well in the face of delayed and inconsistent supplies of local raw materials. It should also be noted that during the administration changeover and economic reform program, the already limited level of higher quality public construction slowed, diminishing further the annual market for these products.

2.6.5 Metal Door and Window Frames

These products were assembled until recently in the state-owned factory CMD (Compagnie Métallique de Dixinn) from iron pieces largely imported from France. Management problems and obsolete equipment, coupled with poor maintenance, forced the closure of this factory in December 1985, pending negotiation of a private takeover. The SIMCO construction company has come forth to purchase it, and, with new equipment, turn the hangar into a fuller-scale assembly of metal door and window frames, street doors for private villas, and a variety of builders' hardware. Figures provided from the business plan for government negotiation indicate that SIMCO plans to produce and

market, through builders and retailers, the following volumes for 1987 to 1988:

Doors and window frames	840 MT
Tubs and other hardware	30 MT
Road doors	300 MT
Builders' hardware	80 MT

Their projections call for increases in production and sales at the rates of 60% for 1987 to 1988, 80% for 1988 to 1989, 30% in 1989 to 1990, and 10% in 1990 to 1991.

Projected annual sales (all products) are:

1987	1,200 MT
1988	2,000 MT
1989	3,500 MT
1990	4,500 MT
1991	5,000 MT

Estimates provided by this company and conversations with the retail trade indicate that average prices for medium-quality soldered metal doors are G.Fr. 65,600 ($160) and for windows, G.Fr. 53,300 ($130). A recent study of locally produced building materials, conducted by UNDP, indicates that most housing and small commercial construction utilizes metal framing for the exterior. This material offers more security and greater longevity in the tropical climate than does wood frame and trim. The demand is believed to be greater in the Conakry area than in other sizable population centers in the interior.

In addition to the CMD factory, some 30 to 40 artisanal fabricators are soldering and assembling metal frames in open lots and small sheds, at km 24 on the road from Conakry to Coyah. The quality of the work observed by the Chemonics team was low to medium. It appeared that workers were assembling frames from abandoned iron pieces as well as new material purchased from small retail vendors. The cost of material per square meter was estimated at an average G.Fr. 22,500 ($55).

2.6.6 Local Brick Production - Factory Level (Kankan)

Until the closure of most state-owned construction materials factories in late 1985, the Guinea building market was served by two medium-scale brick manufactures, located at Koboya (near Conakry) and Kankan, the second largest population center and largest city in the interior. For reasons linked to inconsistent supply of raw materials and poor management, Koboya has been closed and will probably not reopen. The Briqueterie de Kankan is in the process of being taken over by a private Guinean company, Sano et Fils

Export-Import in Conakry, which will attempt to serve the markets of Kankan and Conakry with commercially produced fired bricks.

Originally installed in 1972-73 with Chinese technical expertise, the Briqueterie de Kankan began operations at a yearly production capacity of 15,000 MT, drawing from a nearby quarry with clay reserves estimated at 1.5 million MT. By 1978, the factory was experiencing serious problems with deforestation in and around Kankan, causing shortages of the wood fuel used to fire the ovens. Production plummeted from a 1974 actual of 14,000 MT to 4,800 MT in 1978.

From 1978 through 1984, the factory was rehabilitated by a private French company (CEDIC), and the ovens were converted to heavy fuel oil. The unit reopened in 1985, after a total of $4.6 million had been invested, including $2.5 million by the Chinese as original investors, $1.2 million by the French, and $.9 million by the Guineans in civil engineering work. Its installed capacity is 20,000 MT per annum but it has failed to realize projected tonnage of 70% to 80% of capacity. During a 1985 study of Guinean state-owned industries, IDI evaluated the factory as being in good physical condition and well managed, but cited problems linked to the inconsistent supply of clay (principally during the rainy season), and fuel for the ovens and generators.

The main reason for inadequate supplies has been poor and unreliable transport. Kankan is accessible to Conakry by road and train. The 700 km road is in bad condition, and only the 360 km from Conakry to Mamou are slated for resurfacing under the World Bank Projet Routiers. The IDI team found that the rolling stock serving Kankan was obsolete, frequently derailed, and often out of order. IDI's findings were that the only viable solution to the problem of transport would be an integrated trucking system to supply the factory with key inputs and deliver bricks to the Conakry market on the backhaul.

With respect to production plans for the Briqueterie, Sano et Fils plans to produce in its first year (1987) 65% to 70% of its installed capacity of 7.5 million bricks per year, of an average 15 cm thickness. This would render an annual production of 4.875 million to 5.250 million bricks, or a production capacity of 16,250 to 17,500 per day (300 working days). Total installed capacity is 20,000 MT per year. Projected average selling price per average 15 cm fired clay brick will be G.Fr. 90 ($.22) for local sales carried away by the purchasers.

In order to address the transport situation, the company is in the process of setting up a trucking partnership with a U.S. firm, Texas Transports, to provide hauling capacity of two to three trucks per day (10,000 bricks) in order to serve

the Conakry market. When the cost of transport is factored in, the brick would sell in Conakry for an estimated G.Fr. 130 to 140 ($.32 to $.34). If this projection can be met, the price would slightly undercut the current price of G.Fr. 140 to 150 ($.34 to $.36) for a comparable size cement brick in today's market.

Discussions held with the Sano company indicated that it is entering the takeover with a high degree of confidence that it can produce and sell 4.8 to 5.2 million bricks in the first year (65 to 70% capacity), 80% capacity (6.0 million) in the second year, 90% capacity (6.75 million) in the third, and 100% capacity (7.5 million bricks) in the fourth. It has identified as its primary customers local households seeking to build or expand a home or small commercial structure, and small construction companies in Conakry and in the interior.

As observed in the IDI study, however, the competitiveness of the Kankan fired clay product will have to be market-tested against cement brick in common use and produced and sold by local artisans in Conakry and in the interior. When questioned about the advantages of its product versus the hand-made cement brick, Sano management cited the following advantages:

- Greater moisture resistance in a humid coastal climate
- Aesthetics, or "brique en terre" appearance
- More economical use of the more expensive cement material (less than 10% in mix)
- Rising (and fluctuating) costs of primary materials of cement and gravel

After examining the operating plan, the Chemonics team raised several concerns that could greatly affect the sales and profitability of this factory. Although most artisanal cement bricks viewed by Chemonics were of mediocre quality cement and gravel mix (with one exceptionally high quality product observed in Sonfonia, selling at G.Fr. 260, or $.63), the determining factor is probably not quality, but the competitiveness of the selling price. The company will clearly have to meet or beat the price of the most commonly used alternative, the cement brick at G.Fr. 140 to 150 ($.34 to $.36). At this time, it is not clear to the team that the proposed operation will be able to do so (at a delivered price per brick of G.Fr. 130 to 140 ($.32 to $.34), given the distance required to penetrate the Conakry market (the goal of an estimated 20% of that market to start) and rising fuel prices.

A related concern is the difficulty in maintaining a constant transport capacity, given the problems that operations have experienced in the past in transporting fuel and products to and from Conakry. World Bank road work will only treat one stretch of the road in the immediate future, and the section between the end point of the first project (Mamou) and Kankan is also in need of resurfacing. Work carried out in 1987 will slow transport for all businesses using the route.

A third concern is the sufficiency of the Kankan market to absorb most of the factory output, if serious problems with transport and supply develop on the Conakry route. The present population of this city, the second largest in Guinea, is 90,000, compared with an estimated population in Conakry of 800,000.

Problems in any of the above areas could significantly push up the production cost and selling price of the fired clay product, placing it in an unfavorable competitive position with the "brique en terre" (fired and non-fired), which as noted is used as a matter of habit, affordability, and availability of raw materials throughout Guinea. This product can be made in place, avoiding fuel shortage and transport problems that drive up the cost and decrease the rate of production and sales of the factory-fired brick.

2.6.7 Local Brick Production - Artisanal Level

To better understand small-scale local construction needs, the Chemonics team visited a number of local brickmakers who supply individuals and smaller construction companies with cement bricks, the primary material used in building support walls in housing and small commercial structures in non-rural areas. Discussions with several such entrepreneurs in the Conakry area revealed that production of this widely accepted product takes place by hand on open lots on the main roads. A group of four persons can produce up to 600 bricks per day, subject to the availability of cement. Local ingredients (cement, gravel, sand and water) are mixed in wheelbarrows, and each brick is individually poured into an iron mold that gives it the hollow block configuration used in foundation and wall building.

One mold for a brick 15 cm thick costs G.Fr. 20,000 ($49) and can be used to produce 200 or more bricks per day. This brick, at 15 cm thickness, sells for G.Fr. 150 ($.36); a slimmer brick, at 10 cm, sells for G.Fr. 140 ($.34). Bricks made in this way require three days to dry. At the rate of 600 15 cm bricks per day, ready for selling at G.Fr. 150 apiece at intervals of every three days, an average group of four producers can gross as much as G.Fr. 900,000 per month ($2,195). Their costs of doing

business include the molds (an average three to four per site, at G.Fr. 20,000 apiece), plus raw materials.

The following income-cost analysis was done for one work site near Conakry:

Per Batch of 750 Large Bricks (15 cm width)

RAW MATERIALS COSTS/BATCH

1 MT cement.....	G.Fr. 23,000	($56)
1 cu meter gravel.....	G.Fr. 12,000	($29)
1.2 cu meters sand.....	G.Fr. 14,400	($34)
TOTAL:	G.Fr. 49,400	($119)

INCOME/BATCH

G.Fr. 150 (.36) x 750 bricks =	G.Fr. 112,500	($274)

GROSS PROFIT/BATCH

	G.Fr. 63,550	($155)
MONTHLY PROFIT (before depreciation) (10 cycles)	G.Fr. 631,400	($1550)
ROR (before depreciation)		1.27

Like other small-scale enterprises making construction materials, the brickmakers are working at the will of the economy. One week cement is available through the public import company at G.Fr. 23,000 ($56) per MT, and two weeks later it has to be purchased from a local retailer at G.Fr. 40,000 MT ($97), reducing profit sharply. Increasing demand for cement bricks, coupled with inconsistent, unsubsidized supply of cement, have fostered the development of a black market in construction materials, as evidenced by the prices small retailers charge small purchasers.

The cement bricks examined by the Chemonics team were for the most part of varying durability and uniformity, but were inexpensive, readily available, and well adapted to the climate and local building conditions. For these reasons, cement bricks have become a highly acceptable building material in urban areas and in non-urban areas where incomes will support the price.

Machine technology is not required to build or market this product and would render the existing scale of operations unprofitable. A competing product would have to offer comparable durability, accessibility, and (adjusting for the number of bricks required to build a square meter) price.

3.0 INVESTMENT OPPORTUNITY: A BRICKMAKING PROJECT

Sections 1 and 2 above have provided a great deal of information about the Guinean construction materials industry in general and many of its components. The analysis indicates that there are relatively few immediate investment opportunities for foreign investors working with locally established partners, and that this situation will remain true for some time until some of the problems discussed are alleviated. However, the Chemonics team and CNPIP have identified one particularly interesting investment opportunity in brickmaking.

This investment opportunity would address a large market for durable, locally adapted bricks. It would introduce to the market a new type of brick, a high-pressure, stabilized earth brick (HPSE), machine-produced through compaction of local soil. The product could be produced at a low raw materials cost and would offer greater durability and moisture resistance than cement and traditional earth bricks currently in use.

3.1 Project Concept

The basic project concept is to introduce, over a period of two years, the new HPSE brick product. In order to maintain cash flow during the introduction period, and provide a balanced product line, the proposed enterprise would also produce and distribute cement blocks of the kind currently used in Guinea, but of a better quality because of a higher degree of mechanization.

The project concept calls for the creation of a joint venture between a Guinean company already established in the building industry, and a foreign company that could supply improved equipment for manufacturing and marketing blocks and bricks. The object of the project would be to develop a business that produces and markets a building material with strong growth potential but without extensive capital investment. The business would initially operate in Conakry, expanding into other markets as appropriate.

To maximize sales and initial market penetration, the proposed venture would begin by producing and selling cement blocks for residential and light commercial construction in the Conakry market, at an average size of 20 cm x 20 cm x 40 cm. As indicated in the demand section of this study, the Guinean market

has accepted and is widely using cement blocks of these dimensions, presently produced and sold by artisanal producers at the roadside at relatively inefficient levels of manpower and materials utilization.

The proposed business would be organized to make this product more competitive by (1) more economic sourcing of raw materials, (2) use of an appropriate level of mechanization, and (3) production based upon economies of scale not possible with a totally hand-made operation. It is estimated that this operation would sell cement blocks initially at a per unit price of G.Fr. 451 ($1.10), significantly higher than the price for a somewhat smaller cement brick sold by artisans at G.Fr. 150 (.37). The much higher quality of the proposed block would, it is believed, justify the higher price.

As soon as possible, the proposed venture would introduce high-pressure, stabilized earth bricks (HPSE) of an average 18 cm x 10 cm x 36 cm. The HPSE brick is produced at very high pressures, as much as 250,000 lbs. per square inch, and as a result is a much denser and stronger brick than the traditional earth brick. In addition the HPSE brick is stabilized with 5% cement, is moisture-resistant, and does not require sealing.

Despite its advantages, the HPSE brick is not expected to compete with traditional earth bricks, which are used primarily in informal building in rural and urban areas. The HPSE brick would be targeted at a different market initially, the middle market, or medium-priced construction, representing the lower end of the cement block market. To capture that market, the proposed business would price HPSE bricks slightly lower than cement blocks. Ultimately, the marketing objective for HPSE bricks is to replace the cement block in higher quality residential and commercial construction, and to expand into lower-priced markets as well, as acceptance of the HPSE brick expands.

The manufacture and marketing of the HPSE brick would involve the introduction of new technology tested and proven in the U.S., and the development of market acceptance for the product. The thrust of the marketing strategy would be to convince consumers that the HPSE brick can replace a cement block, at greater compressive strength, reduced moisture absorption, greater temperature stabilization, reduced chipping and cracking during handling, and a much improved appearance. The proposed product would also be easier to build with, as faster bonding allows for more production per day.

Two possible pricing strategies were explored in this study. The first would price the proposed product higher than

the currently used cement block, progressively aiming for a higher profit margin through improved technology and economies of scale. The second strategy would price the product a little lower than the existing product, and expand the market considerably. In the study, a base price and a market size have been estimated, pricing the product higher than the nearest competition. The potential investor would have to develop his strategy based upon a fuller market analysis.

Once the core brick business is established, it could be used as a base for supplying other building materials for which a market opportunity is identified. It should be fairly easy to move into such products as market opportunities arise. Potential opportunities include sales of doors, windows, roofing sheets, hardware, lumber, formed steel shuttering, and concrete. The proposed business could eventually provide a one-stop building center and delivery system, without the necessity of making a capital intensive or complex management investment.

Marketing would be based on a four-part strategy, utilizing introduction of the HPSE brick, through construction of a demonstration building on the business site, moisture resistance tests for public view, and sales of the finished bricks backed by a promotional program. It is anticipated that the introduction of the improved brick to the Conakry market would require one to two years, depending upon the pricing and specific marketing strategy used. Even if the HPSE brick requires an extended period to develop, the cement block business would be a profitable stand-alone business. The introduction of the earth brick would provide the means to expand the market and increase operating margins.

3.2 Operational Plan

3.2.1 General Operations

The operational plan would call for the formation of a joint venture between an expatriate firm and an existing company already involved in construction or related activities in Conakry. This business structure would greatly reduce start-up costs and logistics and would take advantage of the established supply lines and business relationships of the existing company.

The proposed business would operate at an annual production level of 2,160,000 blocks and bricks from the third year on, based upon 240 working days, at 7.5 hours per working shift. The length of the working year is based on reduced production during the rainy season.

The joint venture would develop a production yard in Conakry with fast access to raw materials and market delivery

routes. The yard would be fenced, from .5 to 1 hectare in size, supported by an associated warehouse and brick loading dock, a sales office. product display center, and equipment workshop. The bulk of production would be carried out at the yard, and bricks would be delivered by company-owned trucks with hydraulic conveyor, or sold FOB the warehouse. The brick manufacturing equipment would be trailer-mounted and, with sufficient volume and space at the production site, would be temporarily located on that site to reduce delivery costs. In general, the production yard should be designed in such a way as to enable easy access to customers and buyers, while facilitating security. The operational concept is to keep as much of the process under company control as possible, in order to reduce costs.

The joint venture partners should weigh all alternatives in operations planning, including subcontracting, purchasing or renting equipment, as opposed to using company equipment. It is assumed for the purposes of this study that it will be more economical to do almost everything directly, and the capital and operating cost estimates are based on this assumption.

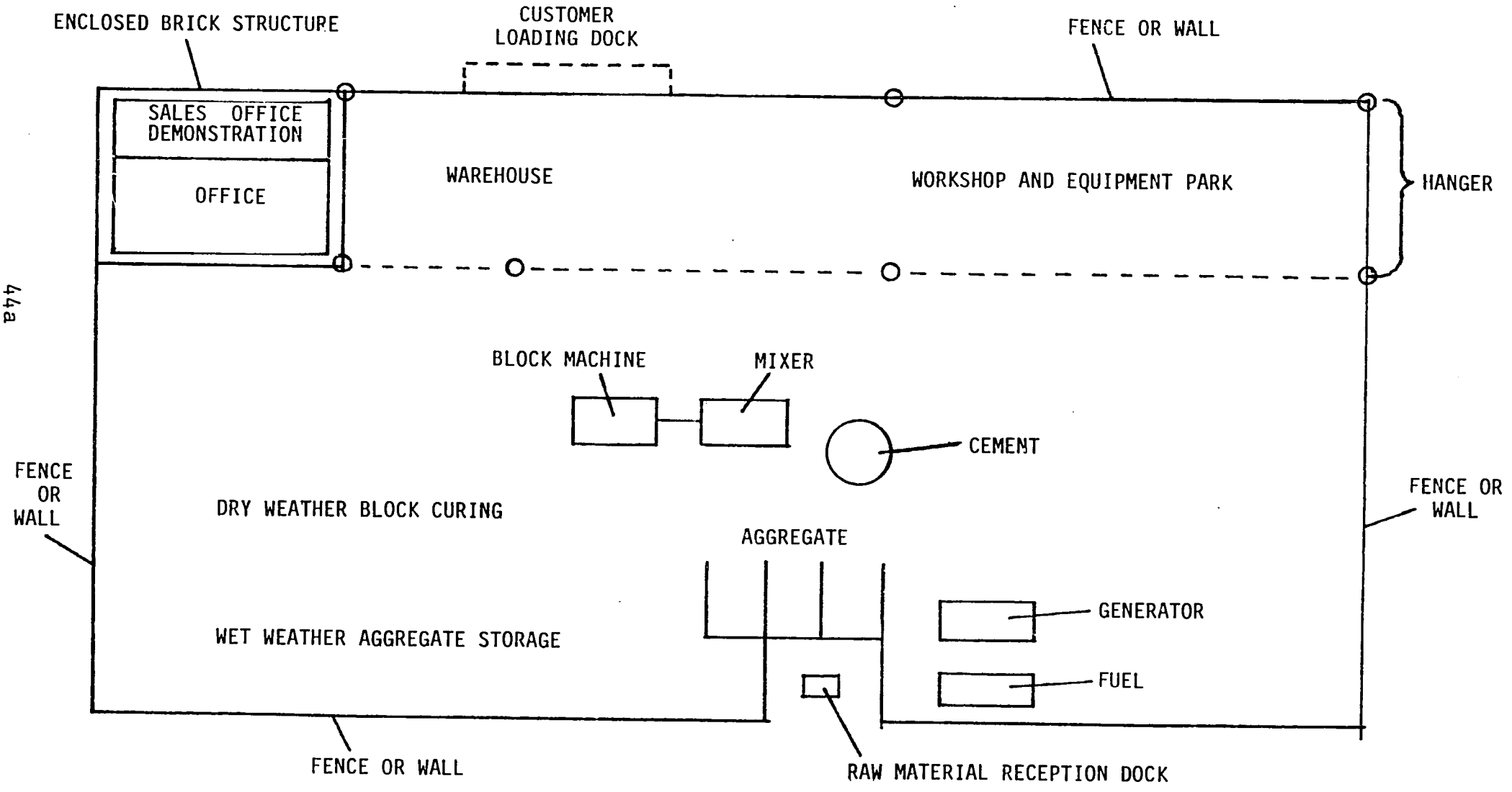
3.2.2 Raw Material Supply

Cement - Cement will be imported in 1 to 2-ton minibulk bags, to allow the business to realize the lowest cost supply. Minibulk bags can be moved with a forklift; they would permit easy handling and storage, reduced losses through the port, minimum inventory levels, and recycling of the bags.

Aggregates - Cement block production would require a range of gravel and sand from 3/8 inch down, washed and screened. To cut costs and maximize profits, the proposed venture would excavate, screen, wash, and transport the aggregate. This will require the location of aggregate pits close to Conakry, with good access to water.

Establishment of the excavation, screening and washing system would require loaders, excavators, screening equipment, water pumps, and conveying equipment. The venture would use its own 15-ton dump trucks to transport raw material to site, at a planned utilization rate of 2 trips per shift per truck, or 60 tons per shift. This plan assumes that the operation will be able to locate raw material within a 60-km radius of the manufacturing site. To reduce the cost of the product, the proposed business would dig its own sand and gravel, paying local villagers a royalty of $3 per cubic meter.

SCHEMATIC LAYOUT OF BRICK/BLOCK PRODUCTION FACILITY



Water - The on-site requirements for water would be limited, at an estimated 2 tons per hour. Water would be provided by the city supply or, more likely, the operation's own tanker, which is provided for in the capital costs.

Wooden Pallets - These would be manufactured and purchased locally from 3/4" plywood and local lumber. A replacement rate of 20% per year is anticipated.

3.2.3 Manufacture of Cement Blocks

Most of the cement block manufacturing will be done on a stationery basis within the yard specifically designed for that purpose. Aggregates will be stored in bulk bins and handled with dump pit and conveyors. Cement will initially be stored in sealed minibulk bags in the warehouse and subsequently in the bulk silo, for immediate use. Cement and aggregate will be mixed in a ratio of 53% sand to 36% gravel.

For maximum production efficiency, the block-making machine will be located adjacent to the mixer, and the mix will be loaded into the machine by conveyor. Cement blocks will be produced in batches of 3 and laid directly on a pallet. Cement blocks require 24 hours of curing before direct handling, and 14 days before use. When they emerge from the press, they will be transported by skid steer loader on pallets to the curing area. Pallets may be stacked six high, reducing the space requirement for curing and storage.

During the dry weather, the cement blocks may be cured and stored in the open air. They would be covered with a polyethylene sheet during light rains. During the heavy rains, they would be stored and cured in the warehouse. Production will be considerably reduced during the rainy season, as construction activity is reduced at this time.

3.2.4 Manufacture of HPSE Bricks

These bricks will be manufactured in much the same way as cement blocks. The raw material will differ, as will the mixing and pressing equipment.

Raw Material - Specifications for raw material requirements are significantly less than those for cement blocks. The primary material of raw earth will be used without grading or blending, provided it contains 8 to 20% clay, with the balance, sand and silt. It appears likely that suitable soils can be found over a wide range of the market area. Thus, raw material will be

considerably cheaper for the HPSE product. Transport costs will be very reduced, and this raw material does not require screening or washing.

To reduce cost of HPSE production, the business will excavate its own soil from nearby areas, paying the local residents $1.50 per cubic meter as a royalty, and haul the material to the production site using its own transport.

The raw soil material can be excavated with a loader/excavator and tumbled to reach the appropriate mixture of 8 to 20% clay. A 5% addition of cement will be needed to stabilize the bricks against moisture and to maintain their strength under most conditions. Mixing will be carried out in an appropriate sized "pug mill."

Curing - HPSE bricks can be handled or cured in much the same way as cement blocks. In very dry weather, they may need to be wetted at intervals.

Site Manufacture - HPSE bricks may be readily manufactured on individual construction sites where the volume warrants it. The "pug" mill and press are constructed to allow them to be moved to such sites fairly easily. It should be noted that the utilization of local soil will greatly facilitate production on customer sites, and, in many cases, may be obtained directly at the site.

3.3 Marketing Plan

As noted, the proposed marketing strategy is to begin operations with production and sales of cement blocks, a widely utilized material in better quality residential and commercial construction, for which a large market already exists. These will be produced at 75% of capacity in the first operating year, moving to 100% in the second year. Beginning in the second full year of production, the business will introduce the HPSE bricks to the market, at 50% of production capacity. The business will grow to 100% capacity in the third year, moving the product as rapidly as possible into the market. We believe that the advantages of the HPSE product will allow this rapid production build-up in spite of the fact that the product is currently unknown. By the third year, the project is thus assumed to be producing at 100% of capacity in both product lines, mechanized cement blocks and HPSE bricks.

3.3.1 Target Market for Cement Blocks

The target market for this product will be quality residential and commercial construction. In residential building, this will include homes of medium to high-quality construction.

Cement blocks are well accepted in the local market, in part because they are locally made at widely accessible locations and in part because they are reasonably priced. The proposed business will enter the market with a better quality block produced, as noted, at higher efficiency, more economical sourcing of raw material, appropriate levels of mechanization, and resulting economies of scale.

During the recommended time period for project start-up, the cement block may face limited competition from the fired clay brick product that will be introduced in 1987 through 1988 by the private company, Sano et Fils, that is negotiating the takeover of the Briqueterie de Kankan. If the factory is successfully re-launched, the SIDAF brick of 7.8 x 6.0 x 7.8 cm would be brought on the market at an average price of G.Fr. 90 ($.22), which comes out to $7.33 per square meter of wall, considerably cheaper than the more than $13.00 per square meter of wall required by the project's mechanized cement blocks. However, with the additional transport costs of G.Fr. 40 to 50 ($.10 to $.12) to move the product from Kankan to Conakry, this fired brick would enjoy a narrower price advantage over the cement brick, i.e., $11.00 per square meter of wall compared with the more than $13.00 for the project's cement block. The Kankan project will also have to contend with many other supply and transport problems, as explained earlier.

A second form of building material that would present some competition is the unstabilized earth brick, or non-fired brick made by hand from local soil and dried in the sun. This product is widely made and sold in rural areas and on the fringes of urban areas, to households building their own homes. This market is largely for low-quality housing construction. Dimensions vary widely, as do strength and durability. These bricks are very susceptible to moisture absorption. They are selling in Conakry at varying prices, and are generally found at roadside artisan sites at G.Fr. 110 to 130 ($.27 to $.32) per brick.

The cement block to be recommended for the proposed project would enjoy three market advantages over known competition. These are:

- Superior quality (strength and moisture resistance)

- Competitive pricing

- One-stop building supply service, with other widely used products in this market being offered at the proposed business site

3.3.2 Target Market for HPSE Bricks

The target market for HPSE bricks will be medium to high-quality residential and commercial construction. In marketing the product, the business will seek to introduce it as a replacement for the cement block, initially in medium-quality construction, and moving gradually into the high-quality market. As the product gains wider acceptance, the business will expand into the lower priced housing and commercial construction markets, competing with traditional earth bricks.

Initial acceptance of this product may suffer from a perceived similarity with traditional earth bricks. Traditional bricks are, in fact, far inferior to the HPSE brick in that they are lower strength, less dense, and less moisture resistant.

In order for the HPSE product to compete against the cement block, it will be necessary to demonstrate that the HPSE brick does, in fact, fall into the same category as the cement block, and not into that of the traditional earth brick. The HPSE brick is, in fact, in many demonstrable ways superior to the cement block as well. It absorbs less moisture, maintaining higher average strength and uniformity. The soil-based HPSE has better cooling characteristics, keeping homes and commercial buildings cooler and less humid during the heat of the day. It is easier to build with because it does not require a sealant, and it is highly uniform for stacking, allowing crews to build a structure faster.

Trials testing the acceptance of a stabilized earth brick (somewhat inferior to the HPSE brick) in Guinea have been limited to the construction and observation of a single, all-brick, three-story residential building, privately erected in the Conakry area in 1978. According to UNDP housing specialists interviewed as part of this study, the stabilized earth bricks utilized in the trial structure have exhibited good moisture resistance under exposure to normal humidity and annual rains, and have resisted chipping and cracking with time and wear.

Based upon limited observation of HPSE performance in the test building, and study of test results and characteristics of HPSE technologies marketed by foreign firms, the UNDP in Conakry has expressed to the study team a direct interest in

considering HPSE for use in the construction of low to medium-quality housing units, as part of the upcoming Sites and Services Program.

3.3.3 Market Size

Based on the information obtained for this study, Chemonics believes that there is ample market for improved cement blocks and HPSE bricks to support a project of the size proposed. In fact, it is quite likely that implementation of the project would attract similar enterprises to compete with it in the near future. Obviously, it is not possible to develop good figures on the overall market size; however, the UNDP Sites and Services Program has done some market estimates and given some indication of the potential itself.

As previously noted, the Sites and Services Program has estimated a 1987 cumulative market deficit of 40,000 standard serviced housing units for families of low income in Conakry. This housing deficit is expected to rise by 5,000 units per year from 1988 onward, to accommodate an estimated annual population increase in the capital of 4,800 to 5,600 households. Obviously, the increase will have to be accommodated either through new construction or rehabilitation of existing units. If projections hold true, the estimated need for lower-income housing in Conakry would reach as high as 55,000 units in 1990, and 70,000 in 1993, the point at which the Sites and Services Program of 10,000 units would be substantially built out.

In the interior, the project's technical team has estimated that 2,500 to 3,000 units per year are self-constructed by lower-income families, requiring durable, moisture-resistant bricks and other basic building materials. At an estimated 3,000 units per year, rural auto-construction of standard low to medium-quality housing would produce as many as 21,000 or more units by the end of 1993. All indications are that this estimate represents only a fraction of the building necessary to meet annual rural housing needs in Guinea.

According to the UNDP's preliminary building schedule, the Sites and Services project would create a market for building materials suppliers of approximately 1,000 to 2,000 units of housing per year, provided financing can be secured throughout the buildout. It is anticipated that most of the purchasers of low-quality housing plots will buy materials to build their own homes with loans made available through the program. Purchasers of medium and higher-quality housing will purchase homes already built, using a housing purchase loan. Thus, the annual building program would create the following demand for units requiring bricks, roofing sheets, iron window and door frames, and some electrical material:

1987-88	Low-Quality Housing	1,000 units
1988-89	Low-Quality Housing	1,000 units
1989 through 93	Low and Medium-Quality	2,000 units/yr.
Or, Four Years	To include Low-Quality	1,000 units/yr.
	And Medium-Quality	1,000 units/yr.
	TOTAL (6 years)	10,000 units

The first 6,000 units would be built in Conakry, and the balance of 4,000 (after 1990 to 1991) in the interior. Given the present uncertainty as to the level of financing available from one year to the next, UNDP officials have estimated that the buildout of the 10,000 units could continue through the end of 1995. In this case, the market would average 1,430 housing units per year.

This and future publicly and privately financed housing programs will provide good potential markets for HPSE bricks.

3.3.4 Promotion

Promotion of the HPSE brick would be based on a demonstration program showing the relative qualities of the product. The first step would be to build a small demonstration building at the business site. The building would be constructed of HPSE bricks without sealant and would be exposed to the rainy season. HPSE bricks could also be placed in water on site to demonstrate their moisture resistance.

Site trials and results would also be publicized, emphasizing the local performance of the HPSE, and product quality rather than price. All media that provide regular access to the Guinean public would be used, including newspaper and radio coverage, demonstrations and/or sales at customer sites, trade fairs, major sporting, and other public events, using boutiques at the newly renovated municipal stadium in Conakry.

As the HPSE becomes more widely accepted, as indicated by sales and increased market outlets, the product will be gradually extended into the lower price construction market. This phase of the marketing program will reach into the rural areas, using performance demonstrations and the message that the brick is a superior replacement for the cement block and traditional earthen brick.

During this phase, the proposed business could consider opening similar production and demonstration operations in other major markets. If the HPSE product rapidly takes hold, another business alternative would be to consider sales and servicing of the HPSE brick-making machine to Guineans, at an attractive dealer mark-up and royalty fee. The limited returns that could be expected from such sales, however, will have to be weighed against the introduction of competition in the brick market.

3.3.5 Promotional Budget

Initially, we propose that a limited budget be available for product promotion, i.e., $50,000 annually, as noted on the financial pro formas. This amount is deemed adequate for the extent of the promotion needed to introduce the product.

3.3.6 Pricing

Two alternative pricing strategies were considered in the study to replace the cement block with the HPSE in medium to higher-quality building. One strategy placed the HPSE at a slightly higher price than the higher-quality local cement block commercially produced in Conakry. This strategy would require a promotional period to demonstrate that HPSE quality would be at least equal to that of the block. Because of lower input costs and economies of scale, the proposed business would enjoy a better margin under this pricing alternative than that realized by cement block producers.

A second strategy would sell the HPSE at a lower price than the medium-quality cement block, and subsequently expand the market significantly. The strategy of selling at a slightly lower price (per square meter of wall) was chosen. The price is, as stated, considerably higher than the low-quality artisanal product.

3.3.7 Marketing

Conakry is a relatively small market. It is assumed that word of a well-priced, superior product will spread quickly. The market survey of potential customer groups performed as part of this study indicates that a lot of business will come from builders who buy at the plant and haul their purchase away, or arrange for delivery to their work site.

In addition, we propose that the business utilize an "outside" salesman to market to construction companies, government building programs and other concentrated markets. At a later stage, the marketing plan will utilize several agents/distribution points strategically located in the areas of Conakry where construction is concentrated. Eventually, in

response to market acceptance, the business could open production and sales points in other cities.

Assuming the UNDP Sites and Services Program is successfully launched in 1987, the proposed brickmaking business would attempt to make one of the first concentrated sales of HPSE bricks to the project's technicians, as decision makers, to supply bricks for construction of medium-quality housing. Utilizing the project as a customer outlet, the business would also market HPSE's to lower-income households that would purchase serviced housing plots under the program and build their own lower-quality housing units.

3.3.8 Delivery

It is expected that the bulk of production would be sold FOB the plant. However, a flatbed truck with a hydraulic discharge arm will be available for delivery of small to medium sized orders. The coordination of product delivery with district agents/distributor centers should allow improved market penetration and advantage.

3.4 Investment Structure

As noted, the investment is proposed as a joint venture between a Guinean company currently involved in the construction and building materials industries, and an appropriate foreign partner. It would be highly advantageous if the local partner were already involved in construction materials production (or marketing), with some infrastructure and equipment in place, to reduce capital costs, start-up, and risk. One appropriate partner currently engaged in construction, with strong interest in the manufacture of building blocks, has been identified in Conakry. There may be others as well.

By having a construction business partner already established in Guinea, the proposed venture would enjoy a significant market advantage, in that the local partner would already have a foothold in the market and would be in a position to identify new construction opportunities to market the HPSE brick. The local company might also serve as a purchaser of the bricks on certain of its own construction sites. Finally, using on-the-ground knowledge of the building materials market, the local partner could move quickly to address new opportunities to purchase and resell related building materials for various levels of construction.

3.5 Pro Forma Costs, Revenues and Cashflow

This subsection provides a brief economic and financial analysis of the brickmaking project. In a profile or pre-

feasibility study of this kind, financial analysis can only be illustrative, because of the large number of variables. The base parameters of the project are set out in table 1 on the following page and correspond to the narrative description above. Basically, the project will produce, from year three onward, somewhat over one million improved cement blocks and an equal number of HPSE bricks. The other financial elements appear in separate tables and are described briefly below.

3.5.1 Capital Costs

The equipment and infrastructure required for the proposed investment are fairly standard for an operation of this type and are outlined in table 2. These capital requirements fall into three distinct categories for depreciation purposes:

- Five-year class - for vehicles and other short-life equipment
- Ten-year class - production equipment, loading, conveying and storage equipment, and project development costs
- Eighteen-year class - buildings and infrastructure

Approximately 5% of the projected capital costs are directly related to project development. These costs, in the amount of $50,000, represent the front-end investment in travel, professional time, and related expenses that will be required of the offshore partner to develop the business with a Guinean partner. They will be capitalized by the foreign partner as equity.

No allowance has been made for the purchase of a site as land because the identified Guinean partner presently controls sufficient land to develop the proposed production site. Any other potential local partner for the venture could be expected to own land for that purpose, or to provide it as a contribution in kind.

It should also be noted that project equity of $417,600 will be invested prior to year one of project operations. This improves the return in that year, enabling the project to break even on a cash flow basis at the end of the second year. (See table 5.)

3.5.2 Revenues

Annual revenues, table 3, is made up of sales of two different products which in the base case are priced at:

TABLE I

GUINEA BRICK-MAKING PROJECT

BASE PARAMETERS

Exchange Rate - GF/$	410

SALES PRICE.	$US/Unit	GF/Unit	US$/Sq.m. Wall
Cement Blocks (20x20x40)	$1.10	451.0	$13.75
HPSE Bricks (18x10x36)	$0.49	200.9	$12.99

COST OF RAW MATERIAL.	$US
Cement per ton	$50
Gravel per Cu. m.	$3
Sand per Cu. m.	$3
Block Soil per Cu m.	$2

		YEAR 1	2	3	4	5	6	7	8	9	10	11	12
PRODUCTION													
Nominal hourly press capacity	600												
Hours worked per day	7.5												
Days worked per year	240												
Annual output/press ,000 brick	1080												
Production buildup Cement Blocks		75%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Production Buildup HPSE Bricks		0%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
SALES (,000 Bricks per year).													
Cement Blocks		810	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080
HPSE Bricks		0	540	1080	1080	1080	1080	1080	1080	1080	1080	1080	1080
Total		810	1620	2160	2160	2160	2160	2160	2160	2160	2160	2160	2160

RAW MATERIAL REQUIREMENTS.	Cement	Sand	Gravel	Dirt
Cement Block Mix	11%	53%	36%	0%
Raw material Tons/,000 blocks	2	9.6	6.6	0
HPSE Brick Mix	5%	0%	0%	95%
Raw material Tons/,000 bricks	0.57	0	0	10.8

	1	2	3	4	5	6	7	8	9	10	11	12
Cement ,000 tons/year	1,620	2,468	2,776	2,776	2,776	2,776	2,776	2,776	2,776	2,776	2,776	2,776
Sand ,000 tons per year	7,776	10,368	10,368	10,368	10,368	10,368	10,368	10,368	10,368	10,368	10,368	10,368
Gravel ,000 tons per year	5,346	7,128	7,128	7,128	7,128	7,128	7,128	7,128	7,128	7,128	7,128	7,128
Dirt ,000 tons per year	0	5,832	11,664	11,664	11,664	11,664	11,664	11,664	11,664	11,664	11,664	11,664

INVENTORY/RECEIVABLES. $,000	Days.												
Cement	30	6.7	10.1	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4	11.4
Aggregate	30	2.3	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
Blocks/Bricks	30	29.3	40.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3
Receivables.	30	73.2	119.4	141.1	141.1	141.1	141.1	141.1	141.1	141.1	141.1	141.1	141.1
Total Operating funds required		111.5	172.9	197.9	197.9	197.9	197.9	197.9	197.9	197.9	197.9	197.9	197.9

FINANCING	Debt/Equity Ratio	Interest R	Term.	Total ($,000)
CAPITAL EXPENDITURES.				
Equity.	40%			417.6
Commercial medium term debt.	60%	10%	7	626.3
Total				1,043.9

OPERATING FUNDS.	Rate
Revl'g credit commercial.	12%

TERMINAL VALUE	100%	IRR.	41%

TABLE II

CAPITAL EQUIPMENT AND COSTS ($,000).

Depreciation period	5 years	10 years	18 years	TOTAL COST
Project Development.		50.0	0.0	50.0
Site Preparation & Security.			30.0	30.0
Buildings.			140.0	140.0
Cement Block press		50.0		50.0
Ribbon Mixer		24.0		24.0
HPSE Block Press		73.0		73.0
Pug Mill		12.0		12.0
Loader/Backhoe x 2		60.0		60.0
Screening Equipment		22.0		22.0
Conveyors		12.0		12.0
Loaders x 3		24.0		24.0
Pumps and tanks	10.0	12.0		22.0
Bulk Cement Tank		18.0		18.0
Generators and Switch gear		22.0		22.0
Dumptruck x 2	100.0			100.0
Flatbed truck	45.0			45.0
Station wagon	12.0			12.0
Pickups x 2	18.0			18.0
Motorcycle	2.0			2.0
Flatbed trailer		15.0		15.0
Service equipment		15.0		15.0
Lumber/tarps etc.	10.0			10.0
Hand tools etc.	8.0			8.0
Office equipment		15.0		15.0
Misc. Contingency				79.9
Operating funds				165.0
TOTAL	205.0	424.0	170.0	1,043.9

CAPITAL LOAN - Annual Payments.

Principal & interest $,000	128.7

TABLE III

ANNUAL REVENUES $,000.

	1	2	3	4	5	6	7	8	9	10	11	12
Cement Blocks	891.0	1,188.0	1,188.0	1,188.0	1,188.0	1,188.0	1,188.0	1,188.0	1,188.0	1,188.0	1,188.0	1,188.0
HPSE Bricks	0.0	264.6	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2
TOTAL REVENUES	891.0	1,452.6	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2

COST OF SALES $,000

	1	2	3	4	5	6	7	8	9	10	11	12
Cement	81.0	123.4	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8
Gravel	11.5	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3	15.3
Sand	16.7	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2
Dirt	0.0	6.2	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Labor	138.2	138.2	138.2	138.2	138.2	138.2	138.2	138.2	138.2	138.2	138.2	138.2
Fuel	50.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Maintenance	40.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Other consumables	10.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Bad debts	8.9	14.5	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2
TOTAL COST OF SALES.	356.3	489.9	514.2	514.2	514.2	514.2	514.2	514.2	514.2	514.2	514.2	514.2

ANNUAL EXPENSES ($,000)

	YEAR 1	2	3	4	5	6	7	8	9	10	11	12
Promotion & Advertising.	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Fixed Personnel.	353.4	353.4	353.4	353.4	353.4	353.4	353.4	353.4	353.4	353.4	353.4	353.4
Fixed Maintenance.	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Fixed POL.	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
General Insurance.	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Investment Insurance.	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3
General & Admin.	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0	72.0
TOTAL EXPENSES	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1

Expenses are constant year 1 through 12

a. Cement blocks G.Fr. 451 (US$1.10) per block

b. HPSE bricks G.Fr. 205 (US$ .49) per brick

Annual revenues increase as production builds and as the proportion of HPSE bricks in production and sales increases. By year three, annual revenues reach $1,717,200. For simplicity, we assume that they remain at that level, although, of course, in practice they would fluctuate with changes in output, prices and the like.

3.5.3 Operating Costs

Operating costs, also given in table 3, are broken into two distinct categories:

a. Cost of sales covers all costs directly related to level of production. A major item in this category is the cost of raw materials. Raw materials costs of cement for the production of cement blocks are particularly significant (23% in first year). It is assumed that the proposed business will import its cement annually, at a more uniform price than would be obtainable in the local market. Other significant costs in this category are labor for securing raw material, brickmaking, and transporting material, as well as fuel and maintenance of equipment. Fuel costs include those related to excavating and transporting raw materials to site, machine production of blocks and bricks, and transport to point of sale.

b. Expenses are the fixed costs that do not vary with production level. (See table 3). The major component in this category is the cost of fixed personnel. Fixed maintenance and fuel (POL) cover the day-to-day requirements of the operation unrelated to production. General insurance provides cover for capital equipment, inventory and liability; investment insurance covers the offshore investor risks associated with adverse political changes or blockage of dividends. Promotion and advertising are budgeted at $50,000 per year, an amount deemed sufficient to cover the costs of local marketing, largely for the introduction and expansion of the market share of HPSE bricks.

Table 4 provides some back-up for the personnel cost estimates in table 3.

TABLE IV

PERSONNEL COSTS

FIXED PERSONNEL COSTS

	Number	Salary	Multiplier	Total Annual Cost	
Manager	1	$70,000	1.5	$105,000	
Assistant Manager	1	$15,000	1.2	$18,000	
Accountant/Admin	1	$12,000	1.2	$14,400	
Sales Manager	1	$15,000	1.2	$18,000	
Outside Sales	1	$12,000	1.2	$14,400	
Inside Sales	1	$12,000	1.2	$14,400	
Clerk Typist	1	$8,000	1.2	$9,600	
Storekeeper	1	$8,000	1.2	$9,600	
Fitter/Welder	1	$8,000	1.2	$9,600	
Foreman	1	$8,000	1.2	$9,600	
Drivers	3	$7,000	1.2	$25,200	
Operators	2	$6,000	1.2	$14,400	
Mechanic	2	$8,000	1.2	$19,200	
Guards	4	$5,000	1.2	$24,000	
General labor	8	$5,000	1.2	$48,000	
TOTAL				$353,400	353.4

VARIABLE LABOR COSTS/Press

	Number	Monthly Rate	Months	Multiplier	Total Cost	
Operators	6	$500	9	1.2	$32,400	
Drivers	3	$600	9	1.2	$19,440	
General labor	20	$400	9	1.2	$86,400	
TOTAL					$138,240	138.24

3.5.4 Proposed Financing and Source of Operating Funds

Total capital requirements are divided into two categories:

- Normal production operations, which comprise the bulk of the capital requirement
- Operating funds

The former will be financed through normal project financing, which can be obtained through the World Bank lines of credit for capital costs financing, the African Development Bank, and appropriate supplier credit. It appears that sufficient medium-term credit could be secured to cover these needs satisfactorily. The loan conditions for such financing vary with the source. For purposes of this review, a loan period of seven years with a twelve percent annual interest rate is assumed.

For simplicity of analysis, all capital loans are drawn down in the first operating year. In addition, operating credit will be required to cover inventory of raw material, and stocking of product and receivables. Operating funds will be obtained on a commercial basis, at a projected interest rate of 10%.

3.5.5 Cash flow

A summary cash flow for the proposed operation, on a constant dollar basis, is shown in table 5. Years one and two of the operation show a negative cash flow, due largely to the taking down of capital loans in the first year. A related factor is the starting of first-year production of the first product, cement blocks, at 75% capacity, moving to 100% in year two. Also, production of the lower-unit-price, higher-volume HPSE brick does not commence until the second operating year, at 50% of production capacity, moving to 100% in year three.

These first-year negative cash flows can be offset by deferring the draw down of a small part of the commercial loan until year two. As previously noted, the potential investor could also increase first-year revenues from sales of the cement blocks, by reducing the size produced to half and doubling the production of units for sale. The smaller blocks would sell for more than half the price of the larger. It would also be possible to improve cash flow in year two and thereafter by extending the production days, thereby increasing production and sales revenue from both cement blocks and HPSE bricks.

It is expected that a tax holiday will be negotiated as a precondition for investment, and taxes are therefore not taken into account in the cash flow analysis.

TABLE V

CASH FLOW ($,000).

		YEAR 1	2	3	4	5	6	7	8	9	10	11	12
REVENUES		891.0	1,452.6	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2	1,717.2
COST OF SALES.		356.3	489.9	514.2	514.2	514.2	514.2	514.2	514.2	514.2	514.2	514.2	514.2
GROSS EARNINGS.		534.7	962.7	1,203.0	1,203.0	1,203.0	1,203.0	1,203.0	1,203.0	1,203.0	1,203.0	1,203.0	1,203.0
EXPENSES.		580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1	580.1
CAPITAL TRANSACTIONS.													
Equipment or business sale.		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,043.9
Capital Expenditures.		1,043.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OPERATING CASH FLOW.		(1,089.3)	382.6	622.9	622.9	622.9	622.9	622.9	622.9	622.9	622.9	622.9	1,666.8
FINANCING.													
Equity Capital.		417.6											
Medium-term loan		626.3											
Total Inflow.		1,043.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEBT SERVICE.													
P&I Medium-term loan		0.0	128.7	128.7	128.7	128.7	128.7	128.7	128.7	128.7	128.7	128.7	128.7
Interest operating loan		13.4	20.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7	23.7
Total Outflow.		13.4	149.4	152.4	152.4	152.4	152.4	152.4	152.4	152.4	152.4	152.4	152.4
DEPRECIATION/SINKING FUND.		92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8	92.8
NET CASH FLOW.	(417.6)	(164.9)	140.5	377.8	377.8	377.8	377.8	377.8	377.8	377.8	377.8-	377.8	1,421.7

Depreciation is treated as a sinking fund to maintain plant and equipment at original value. Consequently the operation is regarded has having a terminal value of 100% of initial capital costs in year twelve.

3.6 Financial Analysis

3.6.1 Measuring Project Worth

For an assessment of project worth, internal rate of return (IRR) is considered the yardstick most appropriate to the nature and objectives of this review. The IRR has been calculated to assess the potential return from the project and its sensitivity to changes in some of the base parameters.

3.6.2 Base Case

Table 1 outlines the base parameters for the perceived operation with total production increasing to 100% for cement blocks by year two, and for HPSE by year three.

Under somewhat conservative conditions assumed, the project could be expected to show an internal rate of return of at least 27%, which represents an attractive investment opportunity.

With the possibility of additional revenues from the sale of other high-volume building products, with no increased capital cost, this rate of return could increase. This assumes that the business will seek out market opportunities to sell construction materials with a high profit margin.

3.6.3 Sensitivity to Sales Prices

Profitability is very sensitive to sales price, and particularly the pricing of the cement block. A 10% rise in the sales price for this product to G.Fr. 496 ($1.21) would increase the IRR to 45%. A 10% reduction in the sales price would reduce the IRR to 15%, making the project marginally feasible. Thus, the venture will not be in a position to compete sharply on price.

The project is less senstitive to price changes for the HPSE brick because, as the project is profiled, the HPSE brick contributes a smaller portion of total project's initial revenues. Thus, a corresponding 10% rise in the sales price for the HPSE brick to G.Fr. 226 ($.55) would increase the IRR to 33%, whereas a reduction of the HPSE brick price by 10% would reduce the IRR to 23%, still an attractive return for investors.

3.6.4 Sensitivity to Production Level

The project is also extremely sensitive to volume of production. A 10% increase in the volume of production increases the IRR to 44%, while a 10% decrease lowers the IRR to 11%, making the project clearly infeasible.

Sensitivity to both price and volume indicates that potential investors should be constantly concerned with price, and very prudent in assessing market volume and sales potential, producing and selling as much as the market will absorb. In other words, the business of producing and selling bricks is very much a commodity business, and investors should be on top of the market all of the time.

The proposed business is not greatly sensitive to changes in raw materials costs. An increase of 10% in the cost of the most costly raw material, cement, decreases the IRR to 26%, and a 20% increase in cost decreases the IRR only 3 percentage points, to 24%. A decrease of 10% increases the IRR to 29%.

3.6.5 Sensitivity to Financing Costs

The business is not particularly sensitive to changes in financing terms. A decrease in the debt/equity ratio from the projected 60/40 to 50/50 decreases the IRR to 26%. At an assumed interest rate for the capital loan of 10%, the IRR increases by 1% to 28%.

3.7 Recommendations for Project Development

From the preceding discussion, it is clear that the conceptual plan to produce and market HPSE bricks and cement blocks in Guinea offers an attractive investment opportunity for a foreign investor with a Guinean business partner already established in the construction market. Working with lower-cost sourcing of raw materials, better equipment, and built-in economies of scale, the business could produce a higher-quality product than is currently available in the local market and would be very profitable.

The potential market for the HPSE brick is enormous, extending into medium and higher-quality residential and commercial construction as building activity in Guinea increases and acceptance of the product grows. There is also good potential for reaching into the lower-cost building markets for home construction, as marketing of the product is accelerated from year two onward.

Potential investors should also be guided in their business decisions by the fact that this is a commodity business,

very sensitive to changes in sales price and production level. Management will have to be constantly on top of market sales and new opportunities to produce and sell, maintaining high levels of production and sales, as Guinea's economic expansion generates growth in the private and public construction sectors.

APPENDIX A

STATE OWNED BUILDING MATERIALS INDUSTRIES

1. SOPROCIMENT

Products: cement in sacks (25 lbs); cement in bulk (VRAC)

Installed Capacity: 250,000 MT/annum

Actual Production Level: Avg. 57,000 to 60,000 MT/annum (25%)

Opened: 1982

Investors: 70% Government of Guinea; 30% Banque Islamique de Developpement

Initial Investment: $3.5 million

Status of Negotiation: Negotiations in advanced stages with Holderbank Suisse Group to create a mixed company with no less than 51% private interest; mixed management (private expertise with Government participation); talks slowed by lack of agreement on alternatives for restructuring

2. SOGUIFAB

Products: Aluminum sheet roofing (Avg. 2 meters x .90); corrugated and cut; aluminum door and window frames, imported and assembled for resale; aluminum dishes fabricated from aluminum disks

Installed Capacity: 2.3 million aluminum sheets/annum; 6000T

Actual Production Level: Varies according to availability of raw materials; avg. 15% capacity average in main line of sheet roofing

Opened: 1965

Investors: Presently 100% Government of Guinea; was a mixed company (approx. 51% Alcoa, 49% Government) until 1973 nationalization

Initial Investment: $1.5 million est.

Status of Negotiation: Numerous attempts have been made by the Government to secure a private partner and create a mixed company with private sector participation in management; thus far no serious private interest due to history of financial and management difficulties, equipment obsolescence; market for sheet roofing being taken over by private sector

3. SIPECO Paint Factory

Products: Low to medium quality interior paints, mixed from imported ingredients, and packaged in 15kg cans for sale on local market

Installed Capacity: 2500 MT/annum, or 36,000 15kg cans

Actual Production Level: 12 to 15% installed capacity or 300 to 400 MT/annum

Opened: 1976

Investors: Presently 100% Government of Guinea

Initial Investment: Figure Not Available

Status of Negotiations: Negotiations for private purchase and management by French company SOGEREF-Artillin are in advanced stages; takeover would increase product quality and substantially serve market at 2000 - 2500 T/yr.

4. CMD (Compagnie Metallique de Dixinn)

Products: Metal door and window frames, street doors, tubs and builders hardware

Installed Capacity: 5000 T/annum metal products

Actual production level: Closed since 1985; est. 15% capacity at closure in 1985 or about 750 T

Opened: 1971

Initial Investment: Figure Not available

Investors: Presently 100% Government of Guinea

Status of Negotiations: Convention to purchase is being negotiated with Groupe Bernard France; resulting mixed French/ Guinean company (51%/49%) will manufacture door and window frames, metal doors and builders hardware, under management of local Bernard affiliate SIMCO; takeover would substantially serve market at 5000T/annum

5. Briqueterie de Kankan

Products: fired bricks from local clays, avg. 10, 15, 22 cm

Installed capacity: Originally 15,000 T/annum; 20,000 T/annum with 1985 renovation

Actual Production Level: 3000 T/annum at closure in 1985

Opened: 1972-73

Investors: Originally Peoples Republic of China, Government of Guinea

Initial Investment: Originally $2.5 million; with successive renovations, total invested by Chinese, French and Government had reached $4.2 million by end of 1985

Status of Negotiation: A Guinean private firm (Sano et Fils Import/Export) is negotiating to buy factory and operate it privately, with U.S partner in truck transport

6. SONACAG Tile Factory

Products: Floor, wall and terrace tiles cut and finished from local marble, granite

Installed Capacity: 120,000 sq. meters/annum; 3000 sq. meters/day

Actual Production Level: 18,000 sq. meters/annum or 15% capacity at closure in 1986

Opened: 1982

Investors: Presently 100% Government of Guinea

Initial Investment: $3.5 million est.

Status of Negotiations: Buyers have been actively sought for creation of a mixed company with mixed management (private expertise with government participation); thus far no private investors located, in part due to lack of technical knowledge of production process; International Finance Corporation has proposed twinning SONACAG with proposed granite quarry project, as new privately run company

7. SOMIAG Quarry (formerly SONACAG)

Products: Granite, granite powder and granite sand, used largely in granite tile manufacture by the state owned tile factory, SONACAG, until its shutdown in September, 1986

Supply Capacity: 10,000 T/Annum est.

Actual Production Level: Figure not available; est. in excess of 6000 T/annum

Opened: 1982

Investors: Originally 100% Government of Guinea; converted to mixed company in 1985 (51% French, 49% private Guinean; operated under French managers)

8. Sawmill of N Zerekore (Scierie de N Zerekore)

Products: Produced until its shutdown in December, 1985, various sizes of carpenters lumber for framing, window and door frames from local hardwood varieties in the Forest Zone of Southeast Guinea

Installed Capacity:

Actual Production Capacity:

Opened:

Investors: Presently 100% Government of Guinea

Status of Negotiations: Government has received an offer to purchase from Lebanon-Anstalt AG (Suisse) and offer is under study

9. Panel Manufacture of Seredou (Usine a Panneaux de Seredou)

Products: Until its closure in December, 1985, wood paneling, panel doors and related products for interior construction (homes and commercial buildings)

Installed Capacity: Figure not available

Actual Production Capacity: Figure not available

Opened:

Investors: At closure, 100% Government of Guinea

Status of Negotiations: In Process of Liquidation Due to Management Problems, Difficulties in Transporting Over Local Roads to Urban Centers

10. Briqueterie de Koboya (Conakry area)

Products: Until closure in 1985, fired bricks from local clay, average 15 cm thickness

Installed Capacity: Est. 10,000 T/annum

Actual Production Capacity: at closure est. 15%, or 1500 T/annum

Opened:

Investors: At closure, 100% Government of Guinea

Status of Negotiations: In Process of Liquidation Due to Management Problems, Obsolete Equipment; Competition from Approaching Takeover of Factory at KanKan by Private Interests

APPENDIX B

PROJECTED ANNUAL MARKET GROWTH FOR CONSTRUCTION MATERIALS IN GUINEA

Market Percentage Growth Percentages:			104%	104%	104%	104%	108%	108%	108%	108%	108%	110%	110%	110%	110%
PRODUCT	UNIT	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Cement	metric tons	170,000	176,800	183,872	191,227	198,876	214,786	231,969	250,526	270,569	292,214	321,435	353,579	388,937	427,831
Roofing Sheets	no. sheets	2.5	2.6	2.7	2.8	2.9	3.2	3.4	3.7	4.0	4.3	4.7	5.2	5.7	6.3
Rebar	metric tons	7,000	7,280	7,571	7,874	8,189	8,844	9,552	10,316	11,141	12,032	13,236	14,559	16,015	17,617
Bricks (fired clay)	no. millions	7.5	7.8	8.1	8.4	8.8	9.5	10.2	11.1	11.9	12.9	14.2	15.6	17.2	18.9
Paint	metric tons	2,500	2,600	2,704	2,812	2,925	3,159	3,411	3,684	3,979	4,297	4,727	5,200	5,720	6,292
Wood Products	cu meters	3,960	4,118	4,283	4,454	4,633	5,003	5,404	5,836	6,303	6,807	7,488	8,236	9,060	9,966
Alum. doors/windows	no. thous.	5,000	5,200	5,408	5,624	5,849	6,317	6,823	7,368	7,958	8,595	9,454	10,399	11,439	12,583
Metal doors/windows	metric tons	808	840	874	909	945	1,021	1,103	1,191	1,286	1,389	1,528	1,681	1,849	2,033
Tiles (floor/wall)	sq. meters	200,000	208,000	216,320	224,973	233,972	252,689	272,905	294,737	318,316	343,781	378,159	415,975	457,573	503,330
Builders Hardware	metric tons	30	31	32	34	35	38	41	44	48	52	57	62	69	75

APPENDIX C

METHODOLOGY USED TO DEVELOP ANNUAL MARKET GROWTH FACTORS FOR BUILDING MATERIALS

For purposes of developing projected growth in demand for building materials, and thus market estimates, through the year 2000, the study team used the following indicators.

1. Annual sales for 1985 and 1986, and projected sales for 1987 and 1988, as given by retail and wholesale dealers in building materials.

2. Annual building materials purchases for 1985 and 1986, projected purchases for 1987, as given by local construction companies interviewed.

From these responses, an average annual growth rate was developed, at about 4% per year between 1985 and 1988. This information was discussed with economists working with the three major multilateral development programs in Guinea: the World Bank, IMF and UNDP. The rate was compared with growth rates as projected by these agencies for the period 1987 through 1991 (5 years), which ranged between 4% and 5% per year. The more conservative figure of 4% annually from 1987 through 1991 was selected by the study team.

Having established an estimated growth rate through 1991, the team then developed from the combined responses of the three multilateral agency economists an average projected annual growth rate for subsequent years: 1992-1996 at 8% per year, 1997-2000 at 10% per year. Thus, the following growth rates were used:

1987 through 1991	4%
1992 through 1996	8%
1997 through 2000	10%

APPENDIX D : COST PER SQUARE METER OF WALL OF VARIOUS BRICKS

	No. Per Sq Meter	Cost Per Unit	Cost per Sq. Meter of Wall	Wall Thickness
Joint Venture				
Cement Blocks	12.5	$1.10	$13.75	20 cm
HPSE Bricks	26.5	$0.49	$12.99	18 cm
Potential Partner				
Cement Bricks (exist) (Mechanized)	33.3	$0.40	$13.32	20 cm
Artisanal Cement Block				
Small (10 cm)	25.0	$0.32	$8.00	20 cm
Large (15 cm)	16.6	$0.37	$6.14	
Burnt Bricks (Kankan) (excluding trans.)				
Small	33.3	$0.22	$7.33	20 cm
Large	25.5	$0.32	$8.16	
Guinea Stabilized Brick (traditional)	55.5	$0.29	$16.10	20 cm
Stabilized Earth (Guinean Small Business)	55.5	$0.28	$15.54	20 cm