2024 Impact Report

Burn Design Lab

from the executive director:

Paul Means, Executive Director 2015-2024

Welcome to the 4th annual impact report for Burn Design Lab. Thank you for your interest in Burn Design Lab and your interest in the impact that we have had over the past year and earlier. It's been my pleasure and honor to have served as Executive Director of BDL for the past 9 years and I am pleased to tell you that we have a new ED in 2025.

I was elected to the role of Executive Director by the Board in December of 2015. I had made several mission trips installing improved cookstoves in homes in villages in the remote highlands of rural Guatemala. This gave me a profound first hand understanding of the huge burden that billions of people in the developing world suffer through each day simply to cook their meals. When I took an early retirement from Weyerhaeuser company in 2012, I looked to see what opportunities might be available in the field of improved cookstoves. Providentially, I learned of an opening at BDL for a Research and Testing Manager – A position that I held for nearly 4 years before becoming the Executive Director.

For the first several years of BDL's existence we operated on a shoestring. Every expenditure over $5 was scrutinized, and the organization was a combination of retired senior engineering types – such as myself and Lou Fezio, together with a handful of interns. BDL couldn't afford to hire any regular engineering staff. But then, as now, invariably all the staff was totally dedicated to the mission of BDL. I think that is one thing that has helped to sustain the organization – a crucially important mission that people are drawn to.

The primary focus in the first 3 years or so at the organization was the development of the Jikokoa charcoal stove. The amount of work involved in developing that stove is hard to believe. Iteration after iteration of the design, and 100's and 100's of performance tests – all to make sure that the stove functioned optimally for the users and that it was durable, and that the production costs were kept low. Our team has applied the same dedication to every project since.

Now thinking about the future, I am proud seeing the organization as it is now, with a strong team, including leadership, staff, and volunteers. And the impact that we have had and continue to have. People at the "base of the pyramid" are the ones who have far and away the most difficult lives. And yet they are the ones to suffer the most due to climate change, war, and government cutbacks. But as long as we focus on doing our best to meet the needs of these families, I don't think we have much else to be concerned about. We are driven by our concern for people – the cooks (mostly women) who cook on open fires or with unimproved stoves. We are making a lasting impact by designing the highest performing stoves we can and by helping local companies to be both sustainable and more and more successful at producing quality, cleaner burning cookstoves to the communities that need them the most.

After 9 years as Executive Director, I am stepping down and in 2025, Jeremy Su has transitioned into the interim leadership role. Jeremy is a remarkably capable and has thoroughly proved himself over the past 5 years. Professionally, am looking forward to spending more time mentoring young engineers and interns, and personally I look forward to spending more time with my children and grandchildren, bike riding, getting the yard and house in better shape and spending more time traveling with my wife. As for my time as ED, I am deeply grateful for the support of our board members, the staff, volunteers, our partners, and all our faithful financial supporters. Together we are making good things happen, and I have total confidence that Burn Design Lab will flourish and have even greater positive impact under Jeremy Su's leadership.

the problem:

For two billion people, cooking is a daily hazard. Women prepare meals using biomass fuels over open fires, exposing themselves and their families to dangerous levels of toxic smoke. The daily search for fuel degrades the local environment and allows little time for outside work, education, or rest, leaving women and girls trapped in a cycle of economic hardship and poor health.

our vision:

We want women in the developing world to live better, healthier lives through improved access to cleaner-burning cookstoves.

Burn Design Lab's mission:

BDL improves lives and protects the environment through the research, design, and development of outstanding cookstoves.

our current board and leadership:

Jeremy Su
Executive Director

Paul Means
Vice President

Aaron Nyarkotey
Country Director, Ghana

Jonathan Posner, PhD
Board Chair

Board of Directors
Susan D. Reed MD, MPH

Sarah Agbey

Leslie Cordes

Ricardo Sitchin

Arie Verloop

Bob Powell

Greg Heath

where we work:

Our lifetime impact:

5 Million Stoves Produced
25.6 Million individuals impacted
15 Million tons of estimated firewood reduced
26 Million tons of estimated CO2 reduced

our project highlights

2024 impact at a glance

Wonder Institutional Stove

Sierra Leone

With support from BDL, in 2024 Westwind Energy produced 27 institutional stoves deployed in 13 schools

In many low- and middle-income countries (LMIC), school meals are prepared on open fires that consume enormous amounts of fuelwood. These same “three stone fires” harm the female cooks and children’s health due to exposure to smoke and burns. In Sierra Leone, a local manufacturer, Westwind Energy (WWE) has developed an institutional stove to address these issues. WWE came to Burn Design Lab in 2022 for help improving the stove’s efficiency, durability, ease of manufacturing, and lowering the cost. BDL is also working with WWE to help design a system to bring the manufacturing rate up to 500 stoves per month vs. the current rate of 20 stoves per month.

In 2024, your support helped BDL bring the improved institutional stove design into production at partner Westwind Energy’s factory in Sierra Leone.

Our new design boasts over 40% thermal efficiency and practically eliminates harmful smoke exposure to the women and children inside. Our team of engineers traveled to Sierra Leone in October-December to transfer this design over to the WWE team and implement the interim manufacturing process, preparing the team to reach full production in 2025. Together with WWE, BDL improved the stove design and production processes resulting in reduced material costs and manufacturing time, higher product quality and consistency, and increased production capacity.

“Cleaner kitchens mean healthier cooks and well fed children.” – Hawa, Sierra Leone

Shea nuts are grown and harvested across much of West Africa. Hand-crafted Shea Butter is a multi-billion-dollar industry, and most of the processing is done by women who get paid very little. The current process for roasting shea kernels needs improvement to address significant health and environmental shortcomings, including high fuel consumption and unhealthy particulate emissions, and inconsistent roasting quality. BDL has been developing this improved technology since 2018, and **thanks to years of support from our donors, foundation supporters, team, and partners on the ground, our improved shea roaster has finally reached the market.**

our work:

BDL wrapped up the year-long USAID Market Systems and Resiliency Grant activity mid-2024, transferring the BDL design for our improved shea roaster to our partner SAYeTECH in Ghana. Together, we completed production of 42 roasters under this grant in 2024 and implemented this safer and healthier technology in shea butter cooperatives in northern Ghana. BDL continues to work with our partners to produce, implement, and monitor our improved shea roasters in Ghana and West Africa.

Following on the awards and recognitions of our improved shea roaster design in 2023, BDL was awarded the UN Innovation Challenge Award in 2024, and Jeremy presented at the UN Science Technology and Innovation Forum at the UN Headquarters in NY on behalf of BDL.

2024 Impact:

– **42** roasters produced locally in Ghana

– Improved roasters used across **12** Shea Cooperatives

– The lives and livlihoods of **1,653** women positively impacted through the use of BDL improved roasters

Improved Shea Roaster

Ghana

Sala Makala Stove

Democratic Republic of the Congo

One out of 72 persons in the DRC die of illness due to excessive exposure to smoke. IMA World Health, an international non-profit, embarked on the application of a gasifier stove as a solution to multiple health, environmental, and socio-economic challenges in the DRC. BDL is working with IMA DRC to reduce fuel consumption by improving the efficiency of the original Top Lit Up Draft Sala Makala stove (TLUD) while reducing both particulate and carbon monoxide emissions exposed to the users. BDL's work and collaboration with IMA in 2023 and 2024 could not have been possible without our donors and the Osprey Foundation.

our work:

After improving the performance of the stove design in 2023, our team finalized the design of the stove for usability and appearance. Our team completed the component design and production tooling design for the handles, the feet, and the pot supports. Later that year, our team finalized the production tooling design and had it machined out of hardened steel for full time production in the DRC. The tooling is now in the DRC and waiting for the next production round to commence.

our impact:

Over **40%** thermal efficiency
Reduced particulate matter emissions by **36%**
Reduced CO emissions by **20%**
Increased stove stability from new stove leg design
More ergonomic and **temperature resistant** handles
Reduced manufacturing **time**

The durability of a low-cost ceramic stove is important when considering both adoption and impact of a new product. Thus, in 2024 BDL evaluated 9 different clay and additive compositions for their modulus of rupture after thermal cycling – a procedure replicating users cooking a meal on a ceramic stove then putting the fire out with water. These results inform our team of the expected durability of ceramic compositions if they were to be used in a stove. Our engineering team of staff and volunteers continue to design and test cookstove prototypes, including those manufactured using 3-D printed forming dies.

BDL is planning to pilot the low cost ceramic cookstove design and production system in West Africa in 2025.

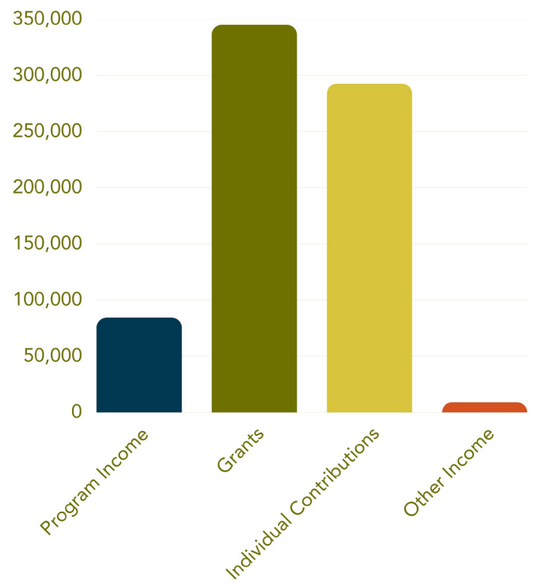
"Low Cost cookstoves help bridge the gap between average clean cookstove costs ($45) and the nearly 700 million people living in extreme poverty (less than $2.15 per day) globally.

Ceramic Stove Research and Development

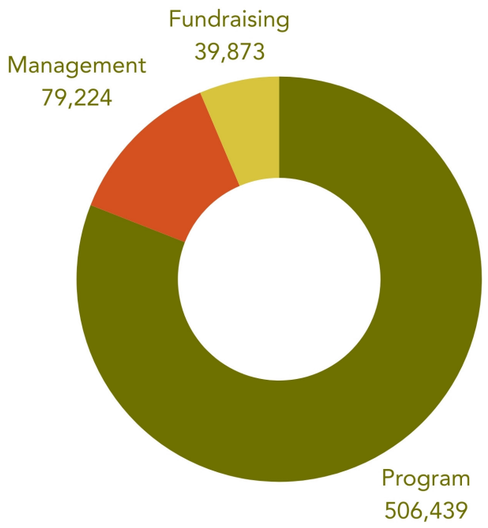
The lack of access to clean cooking necessitates a multifaceted approach of research, development, and manufacturing at scale. The 'improved cookstove' has been around for many decades, acting as a solution to the global issue of household cooking over open fires which causes indoor air pollution and degradation of local forests. However, many stove models are still simply too expensive for the world's most impoverished households and those who stand to benefit the most from cleaner burning cookstoves. As a solution, Burn Design Lab is researching and developing a low cost ceramic stove made out of locally sourced materials and that can be produced with low-capital investment technology. BDL aims to develop an affordable stove accessible to those at the bottom of the economic pyramid.

2024 financial statements:

Income: $730,852



expenses: $625,536



2024 major awards and grants:

UN Innovation Challenge

USAID Grant, Market Systems and Resilience Activity

F5 Tech 4 Good Grant

our supporters:

Sitchin Family Foundation

OSPREY FOUNDATION

USAID FROM THE AMERICAN PEOPLE

Wildwoods Foundation

our global partners:

Westwind Energy
Burn Manufacturing
IMA World Health
SAYeTECH
CMG
Fuego Del Sol

burn
DESIGN LAB