

Recipe for Success

Lessons from Acumen's
Cookstove Investments



RVE.SOL, Kenya

SPRING 2023



Acknowledgments

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Foreword



Foreword

It is exciting to capture here some of the key lessons that Acumen has gained from investing in modern energy clean cooking companies.

Loughborough University partners with Acumen under the Modern Energy Cooking Services (MECS) program, a five year program funded by the United Kingdom Foreign, Commonwealth and Development Office (FCDO). MECS aims to spark a revolution through rapidly accelerating the transition from biomass to modern energy cooking on a global scale.

This report illustrates the essential role that Patient Capital can play in supporting the scaling of modern energy cooking. Statements such as those below show how positive the interventions can be to both consumer and provider;

“But adopters love them ... Respondents were enthusiastic about the reduced cooking time, time savings on firewood collection, and improvements in the household air quality.”

“The clean cookstove sector has been one of the most impactful, and is the most profitable, sector that Acumen has invested in. ... Acumen’s multiple on invested capital (MOIC) for our cookstove investments is 3x higher than our historical portfolio average.”

Yet the report is also realistic, acknowledging the many challenges that the sector has faced; challenges where even the viability of some of Acumen’s investees has, at times, been in question.

Recent years have been difficult. The impacts of COVID, energy price rises and disruptions in supply chains have been day to day realities for these companies. So, it is heartening to see how Acumen’s investees have been able to overcome these challenges and grow strongly. The report takes us on a tour of the key issues and illustrates the essential role that patient investment can play in supporting the scaling of modern energy cooking.

In the report Acumen also highlights the importance of carbon credits. They contextualize their comments by noting that “sub-Saharan Africa (outside of South Africa), has produced a half percentage point of historical emissions, but is frighteningly exposed to climate change.” They quote a University of Chicago study that showed that “one third of cookstove benefits accrue to all of us.” They further demonstrate that their investments have mitigated at least 18 million tonnes of carbon dioxide, equivalent to taking half a million cars off the road for the last eight years.

This is why this report is so valuable — it describes the realities of patient investing in a difficult global context, and points to a future where clean cooking not only dramatically improves the lives of millions, but also contributes to our common goal of mitigating climate change.

Ed Brown, Professor of Global Energy Challenges, School of Social Sciences at Loughborough University

Executive Summary



Executive Summary

Acumen has spent the last 15 years investing in energy access. Often, that “energy” is associated with lighting and electrification. But, the place where households consume the most energy is in the kitchen: In Africa, cooking with unprocessed biomass (mostly wood and charcoal) accounts for over half of total energy consumption, and in India, it is one third.⁴ Over 2.4 billion people around the world lack access to clean cooking and have no choice but to burn wood and charcoal that is devastating for health, livelihoods, and the environment.

From 2015 to 2019, Acumen invested in five companies that changed the way cookstoves were made, sold, and used throughout the world. These investments have become one of the most impactful and profitable sub-sectors Acumen has ever invested in. These five companies have:

- Sold a collective 3.8 million stoves and impacted 21 million lives.
- Saved customers hundreds of millions of dollars in fuel and health costs.
- Mitigated 18 million tons of carbon dioxide.

We cannot overestimate the importance of carbon finance for the cookstove sector. The push for “net zero” and the resulting demand to buy carbon offsets through carbon credits, means high-income countries are (finally) beginning to pay for the damage done to the environment. And, because of the strong documentation for environmental impacts of its products, the cookstove sector is one of the biggest beneficiaries.

Revenue streams from carbon finance enables cookstove manufacturers to recoup the costs of scaling more quickly and reduce the price of their products to be affordable to poorer segments of customers. This revenue boost also enables these companies to accelerate innovations in sustainability, such as cleaner fuels and more accurate monitoring, that will only supercharge this dynamic.

- With a portfolio of dynamic and rapidly scaling businesses, Acumen has important lessons about selling affordable, high-quality stoves to people in poverty:
- Partnerships are essential to market successfully to low-income customers and to distribute cookstoves at scale.
- Listening to customers and incorporating their feedback is essential to not only sell products but also to design products that people will use frequently.
- There is no substitute for grit and passion. The entrepreneurs we invested in have only succeeded because of their commitment to solving the problem of clean cooking for people in poverty.

Executive Summary

Cookstoves are one of the great success stories of Patient Capital. We invested at a time when little equity was going into cookstoves, and few believed market provision could solve the problem. We persevered with our companies, working with them to document the social and environmental impact, and arrive at the right business models for growth. Now, thanks to carbon financing, the time has come to take this success to a global scale.

The clean cookstove sector, per a recent Modern Energy Cooking Services (MECS) program report, “is still considered by many to [be comprised] of country-level producers of low technology cookstoves. This perception has contributed to the sector remaining relatively marginalized amongst the majority of capital providers and development finance institutions.”

This needs to change. We need to integrate modern energy cooking into national-level strategies, accelerate impact-linked capital into the sector, and fund last-mile distributors who can bring these products to the people who need these products the most.



Introduction



Cleaning Up Cooking

Two billion four hundred million people do not have access to clean cooking.² They cook with polluting fuels such as firewood, charcoal, or dung. Inefficient cookstoves generate high levels of air pollution (particularly indoors), waste time, and are a serious hazard to the people that use them, mostly women and girls. Over three million people die every year from indoor air pollution.³ The reliance on biomass and inefficient cookstoves is driving deforestation in areas that are already struggling with the effects of climate change. In sub-Saharan Africa, where 95% of residential energy use comes from wood and charcoal used for cooking, fuelwood gathering is the number one cause of forest degradation.^{4,5}

Since 2015, Acumen has invested over \$6 million in five companies that are transforming the way households cook through improved cookstoves and access to cleaner fuels: BioLite, BURN Manufacturing (BURN), Green Energy Biofuels (GEB), Greenway Grameen (Greenway), and KopaGas.⁶ Four of the companies operate(d) primarily in

sub-Saharan Africa (BioLite, BURN, GEB, and KopaGas), while Greenway operates in India.

In 2020, Acumen and Loughborough University embarked on a partnership under the Modern Energy Cooking Services (MECS) program, funded by the United Kingdom Foreign, Commonwealth and Development Office (FCDO), to address the lack of capital invested in the clean cooking sub-sector and to investigate how to rapidly accelerate a transition from biomass to genuinely “clean” electric or gas cooking. The project aimed to support five of Acumen’s current investees who were already exploring or piloting modern energy cooking solutions (gas or electric cooking) as part of their product suite, through the provision of technical assistance grants and investment capital to further support the growth of the sector.

In this retrospective, we summarize the key lessons we have learned from our investments as well as our work with MECS, then share our perspective on where the market is headed.

TABLE 1: ACUMEN’S COOKSTOVES INVESTMENTS BY YEAR

2015	2016	2017	2018	2019	2020	2021	2022
BURN	GEB		KopaGas	BURN (Follow)	KopaGas (Follow)		BURN (Follow)
BioLite	BioLite (Follow)						Greenway Grameen (Initial Exit)
Greenway Grameen	BURN (Follow)						

Context



A Market-Based Approach to Clean Cooking

Acumen made its initial investments into the cookstove sector in 2015, a year after a World Bank report declared that “three decades of efforts to promote both modern fuels and improved biomass stoves have seen only sporadic success.”² Socially-minded entrepreneurs had been tinkering with improved cookstoves since the 1940s, and aid organizations had put substantial resources into manufacturing and distribution. But outside of China (see inset) there were few successful initiatives. One of our founders characterized the situation around 2010 as there being “more reports about cookstoves than actual cookstoves sold.”

The idea of investing in clean cookstoves was a new and exciting one. There had always been local markets for artisanal stoves. But the development sector was beginning to transition from a project model of distribution, where governments would fund contractors or NGOs to hand out free or low-cost stoves, toward a venture strategy of relying on private enterprises to sell improved cookstoves to customers who were willing to pay.

Acumen’s investments marked an important part of that shift (see Chart 1). By becoming early shareholders in multiple clean cooking ventures, we (a) gave entrepreneurs the Patient

Capital they needed to refine their models, and (b) signaled that this was a sector that warranted real commercial interest. The size of our portfolio is tiny compared to current funding rounds; the important element in our investment was taking the risk of investing in the sector’s nascency.

The last seven years have been a tremendous journey for Acumen. We have worked closely with our portfolio companies and watched them grow into engines of impact.

China National Improved Stove Program

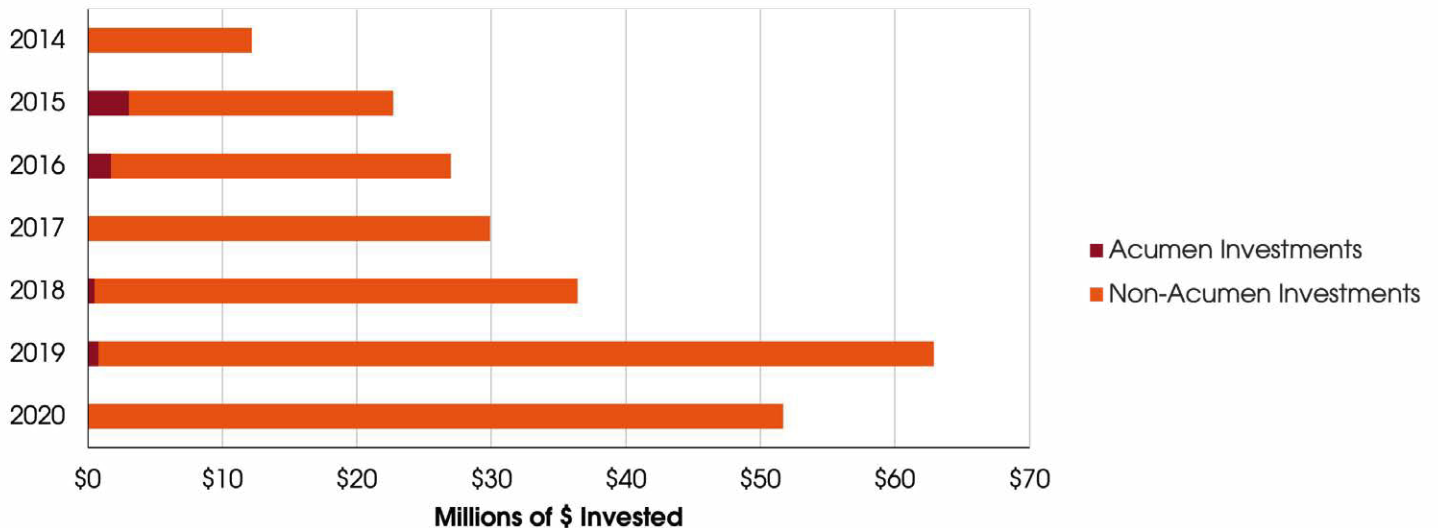
Between 1982 and 1992, China installed improved biomass cookstoves in almost 130 million households. The China National Improved Stove Program (CNISP) remains by far the largest and most cost effective cookstove program ever implemented.

Two factors which drove success are worth considering:

- Start small and well. CNISP started off with pilots in 90 counties that bid for the project, and had the technical, financial, and material resources to succeed. Additional counties were added annually once results were proven, but the program did not rush to scale in difficult areas.
- Embrace commercial solutions. The government’s funding role was relatively minor (perhaps 15% of all project finance flows). Households paid full cost for their stoves, and rural energy companies were established to handle distribution, marketing, and service.

Sources: [Smith et al \(1993\)](#), [Khopkhar \(n.d.\)](#)

CHART 1: TOTAL DEBT & EQUITY INVESTED IN COOKSTOVE SECTOR, 2014-2020



Acumen has:

- Doubled-down on organizations demonstrating scale and financial sustainability
- Deepened companies' understanding of impact on the end customer
- Helped companies to unlock capital to grow their impact, including through voluntary carbon markets
- Provided technical assistance grants to enable them to experiment with new products and refine their business models

The clean cookstove sector has been one of the most impactful, and is the most profitable, sector that Acumen has invested in. Our investees have sold over 3.8 million stoves and reached 20 million lives. They have created thousands of jobs, demonstrated local manufacturing capacity, and literally made the air more breathable. A key part of that social impact is their ability to build financially sustainable operations. **Acumen's multiple on invested capital (MOIC) for our cookstove investments is 3x higher than our historical portfolio average, although**

much of those returns remain outstanding.

Clean cooking has been a classic case study for the effectiveness of Patient Capital. Early-stage equity, combined with an impact-linked subsidy in the form of carbon finance, has helped to build a sector that is delivering incredible impact and impressive returns, among the greatest we have seen in our work.

Yet despite impressive success, additional capital has not followed into the sector at the scale needed. Although overall capital (including grants) in the clean cooking sector has grown in recent years, reaching \$71 million in 2019 and \$61 million in 2020, this is orders of magnitude less than the \$4.5 billion needed annually to achieve universal access to clean cooking by 2030.⁸

As the sector shifts towards modern energy cooking, the complexity of the sector is shifting as well. We will always need innovation around products and business models, but there is also a growing need for well-funded, capable distributors to deliver cooking solutions to low-income customers. We hope our lessons can help the next generation of companies, and investors.

Acumen's Lessons



RVE.SOL, Kenya

1. Selling high-quality stoves at affordable prices requires keeping costs low, subsidies, and listening to customers.

Access to clean cooking is a spectrum, not a binary. Energy Sector Management Assistance Program (ESMAP) has developed a Multi-Tier Framework for assessing access to clean cooking, based on availability, affordability, safety, convenience, efficiency, and exposure.⁹ Acumen has been exposed to virtually every type of cooking technology (wood, charcoal, liquified petroleum gas (LPG), electric pressure cookers (EPCs), ethanol), and there is considerable variation between our companies' product portfolios. BioLite manufactures and sells a range of solar and cookstove products. BURN makes and markets a variety of cooking technologies that cater to different customer segments (from firewood to charcoal to electric pressure cookers), while Greenway and KopaGas (now Circle Gas) each manufacture and sell one core product/service: firewood cookstoves and pay-as-you-cook LPG, respectively.

Yet the vast majority of our companies' sales have come from improved biomass cookstoves (wood and charcoal). This is not an outlier; biomass cookstoves still make up 69% of total revenues in the clean cookstove sector.¹⁰ Biomass stoves have several advantages: they cook with open flame, which limits the behavior change required for the customer. They rely on well-established fuel sources (fuelwood and charcoal) and work with customers' existing cookware. They are the most affordable option; and yet, the main barrier is still convincing a customer to pay for them. Their disadvantages will be covered in the next lesson.

In rural areas, any stove that looks to replace three-stone cookfires or cheap ceramic charcoal stoves must be affordable for low-income customers, perform consistently in harsh conditions, be of high enough quality to establish a trusted brand, and offer sufficient value to induce customers to spend their hard-earned money.

Almost every company Acumen has invested in (cookstove or otherwise) has dealt with this inherent tension of providing a high-quality product to people who can afford to pay very little. The cookstove sector is an extreme example, where some customers (e.g. those using three-stone wood fires) have never paid money to cook before. Even customers who are willing to pay something rarely assign the same value to those cookstoves as economists think they ought to. A recent study on Kenyan charcoal cookstoves found that "despite fuel savings of \$237, households are only willing to pay \$12 (for an improved biomass cookstove)."¹¹ BioLite and BURN both had negative gross margins on early versions of their products, because they were selling at the only price the market would bear.

In short, stoves are not a luxury product, and affordability is non-negotiable. Providing both affordability and quality requires:

- **Cost Control.** The narrow margins of cookstove sales provide no room for error. This leaves businesses vulnerable to sudden shocks. Both BioLite and Greenway's cookstoves sales were impacted when import duties and taxes (respectively) were hiked.

Keeping costs down without compromising quality is a vital challenge. One route that has worked for several companies is to localize their own product manufacturing. This has enabled

companies to minimize manufacturing costs, iterate designs faster, capture more of the product margin, and maintain quality.

- **Scale.** Small-margin stoves are a volume play. Biomass companies did not become profitable until annual stove sales exceeded 100,000. This was also the threshold when companies were able to leverage voluntary carbon markets and begin selling to carbon developers.
- **Subsidy.** Even with rigid cost control and widespread scale, willingness to pay remains low for entry-level products. Each of our investments only found their way to sustainable unit economics through a combination of higher-margin products and/or subsidy. BURN has leveraged carbon offsets to build its business, and has seen traction on the revenue coming from carbon credits or related projects. BioLite has used a combination of carbon and a diverse product portfolio, anchored on solar home systems. Greenway turned its business around when it focused on selling larger, higher-margin stoves.

In Africa, at least, it is likely that some level of subsidy will continue to be needed for charcoal and certainly wood cookstoves. A

wholesale transition to modern cooking will require significant subsidy as well. Luckily, the carbon markets are beginning to provide that, and some of that revenue is making its way to the end user.

- **Listening.** Food is not just calories, it is culture. Everyone has preferences for how heat should be harnessed to create a meal, and how food should taste. Successful companies listened to customer feedback, and revised products accordingly. This is the inherent advantage of a market-based solution; companies need to make a stove that people are willing to buy, or they cease to exist.

Sometimes customer preferences surprise us. Time and again customers preferred larger cookstoves than we thought they needed. Ankit Mathur, the CEO of Greenway, compares it to Americans buying pickup trucks: “do you actually need all that (capacity), every day? No, but people want to have it when they need it.”

Nor are customer preferences immutable. A huge part of selling stoves is convincing customers, often through demonstration, that their food can taste just as good on a new stove.

2. Modern energy has the potential to transform the cooking sector, but many companies are still early in their journey.

Improved biomass cookstoves are productive, but they are not the ultimate solution. More efficient combustion reduces household air pollution, but it does not eliminate it. Few companies control the fuel supply of charcoal or wood, meaning that forest degradation continues, albeit at lower rates. To move towards a cooking sector that is genuinely clean and sustainable, we need a complete shift towards modern energy cooking, meaning electric or gas stoves.

Acumen partnered with MECS to support five portfolio companies¹² with technical assistance (TA) grants that enabled them to experiment with Electric Pressure Cookers and liquified petroleum gas stoves. These experiments included (a) testing willingness to pay, (b) understanding the impact that electric cooking can have for power providers (such as mini-grid operators), (c) piloting various methods of financing, and (d) different forms of subsidy. Across these pilots, we learned the following lessons about modern energy cooking:

- **Behavior change is an upfront barrier,** particularly for technologies like EPCs that change the ways people cook. This could mean that less disruptive tech, such as LPG or induction cooking, might have an edge. Or it might mean more users combine different technologies ('stacking'). Few, if any, readers of this report have just one stove. Why should low-income customers be different?



- **But adopters love them.** The average Net Promoter Score across our projects was 50, meaning that many users are prepared to recommend the products. Respondents were enthusiastic about the reduced cooking time, time savings on firewood collection, and improvements in the household air quality.
- **Fuel costs and electricity tariffs are critical factors with modern energy cooking.** Research has shown that modern energy reduces the cost per meal cooked.¹³ But users may experience those costs in different ways. Prepaid electricity users, for example, see the cost of e-cooking in real-time as their credits tick downwards, while gas users may see wild price fluctuations. The key, as with biomass stoves, is to make appliances as efficient as possible, which will lower costs and drive usage.
- **Creative subsidies are needed, especially in rural areas.** Affordability was already a serious concern with less-expensive biomass stoves. Modern energy cookstoves can cost 5x more

than biomass stoves. For modern energy cooking to make a dent in rural Africa, substantial subsidy is going to be needed, both carbon-based and otherwise. Innovative power companies are experimenting with both asset and tariff subsidies to make modern energy cooking affordable.

Many of the early adopters of modern energy cooking will be in urban areas, where there is greater ability to pay. This creates more possibilities for 'tool-and-fuel' models (LPG, ethanol, pellets) that allow customers to acquire a stove, then pay in small increments for fuel consumption. But stoves must still be competitively priced, while offering sufficient value to motivate a shift. And once a sale is made, companies need the storage and distribution infrastructure to continuously supply that client. One notable setback for an Acumen investee came when the company was unable to guarantee sufficient fuel supply to meet demand, leaving frustrated customers with a stranded asset. There is huge potential for tool-and-fuel models, but the sale is only the beginning.

3. Scale in clean cooking has come through distribution partnerships.

Across our portfolio, many companies began with a vision of selling direct to customers, but all saw some pivot to strategic partnerships. A minority of sales have been made from an Acumen investee direct to a consumer. The vast majority of sales have been B2B, where stoves are sold wholesale to distributors or retailers, who then sell to the final customer.

Knowing that, one core question for a product company is whether to invest in brand-building through above-the-line (ATL) marketing such as TV or radio ads to build name recognition, or to rely on below-the-line (BTL) marketing techniques like community demonstrations, door-to-door sales, and referrals. The right decision depends on market context.

Greenway initially invested in an ATL strategy, trying to push sales through retail channels by creating a brand with advertising. But they did not see returns on that kind of brand-building. Customers did not care which the brand was behind their stove; they only wanted to know if it worked. Proving its workability was far easier, and much less expensive, through in-person demonstrations. Ankit said, "we realized that spending capital on chasing customers doesn't work. There's no lifetime value if you're only selling one product."

So in a competitive market, relatively few stove customers know the name 'Greenway,' but they know Greenway's partners. Partnerships with microfinance institutions (MFIs) allow Greenway to access large numbers of customers, and

to do so with a stamp of approval from an intermediary that customers trust (the MFI). Greenway's agents conduct demonstrations at MFI group meetings, and interested customers can apply for a loan to pay for their stove over time. Greenway then shares some of the stove revenue with their partners.

BURN, on the other hand, had more success with ATL. Customers in Africa are more dispersed and therefore expensive to reach, on average. So BURN's degree of involvement varies more, including arms-length sales to third parties. BURN spent heavily on advertising early on, with Kenyan actress Wilbroda becoming a recognizable face of the company. Once the brand was well-established, they scaled back that kind of expensive advertising and focused on more demonstrations with partners. BURN retains high name-recognition in Kenya, and sells its products through a diverse array of partners, including supermarkets, banks, MFIs, and pay-as-you-go solar companies.

While partnerships are critical, we have also seen them lead to volatility in revenues, long cash cycles, and customer care issues. Large-scale retailers do not always pay on time, and cash conversion cycles for our companies have sometimes exceeded 100 days. Nor is there any guarantee that a partner will remain committed to cookstoves, or even solvent, year-over-year. Our companies have been turned upside down when partnerships (and partners) unexpectedly dissolved. Diversification is crucial, and a massive risk if ignored.



Two changes are unfolding that will impact partnerships going forward. The *first* is carbon finance: how revenues from voluntary carbon markets are shared throughout the value chain is still being settled. Currently, stove manufacturers or project developers (who generally are the ones listing and verifying the products) receive the bulk of the carbon revenue. Yet last-mile distributors are crucial to scaling clean cooking, and their ability to grow will depend on the share of carbon revenue they receive.

The *second* is the growth of electric and gas cooking options, which are necessitating a new wave of partnerships. Pressure cookers and induction ranges can increase power consumption for electric utilities and mini-grid operators in sub-Saharan Africa, who require substantial subsidies to connect low-income households.¹⁴ Research from CrossBoundary showed that minigrids which offered appliance financing (with electric pressure cookers being the largest category) saw 48% higher electric consumption per user.¹⁵ But the logistics of distribution, consumer finance, and after-sales service are a tricky fit for power providers. Partnerships between cookstove distributors and utilities can unlock growth for both, but will require time, patience, and multiple iterations to get right.¹⁶

4. The impact of clean cooking is deep, broad, and affects all of us. Monetizing that impact through carbon finance is transforming the sector.

Our companies have collectively sold almost four million cookstoves, impacting the lives of 20 million people. They have employed well over a thousand people, built up local manufacturing, and created cleaner air for millions of families.

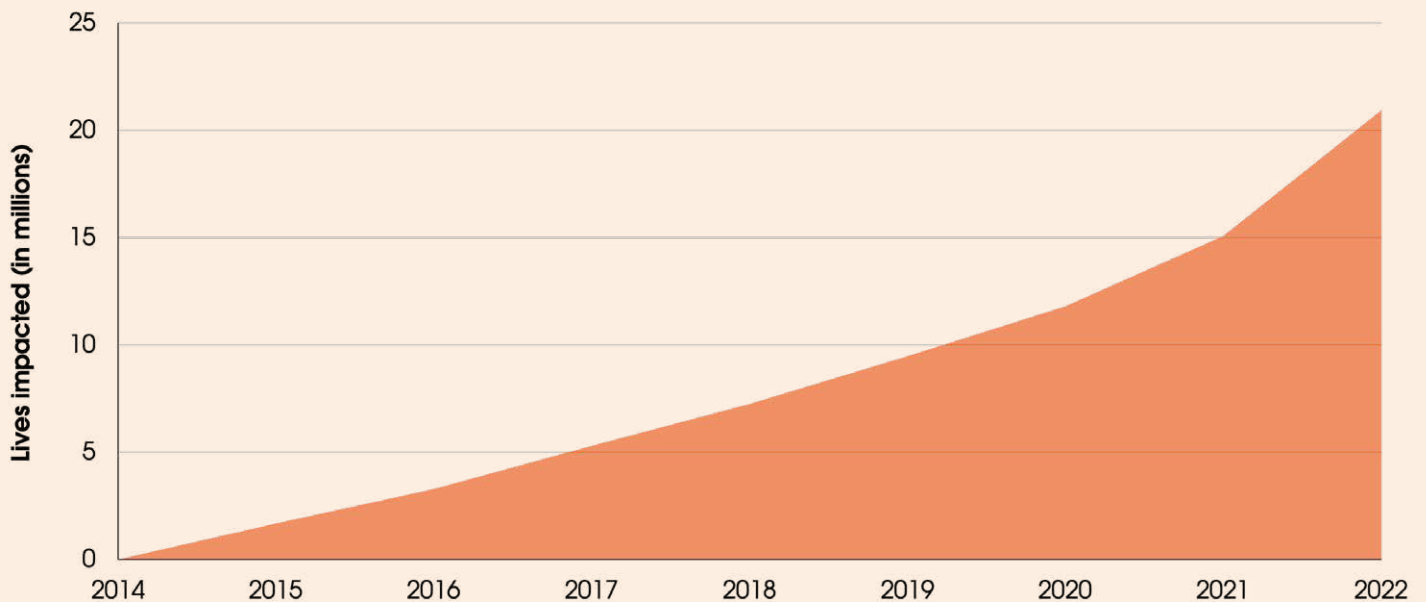
“...Before I bought the Jikokoa my daughter was sick almost everyday. She is asthmatic so the smoke was affecting her chest. But since I bought (it), her health has really improved...”

– BURN Customer

And the household-level impact has been deep as well as broad. A study by University of California, Berkeley and University of Chicago, published in 2022, showed that BURN's charcoal cookstove reduced fuel consumption by 39% and generated \$700 of benefits over two years for customers in Kenya, of which:

- \$214 was financial savings on reduced charcoal
- \$221 was time savings from less time spent cooking and gathering fuel
- The remainder, \$265, was environmental benefits from reduced emissions¹⁷

Extrapolated just for BURN's sales, that equates to hundreds of millions of dollars in customer savings. If the same impact held across Acumen's portfolio, that would be over a billion dollars in time and fuel savings created by companies.



“These days it is hard to find charcoal or even buy it because it is very expensive. But with this stove I can look for five pieces of firewood, cook with them and when I am done, I put them aside to be used another day.”

– BioLite Customer

The rigorous measurement of cookstoves' impact can be traced to the sector's roots in academia and international development. That measurement has enabled perhaps the largest experiment to date in monetizing impact: carbon finance.

We cannot overstate the importance of carbon finance to the cookstove sector.

The climate crisis is the classic example of negative externalities being unaccounted for in a push for economic growth. Historically, sub-Saharan Africa (outside of South Africa), has produced a half percentage point of global emissions, yet it is frighteningly exposed to climate change.

If we want to fill gaps and address inequality, the cost cannot be borne by the people who have suffered from historical injustices. Look at aforementioned study: one third of cookstove benefits accrue to all of us through environmental benefits. In cookstoves we see an acknowledgment that people in poverty should not bear the full cost of the carbon transition. It's only right that all of us pay for those benefits, and the world's poorest people receive them.

The benefits of carbon finance flow to our companies and their customers.

Improved cookstoves reduce the demand for fuel, which in turn reduces deforestation. For charcoal, which requires wood burning during the production phase, the benefits are even stronger. In total, our cookstove investments have mitigated at least 18 million tons of carbon dioxide, equivalent to taking half a million cars off the road for the last eight years.

Women and Clean Cooking

Investing in cookstoves means investing in women, at a customer and company level.

Women are the overwhelming majority of cookstove users. They are the ones tasked with sourcing firewood, they cook the meals, and they inhale the smoke. The benefits of improved cookstoves and clean cooking likewise are felt by them. Improved biomass cookstoves save time and reduce smoke; electric cooking eliminates smoke altogether.

Cookstove companies in our portfolio have been agents of change: convincing male heads of households to invest in products that benefit women. They have employed women as agents and factory workers. One case study found that 54% of BURN's staff was female, compared to a 17% average across manufacturing firms in Kenya.^a Investing in products that improve the lives of women is a critical aspect of Acumen's work.

^awPower (2019)

Burn Manufacturing Case Study

Our companies have been able to monetize that impact, cumulatively raising tens of millions of dollars in carbon finance. Carbon credit sales on voluntary exchanges make up a meaningful percentage of cookstove-related revenue for several companies, as well as sales to

carbon project developers. More sophisticated carbon deals have followed, including some that allow companies to access capital in advance of distribution, enabling investments in manufacturing capacity and working capital.

Credit buyers are paying for impact: carbon credits only accrue when the stoves are used. This strengthens the need to sell a quality product; it also creates a moral imperative to use carbon funds impactfully so that the user receives a portion of the benefit. That is what we've seen: companies are using carbon revenues to lower the cost of products, leveraging impact to drive affordability and scale. BURN has been able to lower the cost of its Kuniokoa woodstove by 30-80%. Giving Green highlighted the additionality of BURN's carbon offsets: "Carbon credit revenue allows Jikokoa and Kuniokoa stoves to be sold at a subsidized, more affordable price; we believe these projects would likely not exist without (carbon finance)."¹⁸

This is not to say that the voluntary carbon markets are perfect. It still costs too much, and takes too long, to get projects listed today. This creates a barrier to entry for smaller firms. We also need to be cautious in how we rely on carbon. Sustainable growth in this sector is only going to come from cookstoves that are responsibly distributed to customers who will use them consistently.

The good news is that modern energy cookstoves can supercharge carbon finance through metering and reliability. Electric and gas stoves enable more accurate tracking of use through metering or fuel sales.¹⁹ Buyers of carbon credit from modern energy cooking companies will be able to monitor impact in near-real-time, giving them greater security that their investments are making critical climate solutions more affordable.

In short, carbon finance helps make companies profitable and products affordable. There has been a 21-fold increase in carbon revenue for the cooking sector.²⁰ But we will need far more to create universal access to clean cooking.

How can companies that encourage charcoal and gas burning address climate change?

Reasonable people may wonder this question. Most experts agree that cleaner stoves are an important step towards fully clean stoves. Efficient biomass stoves are better than 3-stone fires, and LPG is better still.

LPG is an important transition fuel towards e-cooking; the International Energy Agency (IEA) estimates that if universal access to clean cooking is to be reached by 2030, 40% of the 2.6 billion people currently without access would need to be reached with LPG.^a And LPG stoves still represent a decrease in carbon emissions, compared to biomass. In fact, Circle Gas just became the first LPG-based company to be certified on the Gold Standard platform.

^a IEA (2022) *World Energy Outlook*

5. Growing a clean cooking company is a tremendous challenge. Without character and committed teams, it is impossible.

Clean cooking has been an amazing success, but our portfolio companies went through lean times, and several came close to folding before reaching scale. All of our companies have gone through tight cash cycles, and had to postpone executive pay at points.

Greenway

In 2018, Greenway Grameen had burned through most of their cash trying to build the brand, without significant returns. Revenue from their smaller, affordable stove was shrinking, and the margins on it were tiny. Focusing on a larger product would yield increased sales and profits, particularly if they switched to a BTL marketing model and trimmed costs. But Greenway had to keep the lights on, the factory running, and their people employed during a difficult transition. One founder mortgaged their house to keep the company liquid, and executives went without pay for months.

“One thing I’m proud of is that over the last four to five years, we’ve not passed any financial stress down to our people. Senior people get paid last, and we’ve always kept a buffer of three to four months payroll for people in the first tranches.

Sometimes executives went three, four, even six months without pay. That does give stability in choppy water, and that can lead to loyalty.”

– Ankit Mathur, Co-Founder and CTO of Greenway

It was worth it. 2019 marked a turnaround for the company: revenue jumped 92% from 2018, while costs only increased by 42%. Part of it was their product mix: Greenway’s largest stove made up 91% of stoves sold in 2019, up from 37% in 2018. But the company also slashed its marketing budget by half, and cut other costs significantly.

BURN Manufacturing

Problems don’t end once companies become profitable. For Peter Scott, the founder and CEO of BURN Manufacturing, saving lives and preserving forests has been at the core of his work since the early 1990s. After starting BURN in 2010, and scaling it to profitability by 2017, BURN was poised for a big year in 2020, before COVID struck. Rather than furlough staff, the company committed to its people and maintained payroll. “We just agreed to eat rice and beans until COVID was over,” Scott told Business Focus.²¹

The company was rewarded for that commitment. 2020 proved to be a landmark year for the company, regardless of COVID. In December, BURN passed the landmark of one million stoves sold. And, buoyed by financing from the Energy Access Relief Fund (among others), the company not only maintained employment, it actually grew its headcount to over 1,700 people, over half of them women. Scott reflected that “we actually grew during COVID, but our commitment to our people separates us from the industry.”

The Role of Patient Capital



Optimized for Impact

The bulk of Acumen's capital was invested in 2015-16. Cookstoves are a classic example of the Unattainable Triangle; the axiom that it is impossible to deliver quality, affordability, and speed in one product. Cookstoves need to be high-quality and affordable; delivering that combination took years, and required Patient Capital.

Eight years into our major investments, we are still one of the largest equity holders in both BURN and Greenway. Cookstove companies have not historically fit the venture capital model; they are operationally heavy, they work in difficult markets, customers have limited ability to pay, and, as a consequence, growth is slower (early growth rates of 20% were the norm for our portfolio, followed by higher growth once they perfected their models). Traditional commercial capital has not reached these companies (yet), but carbon finance has changed the landscape; there are now paths to scale and sustainability that were only hypothetical a decade ago.

We are grateful to have profitably exited investments in Greenway and KopaGas, and to remain active investors in two other highly successful ventures (BURN and BioLite). One of our exits came from a strategic acquisition (Circle Gas buying KopaGas),

while the other came because Greenway had reached a place of sustainable profitability, and was willing to buy back our equity at an agreed-upon multiple over several years.

As this report has shown, there are successful, impactful businesses in the cookstove sector. Acumen and other early-stage investors understood the risk that they were taking, and tried to share that risk with them, while supporting them in their growth.

Going Forward

In the coming years, we see a split in the capital needs of the clean cooking sector. On the one hand, there are now a group of fast-growing companies with proven models, sophisticated technology that is increasingly affordable, and established access to the carbon markets. These companies no longer need patient equity; they are growing and creating deep impact, just not at a scale commensurate with the size of the problem. It is time for commercial investors and development finance institutions to revisit these companies, and this sector. There is an untapped opportunity to integrate electric cookstove funding into sector and national energy strategies, boosting the effectiveness



of last-mile electrification. And the growing prevalence of Internet of Things (IoT)-enabled cookstoves will allow us to verify and reward impact at a scale that was previously impossible. The work has been done to build this market, now it's all about volume.

At the same time, the sector will continue to rely on local, last-mile distributors to market and service products in more rural, low-income areas. These companies play a critical role, operating established business models in difficult markets. But they also face steep challenges in attracting equity. Their growth has historically been funded with a mix of grants, bootstrapping, and some debt. They still require equity-like investment that will allow them to experiment and grow before forcing them to provide returns.

Going forward, one of the key challenges for investors will be how to fund this type of mid-size, medium-growth type of company ('zebras', as the Miller Center has dubbed them), who face critical shortages of capital, but may not be able to promise sufficient returns for early-stage equity.²² Alternative instruments such as mezzanine finance could provide flexible, long-term capital that is repaid through a percentage of revenue. Or companies may find ways to tap into a greater share of the carbon finance that they play a critical part in enabling. Vehicles like the Spark+ fund are providing the flexible, equity-like capital that can help the next generation of cookstove companies grow, and we desperately need more of them to scale solutions like e-cooking.

Conclusion



Impact for Everyone

Investing, more often than not, is about making five bets and hoping one winner pays for the rest. Yet in the cookstove sector our returns have been far more consistent: an 80% success rate across our investments. This may speak to luck, and absolutely speaks to character. But what it emphasizes for us is the scale of the unmet demand. There is a huge opportunity for development finance institutions to invest in scaling up clean cooking, and a correspondingly large cost to letting the status quo persist.

It has been a privilege for Acumen to work with, and invest in, incredible companies in the clean cooking sector. The impact and returns have been everything we hoped they would be at the outset; a credit to the entrepreneurs and teams who threaded the needle between what people wanted and what they could pay. We believe that this is a sector where the viability is proven, and the impact is undeniable. It is time to bring that impact to everyone.



Endnotes

- 1 IEA (2022) [Energy Statistics Data Browser](#).
- 2 Tracking SDG 7 (2022) [2022 Tracking SDG 7 Report](#).
- 3 WHO (2022) [Household Air Pollution](#).
- 4 IEA (2022) [Africa Energy Outlook](#).
- 5 Hosonuma et al (2012) [An assessment of deforestation and forest degradation drivers in developing countries](#).
- 6 Note: These figures refer to Acumen's 'Patient Capital' investments, which are backed by philanthropy. We also created KawiSafi Ventures, a for-profit fund that has made cookstove investments in BioLite and Sistema.bio. Those are not reflected here.
- 7 World Bank, AFREA, and ESMAP (2014) [Clean and Improved Cooking in Sub-Saharan Africa](#).
- 8 Clean Cooking Alliance (2022) [Clean Cooking Industry Snapshot](#).
- 9 World Bank, ESMAP, & CIF (n.d.) [Multi-Tier Framework](#).
- 10 Clean Cooking Alliance (2022) [Clean Cooking Industry Snapshot](#).
- 11 Berkouwer & Dean (2022) [Credit, Attention, and Externalities in the Adoption of Energy Efficient Technologies by Low-Income Households](#).
- 12 BioLite, BURN Manufacturing, Easy Solar, PowerGen, RVE.Sol
- 13 ESMAP, MECS, & World Bank (2020) [Cooking with Electricity: a Cost Perspective](#).
- 14 Taneja, Jay (2018) [If You Build It, Will They Consume? Key Challenges for Universal, Reliable, and Low-Cost Electricity Delivery in Kenya](#).
- 15 CrossBoundary (2022) [Appliance Financing 3.0 Insights](#).
- 16 CGAP (2020) [Electric Bankers: Utility-enabled Finance in Sub-Saharan Africa](#).
- 17 Berkouwer & Dean (2022) [Credit, Attention, and Externalities in the Adoption of Energy Efficient Technologies by Low-Income Households](#).
- 18 Giving Green (2022) [BURN](#).
- 19 MECS (2023 forthcoming) Role of Carbon Finance.
- 20 Clean Cooking Alliance (2022) [Clean Cooking Industry Snapshot](#).
- 21 Business Focus (2022) [BURN Manufacturing — Something Cooking](#).
- 22 Miller Center for Social Entrepreneurship (2022) [Trudging with Zebras Through the Valley of Death](#).

