

Confidential

Sawmill and Wood Processing Opportunity

October 2008



TECHNO SERVE

Business Solutions to Rural Poverty

Investment Opportunity: Sawmill and Wood Processing Facility

Investment Snapshot

Create a sawmill that acquires logs from a large concessionaire partner for processing wood into usable products.

- Major investment anticipated in the extraction of logs from Liberia's massive forests.

Full time, direct employment initially of up to 150 and then up to 300 people in plant-related jobs upon expansion to an integrated wood processing facility.

Why would this work?

Strong demand for a sawmill in Liberia and high export potential

- The source for wood is assured through concessionaires, private plantations, and a government policy for value added processing.

Impact Potential

Reduce reliance on imported processed wood for construction industry

- Opportunity to improve value chain for extractive industry – significant scale up beyond tree chopping and pit sawing and to improve product quality.

Create products to serve lucrative export markets

- Potential for job creation

Catalyze associated industries in construction, furniture making and other value added wood products

- A sawmill that provides electricity to the immediate community utilizing wood pellets and saw dusts.

What would it cost?

\$4M in startup costs projected for phase one (additional \$10M in year five for phase two growth expansion to integrated sawmill).

- Breakeven in 3 years on initial start-up investment.

A priority sector of the government which provides for attractive investment and tax incentives.

- Elimination of import duty on equipment

Executive Summary

- Liberia has the largest virgin rain forest in West Africa, with over two hundred tree species suitable for a variety of uses, yet it imports a large amount of processed wood or relies on substandard and inferior processing “woodshops” for construction and other needs. After the lifting of five years of UN sanctions on timber in 2007, Liberia has implemented reforms in the sector and is seeking investors.
- As Forest Management Concessions and Timber Sales Contracts have been awarded and others are in consideration, there is an opportunity for a sawmill that processes extracted wood into usable finished products for the growing post-war construction industry. The Government has made “value added” processing a requirement of forest concessionaires. As such there is clear opportunity for the Sawmill Company to enter into an equity partnership with an existing concessionaire to ensure a supply of wood for the business operations.
- Preliminary conversations with current concessionaires have resulted in very positive feedback for such a partnership, and is viewed as a “win-win” situation. This Sawmill will initially process around 1,300 cubic meters of logs on a monthly basis, employ 150 persons and grow up to 300 persons upon expansion. The operation will require an initial investment of \$4 million, breaking even in three years, and its product output in the short term will primarily be sawn wood. Through a strategic growth strategy after the first five years, the Company will diversify into the production of plywood, veneer other “peeled” wood products requiring additional capital investment of \$10M.
- Potential implementing local partners include local and regional logging companies. The concessionaires have gone through the required business planning process and due diligence review for large forest management, and are proceeding with starting logging operations before the end of 2008. With start-up investment from a social investor, all concessionaires indicate the ability to commence with a sawmill operation within 6 to 9 months of commencing logging activities.
- The plan for the Sawmill include the ability to convert saw dusts into usable bio fuel to operate the plant and to provide power to the immediate community near the Sawmill. Studies show that emissions from sawmills can be reduced 90% through renewable energy strategies.

Case for Social Investor

Job Creation

- The full integrated sawmill and wood processing facility will create 300 jobs in a rural community, raising the standards of living for the community and its residents. The impact is likely to be felt most in rural communities closest to the forests that have been hardest hit by Liberia's downward economic spiral over the last two decades.

The use of a renewable energy source

- Given the company's commitment to using renewable energy to power its operations, it will serve as a best-practice example, encouraging other companies to use renewable energy in processing across Liberia.

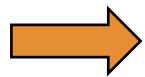
Value added processing

- The company will support the pivotal construction industry and reduce reliance on expensive imported wood inputs.

Conservation

- The company will work with its partners and suppliers to ensure adherence to the replanting regulations stipulated by the Liberian government.

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Opportunity for Investment in Wood Processing

Despite the vast Liberian forest, there is no large-scale commercial wood processing company in post-war Liberia

- Liberia has the largest virgin rain forest in West Africa, accounting for over 40% of the country's land, or 4.3 million hectares, with over 200 specie types suitable for a variety of wood-based products.

Domestic and global demand remains high and growing

- The domestic demand for processed wood products for construction is very high, especially among the concessionaires, the public and private sectors, and Liberians in the Diaspora who are building homes in the country.
 - Current annual demand for processed wood is estimated at \$3 million to \$5 million from construction companies and \$1.5 million from building material supply companies.
 - Imports from Guinea, Ghana and other West African countries, as well as poor quality products from local pit saws and woodshops, currently fill this demand.
- Global demand remains high especially in the Middle East, Nigeria, Russia, China, Canada, Mexico, and Chile.

Favorable industry dynamics

- In 2007, The Forestry Development Authority (FDA) issued a new national forest policy and forest management guidelines governing the logging industry that outlined new requirements for commercial logging, community forestry and conservation.
- The regulations which require concessionaires to implement wood processing creates potential partnership opportunities with concessionaires interested in engaging investors for this initiative.

Efforts are underway to improve the enabling environment for investment in processing

- Recent investments in infrastructure, especially the road network, will ease the challenges associated with transporting logs and the finished products
- The National Investment Commission has identified Forestry as a priority sector for investment incentives.

Liberia has Extensive Experience in Wood Processing

- In the 70s and 80s wood processing plants such as Minaurus on Bushrod Island, Bomi Wood in Bomi Hills, a German-Liberian venture, and Vanply (Vancouver Plywood) a Canadian-Liberian venture in Sinoe County were exporting and supplying processed wood for local markets. Later in the 90s, the Oriental Timber Company (OTC), a Malaysian backed company in Grand Bassa County also ran a sawmill and plywood mill operation through its forest concession. OTC along with the Liberia Wood Management Corporation (LWMC) remained the dominant players until 2003. The destruction of all these businesses occurred between 1990-2003 intermittent civil wars.
- At the end of the most recent civil war in 2003, and the fall of the regime of former President Charles Taylor, there were 27 companies registered with the Government as logging entities with 22 associated sawmills tied to those logging concessions.
- As a result of the extensive logging activities underway prior to the war, Liberia has good human capacity and a strong knowledge base in forestry. Interviews with industry participants revealed extensive knowledge of the forests, terrain, tree species, logging operations and logistics, key constraints, and a sense of global market demands for West African timber.

Saw Mills (Up to 2003)	Locations
TLCC, Forum, Nassau, OTC	Region I
TTCO, BIN, Cavalla, MWPI	Region II
St. Joseph, American Wood, LWMC, Tropical, L&L Getra, Powertech, Ebony, Xoanon, RTC, Fapco,	Region III
Akkari, DABA, ILC	Region IV

Key Government Policies Impacting the Sector

Reforms

- All forest concessions in existence prior to 2006 were cancelled by the new Government and logging companies were required to pre-qualify and bid on new concessions.
- The National Forestry Reform Law was enacted in 2006 and UN Sanctions on timber were lifted.

New policies

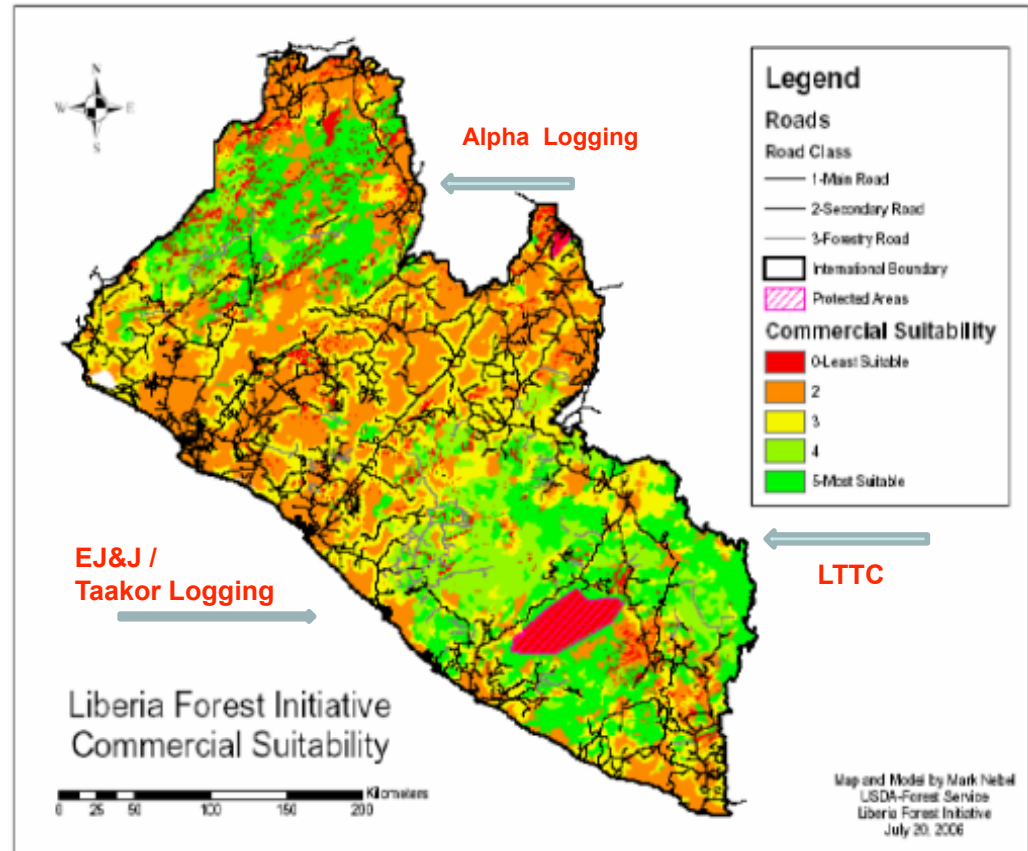
- In 2007, The Forestry Development Authority (FDA) issued a new national forest policy and forest management guidelines governing the logging industry that outlined new requirements for commercial logging, community forestry and conservation.
- As part of the concessionaires agreement, the Government requires “value added” processing strategies.
- An inter-ministerial committee was established to review and conduct due diligence on pre-qualification applications from companies.

Incentives

- The National Investment Commission has identified Forestry as a priority sector for investment incentives.
- The President has suspended certain fees and custom duties on the importation of equipment for forestry.

Recent Activity in the Sector


- As of August 2008, the FDA had prequalified 40 companies as eligible to bid on Forest Management Concessions (FMCs) or Timber Sales Contracts (TSCs). To-date:
 - Three FMCs have been granted, and actual concession contracts are expected to be executed in October 2008.
 - Three TSCs have been signed, and another three expected by the end of the year.
- The current holders of Forest Management Concessions are Alpha Logging and Wood Processing Company, EJ&J Enterprises/Taakor, and Liberia Tree & Trading Company.



Key Challenges Facing the Forestry and Wood Processing Sector

	Challenge
Policy	Although the Government has enacted a reform law, developed a new national forestry policy and other guidelines, the challenge for the Government now is to build its weak enforcement capacity to ensure adherence to its policies.
Infrastructure	The current state of infrastructure in Liberia, especially with regards to roads, bridges, and power supply, poses a serious challenge to operators in the forestry and wood processing sectors. In addition, limited capacity at the ports could impact ongoing operations in the sector.
Illegal Logging	A major challenge for the sector is the curbing of illegal logging, given the vast size of many of the forests.
Security	Although many ex-combatants have been disarmed, security remains a key challenge when it comes to managing forest resources. During the war, many ex-combatants and warring factions laid claims to vast amounts of forest reserves, demanding compensation from the Government and investors for “protecting” the forests.

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Business Concept

Vision: A well equipped self-powered wood processing company that leverages vast forest resources to develop “value added” integrated products for the local and international construction and furniture industries.

Operating strategy

- An integrated wood processing company that sources wood from a nearby forest through a partner concessionaire or through timber sales contract awardees.
- The mill will be powered by saw dust and other wood waste.
- Process will include log extraction, mill processing, cutting, “kiln-drying” for reduction of moisture content, and final processing into useable wood products. The potential output will be 1,300 cubic meters of logs per day for an average mid sized operation based on local expert interviews and desk research of other saw mill operations.
- The sawmill will be located somewhere between the Buchanan, Grand Bassa to Greenville, Sinoe corridor, which is in close proximity to the southeastern area logging concessions and forest reserves. The company will operate a distribution warehouse facility within the general Monrovia area to facilitate exports and local supply.

Commercial output

The company will process the following outputs for the domestic and international markets. It will operate through a phased process, starting off with a standard saw mill gradually adding mills for more sophisticated processing:

- Phase 1:** In the first 1-2 years, the company will process sawn lumber including mahogany, wawa, walnut, and other redwood species.
- Phase 2:** In year 3-5, the company will add on:
 - Moldings for floorings strips and wall cladding.
 - Veneers for faces and back of panels.
- Phase 3:** In year 5-7, the company will commence the processing of plywood for doors, ceilings and other construction.

Target Market

The **domestic target** market primarily includes:

- The **local construction industry** which comprises of companies with an annual demand for \$3 million to \$5 million in processed wood annually according to expert interviews. The major construction companies include Sigmund Construction, Ecocon, LRDC, St. Joseph, Venture, and other smaller companies.
- **Building material supply stores and other retailers** whose annual demand ranges between \$1 million to \$1.5 million. Of the three major building material stores (City Builders, Jetty, and Sethi Brothers), together have about 20 stores, and are expanding operations around the country. In addition, there are several dozens smaller building material stores throughout Monrovia and across the country.

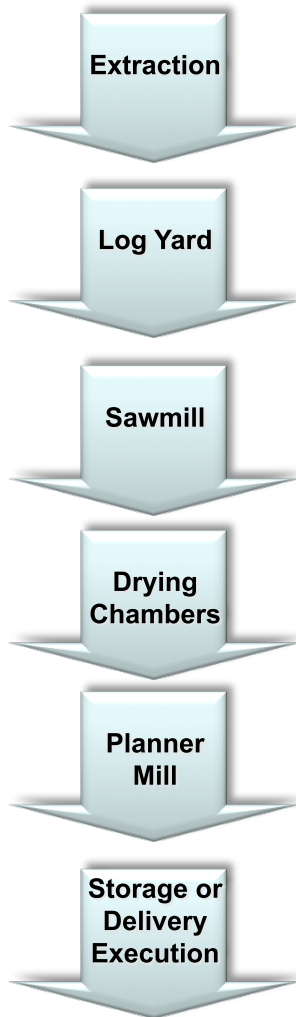
The company will:

- Stock certain **standard wood products** that are routine and common orders in the construction industry such as 2x12, 2x10, 2x8, 2x6, 2x4, 2x2 timber products. On average, the company's strategy would be to maintain 30% of goods in stock based on market demand, and 70% will be developed based on actual purchase orders or standing sales contracts.
- **Peeled wood products**, which are more expensive to produce and priced higher such as veneer and plywood would be produced based on pre-orders.
- The company will price for the local market at \$400-500 per cubic meter, and will offer and price for additional services such as delivery from the plant to customer location.

The **export market**:

- The company will aggressively target the construction, furniture, paper and renewable energy industries in Europe, Asia, North America which include some of the largest global wood product companies. Among them are: **Weyerhaeuser Corporation**, one of the world's largest integrated forest products companies, **UPM-Kymmene Corporation (UPM)** one of the world's leading papermakers with an annual paper production capacity of approximately 12.6 million tons, and **Stora Enso Oyj (Stora Enso)** one of the world's largest manufacturers of paper and board manufacturer based on production capacity. Other leading players in the global forest products market include large companies such as **Sino-Forest** and **The Teal-Jones Group**. All of these companies have operations around the world.

Operating Capacity for Commercial Sawmill



The logs will be extracted from the forest by concessionaires under a standing equity partnership arrangement for an average of 1,000 to 1,500 cubic meters per month.

The log yard occupies an area of 10 acres, providing a storage capacity for up to 20,000 cubic meters of logs. Logs with a length of 6 to 20 m or 3 to 5 m can be processed and stocked in this yard. All logs will be measured by a calibrated 3D measuring system at a feed speed of up to 170 m/min. This is where trucks drop of the extracted logs.

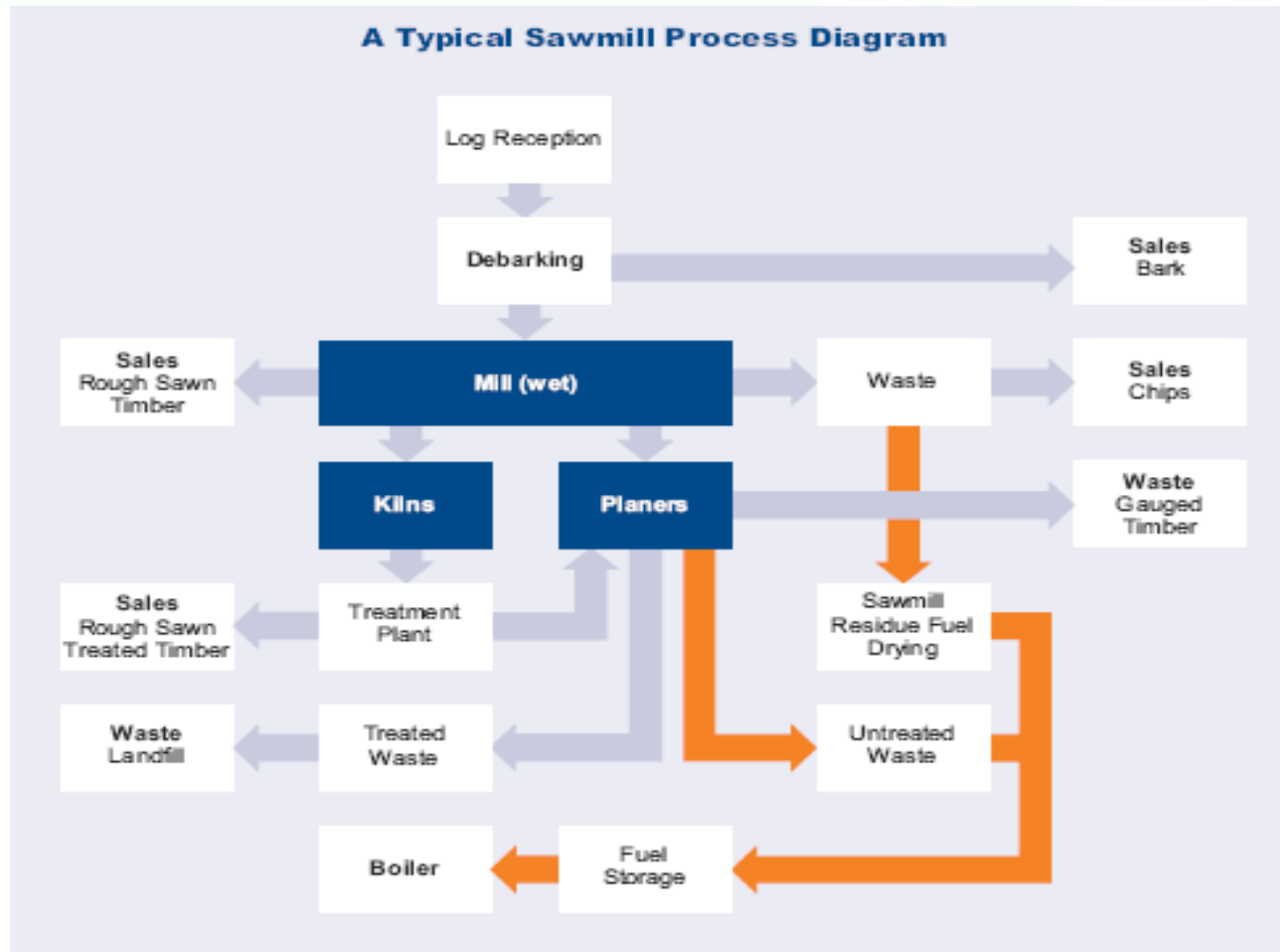
The sawmill will be capable of cutting logs ranging from 3 to 5 m in length and from 12 to 80 cm in diameter.

One drying chamber with an annual capacity of 75,000 m³. The energy required for the drying process will be obtained from the existing on site power station which will be powered by saw dusts, wood chips, and other wood sources of renewable energy.

The timber can be further processed in a high-performance planer line with a maximum feed speed of 600 m/min and cut to lengths ranging from 1.8 m to 5 m. An added value for customers in need of smoother products.

The finished product will be stored in a 10,000 storage area m² outside area or in a 10,000 m² under-cover area. The processed timber products will be shipped to wholesale and institutional contractual alliance customers.

How the Saw Mill will Work



Orange arrows represent waste-wood fuel processes. These will vary depending on which wood-wastes are burnt and will be completely different if the sawmill burns coal or gas.

Source: Energy Efficiency and Conservation Authority and the New Zealand Climate Change, 4/05

Key Considerations in Selecting Ideal Location

Depending on the concessionaire partner, location options include northwestern Liberia in Lofa County, and Southeast Liberia in Sinoe or Grand Kru Counties. However, the company will utilize the following criteria to determine the ideal location:

- Proximity to **wood source** in order to reduce transportation costs in the acquisition of logs, ensure easier access to forest resources, and contribute to rural job development and rural power generation.
- Proximity to key **access roads** in and out of the forest.
- Access to **nearby port facilities** for export operation.
- Areas **free of security threats** and under the firm control of the central government and state security apparatus.
- Land that is **free of ownership disputes** and other conflicting claims.

Proposed Approach for Utilizing Renewable Energy for Wood Processing Operations

- **Sawmills and Energy:** Sawmills in general use a lot of energy, and Liberia's current condition requires innovative solutions to addressing the electricity challenges in operating a sawmill. For example, a study of nine sawmills in New Zealand conducted between 2001 and 2004 demonstrated that the plants all together used a total of 283 Gwh per year in energy consumption.
 - Wood waste is the major source of energy used at sawmills, which is required for kiln drying timber. Fossils fuels mainly LPG, coal, diesel and recycled fuel oil, are large parts of cost. These fuels are generally used for kiln drying as well, and sometimes for supplementing or drying wood waste fuel.
- **The Energy Use** Indices for each sawmill in the study varied from 97 to 1,304 kWh per cubic meter of timber production. The amount of kiln drying has the biggest effect on this variation. The production of wood pellets using sawmill residue (saw dusts) is common in many parts of Europe. The company will utilize the available technology of creating pellets out of saw dusts as a renewable energy source to support the plant and the surrounding community.
- **Key components of process:** Producing pellets from saw dusts includes drying, grinding, palletizing, cooling, and storage.
- **Cost:** Cost factors include the processing costs, equipment, personnel and other raw material costs.
- **Potential suppliers of Pallet Processing Technology:** John Deere, Gremo, and a number of European firms provide the necessary equipment and solutions for converting saw dust into usable pellets for generating bio fuel.
- **Power Generation:** The plant will aim to generate 0.5 megawatts of electricity to support the plant and the surrounding community.

Sources: Energy Efficiency and Conservation Authority, New Zealand, 2005; EUBIONET 2 Swedish University of Agricultural Sciences, 2007

Impact on Communities and the Environment

The company will actively engage the community leadership and residents. More specifically, it will:

- **Actively recruit community residents**, making special efforts to include young people, especially ex-combatants in need of training and a livable wage.
- **Generate power via saw dust** and other renewable energy sources for the mill, the staff quarters and the neighboring homes.
- **Actively manage its waste and minimize any negative externalities** that its presence in the community may cause. The use of this innovative machinery for generating renewable energy via saw dust will also serve as a best practice example for other companies, and will invariably minimize the pollution and waste in the environment
- In partnership with the concession partner, **assist in implementing the community development** requirements stipulated by the FDA.
- **Actively support replanting and reforestation** efforts in collaboration with its concessionaire partners


Major Cost Drivers

- **Cost of Logs at Extraction** – Experts estimate that the logs will range in price between \$160 to \$200 per cubic meter depending on species.
- **Export Prices** – given the high demand for West African wood, multiple experts estimate export prices between \$600-\$700 per cubic meter FOB.
- **Domestic Prices** – local experts believe that processed wood can be sold domestically between \$400-\$500 per cubic meter.
- **Operational Costs** — given Liberia's lack of infrastructure, especially a power supply, this will impact cost of processing each cubic meter. Even though the Sawmill will eventually utilize its own waste for the generating the plant's energy and that of the surrounding community, that is not likely to be fully implemented until after the first 9-12 months of operation, requiring standard diesel fuel from the onset. Other operational factors include: labor, transportation, freight, facilities and equipment maintenance, taxes and fees, etc.
- **Capital Equipment and Buildings** — a sawmill requires major capital investment upfront and adequate facilities to ensure output. Although sawmill equipment is cheaper relative to plywood and veneer wood production process, in order to accomplish the growth strategy to an integrated operation as outlined in this plan, that requires additional capital equipment outlay.

Risks & Mitigating Strategies

Risks	Mitigation Strategy
Operational and Logistics risks: The limited capacity at the port and insufficient equipment in country would slow export operations.	<ul style="list-style-type: none"> • Acquire adequate operational equipment. • Aim for self-sufficiency on port handling equipment. • Prioritize routine maintenance/servicing. • Stock up on equipment spare parts. • Invest in training technicians/mechanics.
Risk of low supply of logs: The requirements placed on concessionaires may delay start-up operations, reducing supply for the sawmill operations	<ul style="list-style-type: none"> • Secure/negotiate concessionaire agreement. • Secure agreements with private landowners. • Secure agreement with small TSCs.
Concessionaire Partnership Risks: Due to the newness of the current concessionaires in Liberia and the nature of those entities, many of which consist of multiple partners.	<ul style="list-style-type: none"> • Thoroughly vet potential partner/due diligence. • Ensure all legal requirements are fulfilled. • Verify all representations and background information.
Negative Headline and Community Relations Risks	<ul style="list-style-type: none"> • Engage community leaders regularly. • Highlight renewable energy program and benefits. • Build a support base among policymakers and politicians impacted by sawmill operations.
Competition	<ul style="list-style-type: none"> • Launch early/establish firm early presence and branding. • Advertise distinctions based on quality and service.
Global Price Factors	<ul style="list-style-type: none"> • Diversify global customer base. • Avoid over concentration in one market. • Will be aggressive on pre-orders, locking in prices.

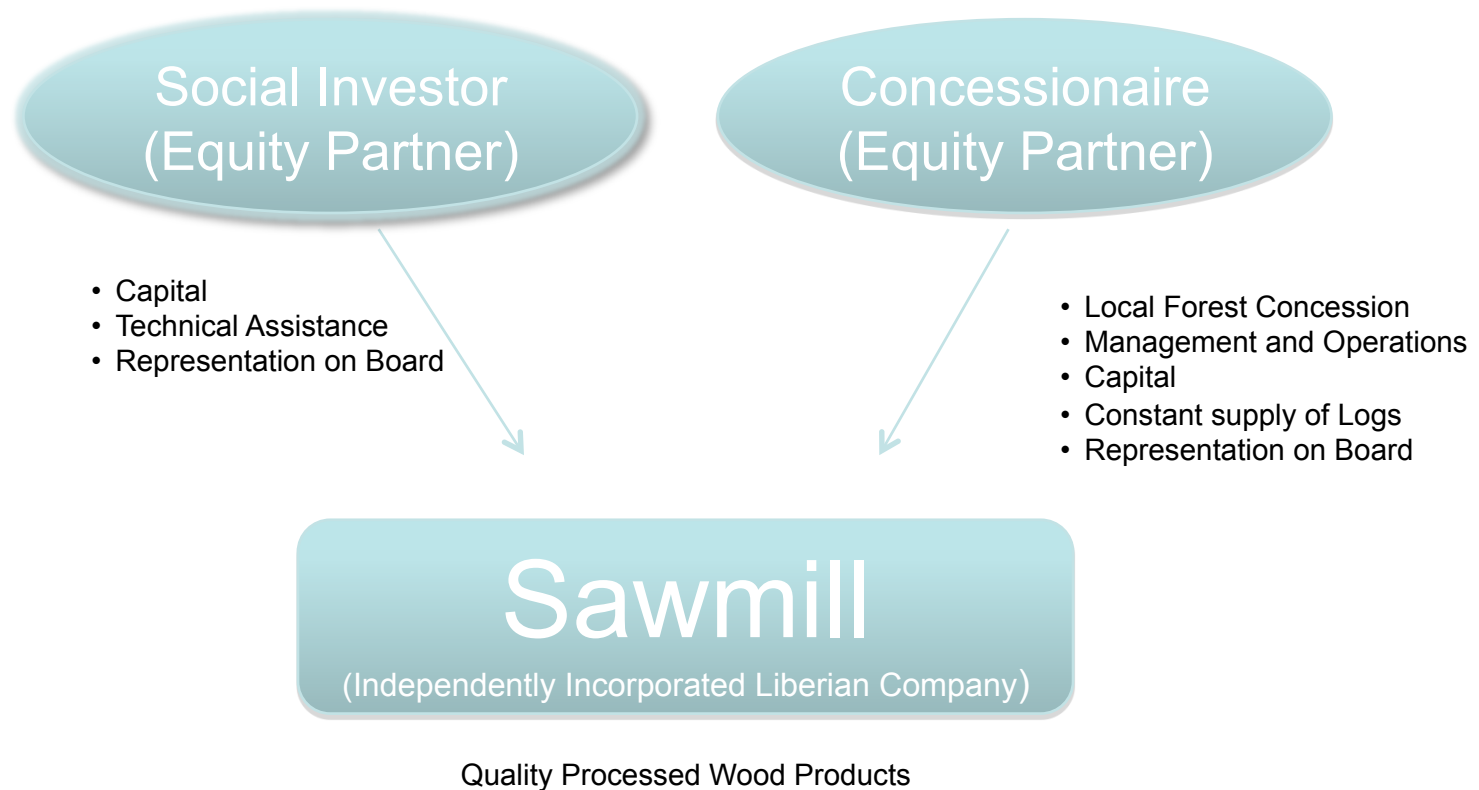
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Local Acceptance and Ownership is Evident

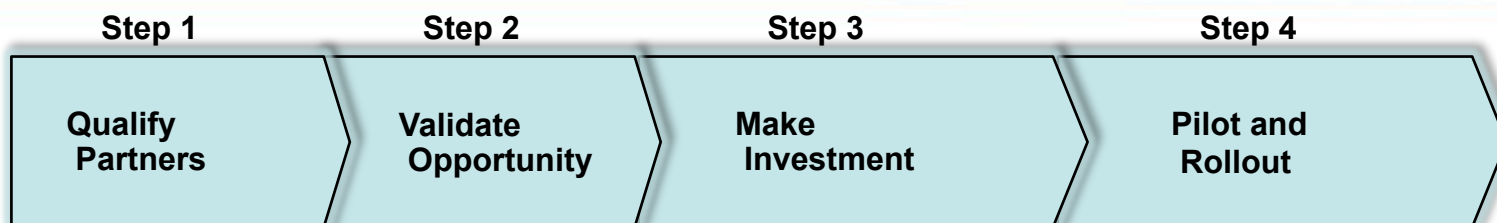
- *“The company would welcome a partnership with an investor in implementing value added processing....it makes sense”* **Mr. Emmanuel Erskine, CFO Alpha Logging & Wood Processing Company.**
- *“It’s a good approach, and could work, and the FDA would not have any problem with a company that partners with another to create a sawmill...that is the whole point of the value added requirement.”* **Mr. John T. Woods, Managing Director of the Forestry Development Authority.**
- *“Samartex is very interested in exploring opportunities in establishing a sawmill presence in Liberia, and I’ve met with them, and you guys should reach out to them. They have a serious operation in Ghana and has managed to engage the community.”* **Mr. Vanii Baker, Senior Policy Advisor, National Investment Commission**
- *“There is great financial value in an integrated sawmill.”* **Mr. Ben Cooper, Retired Logger and Logging Company Owner.**
- *“We intend to be the best logging company in Liberia, will do things differently, and would have no problems with a partnership around a potential sawmill.”* **Mr. Emmet Walker, Taakor Logging Company/EJ&J Enterprises**

Implementing Partnership Concept



Although all concessionaires engaged welcome a potential partnership with a social investor in creating a sawmill company, none of them were prepared to discuss the nature of such a partnership under purely speculative circumstances, and furthermore these engagements were limited to local middle management or Liberian partners and not foreign financial backers.

Next Steps for Social Investors



- Activities**
- Share business plan with 2-3 potential partners or implementers
 - Engage other potential investors from the debt and equity markets and JV partners
 - Obtain firm indication of interest from implementing partners and investors, with perhaps some sort of 'soft' binding commitment
- Social investor co-funds a full feasibility study that is led by the selected company. This study assures company of the opportunity for expansion.
 - Outline prerequisites for investment for local leadership
 - Engage policy makers to ensure support for enterprise
- Company is formally incorporated and social investor takes equity stake in business under specific terms including:
 - Board representation
 - Engagement with community and commitment to engaging at risk youth and women
- Secure 10 acres of land for operations and procure equipment.
 - Build facilities and sites for operations. Commence with hiring while facility is being constructed.
 - Begin operations, with fifth year decision point for expansion.
 - Launch marketing and promotional strategy.
 - Implement a global sales strategy targeting key customers.

Timing

Months 1-3

Months 4-7

Months 8=>

Months 9=>

Other Potential Partners

Success will Depend on Leveraging Existing Resources & Opportunities

Organization

Role

Key Public Sector Players in Liberia

1. The Forestry Development Authority (FDA)
2. National Port Authority
3. Ministry of Commerce and Industry
4. Ministry of Internal Affairs

Industry/Sector Regulator
Oversees all port facilities needed for exports
General business regulatory for export trade and commerce
Liaison Government Ministry to local rural community tribal leadership

Major Customer Base

1. Construction Companies (Sigmund, Ecocon, LRDC)
2. Large Retail Outlets/Building Supply (City Builders, Jetty, Sethi)
3. Regional and Global Exports Agent Networks clients

Large purchase orders/pre-orders
Customer interfacing and consumer market
Established channel of wood buyers and dealers for global

Non-Government Supporters

1. UNMIL
3. Civil Society Organizations

Coordinates with the Government on security issues impacting the forests.
Remain engaged with local groups and organizations advocating better distribution of forest resources.

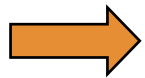
Others

1. Small Timber Sales Contractors
2. Small Private Forest/Land owners

Sale of timber from small forests under 50,000ha
Sale of timber from those areas not under concession as additional sources.

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Major Global Trends in Wood Products

Revenue Growth

- Revenue in 2007 for forest products globally was \$228 billion, representing a growth (CAGR) of 9% between 2003 to 2007.

- Growth for the next five years from 2007 to 2012 is projected at \$343.8 billion.

Production Volume

- Output of 1.4 billion cubic meters in 2007, representing a 3% growth (CAGR) from 2003 to 2007.

- Growth is projected at 8% in volume through 2012.

Market Demand Segmentation

- America-- 58.4%
(Brazil, Canada, Mexico, and the US)

- Europe-- 21.5% (Belgium, the Czech Republic, Denmark, France, Germany, Hungary, Italy, Netherlands, Norway, Poland, Russia, Spain, Sweden and the UK)

- Asia-Pacific-- 20.1% (Australia, China, Japan, India, Singapore, South Korea and Taiwan)

Product Demand Segmentation

- Industrial Round wood --37.6%

- Sawnwood-- 31.1%

- Wood-Based Panels 25.1%

- Chips & Particles 3.4%

- Wood Residues 2.6%

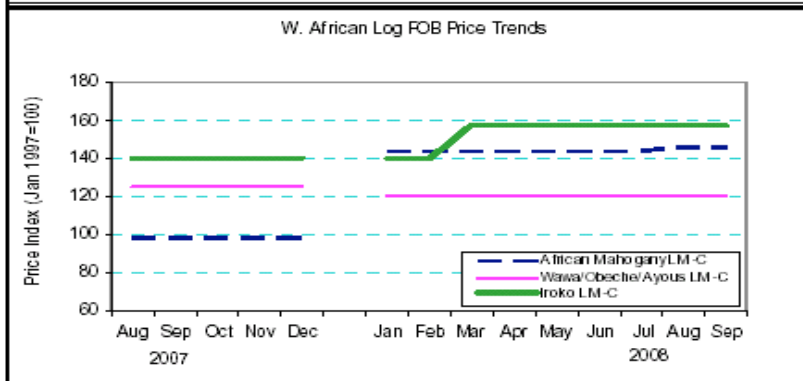
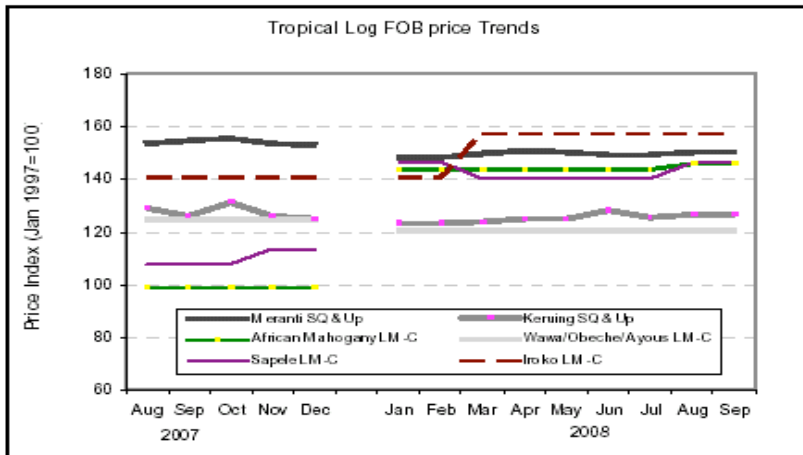
- Wood Fuel-0.2%

Source: Data Monitor Industry Market Research: NA, April 15, 2008

Logs & Sawn Wood: W. Africa and Global Price Trends Compared

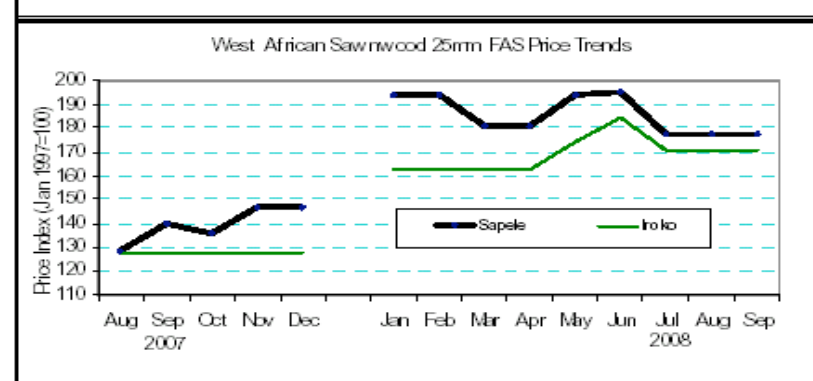
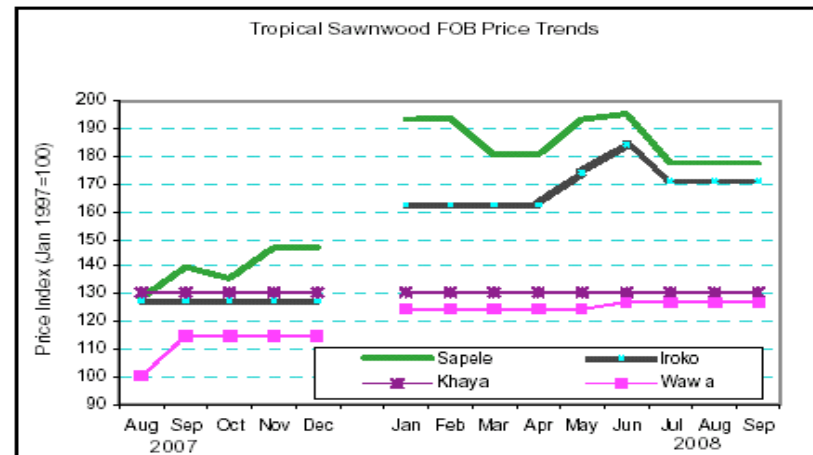
Tropical Log Price Trends

Note: Y-axis: Price index (Jan 1997=100)



Tropical Saw mill Price Trends

Note: Y-axis: Price index (Jan 1997=100)



Source: www.globalwood.org (As of September 2008)

*Please note that our price series have changed since January 2008. Prices for selected UK imported species, which are used in log and sawnwood price charts above, are now collected from different suppliers.

Industry Assessment: W. Africa Log/Sawn Wood Prices

West Africa Log Prices

West Africa logs, FOB		€ per m ³		
<u>Asian market</u>	LM	B	BC/C	
Acajou/ Khaya/N'Gollon	221	191	137	
Ayous/Obéché/Wawa	206	206	168	
Azobe & Ekki	168	168	122	
Belli	168	168	-	
Bibolo/Dibétou	168	168	114	
Bubinga	533	457	381	
Iroko	289	274	259	
Okoume (60% CI, 40% CE, 20% CS) (China only)	132	-	-	
Moabi	259	259	206	
Movingui	191	191	137	
Niove	129	129	-	
Okan	152	152	122	
Padouk	259	259	229	
Sapele	251	251	191	
Sipo/Utile	305	305	228	
Tali	152	152	114	

West Africa Sawnwood Prices

West Africa sawnwood, FOB		€ per m ³
Ayous	FAS GMS	335
	Fixed sizes	396
Okoumé	FAS GMS	300
	Sel. & Bet. GMS Italy	250
	Sel. & Bet. fixed sizes	-
Sipo	FAS GMS	585
	FAS fixed sizes	-
	FAS scantlings	585
Padouk	FAS GMS	585
	FAS scantlings	585
	Strips	425
Sapele	FAS Spanish sizes	520
	FAS scantlings	520
Iroko	FAS GMS	458
	Scantlings	519
	Strips	304
Khaya	FAS GMS	396
	FAS fixed	427
Moabi	FAS GMS	580
	Scantlings	580
Movingui	FAS GMS	420

Source: Globalwood.org
September 15, 2008.

Log and Sawn wood prices for products originated in West Africa and exported (FOB) to Asian and European Markets.

Indigenous Liberian Forest Tree Species*

- Khaya/Acajou
- Ekki/Azobe/Ironwood
- Afzelia.
- Doussie
- Lovo/Dibetou
- Iroko
- Movingui
- Niangon/Whismore
- Frake
- Bombax/Kondroti
- Guarea/Bosse Aiele
- Dahoma/Dabema
- Framire
- Limbali
- Sacloglottis/Ozouga
- Aningre
- Kusia
- Faro/Daniella
- Sipo/Utile
- Abura/Bahia
- Bete/Mansonnia
- Oboto/Memea
- Makore
- Wawa/Obeche
- Amazakoue
- Ceiba/Fromagar/Cottonwood
- Sapele
- Tetra/Sikon
- Tali
- Avodire
- Kossipo
- Naga
- Danta/Kotibe Koto
- Tiama/Edinam
- Didelootia
- Illomba
- Antiaris

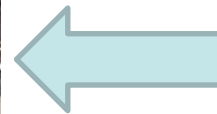
*The specie names above are normal logging industry trade names and not scientific botanical names.

End Product of Some Tree Species

Due to the fact that very little logging has occurred during the past few years, experts note that Liberia has an excellent variety of species for plywood and veneer which requires a different processing than regular sawn wood. Notwithstanding, there is sufficient species variety for all wood making purposes:

Log Species for Plywood & Veneer (Peeling Trees)	Log Species for Furniture and Construction (Non-peeling trees)
Faro	Makore, Sipo
Naga	Abura, Afzelia
Tetra	Khaya, Tali
Khaya, Wawa	Eki ("Iron wood")

Typical Plant Operation Equipment

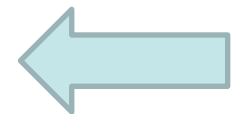


Cutting Equipment—standard dimensions and targeted specifications



Wood Edging Equipment

Log cutter/slicer

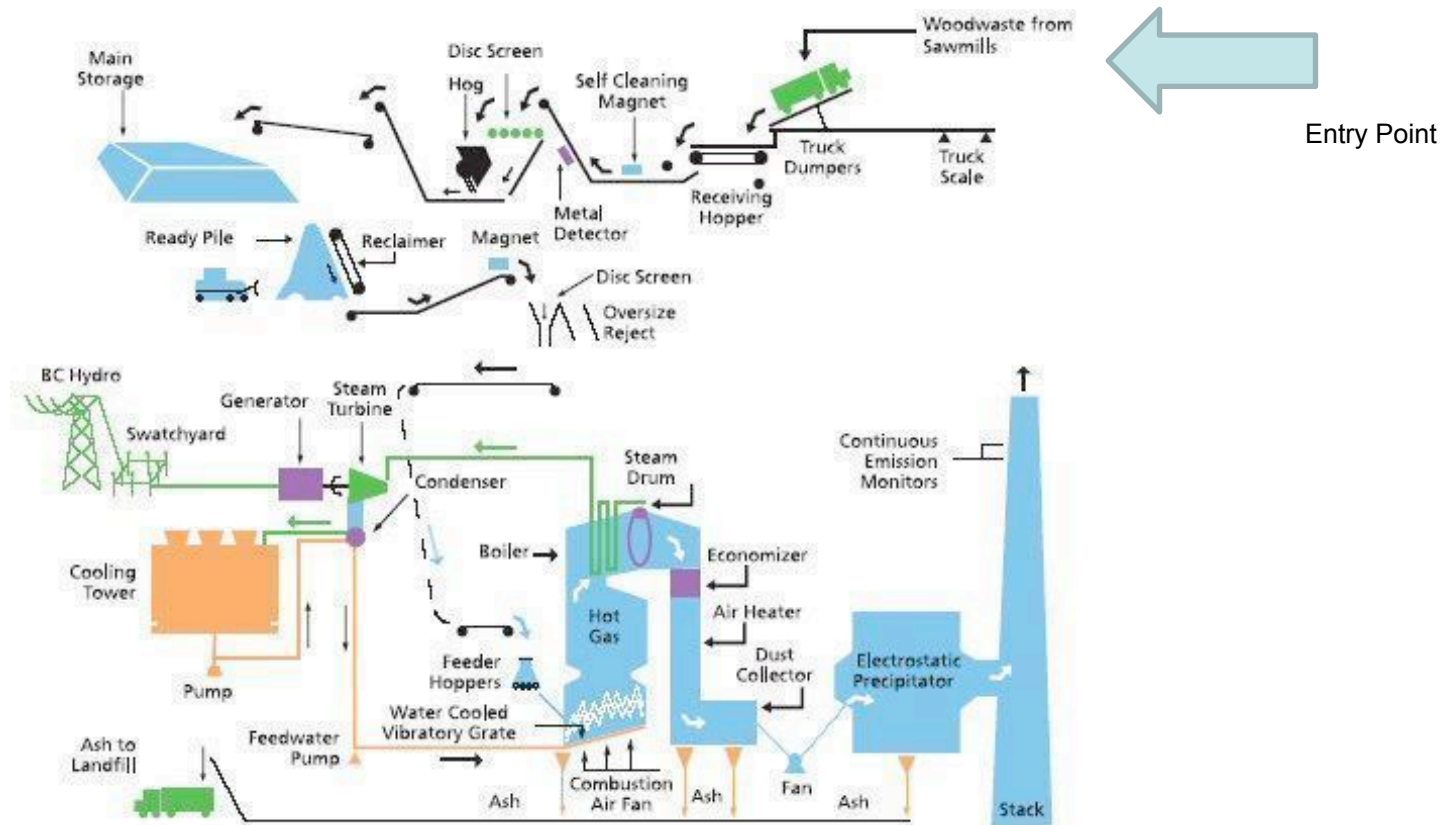


Trimming Saw

How Sawdust Creates Energy

- One of the largest biomass plants in North America that uses saw dusts for energy creation provides a solution to long-standing air quality problems by utilizing wood waste from local sawmills enabling those mills to close their beehive burners, which in turn reduced particulate emissions in the area by over 90%, improving their competitiveness and also solving a major solid waste disposal problem for local sawmills.

Biomass
Power
Plant



Products After Processing



Assorted dimensions of timber after processing



African Mahogany Vaneer



Plywood



Vaneer after peeling Process

Wood Processing in Liberia: A Side Street Woodshop

Wood being processed for usable construction inputs



Shops lack the ability to “kilndry” or reduce moisture content



Wood Processing in Liberia: Facilities

Most facilities are inadequate. Quality of the wood processed is often inferior and it is the responsibility of the buyer to pick up and treat for termites.



Most equipment is outdated with low outputs.



Wood Processing in Liberia: The Demand

A Firestone Container Being Loaded with wood purchased



Container awaits pickup

