



AFRICAN CLEAN ENERGY



African Clean Energy

Social Impact Report



SOCIAL IMPACT REPORT

Introduction:

ACE is a for-profit B-Corp certified enterprise that manufactures and sells a forced draft biomass cookstove that is capable of phone charging and lighting called the ACE One energy system. ACE operates B2C in Lesotho, Cambodia, Uganda and recently opened its operations in Kenya.

Mission:

Our mission is to eliminate the worst forms of poverty on a platform of clean energy and smartphone technology

To achieve our mission, ACE works towards providing affordable clean energy access to households earning \$2-a-day in underserved contexts across the world who would otherwise suffer the health risks of Household Air Pollution and gender related issues. While achieving this through our innovative distribution model, ACE achieves social and environmental impact including the following:

Social Impact:

- ACE provides employment opportunities in the markets we are operating in by manufacturing our product locally with light machinery and hiring local talent.
- ACE is an equal opportunity employer with over 50% female employees across operations and 10% employees with disabilities in our factories.
- In addition to clean energy access, ACE provides first time financial access to unbanked populations through interest-free loans.

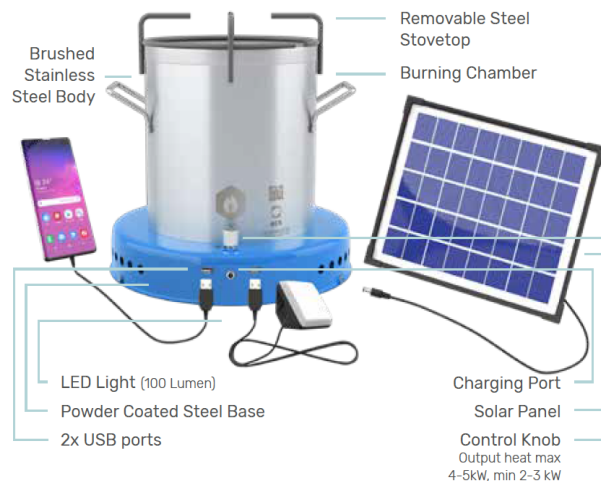
Environmental Impact:

- Reducing human reliance on wood fuel and other forms of fossil fuels creating positive knock-on effects on local natural resources
- Reducing carbon emissions associated with unsustainable cooking and energy practices

ACE's social impact report includes:

1. ACE One Energy System – Impact per unit
2. Global Impact Factsheet – Per year and Cumulative Metrics
3. Customer stories regarding their experience
4. Customer stories regarding their experience during the lockdown (Impact of COVID-19)
5. ACE Impact Survey and Results
6. References to other ACE studies

ACE One Energy System:



Impact (per unit):

CO2 emissions averted: 2-5 tonnes

Woodfuel use averted: 1.5-3 tonnes

Laboratory Testing

The ACE One has been laboratory tested by Colorado State University (2014) and Covair (2016). In these tests the ACE One consistently achieved IWA-ISO tier 3-4 standards on emissions and efficiency, and received a 'best' rating for safety with a score of 97 out of 100. This positions the ACE One as the cleanest, safest and most efficient multi-fuel cookstove in the market.

Field Testing

The ACE One has also been tested extensively under real world conditions. In a field test conducted by Berkeley Air Monitoring Group the ACE One reduced woodfuel used by at least 52% compared to traditional stoves in Cambodia, and it is estimated that every 25,000 stoves distributed avert 40 deaths and add 1,295 years of healthy life (aDALYs) from reduced cooksmoke exposure. In a longitudinal study conducted by Liverpool School of Tropical Medicine in Malawi, the ACE One reduced the incidence of cooking related burns among children by 40%.

Value for Money

The independent British think tank Chatham House has conducted an industry-wide analysis of commercially available cookstoves, comparing various models in terms of annualised costs. This study rated stoves based on their costs over time: the upfront cost of the stove divided over its useable lifespan, as well as the cost of the fuel needed to run it over that time. The ACE One is considered the most cost-effective advanced cookstove, and is even price competitive with much cheaper improved cookstoves due to its long lifespan and high efficiency.

Global Impact Factsheet: As of October 2020; Per year and Cumulative Metrics

YEAR			-> 2017	2018	2019	2020
ACE One's sold/year	1 ACE One/year	Units	6,574	3,913	4,439	5,308
<i>Cumulative ACE One's sold (units)</i>			47,159	51,072	55,511	60,819
Averted tonnes of CO₂ emissions	2.5	tonnes	16,435	9,783	11,098	13,270
<i>Cumulative tonnes of CO₂ averted (tonnes)</i>			168,629	211,994	244,775	274,435
Electrical Capacity	0.010	kW	66	39	44	53
<i>Cumulative electrical capacity (kW)</i>			222	261	305	358
Energy generated	1.825	MWh	11,998	6,506	8,101	9,687
<i>Cumulative energy generated (MWh)</i>			152,726	230,660	308,901	389,006
People breathing cleaner air	5.0	people	32,870	17,825	22,195	26,540
<i>Cumulative number of people breathing cleaner air (people units)</i>			235,795	255,360	277,555	304,095
Averted adjusted Disability Life-Years	0.05	aDALYs	329	185	230	275
<i>Cumulative averted Disability Life-Years (aDALYs)</i>			2,358	2,554	2,776	3,041
Averted deaths	0.002	people	13	8	9	11
<i>Cumulative averted deaths (people units)</i>			94	102	111	122

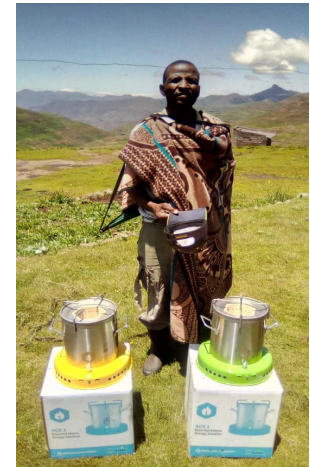
Customer stories regarding their need and experience with the ACE One



Mapitso (Customer #1), a mother of two residing in Butha Buthe (Lesotho) with a total of seven dependents. Mapitso is a guest house owner who used to spend about M850 a month on fuel (gas, paraffin and electricity), due to high fuel costs she says it was a challenge to save money to improve her business. She was first introduced to ACE One in December 2019 at a product demonstration in her village and she fell in love with it upon realizing its benefits. Mapitso

and other ladies then formed a group and purchased on credit, now she is excited about cutting her fuel expenses and the possibility of expanding her business.

Thabiso (Customer #2), from Lesotho, is a proud father of six children who are still in school. He says that taking all his children to school has created a financial burden on him and that is understandable in this economic climate. Ntate Thabiso and his children were used to collecting wood to make fires in order to prepare meals, the purchase of ACE One stove will save a lot of time used to collect wood therefore his children can now focus more on their studies.



Jane (Customer #3) is a 64-year old woman who lives in a 2 bedroom house without access to electricity, along with 2 other family members, including 1 dependent in Eastern Uganda. Jane relies on farming and struggles with charcoal energy expenses. She spends a total of UGX 50,000 on all of her fuels. Jane bought the ACE One cookstove to help her save the money she spends every month on fuel and also to allow her and her family members access solar electricity for charging their mobile devices any time for free.

Dyna (Customer #4) is a 46-year-old woman who lives with 5 other family members in a separated hut with access to electricity in Tbong Khmum, Cambodia. Dyna works as a farmer but struggles with gas and energy expenses. She spends a total of 27 USD on all of her fuel and electricity expenses. Dyna bought the ACE One cookstove to help her family save the money they spend every month on fuel and also help them access solar electricity for charging their mobile devices any time for free.



Customer stories regarding their experience during the lockdown

As shown earlier, we have kept on speaking to our customers throughout the lockdown period in an effort to understand the effect of the lockdown on their day-to-day economics and living standards. Here are a few examples of our Ugandan customers that opened up to us and shared with us briefly what they were going through.

Jessica Alupo, a banker from Kitgum said that ever since the lockdown that the government imposed to mitigate the spread of the virus, the bank decided to put some staff on leave with half pay and she was among those that were selected. This left her with very little money to survive on the fact that she had completed paying school fees for her 3 children just a week before the lockdown was announced and so she had no money on her. This rendered her unable to meet some of the bills at home like water and electricity. She actually says that most of the time she is using the ACE One for lighting her home and charging her phone. She is hopeful that as the lockdown is eased, she will be able to get a full salary and start making payments for the stove and also clear her other bills.

Sarah Abwotu from Gulu says that life has never been the same for her ever since the virus was registered in Uganda and the government announced the lockdown. It affected her side business of boda which she does as a source of extra income since she already has a salary loan which she is servicing. She says this extra income is the one that she uses to clear for the stove because her salary is already too small to survive on. Went on to say that the situation found when she had stocked her food but otherwise she would be starving. So not until the government allows motor bikes to resume work, then she won't be able to pay for the stove.

Kennedy Onen residing in Gulu runs a small business of meat roasting for which he was using the ACE One, but ever since the virus broke out in Uganda, business has been so slow in a way that there are no customers to purchase the meat that he is making and even the price of the meat increased which became so expensive for him that it reached a point and he just could not continue with it, this left him with no any other source of income and yet he had to survive. So even if he doesn't like breaching a contract or a commitment once made, this time it was inevitable not to pay for the stove when he had to buy food for the family and doesn't know how long the lockdown would stay.

These stories clearly indicate the drastic economic stress that has been brought on to ACE's customer households and their inability to repay their loans on time. This is the case for several families in such contexts throughout the world which emphasises the need for further impact and externality financing to enable enterprises like ACE to continue on their mission.

ACE impact survey and results:

During the course of Q2 2020, we executed a survey from a batch of our customers in Uganda. The survey was attempted among 923 ACE customers with a participation rate of 74%.

Among these, over 80% customers reported that they consistently use the stove - ranging from multiple times a day to in rare cases up to once a week. Among the 20% customers that reported that they do not use the stove, up to 50% of them reported the presence of a maintenance issue in the stove as the reason for their lack of usage. It is important to note here that, this issue remains unaddressed due to the low rates of issues being reported to ACE. It stems from the ease of switching back to older practices that have part of ACE's customers' regimens for years. ACE is currently working on creating prompt follow up mechanisms and creating awareness among customers about how to reach ACE's representatives for reporting such issues.

Over 80% of the participating customers reported that they use the stove regularly. The remaining participants that did not use the stove regularly mentioned that they continued with other sources for cooking. This implies the need for further measures around affordability and convenience which form the basis for the upcoming ACE Connect package.

Up to 60% participating customers reported that they "spend a lot less" and up to 87% participating customers reported that they are "saving a lot of time" with the use of the ACE One system.

In addition to these metrics, participating customers reported the recommendation of ACE One to other customers and cooking needs being met by ACE One, scores of 7.58 and 7.71 out of 10 respectively. This shows an overwhelmingly positive response to the introduction of ACE One among our customer base. With the development of the ACE Connect package and the digital integration of real-time usage data from stoves, ACE would be able to make more accurate assessments among our entire customer base that will conclusively drive business and impact.

Other studies:

1. Vianello, M. (2016). A Review of Cooking Systems for Humanitarian Settings. *Chatham House, the Royal Institute of International Affairs: London, UK.*
2. Delapena, S., Garland, C., Jagoe, K., Okada, E., Ouk, S., Pennise, D., ... & Steele, J. (2015). Quantifying the health impacts of ACE-1 biomass and biogas stoves in Cambodia. *Final Report. Berkeley Air Monitoring Group, SNV Netherlands Development Organisation.*
3. Oduro, A. R., Dalaba, M., Aligiria, R., Agao, D., Moro, A., Awaregya, J., ... & Coffey, E. (2019). *Marketing the ACE1 improved cookstove in Northern Ghana: Lessons learned from the prices, peers, and perceptions (p3) study.*
4. Conant, E., Bomba, M., Ramanathan, T., Ruiz, D., (2020). *Scaling Clean Cooking Responsibly: Tackling air pollution through a woman-centered model in Abuja, Nigeria.*

African Clean Energy BV

Willem de Zwijgerlaan 13-3
1056 JD Amsterdam
The Netherlands
www.africancleanenergy.com

Ruben Walker
Founder | CEO
ruben@africancleanenergy.com
+31 6 3383 1208