Full Monitoring Report

1 July – 31 December 2013
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Submitted by Impact Carbon
Local auditing by CIRCODU

Traditional and Inefficient Unimproved Sigiris

Uganda Improved Cookstoves

Contents

1. Introduction

With respect to the Voluntary Gold Standard PDD titled:

Efficient Cooking with Ugastoves: GS Project 447

This Monitoring Report (MR) documents the installation of improved biomass cooking stoves in Uganda as sold by the **Improved Cookstoves for Social Impact in Ugandan Communities** (formerly, *Efficient Cooking with Ugastove's Project*) ("the Project") from 1 January 2006 through 31 December 2013. This report also documents the emissions reductions generated by these stoves between 1 July 2013 and 31 December 2013.

2. Project Description and Summary

From the start of the project in January 2006 through today, this project continues to achieve significant results in three areas:

- business development and growth of the local stove industry at all points of the supply chain through the Uganda Improved Stove (Ugastove) model:
    - manufacturing
    - recordkeeping
    - market development;
- social, economic and environmental co-benefits to local communities; and
- greenhouse gas emissions reductions.

Through carbon finance, the sale of the Project's improved cookstoves has steadily increased. In 2005, Project Partners[1] sold less than 10 residential charcoal stoves per day. In late 2010 and early 2011, Project Partners had steadily increased to selling an average of 75-100 stoves per day. In this current Monitoring Period (Q3 and Q4 of 2013), Project Partners sell an average of 14,659 charcoal stoves per month, or roughly 478 stoves per day—resulting in a total of 87,956 charcoal stoves sold. This is a 5.5% increase from the sales made in the first two quarters of 2013. To date the project has distributed 381,957 charcoal stoves and 273 institutional wood stoves.[2]

Manufacturing

Project manufacturers continue to prioritize stove durability and quality. Kitchen Survey results show that the Uganda Improved Stove model is widely recognized by customers as a stove that is durable and saves charcoal. Quarterly Kitchen Surveys demonstrate that stove users report overwhelming satisfaction with project stove quality, only 1 out of 61 respondents from this monitoring period said that they would not recommend their project ICS to a friend. Usage surveys also demonstrate that stoves last for longer than projected in the PDD as stoves are still being used beyond age five. No new stove design

Figure 1: Ugastove charcoal stove inventory

[1] "Project Partners" refers to all entities (5) currently manufacturing and selling improved cookstoves and receiving assistance through this project. These partners are: Ugastove, SESSA, African Energy Stoves (AES), Energy Uganda Foundation (EUF), and Friends of Wealthy Environment (FOWE).

[2] There were no institutional wood ICS installed during this monitoring period.

Figure 2: Newly constructed Ugastove kiln

changes have been implemented during this monitoring period.

Ugastove's Makindye factory reached its kiln's maximum production capacity and has used carbon revenues to invest in a second kiln on-site. The new kiln has an operating capacity of 4,000 liners per firing and facilitates improved liner quality, production, and inventory management. With the new kiln Ugastove has been able to attain a fired liner inventory of 20,000.

Ugastove also won the Uganda Manufacturers Award of Energy Exhibitors in 2013 and was featured in the October 7, 2013 edition of *The Daily Monitor* newspaper. The award is given to the company that best works to conserve Uganda's natural environment. Ugastove won primarily as a result of its strong charcoal stove sales in 2013 and resulting carbon emission reductions.

EUF has completed the purchase of land that will become the new factory site. EUF is now exploring funding options including grants, private investment, and carbon financing to construct the factory. When complete it is expected to include machinery, significantly improved storage space, and a high capacity kiln.

Friends of Wealthy Environment, LTD (FOWE) opened two retail shops one in Kabalagala and Mengo to increase sales and stove accessibility. In 2013 SESSA moved to a new factory site in Wobulenzi along Gulu highway, which has resulted in an increase in production and sales.

Figure 3: EUF workers in front of factory

Record Keeping and Business Systems

Reporting and recordkeeping continues to be clear, rigorous, and comprehensive. AES, EUF, FOWE, and SESSA continue to work with Traidlinks, a non-profit organization with the goal of helping businesses in Uganda improve operations and business practices. Traidlinks has been contracted to provide additional capacity building support to all manufacturing partners in preparation for future growth. Partners learn to hone skills in areas such as recordkeeping, financial management, and human resources.

Figure 4: EUF employee participating in a QuickBooks mentorship program conducted by Traidlinks

With Traidlinks mentorship, EUF has developed comprehensive record keeping for stove sales, production, and finances. EUF is looking to leverage Traidlinks mentoring to develop its inventory tracking and planning in 2014. Through trainings with Traidlinks, SESSA has been able to utilize QuickBooks to track sales, production, and financial data. It will develop comprehensive inventory tracking in 2014. The Project continues to implement regular randomized Spot Checks to ensure recordkeeping quality and sales record conservativeness. CIRCODU performs quarterly spot checks on recordkeeping to ensure the

various components are accurate and corroborate with one another. CIRCODU's findings on the quarterly spot checks can be found appended as **Annex 11 – CIRCODU Sales Audit Report Summary**.

Market Development

As mentioned previously, Project charcoal ICS sales have grown, by 5.5%, relative to the previous monitoring period. Further, total charcoal ICS sales have almost doubled from 2012 to 2013 (Figure 5):

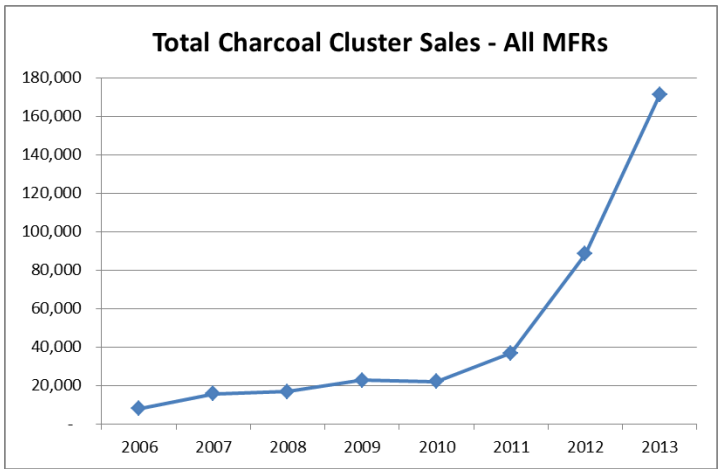


Figure 5: Charcoal ICS sales 2006-2013

Impact Carbon has made improvements to its marketing and laid a strong marketing strategy foundation for 2014. Since July 2013 Impact Carbon's Uganda office has added nine staff members to its sales, management, and office support teams in order to support GS447. These include a Partnership Coordinator, Product Manager, and Marketing Director.

During the second half of 2013 Impact Carbon developed a new brand—BetterLife. BetterLife will be fully launched in 2014 and will include cook stoves and other improved household products under a single name. The aim of the brand is to add value to the ICS by associating the brand name with quality products.

Figure 6: BetterLife logo

Impact Carbon has seen continued distribution success through its partnerships. Living Goods has continued its stove purchasing for distribution throughout Uganda. Impact Carbon also worked closely with Living Goods to increase their stove prices to Impact Carbon's recommended retail prices in order to help improve market competitiveness of manufacturers. Through a project in Northern Uganda with Mercy Corps, Impact Carbon has reached a largely untouched improved cook stove market. The aim of the project is to create a self-sustaining stove distribution network throughout East Acholi. Progress has gone well as Impact Carbon expects to handover regional stove distribution to Energy Uganda Foundation in the first quarter of 2014.

Ugastove has adopted a new marketing strategy. Rather than sending trucks throughout Uganda, regional branches will be opened and serve as staging points for distribution. This shift is primarily due to the high costs and logistical challenges inherent with a traveling sales team and inventory. Branches have recently opened in Hoima, Mbale and Kasese.

EUF has developed an extensive new marketing strategy and capital investment. The approach is comparable to Ugastove's as it will leverage regional branches to bring efficiency to its regional stove distribution. Its capital investment plan is an exciting vision for company growth and East African expansion by 2020. EUF has also had success with a project recently launched in East Acholi, which is currently managed by Impact Carbon, but will eventually transition operations to EUF. EUF has contributed by finding creative means to drive down transportation costs, providing sales personnel for marketing events and radio talk shows.

Figure 7: SESSA Delivery Truck

SESSA has also formed a new marketing strategy, which will leverage regional outlets as replacements to mobile sales teams and inventories. SESSA already has experience with this model, through its outlet in Mbale. The next branch will open in Gulu in early 2014. In addition to changes in sales methodology, SESSA will begin including novel sales offers and free stove trials for end users in an effort to prove charcoal savings. SESSA has also developed an aggressive growth plan that projects financial and sales data through 2020. In a testament to its ability to achieve this plan, SESSA has purchased three new trucks in line with the schedule. The trucks will be used to support the sales and distribution of regional outlets.

In the second half of 2013 AES primarily focused on improving sales and distribution through asset and partnership development. Through the purchase of the truck, AES has improved its marketing and distribution by expanding door to door sales and bulk order delivery to retailers in regions beyond Kampala. The truck has also reduced distribution costs as AES no longer needs to use third party transportation. AES also formed a marketing team, which has the skillset to sell stoves door to door and recruit wholesale buyers.

Figure 8: New FOWE Kampala outlet

FOWE has expanded its retail network by opening a new outlet in Kampala. The outlet is located in Kabalagala, a densely populated area frequented by a diverse collection of demographics. In addition to the new outlet, FOWE has purchased a truck, which allows the partner to expand household stove distribution in a more cost effective manner.

Co-Benefits

The Project continues to provide co-benefits to end users and their communities in addition to fuel savings and reduced indoor air pollution. These co-benefits are described below.

Job Creation and Capacity Building: Locally, the project continues to provide employment for significant numbers of artisans, office staff and field marketers. The Project currently employs more than 230 artisans. Project partners also employ nearly 50 operations, management and administration staff. The Project also supports over 1,000 retailers and other small enterprises who sell stoves by reducing the wholesale price at which they purchase the stoves, providing a steady supply stream and putting resources into marketing the stoves to increase demand. Impact Carbon continues to work with stove manufacturers as well as retailers and distributors to create a sustainable supply chain that benefits parties at all levels of the supply chain.

Livelihood of the Poor: The project's primary goal is to reach low-income families that normally cannot afford to purchase improved stoves. This project saves customers money in two phases: first, when they purchase the stove at a reduced price, and second when they continue to save money regularly on fuel. A major way in which this has been done previously is by subsidizing the manufacture and sale of high quality, long lasting and efficient stoves with carbon revenues wherein the project applies carbon revenues to operations, sales and marketing and production efforts in order to scale the business and reduce costs. These savings are directly passed on to the end user in the form of reduced prices, facilitating greater access to these stoves than would exist without carbon finance. The Project has not only done significant self-promotion of improved cookstoves, it has also developed partnerships with organizations who distribute the cookstoves to previously inaccessible regions such as Northern and Western Uganda. These partnerships have not only facilitated awareness of the importance of improved cooking, but have also provided access to areas that previously would not have had any opportunity to buy a stove.

Figure 9: Commercial stove user cooks local dish chapatti

Once a family owns a stove, reduced charcoal consumption and the subsequent financial savings are social benefits evident in this project. In Kampala, where low-income families spend as much as 15% of annual income on cooking fuels, the cost savings are immense: families using Uganda Improved Cookstoves, which reduce fuel use by 36% compared to traditional cooking methods, can save roughly US$100 per year.

The reduced charcoal consumption also introduces environmental benefits through minimized charcoal-production pressure on forest resources. In a country where more than 90% of the population cooks with biomass fuels,[3] scaling dissemination of high-efficiency cookstoves is a necessary part of the effort to mitigate deforestation trends.

Quarterly Kitchen Surveys reveal that the project continues to achieve the social, economic, and environmental impacts that it is intended to achieve. Environmentally, all impacts outlined in the PDD are being achieved, as stove sales continue to reduce pressure on unsustainably harvested forests. Economically, these improved stoves continue to improve the limited incomes of impoverished Ugandan families, and to improve their health. Further detail can be found in the KS Monitoring Report, **Annex 02**.

[3] http://www.who.int/indoorair/publications/indoor_air_national_burden_estimate_revised.pdf

3. Monitoring of Parameter Values

Tables 1.1-1.9 below summarize the updated values of all the monitored parameters as defined in the PDD's monitoring plan. The source of each value is given in Table 1.1, and the relevant reports are in separate files appended to this document. These parameters were initially assessed in the Baseline Study and KPTs which were first performed beginning in 2006, completed in 2008 and validated upon project registration. Parameters measured every two years did not require resampling this verification, according to the applied methodology. Project baseline fuel consumption factors were updated during the 2010 KPT (see **Annex 01A**. Aging KPTs are conducted biennially to measure stoves' fuel savings as they age (and were last conducted in 2012, **Annex 01B**). Usage factors are updated using the results of usage surveys conducted in 2013.

Baseline Methodology: As is listed on page 21 of the registered PDD, the project follows the methodology approved in January 2008 by the Gold Standard Foundation entitled "Improved Cook-Stoves and Kitchen Regimes", now referred to as Version 01. This methodology covers both the baseline and monitoring requirements for such a project.

Monitoring Methodology: The monitoring methodology is conducted in accordance with the baseline methodology as registered in the PDD. It is important to note that PP has, however, adopted the Version 3 approach to usage monitoring. The PP now applies a singular usage value across the project population for the charcoal and institutional wood clusters, as approved by the Gold Standard Foundation.

The following tables update the status of the monitored parameters listed in Table D.2.1.1 – D.2.1.4 of the PDD:

Table 1.1: Summary of Monitored Parameters

ID#	Data Variable	Source of data, units	Recording Frequency	Comment	Values for ER Calculator
1	Stove Sales	Sales Records	Daily	The Sales Record provides a conservative record of sales. Uga stove's records are kept in QuickBooks and exported to Excel format, whereas other manufacturing locations/partners making the same design enter sales directly into Excel. Sales are entered using paper records and are spot-checked internally by Impact Carbon's Business Development team and externally by CIRCODU. More information on sales records is provided in Section 5: Project Database. The sales record is used to create the Project Database, which re-organizes sales data into one spread sheet and tracks the quantity of stoves sold each day, by cluster.	The Project Database contains daily sales information sorted by cluster. Filename: **Annex 06 Complete Sales Record and Project Database.xls**
2	Project Fuel Consumption	KTs	Every two years	An independent third party monitoring firm, Berkeley Air Monitoring Group, conducted the 2010 monitoring KTs to determine the effect of improved cooking stoves on fuel consumption in households and institutions. This KT evaluated baseline fuel consumption and project-scenario fuel savings for new stoves as well as aging stoves up to age 6 for both charcoal and institutional wood clusters. These KT results were included and verified in previous monitoring periods. As in the previous Monitoring Periods, the project continues to use mean fuel savings for charcoal stoves. This is because the test met the 90/30 rule. So, the fuel savings value used for calculation purposes is .069 kg per	See **Table 1.3**. Further information on KT values available in **Annex 01A** and **Annex 01B**, GS Support of method approach in **Annex 15 - Letter from Gold**

				person-meal. It should be noted that using the mean fuel savings based on the 90/30 precision rule is only applied to charcoal stoves. Results from the institutional wood KPTs did not meet the specified confidence and precision to apply the 90/30 rule; therefore, fuel savings figures for institutional wood remain the same as previously submitted. The fuel-savings findings of the monitoring KTs can be found in **Annex 01A (**Aging KT data on fuel performance over time is available in **Annex 01B)**. The person-meal analysis was derived from the cumulative Kitchen Survey data. Additional Aging-Stove KTs were performed in 2012, per the requirements of the methodology for on-going KTs. This KT evaluated Aging-Stove fuel performance for Ugastove charcoal stoves with an average age of six years, as well as Aging-Stove fuel performance for EUF charcoal stoves with an average age of two years. The Aging-Stove fuel performance assessment for EUF charcoal stoves was conducted per GS requirements to include new project stoves from companies other than Ugastove in future KTs (ref: **Annex 15**) by comparing stove performance for aging devices manufactured by companies other than Ugastove to aging stove performance data previously collected for existing technology in the cluster (ref: **Annex 16**). The KT confirms that Aging EUF stoves perform the same as the Ugastoves. Other factory stoves will undergo Aging-Stove KTs on the same Aging schedule as Ugastoves and EUFs as they reach appropriate age. WBTs conducted in 2012 verified that these stoves perform the same as other stoves in the cluster when they are new and will be included in future KTs the same way that EUF stoves have.	**Standard, Aging KT**.
3	Clustering definitions	Monitoring KS, Biannual KTs	Quarterly (KS), Biannual (KT)	Clustering definitions remain unchanged. The Project continues to measure fuel savings on a per person-meal basis (the cooking of one meal for one person). Thus, total fuel savings are calculated by multiplying fuel savings per person meal by the number of person-meals per day per household/ or institution (an adjustment factor is applied for houses containing multiple ICS). Person meals per day are calculated from the Kitchen Survey results, **Annex 07**. With a sample size of 714 (after outliers removed) for the charcoal cluster and 156 for the institutional wood cluster (no institutions removed), this data dates back to the first monitoring and is the most comprehensive and accurate representation available of the true project population. An assessment of the on-going Kitchen Surveys confirms that clustering definitions should remain the same.	N/A
4	Usage factor	Usage KT or KS	Annually	Beginning with the fifth issuance, the project used the latest version of the GS Methodology (Technologies and Practices to Displace Decentralized Thermal Energy Consumption - 11/04/2011) to calculate a cumulative usage rate of all household charcoal stoves within the project database/sales record, as approved by the Gold	See **Table 1.7** (Charcoal Stoves) and **Table 1.8** (Institutional

				Standard Foundation. For increased accuracy, usage factors are assessed annually rather than biennially. These numbers are applied to each year. Last monitoring period usage surveys were also conducted for institutional wood stoves to calculate a cumulative usage rate. For Charcoal Stoves see **Annex 04 Usage Monitoring Report, Charcoal.** For Institutional Wood Stoves see **Annex 05 Usage Monitoring Report, Institutional Wood.**	Wood) below
5	Age Factor	Stove-age KT	Every two years	The findings of the monitoring KPTs as reported in **Annex 01A** were that Baseline and Project Fuel consumption values remain the same for the full set of stove vintages for charcoal stoves. Stoves from the original 2006 cohort were re-monitored using a standard KPT, which suggested an insignificant change in fuel use. Project Fuel savings for institutional wood stoves starting with Age 4 is 94% of fuel savings seen in stoves during the first 4 years of lifespan. Fuel savings are adjusted by a conservative factor of .94 for institutional stoves starting Age 4 (see **Annex 01A**). The next Aging-Stove KT performed in 2012 for institutional wood clusters indicates that for Aging Ugastoves Age 6+, fuel savings is slightly less as in the previous Aging KT (Age 4). An adjustment factor of .90 is applied for institutional stoves starting Age 6 (see **Annex 01B**). The next Aging-Stove KT performed in 2012 for charcoal and institutional wood clusters indicates that for Aging Ugastoves Age 6, fuel savings is the same as in the previous Aging KT (Age 4).Therefore, for charcoal stoves there is no decrease in fuel performance.	See age adjustment factor in **Table 1.5,** Emission Reductions Values
6	New Stove performance	Additional Stove Kitchen Tests for additional stove clusters	When a new cluster is added, or every two years	The findings of the monitoring KPTs are reported in **Annex 01A** for new stove performance. The Project uses Berkeley Air's recommended person-meal metric to more accurately measure fuel use and fuel savings. Data on number of person-meals cooked is derived from the Kitchen Survey. No new clusters have been added and therefore no new KTs are required. On-going Kitchen Surveys indicate that the customer population has not changed from the baseline and therefore no new baseline KTs are necessary.	See **Table 1.5**, Emission Reductions Values
7	Market development	Company records and Marketing Reports	Quarterly	Over the past year of the crediting period, monthly sales continue to grow. Specific numbers can be found in the Project Database, **Annex 06**. The Project is also working to develop new markets both around Kampala and in rural areas upcountry. Various marketing materials can be found in **Annex 12a-e.**	N/A
8	Non-Renewable Biomass fraction	CDM EB 67 Annex 22	Every two years	The Project adopts the CDM default value of fraction of non-renewable biomass for Uganda.	0.82
9	Baseline Fuel Consumption	Baseline and	Baseline KT was	Berkeley Air Monitoring Group was contracted to perform the 2010 Kitchen Test to re-evaluate baseline	See **Tables 1.3** and

		Monitoring KT	performed in 2010; as baseline population has not changed there is no need to reassess baseline fuel consumption	fuel consumption and measure fuel savings on all new and aging stoves. The survey was conducted using a larger sample size and had a tighter confidence interval than the previous monitoring KTs. Upon performing more robust monitoring to increase accuracy and precision, the findings of the monitoring KPTs as reported in **Annex 01A** were that Baseline and Project Fuel consumption values are updated for the full set of stove vintages. The baselines can be found in the report, and have been included in prior monitoring periods since 2010.	**1.6** below

Carbon Calculator Inputs:

Charcoal Stoves: Based on the 2012 KPT data, the estimated fuel savings per stove year is assessed to be the same for stoves Age 4-6 as it is for stoves of Age 0-4 (see **Annex 01B**). The 2010 KTs findings determined that there was no significant difference in fuel savings among household stoves as they age for the first 4 years; the 2012 KTs determined that there is no significant different in fuel savings among households as they age for the first 6 years (in fact, KTs show that fuel savings slightly increase for the age 4-6 bracket, but for conservativeness PP assumes fuel savings is the same). While household stove usage drops off over time (Tables 1.7 and 1.8 below), fuel savings per stove still in use, per stove year, remains constant over the first 6 years of a stove lifespan. The data from this report can be found in **Annex 01A.** This data is consistent with past assessments of fuel performance which also found that household stoves did not see a change in performance over the first 3 years of a stove lifespan.

The Kitchen Surveys show that the estimation of constant stove performance is particularly conservative because Uganda Improved Stove customers were using less fossil fuels, and using other stoves less often than prior to purchasing their project stoves. At the same time, Kitchen Survey observations reveal that as the stoves age, the pot holders recess and the pots drop closer to the charcoal, increasing thermal efficiency.

The KPT, which calculated fuel savings per person-meal, found estimated fuel savings were not significantly different per person-meal based on stove size or type of stove use (i.e. purely domestic or business households). However, the number of estimated person-meals cooked varies greatly, based on type of stove use. Because business households cook significantly more person-meals per day on their stoves, those customers see significantly greater fuel savings over the course of a year.

As shown in **Table 1.3** below, the mean fuel savings value found during the 2010 KPT conservatively estimates the fuel savings to be .069 kg per person-meal for each stove, and that the variance in person-meal fuel savings based on stove size was insignificant. The average number of person-meals a stove cooked per day varied, depending on whether the stove was used commercially, or for business-household use. Emission Reductions values adjust for this variance in person-meals. The cumulative Kitchen Survey shows that households using the stove for purely domestic purposes (93.98% of charcoal stove users) cooked 14.03 person-meals per day, while households using the stove for commercial purposes in addition to domestic (5.46%) cooked 27.51 person-meals per day and institutional end users with the charcoal stoves (0.56%) cooked 54.75 person-meals per day. This results in a weighted average of 5,372 person-meals per year for charcoal stove users (see **Table 1.2**).

Institutional Wood: Berkeley Air's findings also determined that while institutional stove fuel performance stays constant for the first 4 years of stove use, performance begins to decline for stoves after Age 4; for all Aging stoves monitored after Age 4 the performance stays constant at that new level until Age 6, when there is another drop-off in performance. The data from this report can be found in **Annex 01A;** Aging KT data from 2012 can be found in **Annex 01B.** Due to the changing performance of institutional stoves, the cluster adjusts by .94 for aging performance of stoves starting with Age 4, and .90 for aging performance of stoves starting with Age 6.

It was previously verified that the lower 90% confidence interval for institutional stoves is .072 kilograms per person-meal for all Institutional Stoves. Person-meal data was collected from the Institutional Kitchen Survey. The average number of person-meals a stove cooked per year varied, depending on the type of institution at which the stove was used. If a stove was used in a school versus a non-school, for example, it was conservatively assumed that day schools only cook for 185 days per year and boarding schools cook for 253 days per year, while non-school institutions are conservatively assumed to cook for 185 days per year. Last monitoring period asked institutions how many days they cook per year, so specific days cooked per year are used to calculate person-meals per year for all institutions with stoves installed in 2013.

The tables below further explain person-meal and fuel savings calculations:

Table 1.2: Cooking Frequency and Meals Served Per Stove

		Percent of Population	Daily Individual Meals Served	Cooking Frequency	Total Annual Cooking	
Cluster	Cooking Type		person-meals/HH-day	days/year	person-meals/HH-year	
		%	Mean	Mean	Mean	Weighted
Charcoal Stoves	Domestic	94.10%	14.74	359	5,298	5,572
	Commercial	5.34%	25.61	359	9,186	
	Institutional	0.56%	54.75	313	17,137	
Institutional Wood					306,872	

Explanation of Key Parameters:

Percent of Population: The percentage of stoves that are represented by a certain category within a cluster. As clusters are defined by fuel savings per person meal, categories within clusters are only for the purpose of accurately weighting person-meal calculations.

Person-Meals/HH Day (Daily Individual Meals): The average number of person-meals that are cooked by each category within a cluster per day. For charcoal stoves, person-meal data is derived from the Kitchen Survey, per Berkeley Air Monitoring Group's recommendations. Note: For charcoal stoves, a weighted person meals/stove day figure is applied to factor in for the 93.98% of stoves that cook purely domestically, 5.46% that cook commercially, and 0.56% of institutions that cook with the model.

Days/Stove Year (Cooking Frequency): The number of days per year a stove cooks meals. KS data shows that household and commercial charcoal stoves are used 359 days per year while institutional stoves are used less.

Person-Meals/HH- Year (Total Annual Cooking): The number of Person-Meals/HH- Day multiplied by the number of Days/Stove Year

Table 1.3: Fuel Consumption and Savings

Cluster	Cooking Type	Baseline Fuel Consumption kg/person-meal	Project Fuel Consumption kg/person-meal	Fuel Savings kg/person-meal		
		Mean	Mean	Mean	Weighted	Adjusted
Charcoal	Domestic	0.193	0.121	0.069	0.069	N/A
	Commercial	0.245	0.190	0.063		
Institutional Wood	All	0.199	0.102	0.097	N/A	0.072

Explanation of Key Parameters:

Baseline Fuel Consumption: This is the kilogram/person-meal figure for baseline fuel use. Baseline fuel consumption values for institutional stoves were verified in 2009, available upon request as "Baseline KPT Report" and can be referenced in past verification materials. Baseline fuel consumptions values for charcoal stoves come from the 2010 KPT performed by Berkeley Air Monitoring Group (see **Annex 01A**) and were also previously verified.

Project Fuel Consumption: This is the kilogram/person-meal figure for project fuel use. New stove values for charcoal stoves come from the 2010 KPT; aging charcoal stove values through Age 4 as well as Ages 4-6 were measured in the 2010 KPT (**Annex 01A**); aging charcoal stove values after Age 6 come from the 2012 KPT (**Annex 01B**) .

Fuel Savings: For charcoal stoves, this is the mean fuel savings value for fuel savings/person meal, as was discussed in the above clustering definitions. This is per a Gold Standard recommendation in the 2nd Monitoring Period, stating that the Project Proponent (PP) may update the emission reduction calculations using the mean fuel savings approach if the required 90/30 precision rule is met. **Table 1.6** shows how the 90/30 precision rule is met. Values for charcoal stoves come from the 2010 KPT performed by Berkeley Air.

It should also be noted that using the mean fuel savings based on the 90/30 precision rule is only applied to charcoal stoves. Results from the institutional wood KPTs did not meet the specified confidence and precision to apply the 90/30 rule; therefore, fuel savings figures for institutional wood remain at the Lower Bound of 90% Confidence Interval for Fuel Savings/Person Meal.

Table 1.4: Emission Factors and Non-Renewable Biomass (NRB)

Cluster	Year	CO2 EF tCO2/t_fuel	CH4 & N2O EF tCO2e/t_fuel	NRB percentage	EF nrb tCO2e/t_fuel
Charcoal Stoves	2006-2008	5.106	1.238	91.00%	5.884
	2009-2010	5.106	1.238	90.40%	5.854
	2010 - 2012	5.106	1.238	91.58%	5.914
	2012-2	5.106	1.238	91.58%	5.914
	2013-1	5.106	1.451	91.58%	6.127
	2013-2	5.106	1.451	82.00%	5.638
Institutional Wood	2006-2008	1.747	0.455	91.00%	2.045
	2009-2010	1.747	0.455	90.40%	2.035
	2010 - 2012	1.747	0.455	91.58%	2.055
	2012-2	1.747	0.455	91.58%	2.055
	2013-1	1.747	0.530	91.58%	2.130
	2013-2	1.747	0.530	82.00%	1.962

Thus, the following values for CO2e savings per stove year are entered into the ER Calculator:

Table 1.5: Emissions Reductions Values

Cluster	Stove Age	Total Annual Cooking meals/stove-year	Fuel Savings meal	EF nrb tCO2e/t_fuel	Age Adjustment percentage	Emissions Reduction tCO2e/stove-year
		Weighted	Mean			
Charcoal Stoves	0-7+	5,572	0.069	5.638	100%	2.16
			90% CI Adjusted		90% CI Adjusted	
Institutional Wood	0-4	306,872	0.072	1.962	100%	43.36
	4-6	306,872	0.072	1.962	94%	40.76
	7+	306,872	0.072	1.962	90%	39.02

Equation to Calculate ER Value:

$$\frac{\text{(Person-meals/Stove-Year) x (Fuel Savings kg/person-meal) x } EF_{nrb} \text{ x Age Adjustment (if any)}}{1000}$$

Table 1.6: Confidence and Precision for Mean Fuel Savings Determined During the KPT

Applying 90/30 precision rule to Charcoal KPT	
"Stove Effect" Fuel Savings (kg/person-meal)^	
n	112
mean	0.068
stdev^^	0.095
std error	0.009
^See KPT Report, Table 5, pg. 19 (Q209 - Q210 Annex 01 KPT Berkeley Air 2010 Phases 1-5)	
^^std error = stdev/(sqrt(n))	
90/30 Rule Check	
1.66*[stdev/sqrt(n)]	0.015
0.30*mean	0.020
Meets 90/30 Rule^^^:	Yes
^^^90/30 rule is met if (1.66*[stdev/sqrt(n)]) < (0.30*mean)	

Explanation of Key Parameters:

Age Adjustment: This is the value determined by the aging institutional KPTs. Berkeley Air determined in 2010 that institutional wood stoves starting Age 4 exhibit 94% of the fuel savings that younger stoves do. The 2012 KPT determined that institutional wood stoves starting Age 6+ exhibit 90% of the fuel savings that younger stoves do. No age adjustment is applied to charcoal stoves.

Emissions Reduction: This is the Emission Reduction Value that is entered into the calculator. This is achieved by multiplying the average number of person-meals per stove year by the mean fuel savings value for fuel savings/person meal (or lower 90% confidence interval value for institutional stoves), which is then multiplied by the EF NRB. This calculation inherently assumes one stove per household. Thus an adjustment for multi-ICS stoves is required for the final ER calculation. The adjusted value is divided by 1000 to convert from kilograms to tonnes of ERs per stove, per year.

Usage: Stove usage declines over time, as detailed in the Usage Monitoring Reports (Charcoal and Institutional Wood). Usage surveys were conducted this monitoring period for the charcoal cluster and last monitoring period for the institutional wood cluster using the Version 3 methodology approach, wherein project stoves of every age are surveyed to establish a singular usage rate that can be applied across the project stove population. Further details on this approach and the corresponding data can be found in the document titled **Annex 04 and Annex 05**. Based on those reports, the following stove usage numbers are entered into the calculator:

Table 1.7 Cumulative Usage Drop-Off for Household Charcoal Stoves

Cumulative Usage Drop-Off				
Usage Drop-off, Cumulative	$U_{pj,cum}$	0.8974	fractional	2013 Usage Survey, Project-Specific

Table 1.8 Cumulative Usage Drop-Off for Institutional Wood Stoves

Cumulative Usage Drop-Off				
Usage Drop-off, Cumulative	$U_{pj,cum}$	0.5692	fractional	2013 Usage Survey, Project-Specific

Sources of Leakage (PDD Section B.2.)

The Baseline Study and KS investigated the following risks of leakage:

a) Some users of the efficient stoves might respond to the fuel savings associated with higher efficiency stoves by increasing consumption of fuels with GHG emission characteristics, to the extent that project emissions are higher than those calculated from the assumption that cooking energy is constant. This is sometimes referred to as the 'rebound' effect.

b) The project activity might stimulate increased use of a high emission fuel either for cooking or for other purposes outside the project boundary (as would be the case for example if efficient cooking stimulated an increase in NRB consumption - possibly because the NRB fuel becomes cheaper due to the project activity).

c) By virtue of promotion and marketing of a new model and type of stove with high efficiency, the project might stimulate substitution of a cooking fuel or stove type with relatively high emissions by households who commonly using a cooking fuel or stove type with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline.

d) The project population might compensate for loss of the space heating effect of inefficient cookstoves by adopting some other form of heating or by retaining some use of inefficient stoves.

e) The traditional stoves displaced might be re-used outside the boundary in a manner suggesting more usage than would have occurred in the absence of the project.

f) Significant emissions from transportation or construction involved in the project activity might occur, including emissions associated with production/transport of the efficient stoves themselves, or production/transport of project fuels.

The quantitative results of the Kitchen Test subsumes the potential sources of leakage a, b, d, and e. Because the KT represents fuel savings in actual households, the results already incorporate the effects of these potential leakages.

In the case of (c), it was clear that both the much lower disposable income levels in rural areas and the continuing practice of self-collection prevent a transition from wood users to charcoal. In any case observations and interviews indicated that a switch from a traditional wood stove to an improved charcoal stove would result in reduced GHG emissions, such that there is no risk of leakage in this scenario. On the other hand the indications also were that an efficient charcoal stove has slightly worse GHG emissions than an efficient wood stove. Since this is a very unlikely scenario in view of the investment made by rural people in a new wood stove on the basis of charcoal being unavailable, it can be neglected.

With respect to f, leakage associated with the production of stoves is discussed in Table 1.9 below. Emissions resulting from ICS transport is not greater than the surplus emission reductions resulting from reduced charcoal shipments as end users save fuel with the project ICS, and is thus considered negligible.

Table 1.9: PDD section D.2.3.1 Data and information that will be collected in order to monitor leakage effects of the project activity:

ID number	Data variable	Source of data, units	Comment
All leakage risks	Leakage	*KS, Fuel use records*	The Kitchen Survey found that the only source of potential leakage was fuel switching from crop residue to charcoal with the purchase of project ICS. Following analysis of surveys conducted throughout the monitoring period, no significant fuel switching was observed. Several factors in fact suggest increased fuel savings compared to the baseline, although these adjustments are not included in order to ensure conservativeness. Each new set of Kitchen Survey data is analysed to determine if fuel switching is taking place. See **Annex 02 Kitchen Survey (KS) Report** for analysis of leakage risks to due fuel switching. The other main leakage risk is extra fuel use due diesel and/or petroleum-operated production machinery such as an extruder which mixes the clay, and spraying machine which paints the stoves. As a result, manufacturers have established a system that tracks all fuel purchased and used for the extruder and spraying machine through logbooks and receipts. An electronic record of all fuel purchased and used for the extruder can be found in the calculator: **GS447 Iss 7 ER Calculator**. For conservativeness, it is assumed that all fuel purchased for the machines is used; total fuel purchased for is used to calculate the CO2 equivalent of fuel used, which is subtracted from the overall Emission Reductions total in the calculator.

4. Emission Reductions Calculations

Table 4.1 below shows the CO2e emissions reductions achieved by the *Improved Cookstoves for Social Impact in Ugandan Communities* project in the period reported from July 1 2013 through 31 December 2013. The sales and installations of new stoves took place during the period July 1 2013 through 31 December 2013.

The emissions reductions for this monitoring period of Q3 and Q4 of 2013 total 265,118 tCO2e. The PDD estimated emission reductions at about 145,000 tCO2e per year at this stage of the project—less than what is actually being credited. This difference can be attributed to increased sales and distribution networks, as described in Section 2.

Table 4.1: Emission Reductions Calculations

Verification Period: 1 JUL - 31 DEC 2013

Total Emission Reductions (tCO2e): 265,118

	Cluster:	Charcoal Stoves		Institutional Wood Stoves		Leakage	Total Emission Reductions
Year	Quarter	Stove Years	tCO2e	Stove Years	tCO2e	tCO2e	tCO2e
2013	Q3	57,157	123,460	39	1,656	2	125,117
	Q4	64,052	138,352	39	1,655	3	140,007
	Total	**121,209**	**261,812**	**78**	**3,312**	**5**	**265,118**
					Total ERs Before Leakage		265,123

Total Vintage 2013 Q3-Q4: 265,118

Explanation of Emission Reduction Calculations

The Emissions Reduction (ER) Calculator calculates total emissions reductions on a quarterly basis for each stove in the Project Database. Calculations are run separately for each cluster of stoves defined for the project. A single calculator file accompanies this report and contains the calculations of emissions reductions for each cluster:

- Charcoal Stoves ('HH Charcoal' worksheet)
- Institutional Wood ('Institutional Wood' worksheet)

The calculator accounts for the month that each stove begins use[4] and calculates all the years of usage of each stove in each quarter. The calculator factors in the monitored annual drop-off in usage as stoves age, and other monitored parameters.[5] Stove usage is calculated in stove-years, derived from stove months. Quarterly usage per

[4] The calculator is conservatively built so that crediting begins the month following each stove is sold. For example, if a stove is sold at any time during the month of January, months of usage begins in the following month of February.

[5] The full set of parameters is given in the monitoring tables. The parameter values which have changed from values given in the PDD are: the utilization factor, which now includes usage rates from stoves in their 7th year of use, and Emission Reductions values for stoves. These values are used in calculations that determine the number of stove years.

cluster (in stove-years) is multiplied by the emissions reduction per stove-year (tCO2e/stove-year) calculated in the PDD to quantify total ERs per project quarter.

Total project sales are listed in the 'Sales' worksheet. Stove quantities and 'Usage Start-Dates' are linked from the 'Sales' worksheet to the corresponding age group rows. Monthly stove use (unit use-months) is calculated using Annual Usage Rates for stoves of different ages (agei_j). The Annual Usage Rates are calculated to reflect annual usage drop-off from the Cumulative Usage Rates (CumUi) determined in the monitoring studies below. The Annual Usage Rate (agei_j) is the average annual drop-off in usage. That rate is applied to all stoves equally over the full year they are of a given age (Age 0-1, Age 1-2, etc.).

Usage survey data acquired using the Version 3 approach, sampling from each year to ensure that new project technologies are included in the monitoring. Usage data was compiled and analysed by age to determine the usage rate for each stove age group credited. To determine a cumulative usage rate, the drop-off rates are then weighted to be representative of the quantity of household stoves of each age being credited in the project scenario (i.e. weighted based on the total sales population by age). Based on both the usage survey and sales data, the single usage parameter, weighted by drop off rates and technology sales by age, is calculated using the following equation:

$$= (Usage_{age0\text{-}1} * Sales\%_{age0\text{-}1}) + (Usage_{age1\text{-}2} * Sales\%_{age1\text{-}2}) + (Usage_{age2\text{-}3} * Sales\%_{age2\text{-}3}) + (Usage_{age3\text{-}4} * Sales\%_{age3\text{-}4}) + (Usage_{age4\text{-}5} * Sales\%_{age4\text{-}5}) + (Usage_{age5\text{-}6} * Sales\%_{age5\text{-}6}) + (Usage_{age6\text{-}7} * Sales\%_{age6\text{-}7})$$

Once monthly stove usage (unit use-months) is calculated for stoves from each 'Month of Sale'', it is converted to stove-years. Aggregate quarterly stove use (stove-years) is multiplied by ERs per stove-year (tCO2e/stove-year) to calculate total ERs on a quarterly basis. These values from the worksheet of each cluster are linked to the 'Summary' worksheet where ERs from all clusters are combined and the verification period is specified for crediting.

Adjustments

Charcoal Cluster: KS data from Q2-Q4 2011 and Q1-Q4 2012 showed that 21.15% of project HHs in the charcoal cluster previously owned improved cookstoves. Thus, a 21.15% "Multi-ICS" usage adjustment is applied to all sales made between 2011 Q2 – 2012 Q4, which includes the age groups 0-1, 1-2, and 2-3 for this monitoring period. Adjustments of 32.69 and 27.42 were applied to stoves sold in Q1-Q2 and Q3-Q4 of 2013, respectively.

Institutional Wood Cluster: As detailed in the previous section, institutional stove fuel performance stays constant for the first 4 years of stove use, declines for stoves after Age 4. For all Aging stoves monitored after Age 4, the performance stays constant at that new level until Age 6, when there is another drop-off in performance. Due to the changing performance of institutional stoves, the calculator applies adjustments by a stove degradation factor of .94 for aging performance of stoves starting with Age 4, and .90 for aging performance of stoves starting with Age 6. These factors are provided in 'INST Wood' worksheet of the calculator.

5. Project Database: Quality Assurance

With respect to Section D.3 of the PDD, careful attention has been paid to the accuracy of the sales record. As explained in this section, the Project Database is a conservative record of all stoves that have entered use, and a conservative estimation of the first day they entered use. The data in the Project Database is referred to as Data Variable: Stove Sales (ID#: 1) in the Project Design Document. The project database is used to measure Variable #1:

ID #	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived?	Comment
1	*Stove Sales*	*Sales Records*	*Number of stoves by type and size*	*M*	*Daily*	*All sales*	*Electronic and paper*	

In 2006, a system was set up to track stoves entering use that would underreport sales in the face of irregularities, and thus provide a conservative record of stove usage. First, is the manufacturers are incentivized to ensure the veracity, accuracy and even conservativeness of the sales record. Each manufacturing location is subject to rigorous quarterly random sales record checks in which CIRCODU randomly selects a sample of electronic sales records and follows up to ensure there is a corresponding paper receipt. CIRCODU also contacts a random subset of customers to confirm the sale. If the random 3rd party spot checks are without error, the factory is eligible to receive an additional advance in carbon revenues to invest in social marketing and other business development.

Furthermore, conservativeness is built into the local context at the factory: in the Ugandan context, "shrinkage" (unauthorized distribution and selling of stoves off-book for personal profit) is difficult to avoid, and it is generally accepted that sales agents sometimes engage in this activity, either taking extra stoves and selling them outside the factory or intentionally underreporting sales to pocket additional income. Even though the stoves in question ultimately go into use, the current system does not count stoves that go missing from the Factories to further ensure conservativeness.

Method of Collection

A comprehensive Project Database is kept electronically by Impact Carbon: this is **Annex 06 Complete Sales Record and Project Database.** The database logs how many stoves of each type (sorted by cluster) entered use on each day. Impact Carbon maintains this file as a password protected excel document.

The Project Database is created from the Partners' Sales Records. The Makindye Factory's Sales Record logs sales in QuickBooks, whereas the other Project Factories use the aforementioned Excel-based tool. The files are password-protected and can only be accessed by the Director of Finance. On a monthly basis, the sales records are quality-checked internally for accuracy to catch any data entry errors. Partners then submit the electronic sales record at the end of each month, so these records can be checked against the sales totals that are submitted at the end of each quarter. Then the sales record is checked by Impact Carbon's Business Development Manager to prepare for the 3rd party check and ensure no over-reporting has occurred. Finally the sales record is checked by a third party, the Centre for Integrated Research and Community Development, Uganda (CIRCODU). CIRCODU regularly audits sales entries and contacts customers to confirm that sales records are conservative, as expressed in their spot check reports **Annex 11 CIRCODU Sales Audit Report Summary**. Manufacturing Partners' spot check results continue to improve as the company's trend toward rigorous recordkeeping and build capacity.

All paper invoices and receipts are saved to provide an additional cross-check. Partners provide a paper record of every stove sold, and any sale without a paper record is removed from the database. Many stoves that enter use

are not counted, as receipts are lost, or sometimes not issued. This further ensures the conservativeness of the project database.

Project Database Electronic Record History

As mentioned previously, the Makindye Factory consolidated all of its records into Excel starting in 2007, and now uses QuickBooks exclusively as its only electronic sales record. All sales can thus be exported into Excel files. All other manufacturing partners use an Excel-based tool, which is kept as a password protected file and submitted and reviewed on a monthly basis. This tool was verified in the previous Monitoring Period and has been adopted by additional manufacturing partners in this period.

All data has been aggregated by cluster and merged into one spreadsheet, with each tab containing the complete sales record for each cluster. Only sales made during this Monitoring Period are added to the database; previous Monitoring Periods' sales remain unchanged.

Quarters	Sales Period Combined Sales Period	Source of Sales Records	Reference File
1 July 2013 – 31 December 2013	*1 January 2006 – 31 December 2013*	*Aggregated sources from above*	*Complete Sales Record and Project Database*

All the source files of sales data that are listed above have been combined into the supplementary excel monitoring report file: **Annex 06 Complete Sales Record and Project Database**. This file contains details on every stove sale made by Partners since 1 January, 2006. The information in the sales files is aggregated and uniformly formatted by cluster and date in order to create the Project Database. Sales channel, purchase location, quantity, and date of purchase details are kept for each sale in the Sales Record. Some customers buy household stoves directly from the factory and some buy from retailers.

For institutional stoves the following additional records are kept for each sale: location and contact information, date stove build was completed, number of burners for fixed stoves or quantity for portable stoves, average number of meals cooked per day, number of people for whom food is prepared, and whether those people are children or adults. A Usage Survey performed by CIRCODU indicated a 64.62% usage rate among Institutional Stoves of all ages. The Usage Survey report can be found in **Annex 05 Usage Monitoring Report, Institutional Wood.**

6. The Detailed Customer Database

The Detailed Customer Database is maintained by Impact Carbon to capture records of Kitchen Survey interviews.

Project Database Information

Along with sales channel, purchase location, quantity, and the date of purchase details which are kept for each sale in the Complete Sales Record, further contact details are compiled for a subset of household stove customers in a Customer Sampling Record. The Customer Sampling Record is used for customer follow-up and sampling for monitoring surveys. The Customer Sampling Record is a paper file of returned warranty cards kept in the manufacturer's office. The cards are included when a Uganda Improved Cookstove is sold. As with all warranty cards, a percentage of cards are returned to the manufacturers' offices and filed. For direct sales to end-users, manufacturers collect cards directly.

Figure 10: Ugastove retailer completing customer warranty card

The customer sampling record continues to grow due to prioritized customer tracking. Over 11,000 new customers have been added to the customer sampling record in this Monitoring Period (**Annex 08)**, which has been added the Customer Sampling Record for the project. These customers are distributed all throughout Kampala and neighbouring sales areas and are sufficient for random sample selections for future monitoring activities.

To reduce the possibility of sampling bias for Kitchen Surveys (people who return the warranty cards may have different characteristics from those who do not) Impact Carbon supplements the warranty cards with door-to-door surveys and telephone identification to identify additional customers. A sample of warranty card customers, and stove owners identified by the door-to-door survey, are given an in-depth Kitchen Survey. The results of this survey form the Detailed Customer Database (**Annex 07**) which provides data for **Annex 02**. The Detailed Customer Database holds the contact information of these customers, and the specific data collected by the Kitchen Survey. This data includes information such as stove age, stove usage, stove wear, and cooking activity that is used to estimate stove usage across the entire project database.

When determining if a person should participate in the Kitchen Survey, each subject is asked whether they have ever purchased a Uganda Improved Stove. If the answer is no, the person is not surveyed. The Detailed Customer Database currently includes customers mostly from warranty cards and some identified through door to door searches in a subset of neighbourhoods designed to capture a wide socioeconomic sample of customers.

7. Third Party Inputs to Quality Assurance

Quality assurance measures have been implemented by the designated third party monitor, CIRCODU. CIRCODU is a non-profit consortium of expert monitoring consultants based in Kampala, Uganda. Its members are associated with the Medicine, Engineering, and Public Health departments at Makerere University. CIRCODU has extensive experience developing and employing household energy survey tools, and Joseph Arineitwe, the Director, has extensive experience conducting trainings in customer and group assessment. CIRCODU has conducted extensive spot checks on random samples of the Project sales record. They have contacted hundreds of retailers and users to confirm sales and have carefully checked the electronic sales database to check for conservativeness. In order to create an additional means of cross-checking sales figures, CIRCODU works with Manufacturing Partners to implement a system of precise and accurate production and inventory accounting, which are monitored during the quarterly spot checks as an additional check against the sales record. CIRCODU performs the quarterly spot checks and issues the Uganda Improved Cookstove Sales Audit Report.

In addition, Mike Ssemwogerere, Impact Carbon's Uganda Business Development Manager and accounting expert, applies random spot checks by calling the phone numbers on warranty cards and in sales records to ensure the validity of information gathered. He does this on a monthly basis to prepare manufacturers for CIRCODU's regular monitoring, such as spot checks and Kitchen Surveys.

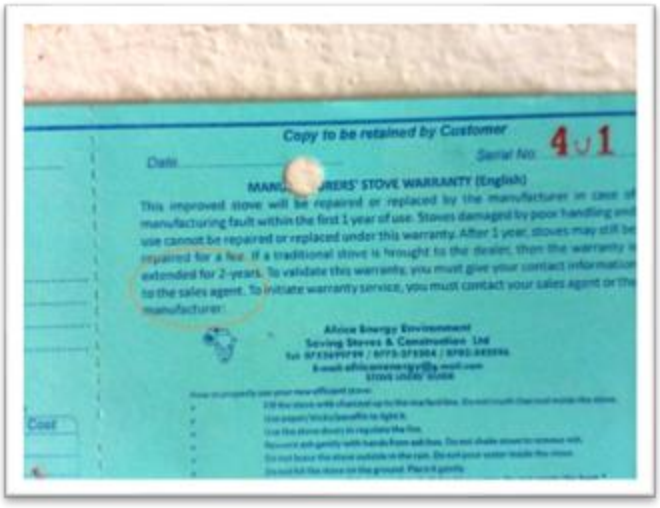
8. Sustainable Development Indicators

The following table monitors the most sensitive sustainable development indicators:

Table 8.1: Sustainable Development Indicators

Sustainable Development Indicator	Monitoring source	Variables, Units and Frequency of Measurements	Monitored result
Air quality	Kitchen Surveys: **Annex 07**; Kitchen Survey (KS) Monitoring Report: **Annex 02**[6]	*Air pollutants (CO, particulates)*	As stated in the PDD on page 6, item 2, improved stoves generally reduce indoor air pollution and improve air quality. The Kitchen Survey Report reveals that 51% of respondents with charcoal ICS cook indoors during the dry season, either in the main house or a separate enclosed kitchen. During the rainy season, this increases significantly to about 87%. Quarterly Kitchen Surveys assess quarterly through observations and estimations the impact on air quality. Overall, end users have report reduced symptoms of IAP. Among those that responded to IAP-related questions, the majority had difficulty distinguishing the difference with the new stove. However, 28% reported that their old unimproved stove resulted in more smoke when cooking; 16% experienced more headaches and/or dizziness with old stove; and 11% decreased incidence of itchy eyes with the new stove. However differences in the ability to breath, coughing, and child IAP-related illness were less distinct. As part of air quality, the Project seeks to find ways to motivate customers to give up their old stoves. This continues to be a challenge. In 2011, the Project ran a "Cash for Clunkers" pilot program, where customers had an opportunity to receive a rebate for bringing in old cookstoves. This resulted in a few stoves being returned, but not at scale. Last monitoring period flyers were printed that advertised to ability to receive an extended guarantee (2-year warranty) per for bringing in the traditional stove. This monitoring period all manufacturers were also given stickers to advertise the extended warranty directly on stoves (see photo below).

[6] No institutional wood ICS were installed between 01 July and December 31, 2013; thus, no institutional no quarterly KS were conducted during this monitoring period.

			 While adoption has been limited, the PP continues to assess the impact of this incentive. Anecdotal evidence shows that warranties are not common in Uganda, which may explain the difficulties with promoting this incentive scheme. Here is a photo of the extended warranty explanation on the card:  77% of KS households cook with more than one stove. Of those households, all respondents noted that the reason they cook with more than one stove is to cook multiple dishes simultaneously in order to save time or keep food warm such as sauce. The Project tracks customers' usage of old stoves: Kitchen Survey data indicates that of the customers who use more than one stove, 42% of respondents still include unimproved charcoal stoves as part of their kitchen regime, but not all are using them on a regular basis.

			As the Project uses a subsumed KT approach, the use of alternative stoves and fuels is already captured in the fuel-savings values.

Employment	Ugastove Employment Records, Ugastove Retailer Records	*Numbers*	As Manufacturing Partners grows, they continue to hire and employ Ugandans in administrative, sales, production and management positions. Refer to **Annexes 13 and 14** for employment information. In addition, artisan training has allowed other stove entrepreneurs to open workshops: there are several other stove manufacturers in Kampala who have opened their own businesses after being an apprentice at Ugastove. Finally, the livelihood of stove retailers also improves by an increased margin of stove sales. Partners currently have a network of more than 1,000 retailers. The jobs and emissions reductions generated by the improved stoves of other workshops were supported by carbon finance. As stated above, since July 2013 Impact Carbon's Uganda office has added nine staff members to its sales, management, and office support teams in order to support GS447. These include a Partnership Coordinator, Product Manager, and Marketing Director.
Access to Energy Services	Monthly Sales Records	*Fuel cost, consumption, ease of collection*	Impact Carbon monitors the access that Project Stoves provide for Ugandans to efficient energy technologies through sales records. In this Monitoring Period, Project Partners sell an average of more than 14,659 stoves per month, roughly 478 stoves per day. The sales record is cross-checked on a quarterly basis with production, inventory and labour records by CIRCODU. Additionally, about 77% of Kitchen Survey respondents, report that it is easier for them to meet their household energy needs with their project stove.
Lively-hood of the poor	Kitchen Surveys; Kitchen Survey (KS) Monitoring Report: **Annex 02** Ugastove Sales Records (**Annex 06**), Kitchen Performance Tests (**Annex 01a & b**), CIRCODU Charcoal Price Survey (**Annex 09**)	*Financial impact*	The Project's improved charcoal stoves continue to increase the spending power of lower income Ugandans by reducing the amount families must spend on charcoal. With the increase in fuel prices, charcoal prices have increased significantly over the past year. Poor families are forced to devote ever larger portions of their income to fuel purchase. The Monitoring KT estimates the average fuel savings of domestic users' stoves at 369 kg of charcoal per year (as stove performance for HH stoves does not degrade over time this fuel savings stays constant with age). As charcoal prices rise, fuel savings becomes increasingly more important. The average price per kilogram of charcoal has risen over the lifespan of this project: - 2010: 401 shillings/kg - 2011: 445 shillings/kg - 2012: 701 shillings/kg - 2013: 664 shilling/kg Given the current price of charcoal (based on 2013 survey data of 41 charcoal retailers in Kampala, Mukono, Jinja, Masaka, and Nakasongora), **domestic customers alone save an average of UGX 245,016 annually**. This means that, in today's exchange, **domestic customers save an average of US $100 per year.** On

			average, for all stove sizes, customers realize even more than that, particularly for those who cook more often. The results of CIRCODU's charcoal price survey can be found as **Annex 09 Charcoal Price Survey**. 83% of respondents who answered the question about how they use their financial savings said they use the savings to purchase necessities such as food, water, and clothes.
Human and institutional capacity	CIRCODU Spot Check Reports (**Annex 11**), Partner Organizational Charts and Staff lists (**Annexes 13 and 14**)	*Skill levels*	Using carbon financing, Uganda Improved Cookstoves manufacturers continue to invest in trainings that build human and institutional capacity, such as internal control systems, accounting systems, and improved manufacturing systems. Partners employ a set of recordkeeping techniques recommended by CIRCODU and Impact Carbon's business development team. Over time, partners' recordkeeping becomes increasingly robust, as the companies develop streamlined templates to track production, sales, inventory, labor and purchase of raw materials – both for carbon purposes as well as business development. This includes the comprehensive sales tracking system as well as the introduction of a serial pilot program, referenced earlier in the report. Staff Training: Partners have facilitated professional development opportunities for management staff, such as a Human Resources training course for upper management and QuickBooks training events for the finance department, including data entry staff. Manufacturing Training: Partners have been able to build capacity and provide training to day labourers to enhance their professional development. Training records can be found as part of Partners' recordkeeping.
Technological self-reliance	CIRCODU Spot Check Reports (**Annex 11**), Partner Organizational Charts and Staff lists (**Annexes 13 and 14**)	*Achievement*	Manufacturing Partners continue to innovate and improve stove technology in Uganda through research and development operations. Impact Carbon's Business Development Team continues to work with partners on recordkeeping and market development. The Makindye factory has also trained many stove builders in Kampala, many of whom are now replicating the design and are included in this project credited in the same cluster.

9. Forward Action Requests

No.	FAR	Action
Issuance 6, 1	It has been observed that the sample size for HH cooking commercially with charcoal is very low during last two issuances. It is recommended that the PP shall increase the sample size (if required) during Kitchen Surveys so as to ensure that a representative sample group for commercial charcoal stove users is reached.	KS for this monitoring period were conducted before this FAR was received. With the GS approval, the PP will implement this request with the adoption of the version 3 of the project methodology which requires a larger sample size of at least 100.
Issuance 6, 2	It is recommended that at the time of next issuance request, the PP shall demonstrate if there are leakage emissions due to increased fossil fuel consumption. The PP may capture the required information through the future Kitchen Surveys. The DOE shall also include his/her assessment for the same in the next verification report.	KS for this monitoring period were conducted before this FAR was received. With the GS approval, the PP will implement this request during the next monitoring period. During this monitoring period the majority of KS respondents that reported using fossile fuel for cooking stated that their consumption of these fuels decreased after adopting the project stove. Only four reported that their consumption increased. For future verifications, KS will include questions to facilitate the quantification of consumption changes.

Appended files list

Project Annexes

- ISS7 Annex 01A - KPT Berkeley Air 2010 Phases 1-5 [published 29 Sept 2010]
- ISS7 Annex 01B – Aging KPT Monitoring Report, 2012 [published Oct 2012
- ISS7 Annex 02 – KS Monitoring Report; Charcoal [published 2013]
- ISS7 Annex 03 – N/A
- ISS7 Annex 04 – Usage Monitoring Report, Charcoal [published 30 Jan 2014]
- ISS7 Annex 05 – Usage Survey Monitoring Report, Institutional Wood [published 22 August 2012]
- ISS7 Annex 06 – Complete Sales Record and Project Database
- ISS7 Annex 07 – Detailed Customer Database (KS Results)
- ISS7 Annex 08 – Customer Sampling Record
- ISS7 Annex 09 – Charcoal Price Survey [published 13 May 2013]
- ISS7 Annex 10 – Partner Retailer List
- ISS7 Annex 11 – CIRCODU Sales Audit Report Summary [published 2014]
- ISS7 Annex 12 (a-e) – Partner Marketing Strategies [published 2013]
- ISS7 Annex 13 – Partner Organizational Charts [published 2014]
- ISS7 Annex 14 – Partner Staff Lists
- ISS7 Annex 15 – Letter from The Gold Standard, Inclusion [published 6 April 2010]
- ISS7 Annex 16 – Letter from Gold Standard, Aging KT [published 9 Jan 2013]
- ISS7 Annex 17 – Usage Survey Data Analysis, Charcoal

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