

Eco-Industry An Economic Growth Engine for Kenya's Future

WORKSHOP SUMMARY

November 20, 2007

Nairobi, Hilton

10:00am – 5:00pm

Presented by:



**Centre for Science and
Technology Innovations**

(A UNESCO Associated Centre)

Utalii House, Utalii Street

8th Floor, Room 812

P.O. Box 42792-00100, Nairobi, Kenya

Telephone: 254 20 315540

Fax: 254 20 247301

e-mail: sowandiga@iconnect.co.ke

website: www.csti.or.ke



(A US Corporation)

5 Bayard Rd # 701

Pittsburgh, PA 15213 (USA)

Telephone: 1 412 607 3300

Fax: 1 412 681 2195

e-mail: cwandiga@globalelectropy.com

website: www.globalelectropy.com

Workshop Participants (alphabetically by company):

Company or Organization	Representative
AWC Features (Kenya Press)	Duncan Mboyah, Journalist
Biosafety News (Kenya Press)	Leakey Sonkoyo, Journalist
City Council of Nairobi – Environment Dept (Kenya Govt.)	Isaac Muraya Kimani
Community Development & Consulting (US Firm – public communication strategies, community empowerment, collaborative planning)	Ann Burroughs, Principal Consultant
FOB Group (US firm – renewable energy & public health consultants)	Babatunde Fapohunda, Principal Consultant
Ministry of Planning and National Development (Kenya Govt.)	Gilbert Kirui,
Ministry of Trade and Industry (Kenya Govt.)	David Nalo, Permanent Secretary
Superior Homes (K) Limited (Kenya Real Estate Developer)	Clara Suka, Marketing Manager
TechNews (Kenya Press)	Ebby Wamatsi, Journalist
TechnoServe (US NGO – business solutions to rural poverty)	Peter Kegode, Senior Business Manager
Text Express (Kenya Graphic Design/Marketing)	Quinto Shikuku, Owner
University of Nairobi (Kenya Academia)	Evans Kituyi
US Department of Commerce (US Govt.)	Tobias Otieno, Commercial Specialist
Virtual Participants (4:00pm – 5:00pm conference call)	
Astonfield Management Limited (US firm – solar power stations)	Ameet Shah, Director
Community Development & Consulting (US Firm – public communication strategies, community empowerment,	Michele Griffiths, Principal Consultant

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collaborative planning)	
Dodson Engineering (US Firm – mechanical design firm specializing in implementing zero emission systems and green design)	Greg Calabria, President
Fossil Free Fuel (US Firm – converter kit for diesel engines to use biodiesel)	Colin Huwyler
Global Ectropy (US Firm – Eco-Industry intermediary, consulting, facilitation & training services)	Marisol Wandiga, Marketing Manager
Growth Resources International (US Firm – process engineering & leadership development)	Josephine Washington, President
IC Group (US Firm – SoilSement® eco-friendly dust suppressant)	Simon Goudiaby, President & COO
Milton Ogot, Architect (US Firm – architectural services)	Milton Ogot, Owner
Hosts:	
Centre for Science and Technology Innovations (Kenya Research Centre – climate change, microchemistry, and technology adaptation)	Prof. Shem O. Wandiga, Director
Centre for Science and Technology Innovations (Kenya Research Centre – climate change, microchemistry, and technology adaptation)	Peter Tinde, Clerk
Global Ectropy (US Firm – Eco-Industry intermediary, consulting, facilitation & training services)	Cecilia A Wandiga, President & CEO

Discussion Notes:

What is needed to start an Eco-Industry sector in Kenya? What opportunities exist?

- We need to remain open to exploring areas, even those we have never imagined. As an example, gasohol; since the mid 1970's Brazil has been saving money on oil imports by using the gasoline-ethanol blend. We had began to explore the use of ethanol for auto fuel, why did we stop? How do we keep initiatives going?
- The Eco-Industry is still a very new concept for us. There is no awareness of the possible applications or of their potential. We need to educate both investors and end-users.
- There needs to be a published framework for Eco-Industry policy and regulations
- Eco-Industry can help address two very important issues for Kenya (a) the high cost of energy, and (b) the dependence on limited water supplies for both energy and agriculture. Eco-Industry focuses on renewable sources. However, what are the incentives for business? How do you maximize return on investment?
- We have the availability of both solar technology and abundant sunlight so why is the use of solar for energy not picking up?
 - There is a high initial cost for individuals. To install a system for residential lighting and water heating costs 80,000Ksh. This is too high of a cost for most people, especially when there is no connection cost for grid electricity.
 - Kenya Commercial Bank had a financing program for individuals but I'm not sure what has happened with the program.
 - The prevalent thinking focuses on short term costs instead of long term benefits. People need to be made aware and understand the long term benefits.
 - The Ministry of Finance needs to implement tax incentives in the same way they offer tax deductions for those who purchase a home.

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- The incentive structure is inconsistent and still makes the component parts very expensive. As an example, the government has removed the tax on panels but left the tax on batteries. You cannot store the solar energy without a battery.
 - There is a need for sustainability. No one wants to be the early adopter. Thus far those who have tried solar first are those in the rural areas. Their experience has been problematic especially with regards to (a) connecting to the grid, (b) distribution, (c) maintenance of the solar panels – no one is available to service them, and (d) energy storage. Because of the lack of support systems for solar in the rural areas, the word that spread is that it is not a feasible option and now others are reluctant to try it.
 - Awareness of solar technology for energy is quite high in Kenya. What is needed is Capacity Building for the implementation and maintenance of solar technology. This need will be the same for other Eco-Industry technologies.
 - The same applies to biodiesel generators. There is a lot of awareness of the technology. However, supply of both biodiesel and the generators is limited. The technology has thus far been costly. Market demand amongst individual consumers is not high, those who are most likely to adopt are large scale farmers and long distance delivery companies but again they are constrained by supply issues.
 - We need to have a cost benefit analysis of our energy options. It needs to compare the fossil based electricity, hydro power (taking into account that our locations are limited and if there is a drought this affects energy supply), geothermal, solar, biodiesel, and windpower.
- Needs can be summarized as follows:
1. Training
 2. Technology
 3. Government Support
 - a. Regulatory framework
 - b. Awareness
 - c. incentives
 4. Industry
 - a. Supply at affordable rates
- When it comes to renewable energy, KenGen (Kenya Electricity Generating Company – government owned) www.kengen.co.ke is at present the only real player in Kenya. In order to truly create a renewable energy sector, additional companies are needed as well as foreign investment. The government should support exploration through the creation of an entity solely focused on promoting renewable energy. Examples of existing government initiatives are:
- a. Geothermal Development Corp (drills wells and examines potential for geothermal energy)
 - b. Coconut Development Authority
 - c. Tea Research Foundation
 - d. Coffee Board
- We need one that is all encompassing for renewable energy
- The energy situation in Kenya is not well thought out. We have no real data on forecasted energy demand, especially in light of available resources. There is one estimate that by 2030 the population of Nairobi will have reached 7 million people. What does this mean in terms of number of cars or energy consumption?
- We need a blueprint that will allow us to shape our energy portfolio in light of anticipated/future demand.

We have had a lot of discussion about renewable energy, what about pollution and efforts to counter pollution?

- Nairobi is currently undergoing a construction boom due to the annual housing shortage of 150,000 units. When developers apply for a construction permit from NEMA, there are standards governing the protection of animals but none governing the protection of the environment. If we really want to make a difference, NEMA should require developers to show how they will deal with or prevent pollution before construction approval is granted.
- The Nairobi River Basin Project is underway but there are no tangible remediation measures in place. There are, however, clean up efforts such as the massive garbage removal and cleaning of the river in the area behind Kijabe St. This area has been set up as a 2.5km demonstration area. As we learn from this demonstration the clean up efforts will be expanded. Notwithstanding pollution control is difficult. The government has not been very effective so we need to bring in new players, especially the private sector. Garbage collection in the City vastly improved once private companies were allowed to operate. We also need collaborative implementation strategies that are developed with community input as well as the support of NGOs and UN agencies.
- Recycling offers an excellent business potential. There are some UNEP initiatives being considered which would examine two approaches: (a) enhanced recycling at the final source, or, (b) separation of waste at the source of origin. For this to be successful we would also need water boards and private water distributors.
- The following gaps exist when dealing with waste and the resulting pollution:
 - A definition of ownership – who owns the waste, the government or the private collector? If it is the government, at what cost shall waste be sold to recycling firms for processing? If the cost is prohibitive this hinders any efforts to develop a true or large scale recycling program.
 - What are the government policies with respect to recycling?
 - What happens after collection and recycling? What types of products/outputs will be created? What happens to the waste that cannot be recycled?
 - The delay in allowing private players has been detrimental.
 - We need to reclassify waste as energy.
 - What incentives are in place for waste management?
 - Piecemeal approaches will not work; we need a comprehensive strategy and approach.
- We cannot be serious about comprehensive approaches unless we use Value Chain Management. This means we need to define the complete cycle from A to Z including:
 - Players involved
 - Types of consumers
 - Amount of product available (e.g. waste output by type by household). The Development Agenda 21 database can be a resource for data.
<http://www.un.org/esa/agenda21/natinfo/countr/kenya/eco.htm>
 - We need public awareness on the issues from point of origin to final destination.
 - An examination of what products can be made available for By-Product Synergy must be undertaken. As an example, we currently have a problem with the disposal of used motor oil. An estimated 22.5million litres a year of used motor oil are improperly dumped into the ground and water systems with 78% of this dumping originating from matatus.
 - We need to focus on both ends of the problem:
 - Before the Problem = Prevention
 - After the Problem = Remediation
 - What are the requirements at each step of the Value Chain?
 - There is a lack of long range planning and implementation
 - There is no framework or strategy. Government needs to create the framework and then let the private sector deliver.

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- There is a lack of incentives
- There is a lack of goodwill
- We need cohesive strategies which would involve the following:
 - Clear agendas and policies
 - Public Awareness campaigns that also generate public acceptance
 - What is the cost?
 - What's in it for me? (benefit)
 - Public Choice – teaching consumers to alter their behavior in favor of the environment
 - Long range planning, impact and assessment initiatives
 - Cross cutting issues – as an example, environment affects the following ministries: Planning, Energy, Environment (incl. NEMA), Water, Finance (for incentives), Trade and Industry (has to become the driver for Eco-Industry)
 - The issue of continuity of efforts is driven by political will. We have to hold politicians accountable for maintaining continuity on these issues even when there is a change of party or administration.

What needs to happen moving forward?

- An Eco-Industry Steering Committee needs to be created. The Committee must recognize that this will be a long-term (e.g. 10 to 20 years or more) ongoing process. It needs to have representation from all stakeholders:
 - Multiple ministries
 - Private sector
 - Investors
 - General public
- The Eco-Industry Steering Committee must formulate an action plan that assigns specific roles and responsibilities to each member (e.g. what is expected of local authorities?)
- There needs to be a continuous effort/push to publicize the benefits and potential of Eco-Industry

What Eco-Industry resources are currently available in Kenya?

- List of companies
 - Sugar manufacturers: they operate across the full scale
 - Ethanol for electricity
 - Steam
 - Hot water
 - Bagasse
 - Biodegradable plastics

Examples of sugar manufacturers producing bagasse are Mumias and GTZ. Both use locally built digestors.
 - Jatropha carcus oil for biodiesel
 - The Japanese are experimenting with the use of jatropha oil for large turbines. [The following information was verified post-workshop: They will be cultivating 30,000 hectares (74,000 acres) and expanding to 100,000 hectares (247,100 acres) within the next 10 years. The project is lead by Biwako Bio-Laboratory LTD and has the support of the Ministries of Agriculture, Energy, and Regional Development in addition to the Kenya Investment Authority, TechnoServe Kenya, KenGen and the Green Africa Foundation. The article is referenced in the briefing materials under Data on Kenya]
 - Waste Management – no examples

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- Water Distribution – no examples
- Solar power
 - Chloride Exide
 - Shell BP
 - KenGen
- Geothermal
 - KenGen is the only player [The following information was verified post-workshop: KenGen has partnered with Mitsubishi Corp. and Mitsubishi Heavy Industries Joint Venture for the engineering, procurement and construction of a new 35 MW machine at the Oklaria II geothermal power plant in Kenya. Construction is expected to take about 27 months to complete. Installation of a third machine at the power station, which was commissioned four years ago, will boost Kenya's geothermal production to 165 MW from the current 130 MW. The article is referenced in the briefing materials under Data on Kenya]
- Dairy farms are an excellent source of biogas (from manure) for cooking and heating.
 - This is a growing sector in Kenya
 - Kenya exports milk and is currently the largest milk producer in Africa with a milk output that is 2X that of South Africa
 - The challenge on the milk/dairy side is that there is no value added production (e.g. cheese)
 - 80% of the dairy farms in Kenya are small (i.e. 5 cows or less) which implies that they would have to cluster in order to effectively produce biogas.

What issues do we face when trying to create an Eco-Industry sector in Kenya?

- Value Added
 - Diversity of products
 - By-Product Synergy
- Agriculture
 - Easily available
 - Cash versus consumption – we must keep food affordable
 - How does this lead to industrialization?
 - Agricultural production is entirely dependent on environmental conditions – how do we sustain economic growth when environmental conditions are not favorable (e.g. during a drought)?
- Technology
 - Processing systems (right now we are not competitive)
 - Biotechnology
- Poor infrastructure both in terms of roads and energy distribution
 - This is a huge problem, especially high energy costs, because it impacts production and makes the cost of goods a lot higher than it needs to be. In some cases it is cheaper to drive raw material to South Africa and have it produced there instead of having it produced here.
- Water supply sources
- Land availability

What are the Core Values that will represent Eco-Industry in Kenya?

1. Value Added/Value Chain Management
2. Lower cost of energy = lower cost of processing/lower operational costs = Kenyan firms become more price competitive in regional and global markets (Enabling environment for the growth of eco-industry)

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3. Commitment to top quality infrastructure. Improved infrastructure = lower cost of processing/lower operational costs = Kenyan firms become more price competitive in regional and global markets. (Enabling environment for the growth of eco-industry)
4. Availability of affordable technology
5. Leverage agriculture but seek to create and expand industrial diversity. This way our economic growth is not dependent on weather/climate conditions, water supply, or availability of land
6. Collect data that shows the rate of return for Eco-Industry investments and make this data publicly available.
7. Increase microfinance options and non-asset based lending. This will assure there is capital available for the development of Eco-Industry, especially since most firms tend to be small to mid sized.
 - a. We need more venture capitalists and angel investors
 - b. We need to ensure a reasonable cost of capital (i.e. low interest rates)
 - c. The bond market needs to be more liberalized to allow for more approved investors (right now bond trading is done only by large corporations and it would help to have other types of investors)
 - i. *This is an area where there is opportunity for training. Kenya's bond market is primarily composed of short term mechanisms (e.g. T Bill and 2yr bonds). Investors are primarily large corporations or retirement pools. Municipal bonds stopped after the 1970s Investment tools such as TIFs (Tax Increment Financing) are not known.*
 - d. Investors need to better understand risk. Government needs to help offset some of the risk (e.g. US model of government guaranteed loans backed by the Small Business Administration)
8. Public Awareness driven by Government, NGO's and the media
 - a. NGOs have the most established channels and campaigns can be driven by the NGO Council and Civil Society – they should lay the groundwork
 - b. CBOs (Community Based Organizations) must also play a role by disseminating information to the citizenry
 - c. Government does not have established communication channels but it must drive the framework, policy and governance issues
9. Enabling regulatory framework driven by government
10. Clean, Safe, Healthy environments for all
11. Effective allocation of resources (e.g. current situation in Nairobi where there is 1 police person for every 2,000 people is not an effective allocation of resources because there should be more police if safety is to be guaranteed)
12. Government must focus on providing security and eliminating the following problems
 - a. Inadequate police force
 - b. Corruption

What standards exist that relate to Eco-Industry in Kenya?

- Construction – standards need to be put in place to ensure increased environmental safety
- Biodiesel – there are standards for feedstock but not for biofuel. Biofuel standards will need to determine how best to harmonize feedstock, grades and blends.
- Waste water (including sewage) – standards were ratified in April 2007 (WHO – World Health Organization – framework was used as the starting point)
- Solid waste management (including recycling) – development of standards is beginning and will take 1 to 2 years to complete
- Waste collection – standards exist through RAD, NEMA and local authorities
- Industrial waste – standards exist for
 - Liquid waste water (not all liquid waste)
 - Gasoline grades.

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- Radioactive waste (this would fall under the Ministry of Health's Radiation Protection Board).
- No standards exist for the following:
 - Toxic and hazardous materials. As an example, no standards exist to regulate the disposal of used car batteries which release a lot of carbon.
 - Safe disposal of industrial waste
- Fuel emissions – NEMA could play an active role by creating incentives to reduce emissions (e.g. the types of cars that are allowed)
- Landfill management – There is an experiment by the French government which encompasses 2 acres in Nakuru and 2 acres in Mombassa but there is no pilot project in Nairobi.
- Digital Waste – there are no standards to govern this although the problem is greatly exacerbated by the fact that Western countries use African countries as a dumping ground for obsolete technology. Examples: (a) computers that are sent are usually 2 years obsolete which greatly limits their lifecycle use; (b) after the West banned Freon in refrigerators we got a huge increase in Freon base refrigerators entering the country; even though we made it clear we did not want them they then started bringing them in as contraband. The first thing that needs to happen on the Digital Waste front is for the West to stop using us as their garbage disposal site.
- Trash collection – there are solid waste management guidelines that govern private trash collectors (e.g. no open burning of waste) and fines are imposed for violation. The trash collectors are responsible for disseminating this information to the public.
- Kenya Bureau of Standards does a good job of enforcing the standards that do exist.

What is the biggest challenge we face in creating an Eco-Industry sector in Kenya?

- How do we clearly articulate Eco-Industry to all stakeholders?
 - The media has to be the first in understanding the value. In order for the media to push a message, we have to answer:
 - What is in it for me for all stakeholders
 - Recognize that controversy sells papers and airtime and the easiest way to generate debate is by articulating the opportunity cost of not pursuing Eco-Industry (e.g. Brazil's current national debt is \$100 billion lower than it would have been had they not pursued the use of ethanol as a substitute for fossil fuel – Kenya needs to leverage the same savings).
 - Before journalists can be educated, editors must be educated because if editors don't see the value of the story they won't allow journalists to publish the stories.
- Demand versus Supply – what do you drive first? or How do you drive both simultaneously?
 - As an example of the difficulty, we have been importing Jatropha seeds and they are to be used for planting so we can have a substantial supply of Jatropha. However, the oil used for biodiesel is obtained by processing the seed so instead of planting, many are converting the seeds to biodiesel without planting. If we don't get a substantial supply of Jatropha plants, we will not be able to effectively produce biodiesel from this plant.
 - Demonstration projects that not only showcase how things should be done but also demonstrate the benefit and rewards of doing things properly would be a good first step.

What should our next steps be? (Note: The responses to each request were provided by the Global Ectropy facilitator)

- Demonstration Project that showcases technology – Global Ectropy and Superior Homes are having preliminary discussions on the possibility of turning Superior Homes' GreenPark development into an eco-village. Clara Suka gave an excellent impromptu presentation on GreenPark and the present status of

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the project. The development plans currently call for 1,550 residential units (estimated 800,000 residents) plus retail, commercial and light industrial. Participants got very excited about what they saw and there were immediate questions on how units could be purchased. Currently a 4BR unit is selling for 4.25million Ksh and the project is in the pre-sales phase. The quality of the homes is above the asking price (appraisals have come in at 7million Ksh). Water supply originates from the KMZ dam and 6 boreholes on the site. Covenants (known in the US as deed restrictions) will be put in place to preserve the quality of the environment. In the event an owner does not comply, the cooperative will buy the owner out. Units can be rented as long as the owner ensures the tenant complies with all regulations. The transfer will be a 99 year lease-to-own agreement and Superior Homes will manage the community. Existing environmentally friendly features include dual flush toilets with a 6 litre (large waste) / 3 litre (normal waste) combination. Thus far there has been a negative public reaction to the proposed use of grey water processed sewage as a water source for toilets due to the misperception that toilet water needs to be potable. Global Ectropy would work with Superior Homes to find ways to overcome such issues as well as to determine cost effective ways of implementing green building and renewable energy technologies. When asked how the convened group could help support the project, the following suggestions were made: (a) involve the Mavoko Municipal Council; (b) offer tours to key stakeholders such as the Ministry of Housing, the anticipated Eco-Industry Steering Committee and biofuel suppliers; (c) make sure there is a lot more publicity on the project. Clara Suka explained that tours have been delayed until the showhouse is complete but Superior Homes is and will be marketing to large corporations, homes expos, Homes Kenya Magazine, and there will be a pullout in the Nation. Participants suggested also providing tours for groups such as KAM (Kenya Association of Manufacturers) and KEPSA (Kenya Private Sector Alliance).

- Training on the various technology options available as well as their applications and uses – we have been invited by the US Department of Commerce to host another workshop in mid February. [Participants reacted very eagerly to this information and stressed that the mid February workshop must encompass a much broader audience, e.g. more ministries and more private sector representation.]
- Education on Eco-Industry – in addition to media briefings, we would like to propose a National Eco-Industry Conference to take place in late 2008/early 2009 [Participants readily endorsed this suggestion and made the following suggestions: (a) it should not be held in Nairobi but rather in a secluded location and preferably in a town that already has an eco-industry project it can showcase; (b) it needs to be designed as a 3 day high level conference and trade show; (c) there will need to be a series of small, localized conferences following the National conference and these will need to be spread throughout the country.]
- Creation of an Eco-Industry Steering Committee – this could emerge from the participants who attend the mid February workshop [Participants readily agreed and stressed that the mid February conference must include: (a) both national and municipal government representatives; private sector; NGOs; CBOs/citizens and end users; investors and venture capitalists; academics; media (for reporting during the workshop but not as members of the Steering Committee)]
- Research – the Centre for Science and Technology Innovations has worked with farmers in drought prone areas in order to teach them methods for increasing crop yields. This type of research and training could easily be applied to Eco-Industry sectors. [Participants readily agreed and stressed that CSTI's ties to the universities for research assistance must be continued.]
- Technology Transfer – as an intermediary, Global Ectropy can recruit US firms who wish to joint venture and collaborate with Kenyan firms. [This suggestion was met with great participant enthusiasm. The enthusiasm was heightened after the 1 hour conference call during which Global Ectropy's existing clients introduced themselves and offered assistance as well as answered participant questions.]

Was this Eco-Industry workshop a worthwhile use of your time today?

- Yes, it was very useful.
- We need many more workshops of this type.
- Yes, but we need more stakeholders at the table.
- Yes, the early invitation was good for scheduling but next time you should send out reminders to everyone who was invited 2 days before the workshop.
- Yes, but next time you should host a ½ day media briefing with an opportunity for Q&A with experts prior to the workshop.

Participants were asked to elaborate on stakeholders and workshop format.

- Participants at the next workshop should include:
 - Academia
 - NGOs focused on the environment
 - Government Ministries
 - Municipal Authorities and Councils
 - Private sector (esp. KAM and KEPSA)
 - CBOs and individuals who are pioneers (e.g. those already using solar in their homes)
 - Rural Electrification Program
 - Multilaterals (e.g. UNDP, AfDB, IDRC, DFID, World Bank)
 - Media (including university press/student papers)
- Next workshop should include
 - Reports documenting any existing policy frameworks that can be adapted
 - Demonstrations on the technologies highlighted/mentioned
 - 1 day is ideal but it should be in a secluded location away from Nairobi with participants checking in the day before. If there is are a lot of participants it should be a 2 day workshop

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