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Sugar in Kisumu, Kenya

KPMG LLP

AUDIT ▪ TAX ▪ ADVISORY

We would like to thank the following KPMG LLP summer interns for their role in the preparation of this report: Elizabeth Davis, University of Virginia, Darden School of Business; Kevin Vakil, University of Michigan, Ross School of Business; Gianfranco Cuoco, New York University; and Sanket Korgaonkar, University of Pennsylvania.

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Executive summary

An investor, seeking to financially benefit from producing sugar as a commodity in Kisumu, Kenya, needs to consider the entire investment environment before making a decision. Since Kenya is a net importer of sugar, domestic demand cannot be satisfied by domestic production, which creates a potential opportunity for an investor looking to bridge the gap. As a result, an opportunity may exist for an investor who wants to play a significant role in the future of the industry. Sugar, produced as a commodity within Kisumu, may have the ability to compete on a global scale if time, investment, and governmental support align.

The Millennium Cities Initiative at the Earth Institute at Columbia University has identified the sugar industry in Kisumu, Kenya as the focus for this study. The attraction, for an investor, to the sugar industry in Kisumu is supported by an anticipated 4 percent growth in consumption through 2013 (Industry participant interview 2008). As domestic producers struggle to remain financially viable at competitive levels because of high production costs, importers are seizing control of the market as the number of legally allowed imports continues to increase. The most noticeable response to this market environment has been the establishment of the privately owned Kibos sugar mill in Kisumu, which began operating in 2008 and took approximately three years to establish from conception to realization (Industry participant interview 2008). The market in Kisumu may be penetrable for an investor who has a sound business plan that will create an enterprise that is going to have a substantial financial and social impact.

The primary objective of this study was to assist the Millennium Cities Initiative in identifying the economic outlook for foreign investment opportunities in the sugar industry, specifically during the production stage, while assessing the relevant costs and risks associated with the identified opportunities. According to the information provided by sources used, some of the key findings of this report include:

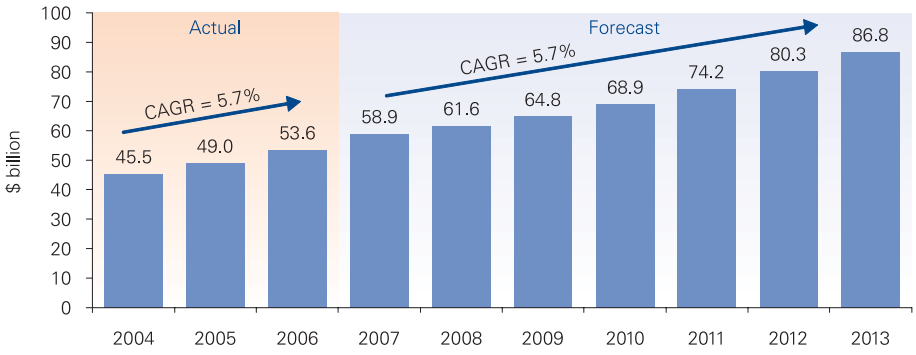
- Domestic demand for sugar in Kenya appears to exceed domestic supply; the demand gap is filled by imported sugar
- Kenyan sugar mills do not appear to operate at levels of production or efficiency that are competitive in the global marketplace
- Consequently, there may be opportunity for investors to turnaround and restructure the current facilities to improve efficiency in producing sugar
- Proposed changes in protectionist government regulations and trade agreements have the potential to make several sugar mills unviable by 2012
- There are two potential options for investment in commodity sugar production:
  - If an investor is able to obtain both land and the necessary permits for construction and operation, the Greenfield investment option may be economically viable and profitable, based on assumptions from research and interviews
  - However, the refurbishment investment option does not appear to yield a positive net present value (NPV)
- Government regulations and requirements may pose significant challenges for both the Greenfield and refurbishment options

Kenya/Kisumu overview

Bordered by Somalia, Ethiopia, Sudan, Uganda, and Tanzania, Kenya resides on the eastern coast of Africa. The population stands at approximately 38 million people with nearly 40 percent unemployed and 48 percent living below the absolute poverty line (defined as less than $1 per day). Kenya's infrastructure includes nearly 2,778 kilometers of railroad, 63,265 kilometers of roads of which 14 percent are paved and 225 airports of which 7 percent are paved (Kenya-Advisor 2008), which highlights the need for further development. Recent studies done by the Common Market for Eastern and Southern Africa (COMESA) have placed Kenya second out of the 19 COMESA countries for ease of doing business, defined as the procedure required to register and incorporate a business as well as the level of capital investment required to enter Kenya for an investor ($100,000) (COMESA Doing Business 2008 and Invest in Kenya: Focus Kisumu 2007, p.48). As the 14th largest economy in Africa with a 2007 GDP of nearly $60 billion, Kenya is projected to grow at a 5.7 percent compounded annual growth rate (CAGR) through 2013 reaching nearly $87 billion (International Monetary Fund 2008).

Major drivers behind GDP expansion include growth in tourism and telecommunications markets, as well as governmental reforms.

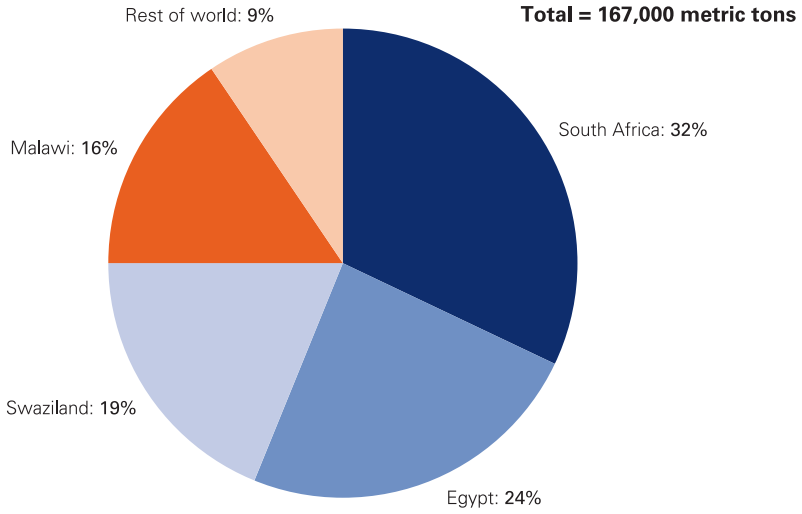
2004–2006 actual GDP and 2007–2013 projected GDP at purchasing power parity



Source: International Monetary Fund, 2008.

Kisumu, located along the coast of Lake Victoria, is found in the western region of Kenya. With a population close to 565,000 people comprised mostly of casual laborers and farmers, Kisumu's location and accessibility to natural resources is situated well for an investor considering the agricultural industry. Additionally, the Kenyan government has increased investment in infrastructure partly due to Kisumu earning city status. Currently, Kisumu infrastructure includes one airport and one port. The major industries that nourish Kisumu's economy include groundnuts, aquaculture, dairy, and sugar (Invest in Kenya: Focus Kisumu 2007, pp.17–30). Due to an ideal environment created by Lake Victoria for sugarcane growth, Kisumu has seven sugar mills that satisfy around 60 percent of domestic demand while the remaining 40 percent is supplied by imports largely supplied by South Africa and Egypt (Industry participant interview 2008). The 40 percent figure, however, does not reflect the number of illegal imports that Kenya experiences on an annual basis, which also contribute to satisfying the gap between supply and demand.

Total Kenyan sugar imports in 2005 were 167,000 metric tons, with the majority coming from other African countries



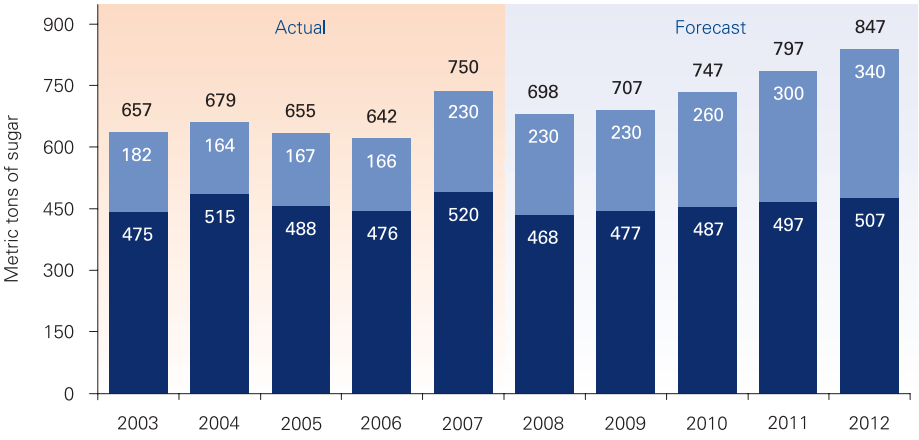
Source: Kenya Sugar Board statistics, 2008.

Due to proximity and trade agreements, sugar companies in South Africa and Egypt dominate the import market for sugar in Kenya.

Although consumption is projected to grow at nearly 4 percent CAGR in the next 4.5 years, domestic production is only set to grow at 1.6 percent CAGR (Kenya Sugar Board Statistics 2008). This statistic may imply that inefficiencies exist within the local production environment, and the opportunities that may exist for an investor to capitalize on Kenya's status as a net importer of the commodity.

Recent declines in domestic production are attributable to lack of sugarcane crop being available to convert into sugar. Also, aged mills being susceptible to machinery breakdowns increase downtime due to repair. Other major factors contributing to low crop yields and low levels of production include limiting infrastructure conditions, drought, farm fires, and civil unrest (Industry participant interview 2008). Investment in road improvement and irrigation could improve crop yield and labor output, and reduce costs.

Kenyan sugar consumption, 2003–2012F



CAGR (%)	2003–2007	2008–2012F
Imports	4.8%	8.1%
Domestic production	1.8%	1.6%
Total consumption	**2.7%**	**3.9%**

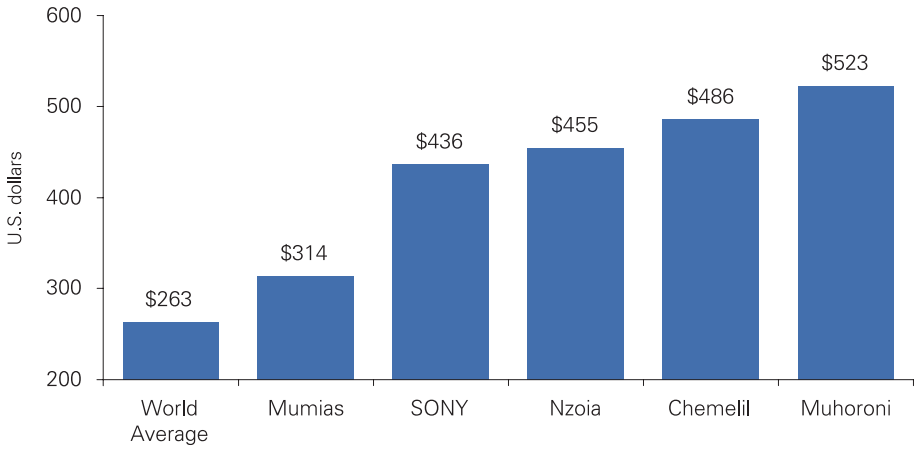
Sources: (1) Kenya Sugar Board statistics, 2008; (2) Industry participant interviews, 2008.

Cost of production overview

The average cost per metric ton to produce sugar across the seven sugar mills in Kenya is higher than that of the rest of the world ($415 for Kenya vs. $263 for world) (The LMC Worldwide Survey of Sugar and HFCS Production Costs 2005, pp.10–11). Of the $415 cost per metric ton, 60 percent is attributed to field costs, which are defined by labor, capital, and fuel costs, 25 percent is attributed to factory costs that include labor, capital, and fuel costs, and the remaining 15 percent is administrative costs (The LMC Worldwide Survey of Sugar and HFCS Production Costs 2005, pp.10–11). Kisumu mills, already suffering from the existing weak infrastructure, use outdated methods to extract sugar from the cane. Conventional extraction technology inhibits the mills from engaging in cost-efficient production, which depletes the capital required for research and development and infrastructure improvement. Lack of investment in new technology and machinery puts factory time efficiency for Kenya at 57 percent compared to the world average of 91 percent (Industry participant interview 2008).

Based on information available for five out of the seven Kenyan sugar mills, every mill produces at a cost above the world average of $263 per metric ton.

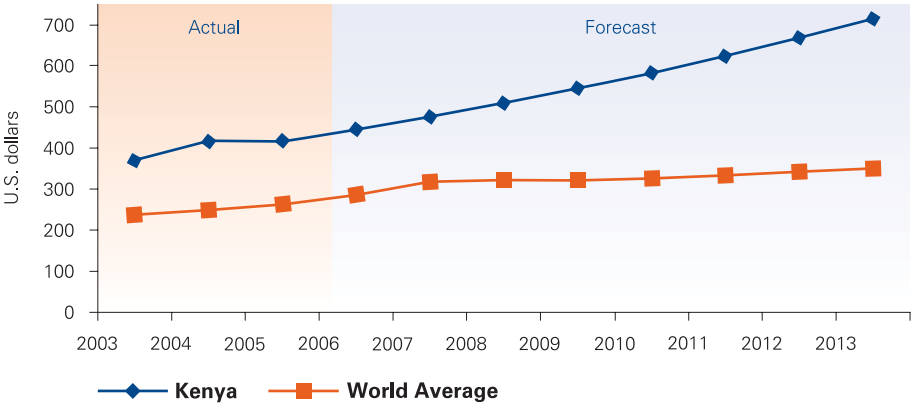
Sugar production cost per metric ton – Kenyan sugar mills versus world average



Source: The LMC Worldwide Survey of Sugar and HFCS Production Costs, 2005.

Additionally, sugar production costs in Kenya appear to be increasing at a faster rate than the world average. When tied to the average inflation rate that Kenya and the world have historically experienced from 2003 to 2005, production costs are forecasted to increase at 6.1 percent CAGR versus the world's 2.6 percent CAGR.

Sugar production cost per metric ton in Kenya versus world average, 2003–2013F



CAGR (%)	2003–2005	2006–2013F
Kenya average production costs	3.9%	6.1%
World average production costs	3.4%	2.6%

Sources: (1) The LMC Worldwide Survey of Sugar and HFCS Production Costs, 2005 (2) The Economist, 2008.

Due to the production inefficiencies that exist within Kisumu's sugar mills, the price per metric ton of sugar charged to consumers is higher than the other COMESA countries. Importers, such as South Africa or Egypt, take advantage of the high retail prices in Kenya by undercutting domestic ex-factory prices by approximately 6.5 percent (Industry participant interview 2008). Importers make high margins off their product because their production costs are lower, making Kenya an attractive market. Consequently, import syndicates have formed that capture margins more than double that of domestic producers. The average ex-factory price in Kenya is $847 per metric ton, and the sugar is sold at an average retail price of $1,068 per metric ton – a margin of nearly 21 percent. The ex-factory price of imports is $476 per ton and is sold at a retail price of $856 per metric ton, a margin of 44 percent (Kenya Sugar Board Statistics 2008; Action Aid International 2007). Because demand continues to outpace supply, Kenya's consumers have demonstrated a willingness to pay that remains appealing to low-cost producers.

Margin comparison of domestic and imported sugar

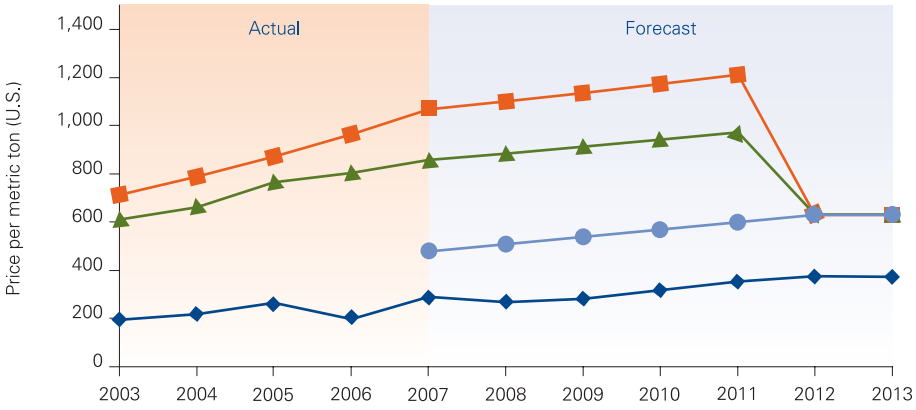
Domestic sugar	Dollars/metric ton
Ex-factory price	847
Retail price	1,068
Gross margin (Ex-factory to retail)	20.7%
Imported sugar	**Dollars/metric ton**
Ex-Mombasa price	476
Average retail price	856
Gross margin (Ex-Mombasa to retail)	44.4%

Sources: (1) Kenya Sugar Board statistics, 2008; (2) Action Aid International, 2007.

The sugar industry in Kenya is protected by COMESA safeguards which, limit the number of imports that are allowed into the country. In 2012, these restrictions are set to expire and the market will be liberalized. As a result, sugar prices are expected to fall 54 percent to COMESA levels, which would potentially affect the domestic production landscape (Industry participant interview 2008). Although there are seven sugar mills in production in Kenya, industry sources indicate that only Mumias and Kibos would survive should the safeguards be lifted because they can produce sugar at costs similar to those of the other COMESA countries based on facilities equipped with modern technology that can achieve high utilization (Industry participant interview 2008). Kibos has recently installed state-of-the-art technology in order to produce at lower costs, while Mumias continuously invests in production upgrades to keep costs low. Another technique used by both mills to keep costs lower than their competitors is cogeneration. Cogeneration is a system that takes sugar byproducts, converts all of it into energy, and supplies the mill's electricity need.

The Kenyan domestic and imported retail prices of sugar in Kenya grew at 11 percent and 9 percent CAGR from 2003–2007. However, both are projected to decrease to the COMESA average price in 2012 when safeguards expire.

Kenyan retail price of sugar versus world and COMESA average prices, 2003–2013F



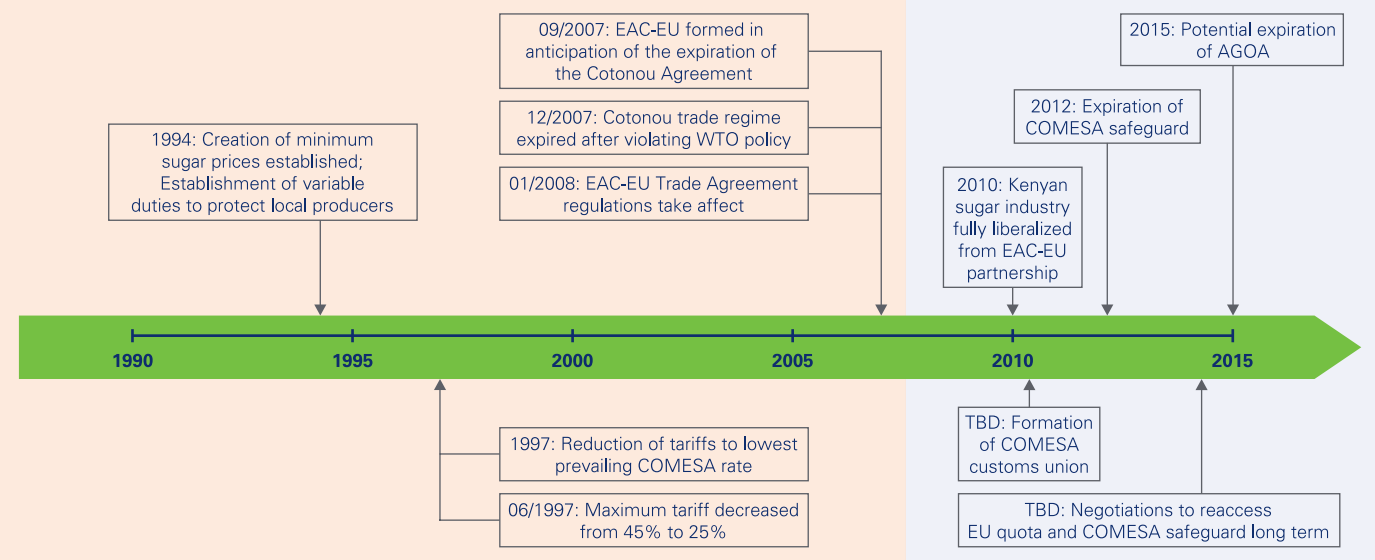
CAGR (%)	2003–2007	2008–2013F
Kenya retail price	11%	(8%)
Imported retail price	9%	(5%)
COMESA average price	N/A	5%
World free market average price	10%	4%

Sources: (1) Kenya Sugar Board statistics, 2008; (2) Action Aid International, 2007; (3) Organization for Economic Co-Operation and Development and Food and Agriculture Organization of the United Nations, 2008; (4) Project Africa interview program, 2008.

Note: Actual COMESA average prices not available

Regulatory timeline

The Kenyan sugar industry is closely tied to the government and is highly influenced by domestic as well as international policy. Expiring regulations on tariffs and quotas have been previously extended for an interim period, as Kenyan sugar was still not competitive with the world. However, current and pending regulations are set to expire in the near future.

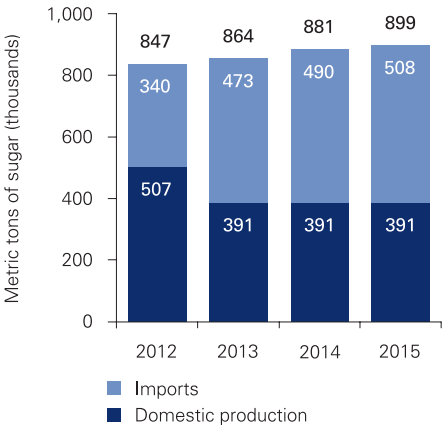


Sources: (1) SUCAM, 2003 (2) Nyangito, 2003 (3) COMESA Aide Memoir, 2008 (4) Business Daily, 2008 (5) EAC Partnership.

Considering the regulatory environment in Kenya is necessary before an investment opportunity is pursued. Current sugar prices in Kenya are inflated due to government protectionist policies. If COMESA regulations are lifted, there may be an influx of sugar from other countries, driving the sales price of sugar in Kenya down by approximately 25 percent to COMESA average prices (Industry participant interview 2008). Prior to COMESA regulations expiring, domestic sugar production is expected to make up 60 percent of Kenyan sugar consumption. Assuming COMESA safeguards are allowed to expire in 2012 and no efficiency improvements to Kenyan sugar mills are made, only Mumias and Kibos will remain in operation.

In 2013, after the safeguards are lifted, domestic sugar production is projected to only account for 45 percent of total Kenyan consumption.

Forecast domestic sugar production versus imports (assuming COMESA safeguards are lifted), 2012F–2015F



Sources: (1) The LMC Worldwide Survey of Sugar and HFCS Production Costs, 2005 (2) United Nations, 2007 (3) Mumias company information (4) Agilo Esperance, et.al., 2007.

Kenya has a number of regulating bodies and agreements that are currently organized to both promote and protect investment. Furthermore, Kenya currently has bilateral trade agreements with over 27 countries and is in negotiations with over 14 more. Since Kenya is a COMESA nation, it enjoys a free trade agreement with 18 other countries within Africa and there is a zero duty issued on imports. Based on industry participant interviews, the success that each organization or agreement has had on investment-related initiatives is not necessarily measurable at this time.

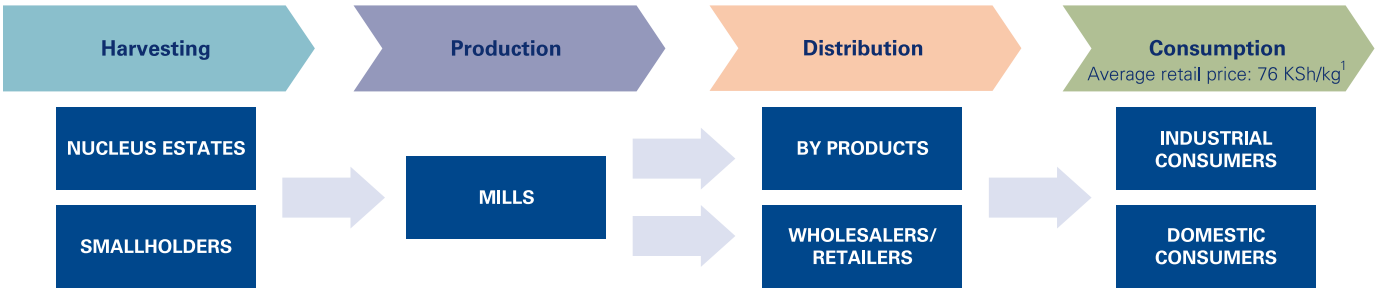
The following is a list of those regulating bodies and specific acts that were enacted to promote and protect investment in Kenya:

- KEPSA – the Kenyan Private Sector Alliance is an umbrella organization formed in 2003 comprised of 200 private-sector organizations designed to ensure the formation of policies protecting and encouraging foreign direct investment
- IPA – the Investment Promotion Act of 2004 eliminates and/or simplifies many of the complicated licensing issues needed to invest in Kenya
- NESC – the National Economic and Social Council is a forum where government officials and labor union representatives get together to identify policy issues hindering investment in Kenya and suggest alternate approaches
- MIGA – the Multilateral Investment Guarantee Agency is an affiliate of the World Bank Group that insures investors against the loss of investment due to political instability
- FIPA – the Foreign Investment Promotion Act protects against expropriation of private property by the government
- AGOA – the African Growth and Opportunity Act, which has been extended until 2015, stipulates that Kenya has duty-free access to export goods to the United States
- CTA – the Cotonou Trade Agreement states that all exports from Kenya to the European Union (recently expired and extended until 2010) are free from all quota regulations and entitled to preferential duty restrictions

The Kenyan sugar industry appears to be heavily dependent on the rules and regulations set forth by its government. The government, historically, has made interim agreements every time a protectionist policy is set to expire. This behavior, although temporarily beneficial in protecting the domestic sugar industry, seems to be a common response, which may further delay improvement of the existing conditions inside the mills. Since the majority of mills are owned by the government and based on the debt each mill has outstanding, the incentive for the government to approve a Greenfield project could be lowered. Additionally, if a foreign investor wants to pursue the refurbishment option, he/she needs to understand the current covenants involved with the outstanding debt and whether they can be renegotiated or erased entirely.

Sugar industry value chain

There are four major steps in the sugar industry value chain: harvesting, production, distribution, and consumption. At each step, a significant number of actions are taken and a number of stakeholders are involved.



Harvesting

- There are two main sources of sugarcane
  - 'Smallholders' and outgrower farms provide about 80 percent of cane supply
  - Nucleus estates provide 20 percent of cane supply
- Kenya's harvest period is up to 10 months longer than neighboring countries
- Poor harvest methods lead to deterioration of crop within 24–48 hours
- Weak infrastructure results in high transportation costs

Production

- Sugarcane crushed and converted into raw sugar
  - Byproducts include molasses, bagasse, and filter mud
- Part of sugar production exported to EU under EAC-EU agreement
- Kenya average Factory Time Efficiency is 57 percent due to frequent factory breakdowns; The world average stands at 91 percent

Distribution

- Sugar reaches the end consumer through a network of wholesalers and distributors
- 16 percent value-added tax and a 7 percent sugar development levy are applied to sugar
- Inefficient administration of quotas enables a cartel of importers to charge higher prices for lower-cost imported sugar
- Import licenses have been revoked to curtail the level of illegal imports
- Currently, byproducts are used for alcohol distillation and electricity generation

Consumption

- Sugar produced domestically competes with low-cost imported sugar
- Refined sugar for industrial use is imported and not manufactured in Kenya

Sources: (1) CGD Bills Digest, 2004; (2) Aguilo, et al, 2005; EPZA, 2005.

[1] Factory Time Efficiency is an index measuring the ability of a factory to sustain operations assuming no cane-supply problems. Distribution of retail price of domestic sugar is based on average local sugar retail price of 76.04 KSh/kg.

The inefficiencies along the Kenyan sugar value chain open up a wide variety of potential investment opportunities at the harvesting, production and distribution stages.

Harvesting

Harvesting investment opportunities

- Introduce new varieties of sugarcane to achieve higher yields and better sugar content
  - Kenya's sugarcane variety is inferior to that of neighbors
- Introduce new harvest methods
- Develop the use of and finance furrow irrigation for smallholders
  - Easier to maintain, cheaper, and less water wasted
  - Likely to raise crop yields to more competitive levels
  - Decreases sugarcane growth time and variability

Production

Production investment opportunities

- Greenfield investment in new Kisumu sugar mill
  - Kenya is a net importer of sugar indicating an unmet demand for sugar
  - Establishing a new mill with latest machinery and technology may be profitable
  - Impending liberalization of the market in 2012 would open export markets and drive inefficient producers out of business
- Refurbishment of existing Kisumu mill
  - Privatization by government opens possibility of acquiring existing mill with land and raw material contracts in place
  - Upgrading current mill through technological and infrastructure advancement may be efficient and profitable

Distribution

Distribution investment opportunities

- Production of ethanol from molasses
  - Kenyan sugar companies currently export molasses, which could instead be used to produce ethanol
  - Kenya currently has feedstock to produce 50 million liters of fuel ethanol a year
  - There is no current E10 mandate requiring use of ethanol in combination with gasoline
- Bagasse waste product for cogeneration
  - Convert waste from sugarcane stalk to generate heat and electricity for mill through cogeneration
  - Mills can become selfsufficient for electricity needs, thereby reducing utility costs
  - Additional revenue stream from sale of electricity to the national grid
- Filter mud can be recycled and sold to farmers as fertilizer

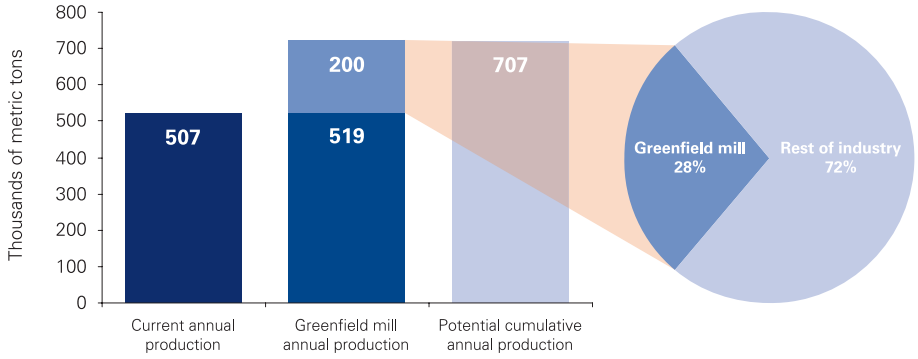
Sources: (1) CGD Bills Digest, 2004; (2) Aguilo, et al, 2005; EPZA, 2005; (3) Industry participant interviews, 2008.

This study focuses specifically on the investment opportunities in the production stage of the sugar value chain. There are a number of reasons for focusing on this area, but most important is the captive market for sugar, based on the historical need for imports. In addition, there is a large community of sugarcane farmers linked to the sugar industry, and if nothing is done to help modernize and revitalize the sugar industry in Kenya, these farmers will potentially see demand for their crop reduce significantly as well as their livelihoods destroyed. Although a number of countries have decided to focus their sugar industries on the production of byproducts, this study's aim was to focus on the problems at the core of the industry before focusing on the development of ancillary industries, such as byproduct development.

Greenfield investment opportunity

An investment in a Greenfield sugar mill would allow an investor to start from scratch and construct a sugar mill as well as negotiate agreements with out-growers to produce sugar more efficiently and cost effectively. The entire facility, including the irrigation plans for the nucleus estates, the water treatment plants, and the transportation network, could be developed to achieve the highest efficiency possible and achieve maximum utilization of the facility. Achieving a higher utilization rate supplemented by state-of-the-art technology, a Greenfield mill could potentially capture a significant portion of the existing domestic market as well as compete more effectively with other COMESA nations' sugar products. As an example, a sugar mill designed to produce 200,000 metric tons of sugar per year would increase overall domestic production in Kenya from 507,000 metric tons per year to 707,000 metric tons per year, an increase of 39 percent, and the new mill could potentially capture up to 20 percent of the market.

Total potential and annual production after Greenfield investment



Market share of potential Greenfield investment

Source: Kenya Sugar Board statistics, 2008.

However, there are challenges that an investor would face while developing a Greenfield sugar mill. First, the presence of small holdings of land spread among the local farmer population lengthens the process of acquiring land as ownership is often contested. Secondly, since the regulatory environment is unstable, there is uncertainty surrounding future amendments and changes to regulation regarding foreign investment in the country. These factors, along with additional risks of investment, which will be discussed later, have the potential to be influential in determining the profitability of the Greenfield investment.

Financial case for the Greenfield investment

A financial analysis was performed to asses the potential profitability of a Greenfield investment in a number of different scenarios. There were a number of key assumptions made in order to conduct this analysis and the rationale behind those assumptions is below.

Assumptions for Greenfield sugar manufacturing facility

Category	Assumptions	Comments
Revenue assumptions		
Production capacity (metric tons per year)	200,000	N/A
Utilization	80%	Mumias, currently the most profitable mill, operates on average at a utilization of 80%
Sales price (KSh/metric ton)	42,000	Interviews lead us to expect price of imported sugar to reach this level by 2012[(2)]
Sales price growth	3%	This is a conservative estimate; average imported sugar price grew on average 6% in the last 10 years
Molasses produced per metric ton of sugar (metric tons)	0.32	Based on industry research[(2)]
Price per metric ton of molasses (KSh/metric ton)	1,800	Price of molasses in Kenya in 2007[(2)]
Cost assumptions		
Raw sugarcane (KSh/metric ton)	2,500	Price at which Kibos sugar mill acquires sugarcane[(2)]
Sugarcane price growth (KSh/metric ton)	(1%)	Likely to fall as supply of sugarcane is constantly increasing[(2)]
Cane to sugar conversion ratio	11%	Based on industry research[(2)]
Variable production cost (KSh/metric ton)	110	Includes other chemicals and raw materials required to process sugar[(2)]
Permanent employees	300	Includes executive, administrative, and security personnel[(2)]
Average permanent employee wage per month (KSh)	25,000	Based on Kibos sugar mill expenditure on permanent employees[(2)]
Casual employment per annual metric ton of sugar produced	0.09	Based on Kibos sugar mill use of casual labor and production capacity[(2)]
Wage per casual employee per month (KSh)	3,846	Based on Kibos sugar mill use of and expenditure on casual labor[(2)]
Investment assumptions		
Fixed Greenfield investment per metric ton of built capacity (KSh '000s)	297,000	Greenfield investment refers to equipment needed to manufacture sugar[(2)]
Variable Greenfield investment per metric ton of built capacity (KSh)	12,182	33% of investment assumed to be fixed, and 66% scalable
Fixed infrastructure investment per metric ton of built capacity (KSh '000s)	297,000	Infrastructure investment refers to construction of plant and development of roads[(2)]
Variable infrastructure investment per metric ton of built capacity (KSh)	12,182	33% of investment assumed to be fixed, and 66% scalable
Fixed agricultural estate investment (KSh '000s)	297,000	Agricultural estate investment includes developing irrigation and harvesting systems of affiliated farmers[(2)]
Variable agricultural estate investment per metric ton of built capacity (KSh)	12,182	33% of investment assumed to be fixed, and 66% scalable
Logistics and feasibility study (KSh '000s)	300,000	Assumed to be constant in relation to capacity[(2)]
Licenses (KSh)	10,000	Assumed to be constant in relation to capacity; one time expense[(2)]
Financial assumptions		
Discount rate	18%	Based on industry research[(2)]
Growth rate	7%	Average growth rate in first 5 years of operation
Exchange rate (Shillings per Dollar) as of 7/16/08	66.68	According to Yahoo! Finance, July 16, 2008
Inflation	7%	Adjusted downwards from 2007 numbers of 9% to reflect potential mitigation of political disturbances in future

Sources: (1) Export Processing Zones Authority, 2005; (2) Industry participant interviews, 2008; (3) Aguilo, et al, 2007.

There were two additional assumptions in the model. First, a construction time of three years was assumed based on industry participant interviews, and second, a ramp up in utilization from 60 percent in year 4 to the maximum utilization of 80 percent in year 5 was applied. Based on these assumptions, and not taking depreciation into account, a cash flow analysis yielded a potential net present value of approximately $29 million with a payback period of nine years.[2]

Financial overview of Greenfield investment in Kisumu sugar mill

($'000s)	1	2	3	4	5	6	7	8	9
Net income[(1)(2)]	–	–	–	15,374	23,182	24,978	26,789	28,614	30,453
Total investment	(41,492)	(41,492)	(41,492)	–	–	–	–	–	–
Net cash flow	(41,492)	(41,492)	(41,492)	15,374	23,182	24,978	26,789	28,614	30,453

Estimated financial benefit

NPV ($'000s)	28,636
IRR	4%
Payback period (years)	9

Sources: (1) Export Processing Zones Authority, 2005; (2) Industry participant interviews, 2008.

In addition to analyzing the base case model, sensitivity analyses were performed to determine the effect of fluctuations in sugar prices and factory utilization rates. With regard to potential sugar prices, the worst case scenario involves a sales price per metric ton of sugar to drop to the world average price of 24,344 KSh/metric ton, and a best case scenario in which the sales price rises to the current sales price per metric ton of sugar from the Mumias facility of 47,800 KSh/metric ton. These scenarios yielded net present values of negative $132 million with a payback period of more than ten years and positive $79 million with a payback period of approximately seven years, respectively.

Sensitivity analysis: Sale price for sugar

Category	Worst case	Most likely	Best case
Assumption			
Price (KSh/metric ton)	23,344 World forecast	42,000 COMESA forecast	47,800 Mumias current
Economic return			
NPV ($'000s)	(132,131)	28,636	78,495
Payback period (years)	>10	9	7

Source: Industry participant interviews, 2008.

[2] Does not take depreciation into account.

The second sensitivity analysis conducted was on capacity utilization rates at the facility. The worst case scenario assumed that the facility operated at approximately 60 percent, the current average of Kenyan sugar mills, and the best case scenario assumed that the facility operated at the world average utilization of 90 percent. This analysis yielded net present values of negative $7 million with a payback period of ten years and a positive $46 million with a payback period of approximately seven years. In this analysis, a breakeven point, with a zero net present value, was achieved at 64 percent utilization.

Sensitivity analysis: Capacity utilization

Category	Worst case	Most likely	Best case
Assumption			
Utilization	60% Current average	80% Mumias utilization	90% Industry standard
Economic return			
NPV ($'000s)	(7,311)	28,636	46,609
Payback period (years)	10	9	8

Source: Industry participant interviews, 2008.

The Greenfield investment opportunity appears to present investors with a potentially viable and profitable investment.

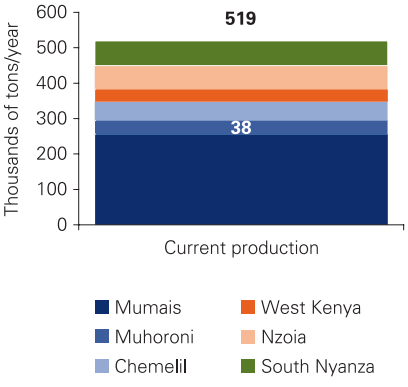
Refurbishment of facility

The second investment explored within the production stage of the value chain was the refurbishment of an existing facility to the Mumias standard of operation. At present, only one of the operating sugar mills, Mumias, produces at or above the global sugar mill production average of 135,000 metric tons of sugar per year (Kenya Sugar Board Statistics 2008). In addition, the world average production utilization rate is over 93 percent, a rate that no mill in Kenya currently achieves.

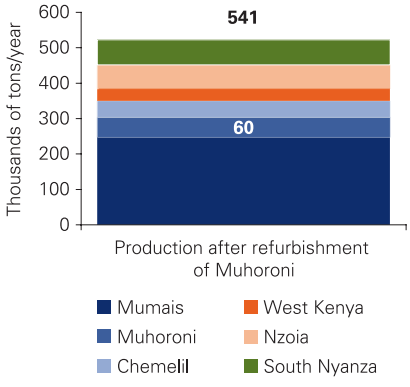
The rationale for the refurbishment of a facility as opposed to construction of a new facility rests on the ease of execution. The construction time-frame is two years, based on industry participant interviews, and the time and expense related to acquiring permits and licenses can be avoided because mills are already in possession of working papers and the mills are also owned by the government. In addition, existing mills already have a network of out-growers transporting sugarcane to the mills, and no new contracts would be necessary.

As an example, the refurbishment of the Muhoroni mill, one of the most cost-intensive sugar production facilities in Kenya, currently operating at 51 percent utility and producing 38,000 metric tons of sugar per year, to Mumias' capacity utilization, would increase production at the facility by 58 percent to 80,000 metric tons per year, and net the facility a 4 percent gain in market share, to 11 percent.

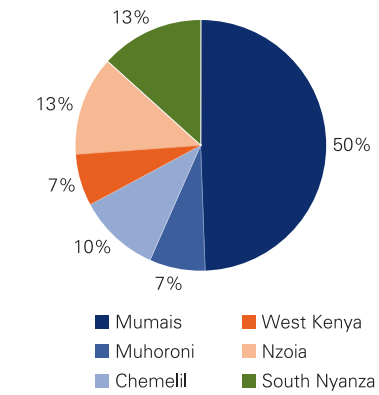
Current production of existing sugar mills before refurbishment



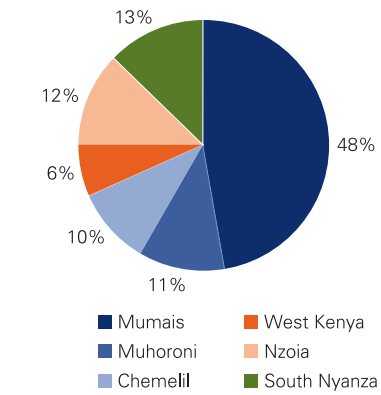
Projected production of sugar mills after refurbishment of Muhoroni



Market share of mills before refurbishment



Market share of mills after refurbishment



Source: Kenya Sugar Board Statistics, 2008.

There are also a number of potential impediments to an investor's ability to profitably refurbish an existing facility. Current government valuations of existing sugar mills appear to be inflated, as evidenced by the 2007 halt of the sale of two sugar mills based on claims of inaccurate valuations. The sugar mills also have large amounts of outstanding debt that the government is currently not willing to retire, which amounts to approximately 4.7 billion KSh (Industry participant interview 2008). Besides the financial roadblocks, it has historically been difficult for foreign companies investing in the sugar industry to obtain the correct licenses and begin operation in Kenya (Industry participant interview 2008). As mentioned in the Greenfield investment opportunity, land ownership is also a major concern. In addition to claims of improper valuations on the Miwani and Muhoroni facilities, claims were made that the government did not have the right to sell the facilities because they were located on land that was privately owned.

Refurbishment of the Muhoroni facility to exclusively produce commodity sugar does not appear to be profitable. An investor would initially have to purchase a 51 percent majority ownership stake in the mill, which, based on the 2007 bid by Pan-African Millers Limited, amounts to approximately $23 million. Once purchased, an investor would have to invest an additional $32 million approximately, based on the current size of the Muhoroni facility and the assumptions stated in the previous section including infrastructure improvements, agriculture development, as well as other miscellaneous costs. An analysis of this investment yielded a potential terminal value of approximately $43 million and a net present value of approximately negative $29 million with a payback period of nearly 17 years.

Financial overview of potential investment ('000s)

Purchase of 51% ownership[1]	(22,945)
Refurbishment investment[2]	(109,614)
Terminal value	54,093
Net present value	(70,885)
Payback period	17 years

Sources: (1) Odhiambon, 2008; (2) Industry participant interviews, 2008.

However, there are scenarios in which refurbishment could potentially be profitable and have a positive net present value. If the government were to allow an investor to take over a facility free of charge and it did not require service on the current debt on the facility, the refurbishment investment option appears to be more viable. Based on the assumptions that were stated in the base case model for a Greenfield investment, a sales price of 42,000 KSh per metric ton of sugar, capacity utilization of 80 percent, and an approximately $32 million refurbishment investment, there appears to be a net present value of approximately zero, and a payback period that is greater than nine years, resulting in an option that is more appealing for an investor.[3]

Financial overview of potential investment in refurbishment of Muhoroni sugar mill

($'000s)	1	2	3	4	5	6	7	8	9
Net income[(1)(2)]	–	–	3,201	4,268	4,713	5,076	5,443	5,815	6,212
Total investment	(16,442)	(16,442)	–	–	–	–	–	–	–
Net cash flow	(16,442)	(16,442)	3,201	4,268	4,713	5,076	5,443	5,815	6,212

Estimated financial benefit

NPV ($'000s)	(8)
IRR	1%
Payback period (years)	>9

Sources: (1) Export Processing Zones Authority, 2005; (2) Industry participant interviews, 2008.

[3] Does not take depreciation into account.

Refurbishment alternatives

Although the refurbishment of a sugar mill for the exclusive production of commodity sugar does not appear to be profitable, the refurbishment of a sugar mill to produce sugar and other cane derivatives may have more potential. In 2002, Spectre International was granted land titles to 112 hectares abandoned by the Kenya Chemical and Food Corporation, including the Kisumu Molasses Plant. In January 2003, Spectre sold a 55 percent majority interest to Energem Resources for approximately $2 million. Subsequently, Energem invested approximately $14 million to refurbish and convert the facility to produce biofuels, alcoholic beverages, and yeast. Currently, the facility's production capacity is approximately 29 million liters per year. In 2004, a third party valued the facility at $100 million, as compared to a precommissioning value of $24 million. Given Energem's 55 percent interest in the company and their approximately $16 million investment in the facility, it appears that Energem's return on investment since inception is approximately 261 percent.[4]

Energem Resources financial results

Precommissioning valuation(1)	$24,000,000
Energem investment(2)	
Purchase price(2)	$2,000,000
Refurbishment(2)	$14,000,000
2004 valuation of facility(2)	$100,000,000
Return on investment	**Approximately 261%**

Sources: (1) Energem Resources, Inc; (2) Millennium Cities Initiative, 2007.

It is unclear whether it would be possible or permitted by the Kenyan government for a foreign investor to enter the country with this type of investment idea; however, given the current situation of the Kenyan sugar industry, a need for alternative revenue streams appears to be necessary in order for the current sugar mills to be profitable going forward.

[4] Analysis assumes that a 51 percent stake in ownership nets the investor 51 percent of total net income.

Scenarios affecting an investor's ability to invest in Kenya

There are a number of potential scenarios that would deter an investor from investing in the Kenyan sugar industry, including the government's current high valuations of the existing mills, its refusal to retire the debt on these mills, and the reportedly difficult procedures and policies for foreign investors to acquire or lease land to begin operations. In addition, if the recent civil unrest and political instability caused by the December 2007 elections continues, investors will be deterred and their ability to invest in Kenya hindered. For example, a scenario in which the collapse of the Party of National Unity and Orange Democratic Movement power-sharing agreement occurs and/or the inability of the government to legitimize election procedures and vote tabulation would have a ripple-effect in the level of foreign investment. As an example of how the recent civil unrest and political instability has affected development in the sugar industry, the Kibos facility was required by investors to obtain a $10 million political insurance policy from the Multilateral Investment Guarantee Agency in order to receive the financial backing the investor group required to complete the facility (Industry participant interview 2008).

If an investor is able to invest in the Kenyan sugar market, there are a number of scenarios that would affect the ease of execution. If the government continues to protect its domestic producers and land owners, most of whom have ties to the government, investment initiatives such as the Investment Promotion Act and the Foreign Investment Protection Act will remain ineffective and acquiring licenses and permits for foreign investors can be delayed, postponing operational launch and delaying returns. Secondly, if the government and the port authorities do not initiate a system of checks and balances to monitor import quotas, illegal imports into Kenya will continue to rise, which will harm the potential revenue or ease of sugar sale for foreign investors. Also, there is the potential continuation of the COMESA trade agreement, which will protect existing mill operations and the welfare of the sugarcane out-growers, thus effectively eliminating any government motivation to modernize or privatize the existing facilities.

Operational risks to investment and mitigation strategies

In addition to the political and regulatory risks associated with investments in the Kenya sugar market, there are a number of operational risks an investor will face. However, despite the risks, there are a number of possible mitigation strategies to reduce the likelihood of an investor being affected.

The potential supply and demand risks an investor faces are of the most concern. There are a number of factors that affect the supply of sugarcane available. Under normal circumstances, there is an abundance of sugarcane produced in Kenya; however, given the nature of the type of sugarcane used in Kenya, the amount of sugarcane available fluctuates greatly. Recently, the supply of sugarcane to the mills has been limited due to extensive burning of the outgrowers' fields by rioters and other protestors. In addition, changes in the weather and abnormal weather patterns have the potential to adversely affect the supply of sugarcane available. In order to attempt to mitigate the effects of decreased supply of sugarcane, investors could increase expenditures on research and development to adopt a more suitable type of sugarcane or cane alternative for the Kenyan climate. Investors could also work with the outgrowers to install furrow irrigation systems to more effectively utilize Lake Victoria and to reduce dependence on natural rainfall. The demand risks for sugar are also numerous and a cause for investor concern. Decreased demand could result from increased numbers of illegal imports into Kenya. In order to brand their products, investors could use a marketing campaign to increase awareness among the Kenyan population to differentiate domestic sugar from imported sugar as a premium product.

There is also significant risk associated with the sales price of sugar in the future. As the number of imports increase in Kenya, the price of sugar could be depressed to unprofitable levels, impacting the projected returns and payback period of the Greenfield or refurbished mill. To attempt to mitigate risk and maintain profitability in this situation, investors could differentiate their product through a number of ways including the marketing campaign described above, selling different varieties of sugar such as regular, premium, deluxe, etc., or through promotions and other bulk discounts. In addition to the sales price of sugar being depressed, there exists the possibility of outgrowers forming a union and subsequently charging premiums on their sugarcane. In order to avoid this situation, an investor can solidify the relationship with outgrowers through subsidizing farm development and modernization, thereby taking an invested interest in the prosperity of the mill's suppliers.

The state of infrastructure in Kenya is another concern for investors when considering the operations of a sugar mill. Although there have been funds set aside by the government for the repair of existing roads as well as for the paving of additional roads, there is the potential for continued delays due to poor project management or the unavailability of raw materials needed for construction. Investors might consider either privately funding the road development or working with the government to negotiate a contract for infrastructure improvement.

Additionally, the implementation of modern management methods and process are critical to the efficiency and financial performance of a Kenyan sugar mill. An investor will need to attract management with experience in running successful mills and may need to invest in employee training programs.

Lastly, an investor can face currency risk due to the volatility of the Kenya shilling. This can lead to the need for additional funding, but an investor can hedge against this risk by purchasing futures in more stable currencies.

Social benefit of investment

Although there are a number of political, regulatory, and operational risks associated with an investment in the Kenya sugar industry, there is a seemingly large positive social impact on Kisumu and in Kenya. According to industry participants, the construction of a Greenfield sugar mill would generate approximately 400 new permanent jobs and significantly increase the casual labor workforce along the value chain. Investments in the refurbishment of a sugar mill or the construction of a new facility can lead to indirect job creation in a variety of supporting industries including construction and transportation.

By investing in the sugar industry and up-to-date machinery, workers will gain access to new technologies to enhance efficiency and increase productivity. In addition, by providing well-paying jobs to educated individuals, others may be motivated to pursue higher education, thus increasing the percentage of the population with advanced degrees.

On a macro-level, investment in a high-potential sector, such as the sugar industry, may enable the Kenyan government to make investments in other areas through increased revenues from economic activities.

Although there are a number of positive social benefits, there is the potential for the investment to have a negative effect on the environment. The creation or refurbishment of a sugar mill may lead to increases in air, soil and water pollution, and soil erosion as well as potential loss of habitat for a number of animals leading to less biodiversity. However, the Kibos sugar mill, by utilizing previously fallow land, has actually improved the condition of the soil surrounding their mill (Industry participant interview 2008). Thus, there is the ability to mitigate any potential negative environmental impacts.

Investment summary

There are many factors influencing investment in Kisumu. The most influential factors an investor needs to concern him or herself with appear to be the regulatory environment, the state of infrastructure, the availability of human capital, and the state of the current manufacturing process. Regarding the regulatory environment in Kenya, a foreign investor must be able to obtain government approval for permits and to obtain and secure land leases in a timely and cost-effective manner. At present, the policies and licensing requirements constrain the ease of execution for foreign investors in Kenya. Land leasing and licensing is difficult to obtain and can be delayed significantly based on industry participant feedback. In order to make the regulatory environment more appealing to foreign investors in Kenya, industry participants have indicated that the government policies to legally protect foreign investment in Kenya need to be strengthened and adhered to as law. Moreover, land needs to be made readily available and licensing needs to become more attainable.

Regarding the state of infrastructure in Kenya, the roads and railways must be suitable for heavy vehicles, and the conditions should allow for easy and efficient travel. Furthermore, the majority of the population must have access to piped water and electricity. Currently, 14 percent of the roads in Kenya are paved, and less than 40 percent of the population has access to piped water (Millennium Cities Initiative 2007, p.20). Industry sources indicate that investors will need to provide funding to assist in infrastructure development in order to enhance their manufacturing and allow their business accessibility to export markets.

The availability of labor to develop or refurbish a sugar mill is another major investment consideration. In order to effectively own and operate a sugar mill, there needs to be steady supply of workers for construction and operation purposes as well as a trained management group. Fortunately, the Kenyan workforce is held in high regard for both skilled and unskilled labor. In addition, there is an unemployment rate of approximately 40 percent in the country, further supporting that there is a supply of workers.

Manufacturing considerations include operating costs and efficiency improvements for investors. A modern harvesting process and effective utilization of Lake Victoria as a resource needs to be implemented. At present, there are primitive harvesting processes in place and low factory utilization due to the lack of research and development investment into new technologies. Lake Victoria has the potential to provide moisture for soil, making sugar harvesting more fruitful and profitable; however, it is not currently being utilized as the primary source for irrigation or other activities. Research indicates that increased expenditures for research and development need to be made to modernize the harvesting process and develop furrow irrigation systems utilizing Lake Victoria.

The Kibos sugar mill, the newest and perhaps the most technologically advanced mill in the Kisumu area, is owned by the Kibos Sugar and Allied Industries, a subsidiary of Chanan Agricultural Contractors (CAC). CAC was started by a large-scale sugar farmer in the Kibos area, located just outside of Kisumu. According to industry sources, due to the owner's family ties to both the community and the government, the CAC was able to obtain the necessary building and operation permits needed to begin operations quickly and easily. Industry sources have indicated that it would be necessary for an investor to have significant relationships with either the community at large or the Kenya government if they desire to begin operations in a reasonable time frame.

Conclusion

The current state of the sugar industry is such that there may be potential for an investor to play a significant role in the future of the industry. However, government regulations and requirements may pose various challenges for investors. Based on research and analysis, it appears that currently the more economically viable option for an investor is the construction of a new Greenfield sugar facility as compared to the refurbishment of an existing mill.

The ability for an investor to invest in Kenya has been made difficult by government regulations; however, recent government actions have been taken to attract more foreign investment into the country. It remains to be seen whether these initiatives will have their desired affect or whether they will be enforced effectively to create the environment necessary for foreign investment in the country.

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