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**Mission Statement**

The Gaia Association's mission is to revolutionize the household energy market by introducing ethanol as a sustainable and economical cooking fuel.
**ACRONYMS**

ARRA - Administration of Refugee and Returnee Affairs  
CC - Clean Cook  
CO - Carbon Monoxide  
ERM – Environmental Resources Management  
FEPA - Federal Environmental Protection Authority  
FINCHAA - Ethiopian Sugar Factory  
IAP - Indoor Air Pollution  
PM - Particulate Matter  
UNHCR - United Nations High Commission for Refugees  
USEPA - United States Environmental Protection Agency
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I. INTRODUCTION

1.1 Overview

The following report summarizes the 2008 fiscal year activity by the Gaia Association on its various projects including commercialization in Addis Ababa and stove distribution in refugee camps. Gaia Association continues to proceed toward our ultimate goal of providing clean and safe energy for all Ethiopian households. This report documents our recent progress and accomplishments, including research conducted and awards won in 2008.

1.2 Ethanol Pricing Issue

Gaia’s projects are facing a serious challenge with ethanol supply. The year-long process of setting a fixed wholesale price continues to slag, leaving Gaia with no option but to purchase ethanol for the refugee camps at exorbitant rates. Meanwhile the commercialization project remains stagnant.

From September until the end of 2008, current projects faced stagnation and the inception of planned projects has been put on hold. In early December, Finchaa announced that they had set a temporary wholesale price at 5.40 ETB (US$0.54)/L, which after VAT totals 6.20ETB (US $0.62)/L. Their Board of Directors is to vote on two different prices in the final weeks of 2008 for the final price to be fixed. This temporary price is simply unacceptable; there is little chance a new fuel market could be sustainable at this price. We cannot compete with kerosene and other, unsustainable fuels at this rate, especially when the cost of fuel transportation is added to an already inflated rate.

We had budget obligations to meet by the end of 2008 and have, out of desperation and duty to our funders and partners, purchased 100 000L of ethanol at this temporary price. Finchaa has assured us that they will refund any price adjustment in the event of a lower price being determined by the board, we have lost confidence that the board will have any incentive to vote for a lower price.

II. PROJECTS

2.1 Commercialization of the CC Stove

Gaia Association and Makobu Enterprises PLC received a grant of $200,000 by USEPA to initiate commercialization of the Dometic “CleanCook” (CC) stove in Addis Ababa, Ethiopia. Gaia Association and Makobu Enterprises PLC have signed a commercialization agreement to commence the project. According to the agreement, commercialization will begin as soon as a fixed wholesale price for ethanol is confirmed by Finchaa sugar factory. Gaia Association has also hired additional international staff to manage promotional activities in order to establish a market. Further, a representative from Ashden(?) will be coming to Addis Ababa to consult on marketing.
2.1.1 Promotional Project at the Condominium Sites

A key component of the commercialization project is the promotional phase of the project in which fifty CC Stoves were provided to fifty families in a sub-city selected by the Gaia Association and Addis Ababa Housing Agency. The households range from lower income to middle income, and were largely selected for their community involvement, in order to ensure word and demonstrations of the stove would spread.

The promotional demonstration project began in July to assess the impact of the stoves on the participants’ health and general livelihood. The project addresses the negative health problems associated with burning biomass, such as using fuelwood indoors for cooking purposes. The project showcases the CC Stove in condominiums of Addis Ababa and the demonstration project has provided an opportunity for the public to witness how the CC Stove is an appropriate cooking technology for these dwellings.

This promotional project has three phases. The first phase was characterized by free supply of ethanol to the fifty households. During the second phase, the households paid the factory gate price. The second phase has been extended due to problems with fixing a wholesale price for the ethanol. The third phase – which would entail the households paying the set market price for ethanol – was meant to be completed in 2008; however it has been postponed until confirmation on the fixed price is received. In all likelihood, the third phase will commence in early 2009.

Monitoring and evaluation has been ongoing during the project. Data collected to date has indicated a high approval rating for the stove, improvement in air quality and general enjoyment of the stove. This data, coupled with the final evaluation surveys to be completed at the end of the third phase, will be used to justify a future scale up of stoves in the entire condominium complex.

During the early stages of the project, the focus was on the efficiency and safety of the fuel and the stoves, comparative cooking cost of ethanol and competing fuels. As with all Gaia Association projects, additional goals included improving household health, safety and livelihoods of families, in particular, women and children.

2.1.2 Local Manufacturing

Makobu has come very far with its preparations for local manufacturing of the CC stove. However, while many aspects of the production are in place to begin, Makobu is waiting for the ethanol price fixation issue to be resolved before the full scale inauguration of local manufacturing.

i. Tax Exemption for Importation

While the intent is to move to the local production of the stove, the fuel canisters will continue to be imported from Slovakia. Gaia has requested a period of tax exemption for both the stoves that will continue to be imported prior to the launch of the local factory and for the continued importation of the canisters, in order to ensure a fair price for the consumer and a rapid scale up of the project.
ii. **Raw Materials Sourcing**

Makobu has informed Gaia that they have been working to ensure the most affordable raw materials are available for the local production of the stove.

iii. **Factory Construction**

The construction of the factory made great progress in 2008. The windows and doors have been installed and the machinery is being worked out to be the most effective for the task. Makobu and Dometic AB made an agreement for an official from Dometic's Slovakia factory to come to the Addis factory for an inspection, to ensure top quality in the local production of the CC stove. The final stages of the construction will be completed upon the inspector’s recommendations and the confirmation of a fixed wholesale price for ethanol, anticipated for early 2009.

2.1.3 Ethanol Storage and Distribution

Every batch of ethanol transported to Addis Ababa is denatured with light blue dye to color the ethanol and the chemical agent “bitrex” to bitter the ethanol taste and make it unpalatable. Every shipment of ethanol has been and will continue to be carefully tested for purity by Gaia team-members to protect the stove canisters from damage.

Makobu plans to mount two 50,000 liter storage tankers at their facility in Alemgena. Gaia will build the backup storage infrastructure for a “Clean Energy – Safe Energy” ethanol fuel cooking program in Addis Ababa and ethanol purchasing for Kebrabeyah and Awbere refugee camps for 2009. The depot, with a proposed storage capacity of 100,000 liters, will use two tanks and will provide for efficient and safe receiving, storing, fuel denaturing, blending, filtering and dispensing. Makobu is awaiting price fixation before initiating construction of the depot.

2.2 Good Shepherd Sisters

The Good Shepherd Sisters continue to be a very strong partner of the Gaia Association. The Association has solidified plans to implement seven hundred stoves to the beneficiaries of Kebele 05. The stoves have been imported and, upon ethanol price fixation, they will be disseminated by the GSS (likely early 2009). The Gaia Association will work with Makobu Enterprises PLC to facilitate the distribution of ethanol and CC Stoves to the recipients. The unit has been ordered, however has not yet arrived in Addis, due largely to the ethanol supply interruption.

Beneficiaries rely heavily on kerosene and charcoal for their cooking needs. The implementation of this project in their household will have a positive impact on their health and safety. This project will demonstrate how the CC Stove can provide clean and safe energy to the people of Addis Ababa. The homes that will gain from the stove will be the first large-scale distribution of the CC Stove in an urban environment. The ethanol distribution center’s central location will ensure equal access to the site by all the beneficiaries.
2.3 Awareness Raising

Raising awareness about the benefits of the CC stove and ethanol is an important factor, not only in the development of the commercialization of the stove, but to all of Gaia's projects.

Gaia's acceptance of the prestigious Ashden Award (see below) not only served to raise awareness of Gaia's projects on the international scale, but the local celebration at the Sheratan Hotel Addis (July 31) received a large turnout and brought vast local media attention. Through the Ashden attention, Environmental Resources Management (ERM) nominated Gaia for its 'Christmas Card Appeal', whereby e-cards are sent out at the holidays to replace traditional card in the mail. The money saved in materials and postage will be donated for use by Gaia. Each person or organization receiving holiday greetings from ERM will read about Gaia!

As part of the World Environment Day and World Refugee Day celebrations, Gaia staff distributed T-shirts, gave demonstrations of the CC stove, and showed a short film that had been made about Gaia's projects in the refugee camps.

Finally, Gaia was invited to a number of conferences throughout the globe to speak about the CleanCook stove and Gaia's projects (see other activities below).

2.8 Staff Evaluation
The Gaia management conducted individual staff evaluations based on their job descriptions and an internal report was prepared of its findings.

III. REFUGEE CAMP ACTIVITIES

3.1 Staffing

Gaia's staff in Addis Ababa continued to be active in the implementation of the various aspects of the refugee program, visiting the sites for training, distribution, monitoring and evaluation, and participatory assessments. In early 2008, Gaia secured a plot for the construction of a local office in the region, for quality control, security, and logistics. Local staff was hired in the capacity of: regional project coordinator, supervisor, bottler, and security guard.

Some members of Gaia's international staff also paid a visit to the camps as part of monitoring and evaluation efforts, baseline survey completion at Awbere, and in awareness training.

3.2 Household Selection

In Kebribeyah camp, the purpose was to reach 100% of the households, and the UNHCR-Gaia team succeeded in this endeavor. For each incremental scale-up, priority was given to female-headed and other vulnerable households.
In the initial assessment of Awbere Camp, Gaia staff performed an identification of vulnerable groups, in order to inform their methods of implementation. While the goal is to reach 100% at Awbere camp as well, vulnerable groups were and will continue to be prioritized during each scale-up stage.

3.3 Training

Training, and in some cases, retraining, were important activities throughout 2008. Prior to any distribution of stove or fuel, beneficiaries undergo thorough training for proper (and optimal) use and safety. Gaia staff emphasize the importance of not mixing fuels or using any fuel other than ethanol in the CC stove. The design of the stove itself acts as a sort of safety precaution, however, proper use and storage of the stove and the ethanol not only will prolong the life and efficiency of the technology, but will ensure the avoidance of accidents.

At Kebribeyah camp, 1035 additional families were trained in the use of the stove and the ethanol fuel. In July, 2008, after having received reports of accidents, Gaia sent staff back to the camp for further training in proper use of the fuel. Investigations into the cause of the accidents indicated that the ethanol was being misused to light charcoal stoves, so further safety training stressed the avoidance of fuel blending. As a follow-up to this training, 'safety reminder' posters were placed around the camp and at the ethanol distribution centre.

At Awbere camp, incremental training of households throughout the year totaled 800 households by the end of 2008. In April, Gaia staff kicked off the Awbere project with the training of 210 households. In May, 400 more households were trained in the use, storage, and care for the CC stove and ethanol fuel. By the end of the year, 800 households had been trained.

3.4 Distribution

2008 was a busy year for stove distribution at both Kebribeyah and Awbere camps. Early in the year, 700 stoves were distributed in first part of 2008 scale-up in Kebribeyah. April (100 stoves), May (139 stoves) and June (60) were each characterized by another phase of scale-up, with June’s phase indicating the final scale-up, when 100% of the households had been reached. As part of the ongoing monitoring and evaluation, Gaia determined that families with 16 or more members would require a secondary stove. Four households had not yet been given a CC stove package since they were new comers. As such, in August, 32 stoves were given to households exceeding 16 members, and 4 were introduced to the households.

At Awbere, the Lutheran World Federation provided for 800 stoves to be distributed at Awbere camp. After the training of the 600 households, and the training of a further 75 households, 554 stoves were distributed in June. By the end of the year the remaining 246 stoves were given out to the camp dwellers.

3.5 Ethanol Purchase and Transportation

Gaia Association purchased 466,000 liters of ethanol for Kebribeyah and Awbere refugee camps. The ethanol was transported by a tanker truck to the storage tanks in the camps.
3.6 Denaturing and Quality Control

Every batch of ethanol transported to the camps was first denatured by the Gaia Association team in Addis Ababa. A “sky blue” dye was used to color the ethanol and the chemical agent “Bitrex” was used to bitter the ethanol to make it unpalatable. Every shipment of ethanol was carefully tested for purity by the Gaia team to protect the stove canisters from damage. The result of the tests confirmed that the ethanol transported is 95+% ethanol and oil free.

3.7 Ethanol Storage

As part of the Kebribeyah scale-up, a second ethanol storage tanker was installed at the camp, bringing the total storage capacity to 60 000L. Shade construction began in 2008 to protect the ethanol while in storage. Currently Gaia Association and Makobu Enterprises installed a 150,000lit storage facility in Addis Ababa.

3.8 Interruption of Ethanol Supply

In September, 2008, Gaia faced its biggest challenge to date. Finchaa sugar, the manufacturers of ethanol, was unable to provide a fixed wholesale price for the ethanol, which resulted in a supply interruption. As a result, the supply chain to the camps was broken, and the refugees had to return to the use of other fuels for the household energy needs. In December, a temporary price for the ethanol was set, and UNHCR-Gaia was able to purchase 100 000L to continue supply to the camps.

3.9 Monitoring and Evaluation

Monitoring and evaluation continues to be an important method of ensuring quality in project implementation and of products, informing future project designs, and assessing the impact of the projects. Gaia demonstrated a solid commitment to monitoring and evaluation, particularly in the refugee program in 2008.

3.9.1 Indoor Air Pollution

Gaia staff recreated the indoor air pollution test performed in YEAR in partnership with the University of California at Berkeley. Using the same instruments and technique, Gaia tested the indoor air pollution (CO and Particulate Matter) levels in 10 households at Kebribeyah camp, both before and after the introduction of the CC stove and ethanol. The results fell in line with those of the previous study – indicating a dramatic drop in levels of these poisons upon introduction of the CC stove.

3.9.2 Impact Assessment

Impact assessments are an important consideration in monitoring and evaluation. Given the breadth of the CC stove project in terms of impact, it is useful to consider the impacts according to social, environmental and health factors. From Gaia’s various M&E activities, the following offers a summation of the various ways in which the Clean Energy-Safe Energy program is impacting the social, environmental and health aspects of the refugees’ lives. The primary social impacts were found to be relief from the dangers and
burden of fuel wood collection, more time for productive activities, and improved relations with the local community.

The environmental impacts identified included reducing the impact on deforestation and desertification of the region by eliminating the collection of fuel wood and decreasing the ‘carbon footprint’ of the refugee households, by using a clean-burning stove and fuel.

Finally, the health impacts are great, with a reduction in smoke that has been linked to Chronic Obstructive Pulmonary Disease and Acute Lower Respiratory Disease. Other lung diseases have been linked to indoor air pollution, many of which contribute to both perinatal and child mortality.

### 3.9.3 Participatory Assessment

Gaia completed its annual Participatory Assessment at Kebrhibeyah Camp and initiated its first at Awbere Camp over the summer. The purpose of the PA is to help mobilize communities to take collective action to enhance their own protection. PA forms the basis for the implementation of rights and community-based approaches. Participatory assessment is one phase of a comprehensive situation analysis. Through separate discussions with men, women, boys and girls from various age groups, Gaia staff was able to hear, in an unbiased sense, the experiences of the CC stove users and the impact in the reduction or elimination of fuel wood collection.

The Kebrhibeyah users were unanimously happy with the stove and its benefits; however, what Gaia staff discovered during the PA was that larger families were not receiving enough ethanol for their needs. It was also suggested by some participants that delivery be every 15 days rather than 25. In some cases, larger households required the use of a second stove as well. Gaia responded to these concerns, introducing secondary stoves to 32 households, and increasing the ethanol supply according to household size. Of course, some of the requests for increased and more continuous supply could not be met, given the interruption in ethanol supply, but these suggestions have been taken under advisement. The needs-based assessment was not based on the supply interruption, but rather average usage with a continuous supply.

Another note of interest that came out of the PA was the indication that, while other fuels were regularly sold for income generation, and at times so too were food rations, the one commodity never taken to market by the refugees was the ethanol or CC stove. This is a good indication for Gaia that the product is a positive addition, not only for the many benefits, but also because it’s efficacy is so favored by the beneficiaries, that the program will not go to waste as a trade game.

### IV. OTHER ACTIVITIES

#### 4.1 Research

Excellence in research is an important component of Gaia’s work. During 2008, much energy was placed in seeking grant opportunities, for the development of both research and stove implementation projects. Further, publication and research opportunities contributed to the success of 2008’s progress.
4.1.1 Publications

Gaia’s expertise in monitoring and evaluation was requested for an article in the publication *Boiling Point Energy Journal* Number 55, Monitoring and Evaluation [http://www.hedon.info/1200/news.htm](http://www.hedon.info/1200/news.htm)

4.1.2 World Bank Madagascar Feasibility Study

Gaia was selected to join a team of researchers to conduct a feasibility study of developing local ethanol production in Madagascar for the World Bank. A number of facets in the study will fall to the responsibility of Gaia’s research staff, including: small and large scale production, comparative stove testing.

4.2 Awards and Presentations

4.2.1 Ashden Award

In recognition of Gaia’s accomplishments with the introduction of the CC stove to Ethiopia, Gaia won the prestigious Ashden Award for Green Energy, worth £20 000 in June.

Through Ashden connections, Gaia was nominated for ERM Christmas Card – whereby ERM sends an e-card in place of regular mail. The proceeds from savings in materials and postage are forwarded to Gaia. Gaia has planned to use the funds, which are estimated to be between 5 and 10 000 USD, for X project...

4.2.3 Women’s Commission Conference in India

In December, Gaia was selected by the Women’s Commission for Refugee Women and Children to present at their international conference in New Delhi, India. The presentation focused on the need for and the benefits of the Clean Energy – Safe Energy Program at the refugee camps.

V. PARTNERSHIPS

5.1 Building Contacts within the Government


5.2 Makobu Enterprise PLC

The Gaia Association is now working closely with Makobu Enterprises PLC, who will be the eventual stove importer and local manufacturer. The partnership is currently collaborating on the Addis Ababa Condominium project, commercialization of the CC Stove under the USEPA project, carbon finance, and the micro distillery project.
5.3 UNHCR

UNHCR has been a tremendous supporter and advocate of the CC Stove. Working in the Kebríbeyah and Awbere Refugee Camps has enabled large-scale introduction of the stove.

5.4 IRC and the Lutheran World Federation

Partnership with IRC and the Lutheran World Federation has given Gaia Association access to sufficient funding to purchase 1400 two-burner and 800 one-burner CC stoves. Gaia welcomes these connections and will maintain close ties with these two organizations as our work continues.

5.5 Dometic AB

The Association is in a technical working group with Dometic AB, Dometic, a Swedish company. Dometic AB is the original stove manufacturer and originator of this project concept. Both the Gaia Association and Dometic have been collaborating to import the CC Stove for the up-coming scale up in the Kebríbeyah Refugee Camp and for country commercialization.

5.6 Project Gaia, Inc and the Stokes Consulting Group

VI. LIMITATIONS

Gaia Association faced ethanol supply interruption during the reporting year. Ethanol supplier, Finchaa sugar factory, took a long time to fix ethanol whole sale price and this has been a problem to make purchase with the allocated budget. Gaia Association with UNHCR, ARRA and other partners advocated to get ethanol whole sale price. Now, the Association has got a temporary whole sale price and continued its effort to get permanent whole sale price which is expected to be cheaper than the current temporary price.

VII. 2009 ACTION PLAN

The main focus for 2009 will be to assist in the development of the ethanol and CC stove market in Addis. The commercialization project will be of priority; however, scale ups and continued monitoring and evaluation of the Refugee Program, the World Bank Madagascar study, becoming involved in the carbon market.