INVESTMENT CASE FOR THE DEVELOPMENT OF AN ECO-INDUSTRIAL PARK AT EMALI, MAKUENI COUNTY.

Executive summary

The paper outlined below attempts to build an investment case for the development of an Eco Industrial Park (EIP) at Email town, Makueni County which shall be built on a 4 900 acre parcel of land. Emali's preferential location based on its background and attraction makes it an ideal location as a launch pad for the concept based on its physical characteristics. The proposed project would be the first one of its kind in Africa as it diverges from the conventional industrial park models that have proliferated in the Kenyan industrial real estate sector by building a model that enhances sustainable development based on the new revolution.

The concept is based on integrating nature in the industrial processes by establishing a man made industrial ecosystem. The model looks at industry from a systematic perspective and tries to devise mechanisms that can create interdependence amongst manufacturing entities. It seeks to outline the benefits to the community and the EIP members associated with building relationships that will ensure the protection of the environment and fostering the development of mankind sustainably. The paper studies the principal components of industrial ecology and how it can be used in Kenya as a model for promoting cleaner production. The concept illustrates the importance of enhancing environmental and economic performance and the superior benefits associated as evidenced in more developed countries.

The paper illustrates the principal real estate components that will be included at the site based on a community concept where people can work, live and play. It blends the different components with a view to enhance sustainable villages capable of accommodating over 400,000 people. An investment justification from an economic and regulatory perspective to guide in the preparation of the feasibility and to understand the applicability of the concept based on existing environmental law is important towards decision making by various stake holders.

Financing of the development requires several approaches in structuring vehicles to raise capital dependent on risk appetite so as to move the concept forward. Critical to this is the identification of suitable partners with a long term vision needed for providing capital for infrastructure and real estate and are in seek of superior return the project proposal provides. In order to attain the set objectives, certain necessary activities have to be planned in an organized and logical manner to ensure that the project implementation moves smoothly. The sensitivity of the concept begs for extensive as well as careful research and planning to ensure success in implementation of the concept.

Description of the location and site

Emali Town is situated within Makueni County and borders Kajiado County to the south and has an estimated population of 8000 inhabitants. It lies along the busy Mombasa-Nairobi highway and it has positioned itself as a hub for trade activity over the years. The busy town has a vibrant hospitality sector which serves as a resting place for truckers destined for far flung locations such as Uganda, Tanzania and the Democratic Republic of Congo. In addition Emali town which falls under the larger Kibwezi West sub county borders the expansive Tsavo national park which provides a gateway to one of Kenya's great tourist attraction site. Travelers to the park usually tend to savor the town's delicacies and nightlife. The town has a rich historical background principally dominated by the local Kamba and Maasai tribes which also attracts foreign visitors.

The town is located about 120 km from Nairobi and 350 km from Mombasa and is currently served by the metro gauge railway system. The development of the standard gauge way rail which is expected to pass through the town, presents a great attraction to would be investors. The predominant economic activities within the area include trade mainly in essential agricultural produce, livestock and livestock produce, small scale subsistence farming.

It is worth noting that the area is located within an arid and semi arid zone with variability in rainfall patterns and high temperatures hitting a maximum of 33 degrees Celsius leading to inadequacy of water in most areas. From the statistics at least 70% of the people suffer from food insecurity with a partly 9% of the population in the area practice irrigation farming and only 2 % of the population are connected to the national grid. Great potential exists in harnessing green energy particularly thermal, solar and wind power energy.

The proposed site LR. No. 12970, which lies 4 km west of Emali town, consists of vast undeveloped gently sloping agricultural land diluting north to the Muoni river and it measures 1, 990.07 ha or 4,916 acres in size and the soil type is loam soil. The subject site is communal land owned by the immediate community with select representatives. The surrounding land is however owned in trust by the county government as per the Trust Lands Act on behalf of the community by the National Land Commission. It is located 2 km from the Mombasa-Nairobi highway and accessed through an all weather road. The parcel lies flush to the existing metric gauge rail system at the south west corner of the plot. Further, it is in close proximity to the proposed standard gauge way line which shall lie 0.5 km south of the site.

PROJECT DESCRIPTION

Background

The scarcity problem in the use of economic resources begs the development of mechanisms that foster the sustainable use of resources efficiently. The shift from the Agrarian period to the first and second industrial revolution brought about several significant benefits to humanity. These processes gave rise to sweeping increases in production capacity and would affect all basic human needs, including food production, medicine, housing, and clothing. However the increased population growth over the years during this period led to an in exhaustible demand for resources by mankind. The question now became how we reduce the unsustainable growth through the dependence on limited resources.

New revolution

This realization has led to the new focus of sustainability in the use of resources to minimize the effects of degradation brought about by pollution and waste of resources. The essence is in analyzing the environmental problems that exist in traditional industrial parks and zones in Kenya and creating systems that would lead to eliminating the problems through a systematic approach. Towards this cause, the concept of incepting eco industrial parks, as proposed in this paper, provides solutions whereby various entities in the manufacturing and allied sectors can sustainably enhance their performance while maintaining the environmental quality. It calls out for the creation of a man made industrial eco system. Through industrial ecology, manufacturing firms are able to devise ways in which industry interacts with nature and utilizes the wastes and by products of other industries as inputs into its own processes. It shifts from a linear production method to a more cyclical method of production.

Principles

The core principles towards the development of an Eco Industrial Park include the creation of industrial ecosystem where waste is seen as a resource and industries can be able to trade with each other's by products as inputs in their processes. It calls out for the balance of industrial outputs and inputs to natural levels, becoming resource efficient by using less energy, use of re-use materials and less of virgin materials or the use of environmental friendly materials. Lastly, the emphasis is in the use of more sustainable energy in production and improving efficiency in manufacturing lines. The four key principles highlighted above form the pillars in creating an efficient Eco Industrial Park.

Practices

Towards the development of the proposed park, attention should be placed on how to best enhance environmental protection. Heavy and light industries within the proposed site have to adhere to specific sets of guidelines towards prevention of pollution. The guidelines need to be specified to each individual firm rather than the industry as a whole. Secondly, employment of source reduction practices by firms in the industrial park in attempt to reduce the amount of hazardous wastes entering any waste streams or released to the environment prior to recycling, treatment or disposal need to be emphasized. Waste minimization actions which reduce the amount of hazardous substances being generated by firms being sorted and disposed off have to be incepted. Through total quality environmental management, best practices in environmental management can be inculcated in conventional total quality management practices in firms to ensure enterprise wide resource management.

Benefits

Cost Savings & Enhanced Competitiveness Companies participating in an eco-industrial network can benefit from a wide range of potential cost savings. Increased efficiency typically involves new by-product exchanges and joint infrastructure projects with neighboring facilities. For example, in Kalundborg, Denmark, a $60 million investment in eco-industrial network infrastructure generated a $120 million in cost savings over five years.

Revenue Generation Companies are sometimes unaware that their by-products have market value and can be sold rather than disposed off. For example, Chaparral Steel in Midlothian, Texas, produces slag which is used as an additive to cement produced by TXI. This by-product to resource conversion conserves natural resources while reducing energy requirements by 10-15%. Revenue generation may also result from improved market share. In France, a system has been developed that provides firms with an 'eco-label' that identifies them as participants in a particular eco-industrial network.

Improved Opportunities for New Investment The development of a flexible strategic plan for an eco-industrial network that includes baseline information on material and energy flows among existing firms can have a number of economic advantages for potential new investors. For example, several chemical companies are working to develop underutilized land holdings to attract new facilities that can utilize their products or by-products.

Access to New Technology Greater cooperation between firms provides a 'supplier' pathway for the diffusion of new technology across sectors and also helps stimulate new technological developments.

LAND USE

In the design of the proposed park the master plan embodies the different concepts that have been outlined above. The industrial park integrates businesses, wildlife, people and the environment in its design and this has to fully meet the stakeholder's objectives. The economic driver of the park is establishment of a high powered **Industrial District** that shall be the epicenter for industrial new revolution in Africa. The centre will comprise of a mix of businesses with industrial symbiotic linkages with potential for growth and opportunity for waste exchanges. The district will be home to large scale manufacturing enterprises with huge operations big enough to support the vision and who also by the nature of their activities, environmental impact is very important. It shall consist of centres for innovative environmental research and development as a collaborative initiative by the EIP members. The objectives of the industrial centre embraces the four pillars of industrial ecology as illustrated above to enhance environmental and economic performance. This area shall occupy the bulk of the land utility in the area with further segmentation in to smaller special economic zones in line with different categories of products and needs of production. Products that are closely related would be lumped together i.e. food processing in attempt to enhance association. Incentives to investors within the areas may be provided within the law in conjunction with county and national governments. These may range from taxation, operational permits etc. The area shall comprise of high-rise office developments, industrial warehouses for manufacturing, logistical centre comprising of cargo handling facilities and an inland container depot. The park will be developed on a 3,000 acre parcel of land.

London Sustainable Industrial Park

Kalundborg Eco Industrial Park

The **residential district** will emphasize a density gradient development ranging from very low density to very high-density housing. The development shall range from high rise apartment style units to stand alone houses and clustered low rise developments to suit different tastes and preferences based on social stratification. It shall feature a large Metro Center that will be a mixed-use development in the residential district with a high-density development with retail and ancillary office space conveniently located adjacent to the mass transit systems close to the residential area. It will further consist of various community centres' for convenient shopping and wellness facilities that will be situated close to residential neighborhoods. The district will feature open spaces with green areas centered with water bodies around the developments with miniature nature parks. The residential area shall accommodate an estimated population of about 400,000 people on 1,500 acres.

RECREATIONAL PARKS

The development will see the inclusion of recreational spaces within the residential zones aimed at providing leisure and sporting activities to the parks residents as well as neighboring communities. It will see the construction of sports stadia for various field sports, entertainment spots for the family complete with water amusement parks, championship golfing facilities and other arenas for indoor sports.

Recreation Park in Long Beach, California.

HOSPITALITY CENTRES

The parks master plan shall provide for hospitality developments which will be located within the commercial zone and close to wildlife sanctuaries. Within the commercial zone, they will comprise of different hotel star ratings to suit different client needs on both short stay and long stay. Further towards promoting eco tourism, hospitality facilities will be built around an eco-lodge model close to the Tsavo National Park while others will be located close to the Chyulu Hills.

SPECIAL PURPOSE CENTRES

The park will have centres for healthcare comprising of a world class medical facility complete with a general hospital and providing various specialties ranging from Mother and Child hospital, Oncology and Diabetes care hospital, Heart and ENT hospitals. In addition the park will incorporate education and training centres targeting the primary to the tertiary levels based on international and local education standards. Partnerships between the EIP with the academia is very important to enhance and develop more relationships in industrial symbiosis through linkages between in house research and academia.

Mpesa Foundation Educational Centre

ENERGY USE

Parallel to the mission of creating a truly sustainable village in Makueni County, the use of energy remains a vital element in enhancing the objective of the EIP. Conventionally, the Kenyan grid has been majorly supported by hydroelectric power and oil powered turbines to power our industries. The shift in to more renewable energy sources has been propagated endlessly since the turn of the 21st Century. Great strides have been made in harnessing green energy sources and it's the objective of the proposed project to move the concept further in this direction. The project proposes to create thermal plants and harness green energy by creating solar and wind farms in the area to power the park. The estimated power requirements at this level of development is estimated at ……the power can be augmented through power backups from the national grid to mitigate against interruptions in supply. The electricity shall be distributed through primary and secondary distribution lines with the former geared to the industrial district and the former towards the commercial and residential areas.

WATER AND SEWAGE SYSTEMES

The development of the industrial park will see the creation of water systems for industrial and commercial use. Water sources to be utilized include underground water aquifers and reservoir dams from harvesting rain water during the rainy seasons. The mini city shall have treatment plants installed in the area to purify the water sources. In the construction of the development the master plan shall design an expansive sewer system designed to meet the anticipated population of the local area post development as well as connect with areas with high urban civilizations that will be spillover effects of the development of the park. Sewer treatment plants will be cited within the industrial town with adequate capacity to meet future expansion.

CENTRES FOR CONFLICT RESOLUTION

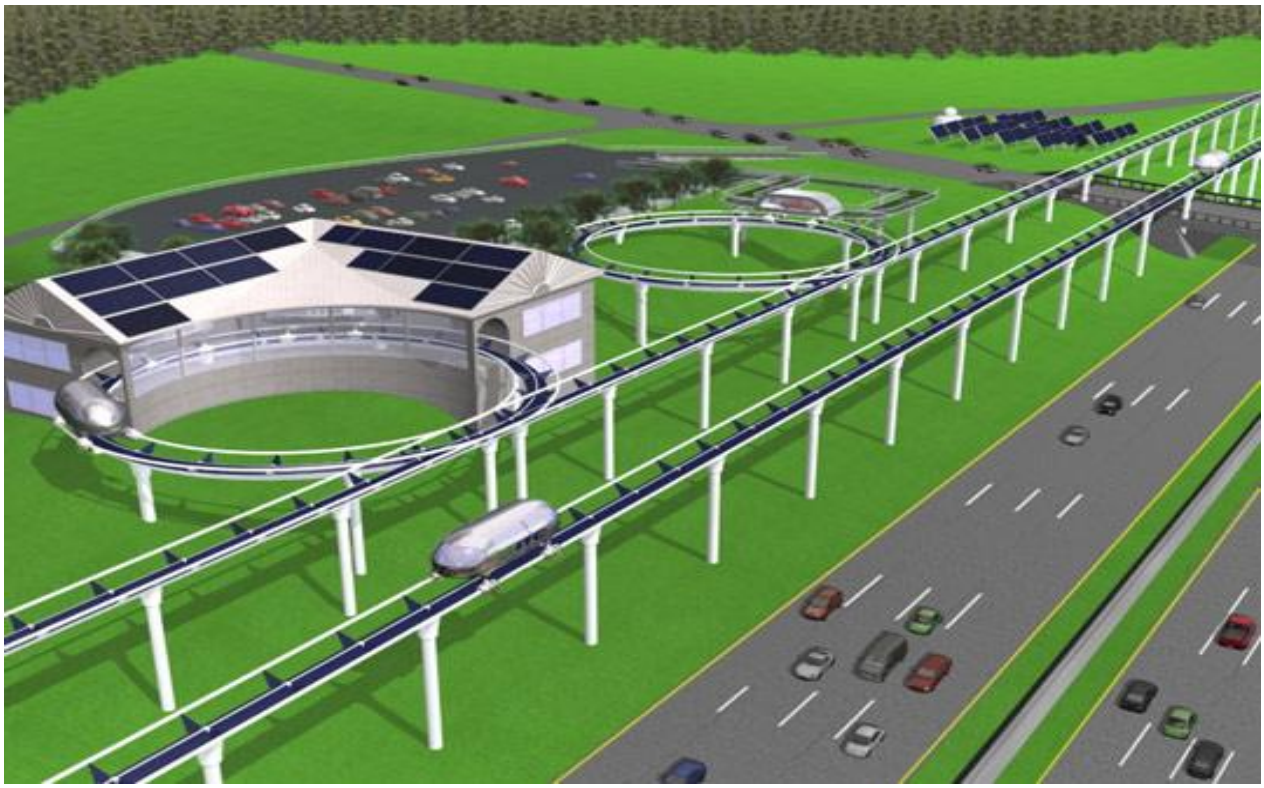
The relationship between the project promoters and the immediate community will have to be governed and managed in accordance with existing law and community norms. The purpose of establishing the centre lies in the expectations different stakeholders hold from the project. The objective of the centre is to enable the prevention, de-escalation, resolve and transform all human conflicts arising from the project. This shall entail the appointment of various institutions or individuals with expertise in this field.

CENTRE FOR INDUSTRIAL COLLABORATIONS AND LIASON OFFICE

The centre will mandated with the identification and selection of preferred companies that would best be suited in being members of the park. The entities have to have strong industrial symbiotic linkages and would benefit enormously from the venture. The centre will be tasked with the responsibility of ensuring that the choice of the members selected is in consideration to all the pertinent levels of industrial ecology and is economically efficient. It shall be the major communications office and will co-ordinate all the activities prior to set up including feasibility analysis. It will consist of corporate entities, academia and individuals with expertise in this field.

MASS TRANSIST SYSTEM

The development shall have a mass transit system that will be for both commercial and passenger use. This will comprise of heavy rail for industrial use, light rail for passenger use, rapid transport and an elaborate road network. The industrial park will incorporate a heavy goods transit system comprising of road and rail and shall be connected to the existing metric railway system and the standard gauge rail and the Mombasa-Nairobi highway. It is the intention that the system be powered by green energy. The urban transit system shall be either publicly or privately owned or a combination of both and be part of the internal infrastructure systems within the park.



Solar& Hydrogen Powered Interstate Model

INVESTMENT JUSTIFICATION

In this section the paper evaluates the suitability of the proposed site, economic, regulatory and environmental feasibility of the proposed concept and builds a business case for investment.

Site suitability

The proposed site is well located for the development of the proposed concept. The size of the parcel of land adequately provides space for the incorporation of the chosen and required component land uses as highlighted above. Measuring 4,900 acres, it provides the EIP with a wider scale in the development providing economies of scale lowering marginal development cost. The project shall be implemented in a phased approach thus providing the developer with a continued appreciation in value of assets over the implementation period. Further, the presence of residential communities to be incorporated in the concept provides a ready market for the finished goods market. The location of the site and its proximity to supply and demand generators uplifts further afield the profile of the proposed concept. For example, a key demand source would be the development of the proposed Konza Techno City which widens the market for goods manufactured within the park through the creation of an effective demand across the Kenya's Eastern region. The proposed city further provides the required resources that will feed in to the specialized labour market and support the research and development of the EIP.

Infrastructure plays a key role in actualizing the vision of the project. The site enjoys good access from both road and rail. Mombasa –Nairobi Highway which passes close by enhances the quick and easy linkage and transportation of finished goods to different markets both locally and in foreign countries. Further, linkages between the site and the standard gauge way rail way line and the conventional metric gauge rail, of which pass close to the site, allows for easier access and transportation of intermediate goods and finished products to move to other markets. The existence of a pipeline network that passes close to the site also provides easier connectivity to industries which use petroleum products in their manufacturing. Air transportation shall be facilitated by the construction of an airport to improve connectivity to other regional and global markets. Makueni County has a high production potential for the commercialization of thermal, solar and wind energy owing to the areas climatic conditions. Green energy harnessed in this form could be easily used in the manufacturing processes as a perfect substitute to the reliance on non renewable energy sources.

Economic analysis

Economic analysis studies the benefits the proposed project will have on the society at large and feasibility studies need to measure the benefits associated. An investment is justified if the present value of the revenues outweighs the present value of costs that will be incurred in its development. Thus the net present value of the project has to be positive. Economic feasibility reports that justify the investments into these sectors based on the concept have to provide benefits to enhance participation by various stakeholders. These include the government, private sector and communities. The focus on the viability warrants performing thorough feasibility studies to study key outputs based on each stakeholder.

From a micro perspective the choice of the business mix to be adopted requires the identification of businesses with symbiotic linkages. To attain the intended objectives, the eventual benefits to the EIP member should result in higher product prices for each member in the EIP, lower prices paid by each member for inputs, or the production of a larger output based on the normal level of input. Members benefit from lower transportation costs as goods are procured from a proximate source, higher residual values for example if different companies were to agree to use a specific solvent in their production processes. Pool their waste solvents, and thereby obtain a lower per-unit waste management cost or a lower bulk rate for treatment or disposal of their waste solvent. The expected outputs as highlighted above need to be measured comprehensively to ensure that expectations are met by EIP members.

During the analysis period the impact of the EIP on the community can be measured through analyzing the multiplier spending effects resulting from the spending stimulated by increased income and wages. Secondly, there will be increased employment as profitable companies expand their workforce and new companies enter the EIP. Thirdly, greater tax revenue derived from wages, profits, and expenditures enhancing better service provision by governments in communities. Lastly, a sustained reduction of the burden on community solid and liquid waste management as the industrial users rely more heavily on recycling and re-use and use EIP waste management services. Some economic indicators that the community could track to measure the impact of the EIP include; value addition by the production processes, the workforce that would be integrated in the EIP and total wages paid, tax revenues that would be paid out to the Kenya Revenue Authority, and public expenditures for sewerage and sanitation, as a percentage of value added or tax revenues.

The environmental performance of an EIP is also an important criterion for determining the usefulness of industrial ecology as an organizing principle for industrial activity. This is based on two approaches.

- Resource use
- Waste emissions.

Efficient resource use

This involves measuring the use of energy in the park with respect to the type of resource i.e. the use of solar, thermal or wind energy in the production processes. The decreased reliance on non-renewable sources and increased level of input from green sources by plants in the park justify the objectives of cleaner production which lowers energy costs as green energy is cheaper compared to non renewable sources. Further the incorporation of efficient design in construction and operating procedures and the use of water and materials saving and recycling technologies act as mechanisms in enhancing environmental performance.

Waste emissions

Environmental emissions include releases to water and air and of solid waste and hazardous waste. Holding the level of output of goods and services constant, minimizing each category of environmental discharges improves environmental performance. Discharges to water of particular concern to the community might include waste oil and other hydrocarbons, solvents, and other hazardous liquid substances. Discharges to air of particular concern to the community might include;

- Greenhouse gas emissions,
- Ozone-depleting substances releases,
- SOx and other acidifying substances,
- Particulate releases,
- Photochemical active substance releases, and
- Volatile organic compounds (VOCs).

Noxious odors might also be of concern, particularly if the EIP is located near a residential area. For solid waste, we include solid waste shipped for disposal in either a local landfill or other disposal site. The performance framework could include both the relative level of emissions and the steps that have been taken to reduce them.

Case study: Kalundong Denmark EIP

One of the best-known examples of industrial ecology can be found in Kalundborg, a small industrial zone 120km west of Copenhagen in Denmark. Over time, this unplanned industrial park has evolved from a single power station into a cluster of companies that rely on each other for material inputs. The project began in 1972 and by 1994, 16 contracts had been negotiated. The extent of the material and energy exchanges in 1995 was about 3 million tonnes a year. Estimated savings totaled US $10 million a year, giving an average pay-back time of six years.

The core participants are:

- *Asnaes, Denmark's largest coal-fired power station;*
- *An oil refinery owned by Statoil;*
- *A pharmaceuticals plant owned by Novo Nordisk;*
- *Gyproc, Scandinavia's largest plasterboard manufacturer;*
- *The municipality of Kalundborg, which distributes water, electricity and district heating to around 20,000 people.*

The symbiosis has grown over the years to include partners from other districts, as well as farmers.

How does it work?

The participants exchange materials and energy for mutual benefit, on the basis that by-products from one business can be used as low-cost inputs by the others. For example, treated wastewater from the Statoil Refinery is used as cooling water by the Asnaes power station. Meanwhile Statoil and Novo Nordisk purchase 'waste' process steam from the power station for their operations. Surplus heat from the power station is used for warming homes in the surrounding area, as well as in a local fish farm. The power station produces other valuable by-products including 170,000 tonnes a year of fly ash, which is used in cement manufacturing and road building. The wallboard company, Gyproc, uses the power plant's fly ash to obtain gypsum, a by-product of the chemical desulphurization of flue gases. Gyproc purchases about 80,000 metric tons of this material each year, meeting almost two-thirds of its requirement. Surplus gas from the Statoil refinery, which used to be flared off, is now delivered to the power station and to Gyproc as a low-cost energy source. Local farmers, meanwhile, make use of Novo Nordisk's by-products as fertilizers. Industrial enzymes and insulin are created through a process of fermentation, the residue from which is rich in nutrients. After lime and heat treatment, it makes an excellent fertilizer. Some 1.5 million cubic metres a year are delivered to local farmers, free of charge.

Benefits

Originally, the motivation behind the clustering of industries at Kalundborg was to reduce costs by seeking income-producing applications for unwanted by-products. Gradually, though, industry managers and local residents realized that they were generating environmental benefits as well. This project has enabled its participants to achieve substantial cost savings and to improve their resource efficiency. Gyproc has recorded a 90-95% saving in oil consumption after switching to gas supplied by the adjacent refinery. In addition to these reductions, the use of the excess heat from Asnaes for household heating has eliminated the need for about 3,500 oil-burning domestic heating systems.

Environmental Regulation

The National Environmental Management Authority is mandated to provide guidelines geared towards the protection of natural resources. In conjunction with the national government the institutional body is charged with issuing regulation to specific sectors of the economy to control the use of resources and promote sustainable economic development. As per the issued guidelines by the Authority, specific focus on manufacturing and environment is governed by the Waste Management Regulations. The existing regulatory framework provides an adequate environment for the development of Eco Industrial Parks having incorporated mechanisms to support their development.

In summary, within the general provisions of the regulation, the Authority strictly adopts the use of cleaner production principles in the handling of waste. This covers hazardous waste, industrial waste and bio medical wastes. It prescribes a more sustainable method of handling waste products which includes;

1. Improvement of production process through:
    - Conserving raw materials and energy
    - Eliminating the use of toxic raw materials within periods prescribed by the Authority
    - Reducing toxic emissions and wastes
2. Monitoring the product cycle from beginning to end by:
    - Identifying and eliminating potential negative impacts of the product
    - Enabling the recovery and re-use of the product where possible
    - Reclamation and recycling.
3. Incorporating environmental concerns in the design, process and disposal of a product.

These methodologies enhance the adoption of closed loop systems and special considerations relating to their operations across industry. Further the regulations sets aside mechanisms for treatment of waste emanating from factories that are both technologically and performance based standards which the latter allows the owners to devise best ways to deal with emission from factories as long as they meet the standards as set out. They allow for re use and recycling of waste by manufacturing firms which can be used as inputs in other industries. Compliance based on the set regulations for the proposed park is in harmony however modification of the legal framework needs to be carried out to encompass facility wide permitting which lowers costs in a particular industry, and adoption of energy use standards. The current legal environment further requires a multiplitude of licenses in order to handle and treat industrial waste creating inefficiencies across the board. The increased compliance cost associated is quite prohibitive necessitating the reduction in the number of licenses to handle waste especially within a closed loop system.

FINANCING THE DEVELOPMENT OF THE PARK

Our recommendation is that the development of the EIP be carried out in a phased approach and this will be as illustrated within the master plan.

Investment vehicles

Private equity

Our first proposal would be the setting up of private equity fund that can be domiciled in tax haven states to spearhead the development of the EIP. The rise in interest amongst various global investors scouting for good investment opportunities in the sub Saharan region especially in commercial real estate and infrastructure has provided developers with a wider source of capital. Around 69 per cent of capital raised for African real estate funds between 2009 and 2013 was focused on sub-Saharan Africa. The vehicle can be structured through Limited Liability Partnerships (LLPs) where the promoters of the project can seed the project with adequate capital then invite various investment firms to participate in the funding of the project through a specified offering. Various exit mechanisms can be achieved through spin offs through REITS in the local market.

Owner equity

Secondly, owner equity investment can be used towards the construction of the real estate and infrastructure. The equity invested can be supplemented by commercial real estate debt by several lending partners through a syndicated loan offering.

Venture capital

Due to the projects long term implementation the project can be funded by venture equity from various global venture capital funds. Globally, venture capital equity has grown immensely especially in early stage, high risk and high return projects with high growth and profitability potential. Over the recent past, VC capital in Kenyan start ups has accumulated more than Kshs 20 billion in capital. The Kenyan capital market regulatory framework has introduced regulations that guide the participation of venture capital firms in the local capital markets.

REIT Approach

The introduction of Real Estate Investment Trusts in the local economy by the Capital Markets Authority heralded a shift in financing of the real estate sector from direct to indirect investment. It provides an avenue whereby the project promoters of the EIP may be able to raise capital from the local and foreign markets towards funding the development of the park. The incentives including; tax incentives to the developers and investors alike further strengthen the expected returns from the venture. A development REIT can be established which can later be converted to an income REIT for purposes of income distribution. Several REITS can be formed based on the phased approach and capital requirements of each phase. The REIT concept can be able to finance the real estate aspect and other partnerships used to finance the infrastructure component.

Stage 1: Land acquisition

The acquisition of the land can be financed through either direct purchase by the projects promoters or through the incorporation of the interest of the communal land in the SPV through share ownership. The former concept provides autonomy to the promoters of the projects however it involves initial huge cost outlays pre feasibility stage. The latter concept allows a lot of flexibility by providing the promoters with lower initial capital outlays. This increases the returns to the developers. The value can be enhanced by capitalizing the ownership post feasibility and master plan stage thereby reducing risks associated as the cost will be shared.

Stage 2: Planning

This will involve raising capital through issue of common stock to venture capital institutions. Proceeds from this issue will be to fund feasibility studies: needs assessments, geotechnical and topographic studies environmental impact assessments and landscape master planning, and development of architectural conceptual drawings, and to commence Phase 1 Development Project.

Stage 3: Construction

To fund construction, the goal is to raise infrastructure and construction capital through sponsor equity, external private equity, the public equity markets, through the commercial debt market. Proceeds from the private or public offering will fund full construction of all the projects on the 4,900acres based on a phased approach.

PROJECTS IMPLEMENTATION SCHEDULE

STEP	TASK	TIMELINE
1	Expression of interest in land acquisition	
2	Formation of development SPV and other legal frameworks	
3	Formation of centre for conflict resolution and industrial collaboration	
4	Creation of an Eco-Industrial Park Managing Entity	
5	Identification and Selection of corporate entities suitable for industrial symbiosis	
6	Green energy use studies and audits of existing research	
7	Conduct viability and feasibility analysis around different industrial ecology pillars based on economic simulations to illustrate potential benefits for analysis.	
8	Formation of different holding companies as SPVs to hold different components of the development	
9	Project structuring and financing	
10	Land acquisition	
11	Appointment of consultancy team to undertake the design process	
12	Preparation of a masterplan for the entire development	
13	Project phasing	
14	Preparation of environmental impact assessment reports for each select industrial zone	
15	Stakeholder presentation; Government, community and proposed park members	
16	Business model formulation	
17	Detailed designs and costing	
18	Project approvals; County and NEMA approvals	
19	Project phase 1 construction.	