



AFRICAN CLEAN ENERGY



African Clean Energy

Social Impact Report 2021



SOCIAL IMPACT REPORT

Introduction:

African Clean Energy (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 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 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 fossil fuels, thus 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 and impact on their life
4. ACE Impact Survey and Results
5. 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 2021; Per year and Cumulative Metrics

| YEAR | | | 2018 | 2019 | 2020 | 2021 |
|---|-----------------------|---------------|---------|---------|---------|---------|
| ACE One's sold/year | 1 ACE One/year | Units | 3,913 | 4,439 | 5,308 | 7,268 |
| <i>Cumulative ACE One's sold (units)</i> | | | 51,072 | 55,511 | 60,819 | 69,790 |
| Averted tonnes of CO₂ emissions | 2.5 | tonnes | 9,783 | 11,098 | 13,270 | 18,170 |
| <i>Cumulative tonnes of CO₂ averted (tonnes)</i> | | | 211,994 | 244,775 | 274,435 | 320,250 |
| Electrical Capacity | 0.010 | kW | 39 | 44 | 53 | 73 |
| <i>Cumulative electrical capacity (kW)</i> | | | 261 | 305 | 358 | 448 |
| Energy generated | 1.825 | MWh | 6,506 | 8,101 | 9,687 | 13,264 |
| <i>Cumulative energy generated (MWh)</i> | | | 230,660 | 308,901 | 389,006 | 481,156 |
| People breathing cleaner air | 5.0 | people | 17,825 | 22,195 | 26,540 | 36,340 |
| <i>Cumulative number of people breathing cleaner air (people units)</i> | | | 255,360 | 277,555 | 304,095 | 348,950 |
| Averted adjusted Disability Life-Years | 0.05 | aDALYs | 185 | 230 | 275 | 363 |
| <i>Cumulative averted Disability Life-Years (aDALYs)</i> | | | 2,554 | 2,776 | 3,041 | 3,490 |
| Averted deaths | 0.002 | people | 8 | 9 | 11 | 15 |
| <i>Cumulative averted deaths (people units)</i> | | | 102 | 111 | 122 | 140 |

Customer stories regarding their experience and impact on their life



Salao (Customer #1), 33 year-old teacher in northwestern Cambodia, used to have to gather firewood to cook meals for her family. There are four people in her family these days, all of them are female and she is the only one who has a job in the family. Before she bought ACE One, she had to buy at least two bags of charcoal a month for cooking and wake up early in the morning just to start the fire with the stoves she was using. Salao said that the ACE One has saved her time and money by eliminating the need to gather or buy firewood and charcoal and providing free solar energy to charge the

family's phones. According to her, ACE One saves almost fifty percent of her expense on stove fuel. She loves that it lights fast and doesn't give off any toxic fumes. Above all, she mentioned that the clean-burning stove has increased her joy in spending time in the kitchen.

#costeffective #timesaving



Nil Thach (Customer #2), a mother of two kids in Siem Reap, used a normal stove with firewood prior to purchasing the ACE One. The old stove generated so much smoke and consumed a lot of firewood, as much as 2 or 3 bags (60kg) of firewood per month. After shifting to the ACE One, she only used around 1 bag and alternatively can use palm flowers or seeds easily picked up nearby instead of the firewood. She was also happy that the eco-friendly stove cooked food quicker while making less smoke.

She is now working as a sales campaigner at ACE Cambodia, promoting and reaching out to new customers. She wanted to work with ACE because she knew the advantages of ACE One as a customer and to support her family. *"The reason I want people to use this stove is that this stove saves on expenses, cooks quicker, and reduces smoke emission,"* Thach said. She has a dream to keep on working this job forever to help her family and children's education.

#eco-friendly #lessfuel #jobopportunity #fromacustomertoanemployee



Mapitso (Customer #3), 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 (i.e., 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 realising 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.

#savefuelsavemoney
#fellinlovewithACEONE

Dorothy (Customer #4), a retired nurse in Agule Palisa, Uganda, bought a second ACE One straight away after finishing paying for her first loan. She loves the ACE One as it saves her so much time for cooking. After using ACE One, she has been especially able to save money on fuel costs but also electrical costs by using the LED lamp connected with it. Dorothy emphasised how it is good for her health and it will prolong her life as it generates no smoke.. *"As a retired nurse I understand what great positive influence the ACE One has on one's lungs,"* Dorothy said, a loyal customer who bought two ACE One and shared the benefit with others.



#timesavingcostsaving
#HealthMatters



Kato (Customer #5), a businessman in Kassanja, Uganda, purchased the ACE One to boost his food business. He has been selling fried chips, eggs, and other types of food. According to Kato, ACE One allows him to save a lot on his fuel costs. With ACE One he didn't have to buy charcoal or cut down trees anymore. Instead, he could use any type of fuel that he found in his surroundings. *"With the money, I saved on fuel in one year I bought a plot of land!"*, Kato said. He promotes the ACE One, especial about how durable it is, to others because he knows the durability of the product after using it daily for over 3 years.

#amazingscostsaving
#nocharcoal

ACE Social Impact Summary:

In 2021, ACE conducted customer interviews to understand their experience and ACE One's impact on their life. According to the customers' testimonies, it is evident that many customers saved fuel costs after they started using ACE One. Most of the customers mentioned that ACE One also attributed the users to turn into alternative fuels (i.e., sticks, palm flowers, or seeds) that they can easily find near their place while reducing the use of charcoal or firewood. Some customers specifically highlighted their positive experiences with their health and admitted that ACE One reduced cook smoke exposure and would be good for their health in the long run.

In addition, the global impact factsheet as of 2021 clearly shows the economic and social impact of ACE One on the users. ACE has sold nearly 70,000 units by 2021, which averted ~320,250 tonnes of CO₂ (cumulative). ACE One also allowed 348,950 people to breathe cleaner air as well as averted 140 deaths related to household air pollution by 2021. Other research also highlights ACE One's positive impact on health (Berkeley Air Monitoring Group) and value for money (Chatham House).

Furthermore, ACE is now able to offer data-underwritten carbon offset credits to carbon buyers based on accurate measured data of ACE One users' usage patterns. This carbon revenue will be invested in scaling up an sustainable fuel supply chain to cater to ACE customers. ACE establish a pioneering virtuous cycle that transitions communities from unsustainable biomass reliance to affordable, local, and sustainable biomass fuel use.

Resources:

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.*