ECO2LIBRIUM
Sustainable Solutions
www.eco2librium.net

Certified B Corporation

10 YEAR REPORT

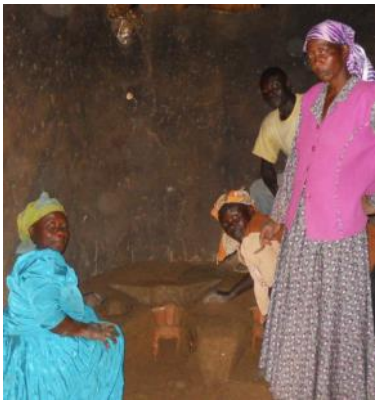
USING BUSINESS AS A TOOL FOR GOOD **2010—2020**

About Eco2librium

Eco2 was founded to use business as a tool for good. Its fundamental goal is to build sustainable and inclusive business models that address a specific problem – e.g. forest conservation - and create good jobs and support the development of local entrepreneurs while ensuring the equitable distribution of benefits accrued in the process. Started in 2010 by two biologists and a businessman out of a backpack in Western Kenya, Eco2 now houses twenty-five professional staff that oversee and manage two product divisions, an applied research/restoration arm, and two emerging business ventures. Eco2 provides over 500 quality jobs for underserved people, primarily women, and since 2020, products that improved the health and livelihoods of 250,000 people, conserved 5,000 acres of tropical forest and reduced 1.16 million tons of greenhouse gas emissions. These impacts and business model earned Eco2 as one of the top B Corporations in the world, honored among 300 global companies as Best for the World and invited to speak at the 2019 World Forum for a Responsible Economy.

Women collecting forest wood for cooking and selling

In This Report



The Upesi cook stove, produced and installed locally by women, replaces the 3-stone.

Efficient Cook Stove Division

Eco2's cook stove division, launched in partnership with Swiss myclimate Foundation, uses carbon financing to subsidize the production, transportation and installation of efficient stoves in rural Kenya. Our learning experience working within our partner communities showed that the vast majority of people would choose not to exploit forest resources if they had alternative means of accessing the resources they harvest from the forest or the income they get from these resources. These cook stoves, locally made by artisan women groups, consume only half of the wood normally used cooking with the traditional 3-stone. Jobs and entrepreneurs are created, women and children are exposed less to harmful cooking smoke and save time collecting fuelwood, forests are conserved, and greenhouse gases reduced. The cook stove division, called Stoves For Life, is a Gold Standard registered carbon project.

10 YEAR IMPACTS

Associated with 120,000 efficient cook stoves in 65,000 households

ENVIRONMENTAL	ECONOMICAL	SOCIAL
1,160,000 tons reduced greenhouse gases =	**500 jobs** mostly for unemployed women	**200,000 women & children's** health improved
251,000 U.S. cars off the road for 1 year	In a region with over 50% unemployment	Related to using clean cook stoves
664,000 tons forest wood not consumed =	**$1,630,000 USD** into the local Kenyan economy	**540,000 hours** saved collecting wood
2,375 hectares of forest conserved	In a region with 60% making less $2/day	Equivalent to 2 weeks annually per family

Stoves and Health

The World Health Organization reports that 3.8 million deaths are the result of cooking solid fuels indoors and ranks this as the 4th biggest global health burden.

Over ninety percent (90%) of stove users say that indoor air is much better than before, and medical attention related to cooking drops from 71% to 11% of people, thus lessening the health burden for almost 200,000 women and children cooking indoors.

Smoke and the 3-stone fire

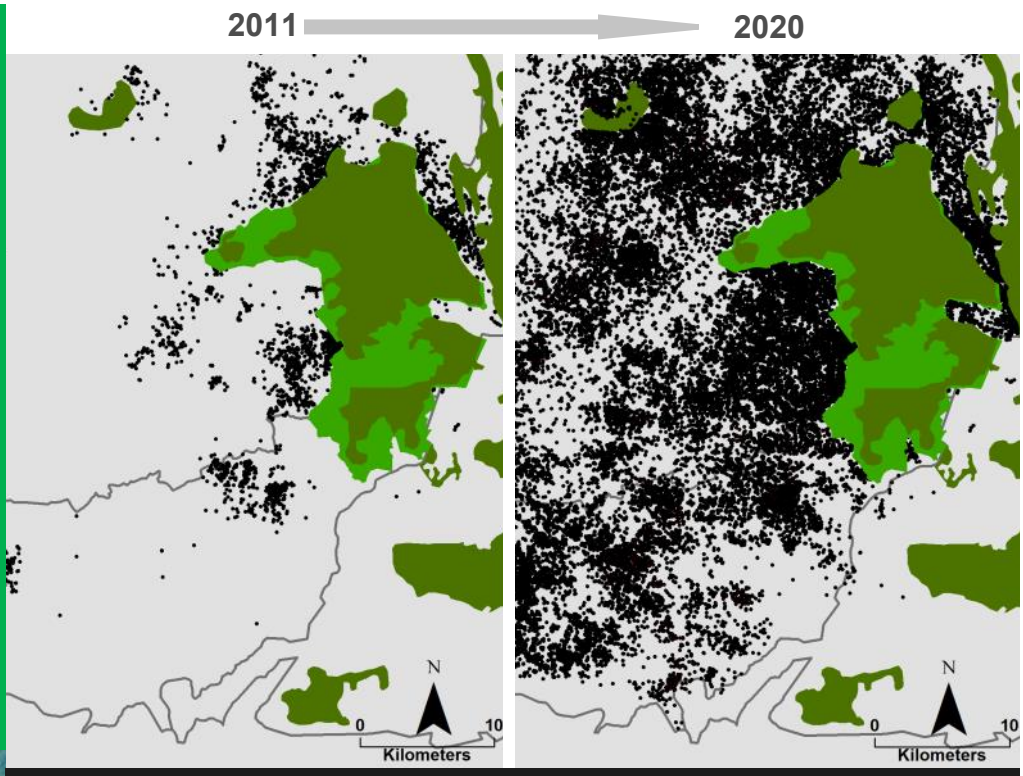
"As an old woman, I am happy that my daughters and their daughters will not have to endure the smokey, hot 3-stone fires that I have lived with all my life."

Mama Fridah

Cooking with the 3-stone fire

Focus on Forests

Most people use the region's forests for fuelwood (green areas in figure right). With 200,000 households living within 5 km of a forest and each using 4,000 kg wood/year, this is unsustainable. Eco2 focuses on providing wood saving cook stoves to families near forests (black dots in figure).

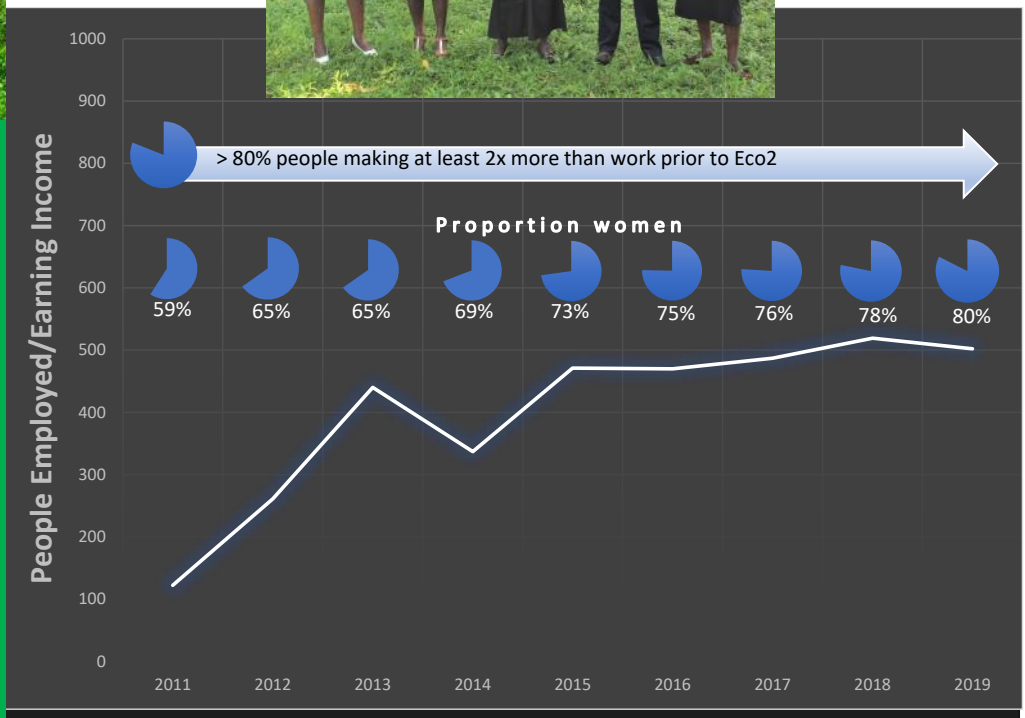


GIS spatial map of stove installations in households in context of regional forests over 10 years

Eco2 Senior Women Staff

Focus on Jobs for Women

Poverty and unemployment is over 50% in this region. Eco2's business model maximizes quality jobs for women and those who previously had little to no source of income (see graph right).

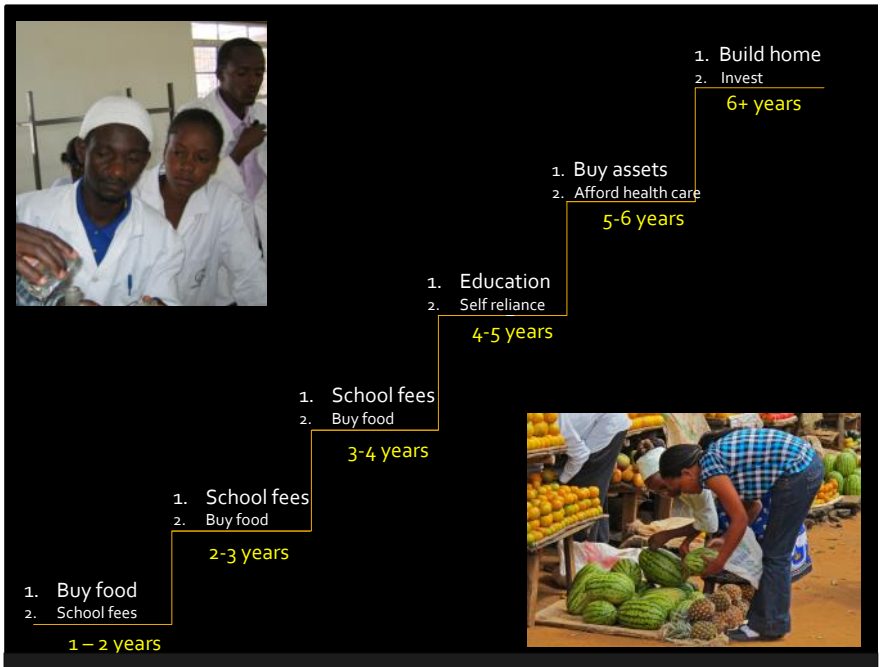


Employment numbers with proportions of women and income amounts over 10 years

Mary Arata, Chairlady of Ebwaliro Stove Production Group, drying stove liners.

Cook Stove Impacts: A Closer Look

Many people have produced and/or installed Eco2's cook stoves for almost a decade. Working as independent entrepreneurs, this gives these rural Kenyans flexibility to first run their farms. They can also earn as little or as much as they want. Some people have gone from making as little as $16 (before Eco2) to over $300 per month in an area where more than 50% make less than $2 per day. This predictable and long-term source of substantial income has had considerable bearing on previously subsistence lives. Women in this circumstance, after taking care of food needs when crops run out and paying for daughters to go to school, are finding self-reliance, buying assets like livestock and land, building permanent homes, and affording health care for themselves and their families (see below).



The first and second most common use of income when working for the specified number of years.

Ripple Effects

Every year, hundreds of thousands of families are benefiting from making, selling, installing or using Eco2's Upesi cook stoves. Saving time and money collecting less wood allows daughters to go to school, mothers to invest in small businesses, husbands to improve farm yields, and forests to endure.

When girls go to school, women enter workforces, families and economies improve. When farm yields increase, resilience is improved. When forests endure, biodiversity is preserved.

Solar Division

The same philosophy that guides Eco2 is behind our solar division. We build sustainable and inclusive business models that not only address the specific problem – e.g. provision of affordable electricity in this case – but also creates jobs for women and other community members and supports the development of local entrepreneurs while ensuring the equitable distribution of benefits accrued in the process. We started Solibrium in 2017 and it has since grown to be an independent registered B-Corp.

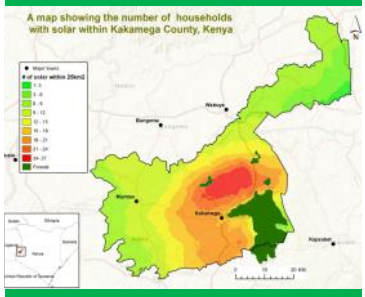
Children studying at night with solar electric lights.

Solibrium has operations throughout Kenya with a recognized impact in job creation, women empowerment and employment, and environmental stewardship through its focus on sustainable solar e-waste management and solar home system life extension activities (https://www.solibrium-solar.com/our-projects). Solibrium distributes stand-alone solar electric kits with Pay as You Go (PAYG) technology in Kenya. By using PAYG technology, electricity becomes available to even the poorest of families. In this way, we tackle energy poverty, a significant factor holding back socio-economic development of our partners and the communities where we work.

Focus on Solar Waste

Kenya is the largest African market for off-grid solar products. In 2016,1.23 million units were sold. There is currently no system or infrastructure to deal with the impending waste at the end of solar product lives.

Eco2 is working with national and international organizations to understand and present business solutions for this waste. In circular economy language, waste has value and opportunity.



Eco2, in cooperation with universities, is mapping this solar waste potential and opportunity (see above).

Eco2 tech prepping bagasse for kilns

Eco2 staff engaged in forest restoration

Eco2librium's Horizon

Eco2's newest business ventures tackle tropical forest conservation at its core. In Kenya and much of Africa, demand for woodfuel in the form of urban charcoal use is one of the biggest threats to forests and rangelands. In tandem with this degradation is the growing realization that current forests are not large enough to provide habitat for species and fundamental ecosystem services.

Renewable Biomass Fuels

ECO2's newest division just finished pilot research, production and sales of a fuel created from biomass wastes, predominately sugar cane fiber (bagasse). This product surpasses other biomass fuels like charcoal in lighting ability and burn time, is manufactured from a sustainable and renewable source, and reduces forest loss and GHG emissions. This business tackles the environmental problems associated with unsustainable charcoal production and use in Kenya, one of the leading causes of deforestation.

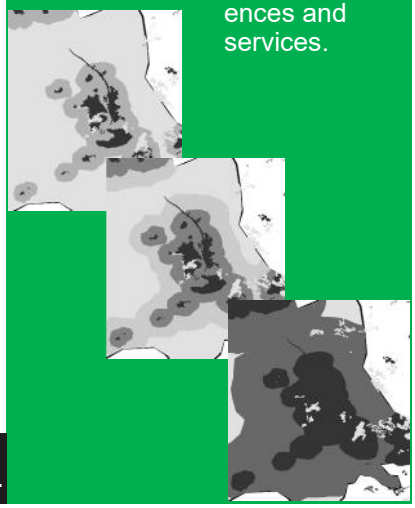
Agroforestry

Forests will endure and expand if they have more value in their conservation and existence than in their exploitation. This value now is in their immediate and persistent ability to stop and reverse climate change. Focusing on services and products that restore/expand forests can simultaneously conserve threatened biodiversity, improve the lives of poor people, and directly and effectively combat climate change. Eco2's plan is to use agroforestry to restore 4 million acres of tropical forest (see images right) which will take 10 million tons CO2 out of the atmosphere, improve farm yields, and put $250 million into a poor subsistence rural economy. Currently we are piloting with 30 farmers, chosen for their leadership in the communities.

Trees on Farms Provide Wood Value, Farm Value, and Conservation Value

Mature trees on Kenyan farm

Eco2's business and research culminates in its grand endeavor to apply a business model to restore forests using agroforestry. We are using the value of trees to farmers for wood fuel, timber, and increasing crop yields to incentivize long-term native tree planting and growing. This will increase tree stocks and diversity on private land around forests to extend forest influences and services.



Spatial maps showing predicted increased tree density and diversity (dark areas) around forests.

Applied Research & Conservation/Restoration

Since its inception, Eco2 has been engaged in applied research that informs its fundamental goal of conserving forests while improving lives. This research involves all levels at Eco2, including the CEO (Mark Lung) and COO (Anton Espira), a entire branch devoted to data and monitoring, and education of our team. Eco2 has research partnerships with several Kenyan, Ugandan, and American universities as well as European and African organizations (e.g. Kenya Forest Service, Kenya Wildlife Service, and the National Museum of Kenya). This research improves our business ventures, quantifies our impacts, and informs efforts to protect and restore tropical forests. We also feel it is important to share this work and thus several research projects have been published in peer-reviewed science journals (see below).

Eco2 Recent Research Publications

Lung, M. and Espira A. 2015.The influence of stand variables and human use on biomass and carbon stocks of a transitional African forest: Implications for forest carbon projects. Forest Ecology and Management 351: 36-46.

Kefa, C., Lung, M., Espira, A. and Gregory, A. 2017. Quantifying the rate of subsistence wood harvesting from a tropical rainforest in Kenya. Onyx 17:1-5.

Kefa, C., Gregory, A., Espira, A. and Lung, M. 2018. Does Wood Fuel Gathering for Household Use Follow an Optimality Model? A Study from Kakamega Forest, Western Kenya. Human Ecology 46:473-484.

Lung, M. and Espira A. 2019. A large-scale, village-level test of wood consumption patterns in a modified traditional cook stove in Kenya. Energy for Sustainable Development 49:11-20.

Eco2 Conservation/Restoration Activities

KWS De-snaring Initiative (photo right)

One Child-One Tree Initiative

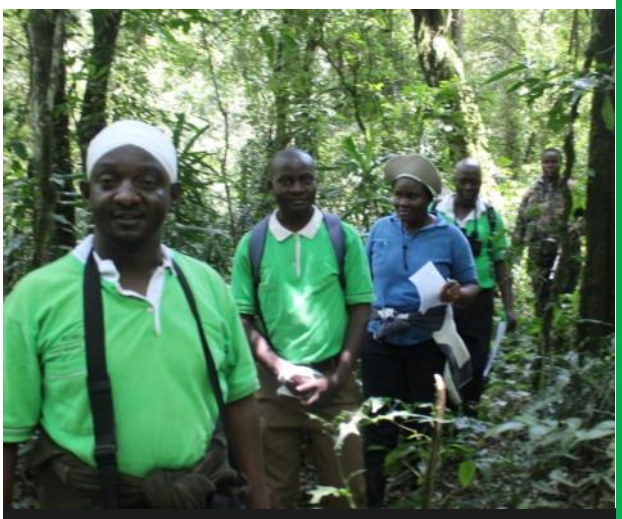
Endangered Debrazza Monkey Monitoring

Clay sites Rehabilitation

Forest Again Restoration

NACOSTI

Kasili Conservation



Eco2 biologists working with Kenya Wildlife Service

Research Informs and Guides our Work

Eco2's Assistant Director, Chris Amutabi Kefa, completed a Master's Degree in Spatial Ecology at Bowling Green State University (above). His thesis informed Eco2's work on conserving forests through reducing wood demand.

Eco2's Monitoring and Research Coordinator, Hardley Malema, collects and analyzes all data related related to Eco2 operations. He also uses his expertise to assist monitoring of reforestation activities and endangered species with the Kenya Wildlife Service (above).

Corporate Social Responsibility

In addition to the social, environmental and economic impacts related directly to Eco2's business model, the Eco2 team is intimately engaged with the community. The activities associated with our CSR originate with and are guided by the staff. Below are some current examples of these activities:

International Day of Forests

One Child, One Tree Program

World Water Day

Anti-jiggers Campaign

Contact Us

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John Luseno—General Manager Chris Amutabi Kefa—Assistant Director

From the General Manager
John Luseno

With an environmental conservation passion, the genesis of my work was steered up after joining a volunteer-based environmental organization (Kakamega Environmental Education Program) after my secondary education in 1995. Even though I was charged, as the Executive Secretary, with the control of all correspondents and to oversee the activities of the organization, as well as running a Saturday children program and extension work in energy efficient technologies, it was a very big challenge to cater for my basic needs. I managed to make a small tree nursery and sold the trees to earn some few coins. In 2008, I lost my position as an executive secretary in an election, but my love for environmental conservation still engaged me on many aspects on energy saving technologies and as a forest guide. Through this I would struggle to make both ends of life meet. It was during this time that I worked with Mark Lung and Anton Espira to design the cook stove business and all implementation was conducted through a "mobile office" – my backpack. I was charged to handle most of the operations including selection and training and quality assurance. I am now the senior manager to a large staff that manage the Eco2's cook stove division – Stoves for Life.

Starting with only the three of us and a few women making and installing stoves, we have grown to over 40 staff members, 10 producer groups and over 80 installer groups, representing a milestone on the environmental conservation work of the company. The division is now well known with a positive impact on Kakamega forest having reduced consumption of firewood as over 60,000 households have been supplied with a cook stove, and more than 700 jobs have been established reducing pressure on the environment. "Problems of environmental degradation and climate change are not threating to the earth at large, they are challenges to human survival. In respect to this, its our responsibility to play our positive role on protecting the environment."

From the Assistant Director
Chris Amutabi Kefa

My passion and interest in environmental conservation started way back during my childhood. As a small boy at the age of 5 years, I collected wildings from the nearby bushes and planted them near my parents' house. These would later be used to construct my parents' new home after our old grass-thatched house collapsed. I was one of the earliest members/volunteers of the Kakamega Environmental Education Program (KEEP) where as an Education Coordinator, I worked primarily on education programs and spreading of conservation knowledge to schools and the local communities. I joined Eco2 in 2011 after completing a degree in Wildlife Management. After a few years, Eco2 supported a Master's Degree in Applied Geospatial Science in the U.S. My graduate studies, travels and professional work not only gave me skills and knowledge in conservation and biology, but also led to great personal and professional growth. In tandem with my previous conservation experiences, my work at Eco2 as Monitoring Coordinator, Senior Manager, and currently Assistant Director, have had an invaluable contribution to my evolving understanding of conservation, climate change mitigation and adaptation, and ecosystem-scale conservation.

There is no question that poverty is one of the primary drivers of ecosystem degradation and species loss. Eco2 has demonstrated that businesses and other social enterprises can use the power of business to solve social and environmental problems by conserving and/or restoring natural forests, creating jobs for the under-served, improving the lives of people and building a skilled workforce. It is great pleasure and joy to have been part of the great transformation that Eco2 has had over the past decade, a transformation that has created full time jobs to more than 50 people, improved livelihoods of thousands of local community members, provided clean and efficient cooking to over 60,000 households and restored of hundreds of acres of forest land.